GV355CEU @Track Air Interface Protocol

GSM/GPRS/LTE CAT1/GNSS Tracker

GV355CEUTRAC0001

Version: 9.05



Driving Smarter IoT

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1 Revision History

Version	Date	Author	Description of Change
1.00	2022-07-06	Aleo Liu	1. Initial.
2.00	2022-11-24	Claire Liu	1. Update the protocol version. 2. Modified the parameter <Additional Event> in **AT+GTCAN** to <Additional Event Mask> to support other CAN event messages. 3. Added parameters <Scan Interval> and <Scan Window> to the command **AT+GTBTS**.
2.01	2022-12-02	Aleo Liu	1. Added parameter <Segment Mask> to the command **AT+GTTTR**.
3.00	2023-01-10	Claire Liu	1. Updated the protocol version. 2. Modified the parameter <iButton Timer> in **AT+GTACD** to <ID Read Timer>. 3. Added mode 2 to the parameter <Report Mode> in the command **AT+GTTTR** for diagnostic downloads. 4. Added type 14 to the parameter <Accessory Type> in command **AT+GTBAS**. 5. Added type 13 to parameter <Accessory Type> in the command **AT+GTBAS**. 6. Added model 4 to parameter <Beacon ID Model> in the command **AT+GTBID**. 7. Added type 3A to parameter <Sub Command> in the command **AT+GTRTO**.
3.01	2023-03-03	Claire Liu	1. Updated the protocol version. 2. Added <Extended Debug Information>, <Standard Debug Information>, <Hardware Information> to parameter <CAN Information Mask> in the command **AT+GTRTO**.
3.02	2023-03-20	Elvin Shen	1. Added Bit 3 and Bit4 to the parameter <Additional Event Mask> in the command **AT+GTCAN**.

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Version	Date	Author	Description of Change
3.03	2023-03-30	Claire Liu	1. Updated the protocol version. 2. Added mode 2 to the parameter <ODO Enable> in the command **AT+GTCFG**. 3. Added AT+GTMSI command. 4. Added AT+GTMSF command. 5. Added parameters <Tacho Report Mask> and <Tacho Report Interval> to the command **AT+GTCAN**. 6. Added **+RESP:GTACN** message. 7. Added <Tachograph Information Expand> to parameter <CAN Report Expansion Mask> in the command AT+GTCAN. 8. Added the **+RESP:GTEUC** message in HEX format. 9. Modified the default value of parameter <Bluetooth Name> in command **AT+GTBTS**.
4.00	2023-05-30	Archie Li	1. Added model 5 to parameter <Accessory Model> in the command **AT+GTBAS**.
4.01	2023-05-31	Allen Zhang	1. Added parameter <Reboot Device Type> to the command **AT+GTDOG**. 2. Added type 6 to <Power On Reason> in the message **+RESP: GTPNR**.
4.02	2023-05-31	Elvin Shen	1. Added the parameter <Electric Report Mask> to the command **AT+GTCAN** to support reading some parameters of the electric vehicles. 2. Added the parameter <Gaseous Fuel Level> to the <CAN Report Expansion Mask> in the command **AT+GTCAN**. 3. Added type 10 to parameter <Command Type> in the command AT+GTTTR to support checking the current TachoReader connection environment and the device whether ready to download DDD.
5.00	2023-07-14	Elvin Shen	1. Added Bit13 and Bit14 to <Expansion Information> in the **+RESP:GTCAN** message.
	2023-07-14	Ying Xiong	2. Added type 32 to parameter <Working Mode> in the command **AT+GTURT**. 3. Added Bit16 to the parameter <ERI Mask> in the command **AT+GTFRI**. 4. Added type 8 to the parameter <UART Device Type> in the message **+RSEP:GTERI**.

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Version	Date	Author	Description of Change
5.01	2023-07-14	Harper Kuang	1. Added the command **AT+GTMQT**. 2. Added the command **AT+GTTLS** to support TLS encryption. 3. Added the command **AT+GTRTP** to support downloading CA certificate file from the backend server. 4. Added the command **AT+GTLTP** to support writing the CA certificate file to the device by subcontracting 5. Added the parameter <CAN Report Expansion Mask1> to the command **AT+GTCAN**. 6. Added the parameter <Retarder Usage> to the <CAN Report Expansion Mask1> in the command **AT+GTCAN**. 7. Added the parameter <Power Mode> to the <CAN Report Expansion Mask1> in the command **AT+GTCAN**.
5.02	2023-07-27	Elvin Shen	1. Added Bit6 and Bit7 to the parameter <Filter Mask> in the **AT+GTMSF** command.
6.00	2023-08-16	Elvin Shen	1. Added 'OUT' information to <Tachographer Information Expand> parameter in the +RESP:GTCAN message.
6.01	2023-08-29	Aleo Liu	1. Deleted the mode 1 of the parameter <Virtual Ignition Mode> in the command **AT+GTVMS**. 2. Added Bit 36/37/51/52 to the parameter <Input ID Mask> in the command **AT+GTUDF**. 3. Added mode 12/14 to the parameter <GNSS Working Mode> in the command **AT+GTCFG**. 4. Added type 11 to the parameter <Command Type> in the **AT+GTTTR** command.
6.02	2023-09-08	Haze Zhang	1. Added Bit 47/48 to the parameter <Input ID Mask> in the command **AT+GTUDF**. 2. Added <Battery Instantaneous Voltage>,< Battery Charging Cycles Count>, <Total Energy Recuperated>,<Battery Temperature>, <Battery Charging Current>, <Battery Instantaneous Power>, <Battery State of Health (SoH)>,<Total Energy Used>, <Total Energy Used When Idling> , <Total Energy Charged > parameters to <Electric Report Mask> in the AT+GTCAN command.

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Version	Date	Author	Description of Change
6.03	2023-09-18	Elvin Shen	1. Added parameters <Tachograph Driver1 Working Time Mask> and <Tachograph Driver2 Working Time Mask> to the command AT+GTCAN. 2. Added <Tacho Timestamp> to <CAN Report Expansion Mask1> in the **AT+GTCAN** command.
6.04	2023-10-11	Elvin Shen	1. Added "ferry/train crossing condition" information to <Tachographer Information Expand> in the **+RESP:GTCAN** message. 2. Added Bit6 to <Additional Event Mask> in the **AT+GTCAN** command.
6.05	2023-11-10	Aleo Liu	1. Added the parameter <Format Version> to the command **AT+GTRTO**.
7.00	2023-11-10 2023-11-13 2023-11-15	Elvin Shen Harper Kuang	1. Added Bit5 to <Additional Event Mask> in the **AT+GTCAN** command. 2. Added Bit 3 to the parameter <Satellite Information Mask> in the command **AT+GTRTO**. 3. Added the **+RESP:GTASV** message. 4. Deleted the parameters <Brake Speed Threshold>, <Delta Speed Threshold> and <Delta Heading Threshold> from the command **AT+GTASC**. 5. Added the parameter <Report Mode> to the command **AT+GTASC**.
7.01	2023-11-31	Bear Cao	1. Added type 9 to <Digital Fuel Sensor Type> in the **AT+GTURT** command.
7.02	2023-12-08	Bennett Cui Haze Zhang	1. Added the parameter <Validity Time> to Ignition Detection in the **AT+GTDIS** command. 2. Added <Format> to Mode 7 and 8 of <Working Mode> in the command **AT+GTURT**.
7.03	2023-12-26	Aleo Liu	1. Modified the command **AT+GTRCS** to set RS485 communication configuration. 2. Added the command **AT+GTRAS** to configure RS485 accessory settings. 3. Added **+RESP:GTRAS** message to report information about the RS485 Modbus device. 4. Added the parameter <Fast STP Mode> to the command **AT+GTSSR**.
7.04	2024-01-23	Ying Xiong	1. Added parameter <ID Filter Mode> to the command **AT+GTIDA**. 2. Modified the range of parameter <ID Validity Time> in the command **AT+GTIDA**.

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Version	Date	Author	Description of Change
8.00	2024-03-01	Bennett Cui	1. Added the parameter <1-wire Data Mask> to the command **AT+GTACD**. 2. Added the **AT+GTHUM** command and the **+RESP:GTHUM** message. 3. Added type 4 to <1-wire Device Type> in **+RESP:GTERI** message. 4. Modified the description of <1-wire Device Data> in the **+RESP:GTERI** message.
		Ying Xiong	5. Added mode 33 to the command **AT+GTURT**. 6. Added the command **AT+GTMCT** to configure multiple commands transferred through secondary serial port.
8.01	2024-03-06	Elvin Shen Archie Li Todd Zheng	1. Added mode 12 to the command **AT+GTTTR**. 2. Added type 14/1 to <Accessory Type/Accessory Model> for ZWP-Q80 Bluetooth Accessory in the command **AT+GTBAS**. 3. Added command **AT+GTIDS**, and added option 2 to parameter <ID List Type> in **AT+GTIDA**.
8.02	2024-04-08	Elvin Shen	1. Added <CAN1-bus Status> to <Message Type> in the **+RESP:GTTTR** message.
8.03	2024-04-16	Aleo Liu	1. Added the parameter <Protocol Type> to the command **AT+GTRAS**.
8.04	2024-04-24	Elvin Shen	1. Added type 13 to <Command Type> in the **AT+GTTTR** command to support querying driver2 name/id/time related status. 2. Added type 10 to <Message Type> in the **+RESP:GTTTR** message.
8.05	2024-04-29	Allen Zhang	1. Added the parameters <Primary DNS Server> and <Secondary DNS Server> to the commands **AT+GTSRI** and **AT+GTQSS**.
8.06	2024-05-06	Walker Wang	1. Added mode 4 to the parameter <Mode> in the command **AT+GTIDA**.
8.07	2024-05-13	Elvin Shen	1. Added Bit16 (<Charge State Optimization>) to <Electric Report Mask> in the **AT+GTCAN** command.
8.08	2024-05-28	Ying Xiong	1. Added the command **AT+GTTPM** to support RS232 TPMS accessory. 2. Added type 3C to parameter <Sub Command> in the command **AT+GTRTO**. 3. Added mode 41 to parameter <Mode> in the command **AT+GTURT**.

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Version	Date	Author	Description of Change
9.00	2024-07-23	Elvin Shen	1. Added Bit4 - Bit12 to parameter <CAN Report Expansion Mask1> in the **AT+GTCAN** command.
9.01	2024-08-20	Elvin Shen	1. Added Bit8 - Bit10 to <CAN Information Mask> in the **AT+GTRTO** command.
9.02	2024-08-23	Elvin Shen	1. Added the parameter <Tacho Driver Work Time Mode> to the **AT+GTCAN** command. 2. Added bit 11 to parameter <CAN Information Mask> in the **AT+GTRTO** command to support querying tachograph drivers' working time mode.
9.03	2024-08-27	Aleo Liu	1. Added type 9 to parameter <Sensor Type> in the command **AT+GTFSC**.
9.04	2024-09-06	Elvin Shen	1. Added **AT+GTCAS** command to support to configure CAN module.
9.05	2024-09-24	Bennett Cui	1. Deleted the parameter <Read Interval> from the command **AT+GTBAS**.

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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

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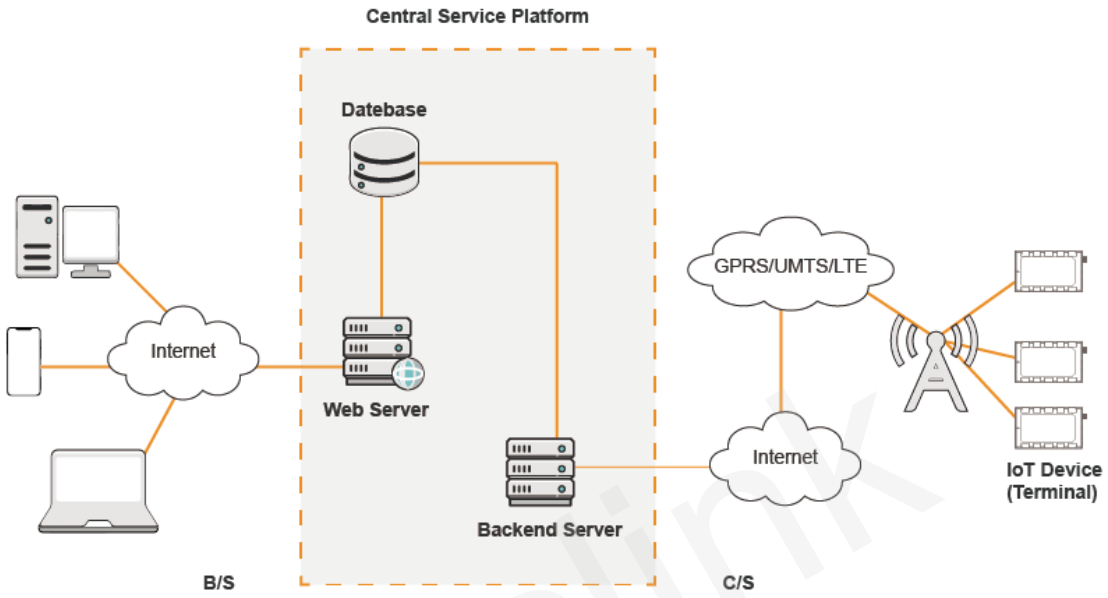
2.3 System Architecture



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:

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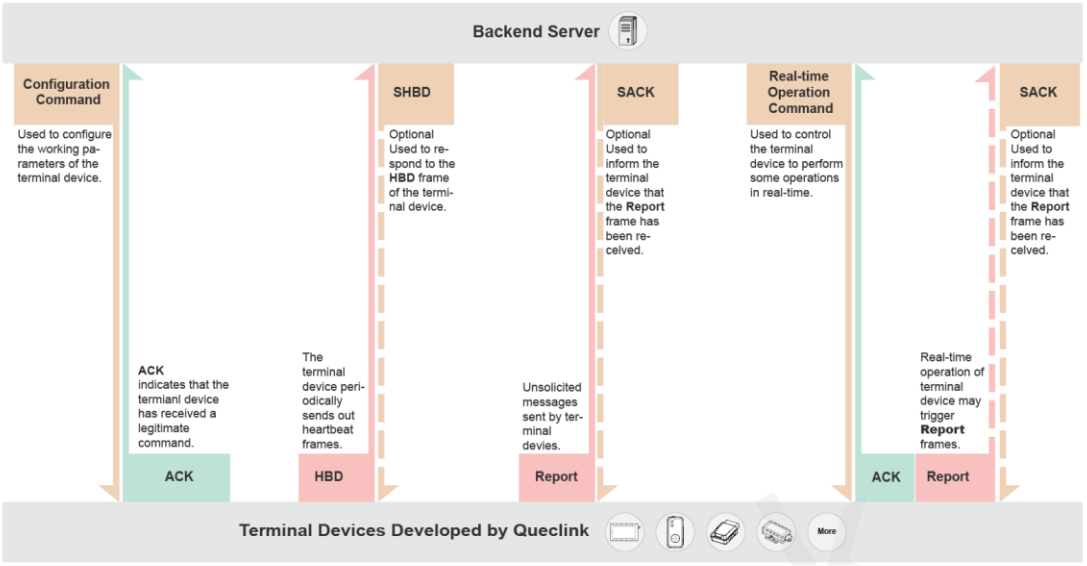

Frame Types and Encoding

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.

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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=gv355ceu,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'	gv355ceu
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 "gv355ceu".

✧ *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
  - **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=gv355ceu,3,,1,some.host.name,7011,116.226.45.229,7012,+8613812341234,15,1,,,,,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'	gv355ceu
Body	Report Mode	1	0-7 | 9	0
	Reserved	0		
	Buffer Mode	1	0-2	1

Parts	Fields	Length	Range/Format	Default
	Main Domain	<=60	ASCII (not including '=' and ',')	
	Main Port	<=5	0 - 65535	
	Backup Domain	<=60	ASCII (not including '=' and ',')	
	Backup Port	<=5	0 - 65535	
	SMS Gateway	<=20		
	Heartbeat Interval	<=3	0 | 2 - 360(min)	0
	SACK Mode	1	0-2	0
	Protocol Format	1	0 | 1	0
	SMS ACK Mode	1	0 | 1	0
	Reserved	0		
	Reserved	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	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".

✧ *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.

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- **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) , **PHL** (ASCII)/(HEX), **ALM** (ASCII) , and (+DAT) are sent via TCP short connection when the report mode is forced SMS mode.
- **6** - UDP with fixed local port mode.
  Like the UDP mode, the terminal will send data using UDP protocol. The difference is the terminal will use a fixed local port rather than a random port to communicate with the server in this mode. Thus the backend server could use the identical port to communicate with all terminals if the backend server and the terminals are all in the same VPN network. The port number the device uses is the same as the port number of the main server.
- **7** - Backup server supported TCP long-connection mode.
  The connection is based on TCP protocol. The terminal connects to the backend server and maintains the connection using the heartbeat data. The backend server should respond to the heartbeat data from the terminals. If the connection to the main server is lost, the terminal will try to connect to the backup server. If the connection to the backup server is also lost, the terminal will try to connect to the main server again.
- **9** - MQTT mode.
  MQTT is a Client-Server based on message Publish/Subscribe transport protocol. The protocol is built on the TCP protocol. This mode has a default username(**admin**) and password(**password**) as well as a subscription topic(**quec_msg**) and a publication topic(**quec_ctrl**).

✧ *Buffer Mode*

The working mode of the buffer report function.

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

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

- **0** - Disable.
- **1** - Low priority. In this mode, the device will send the buffered messages after real-time messages.
- **2** - High priority. In this mode, the device will send all the buffered messages before real-time messages, except the messages **+RESP: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.

✧ *Primary DNS Server*

The address of primary DNS server.

✧ *Secondary DNS Server*

The address of secondary DNS server.

Note

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

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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=gv355ceu,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'	gv355ceu
Body	APN	<=64		
	APN User Name	<=30		
	APN Password	<=30		
	Report Mode	1	0-7 | 9	0
	Reserved	0		
	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
	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	$	$

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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=gv355ceu,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'	gv355ceu
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		
	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 "gv355ceu".
- *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 OWL (Operator List Configuration)

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

Example:
AT+GTOWL=gv355ceu,1,1,1,46000,60,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	OWL	OWL
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Mode	1	0-2	0
	Start Index	<=3	1 - 100	
	End Index	<=3	1 - 100	
	Operator List	<=6*100		
	TCP Connection Timeout	2	30 - 90(min)	60
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".

✧ *Mode*

The working mode of this function.

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

✧ *Start Index*

A numeral to indicate the first index of the list operator numbers to be input. For example, if it is 1, the device will update the list operators from the first one. If it is empty, there should be no list number.

✧ *End Index*

A numeral to indicate the last index of the list operator numbers to be input. For example, if it is 2, the device will update the list operators until the second one. If it is empty, there should be no list number.

✧ *Operator List*

A list of PLMN codes for network operators. The PLMN code comprises of mobile country code **MCC** and mobile network code **MNC**, each of which consists of 3 digits. The last digit of MNC can be omitted, for example, **46001F** or **46001** represents the PLMN of **CHINA UNICOM**.

The operators in this list will be considered as in **Home** state. And two adjacent operator codes are separated with ','. The number of the operators in the list is determined by the parameters <Operator Start> and <Operator End>. For example, if <Operator Start> is 1 and <Operator End> is 2, the operator list should include 2 operator codes (empty value acceptable) and the two numbers are separated by with ','.

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

✧ *TCP Connection Timeout*

The timeout period for the terminal to establish connection to the TCP server.

Note

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

3.1.6 FTP (FTP Server Information)

The command **AT+GTFTP** is used to configure the FTP server information as to where and how to upload data packets. If the device is configured correctly and <Server Type> of (AT+GTCMS) is set to 1, it will be able to transfer data packets to FTP server.

Example: AT+GTFTP=gv355ceu,116.228.146.250,21,SW_RD/Projects/,queclink,queclink,0,1,1,IMEI,,,000B$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	FTP	FTP
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Server Address	<=60		
	Server Port	<=5	0 - 65535	0
	Full Name	<=60		
	User Name	<=20		
	Login Password	<=20		
	Transfer Mode	1	0 | 1	0
	Operate Type	1	0 | 1	0
	Report FTP	1	0 | 1	0
	File Name Prefix	<=20	'0'-'9' 'a'-'z' 'A'-'Z'	
	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 "gv355ceu".
- *Server Address*

  The IP address or the domain name of the FTP server.
- *Server Port*

  The server port of the FTP server.
- *Full Name*

  The file path to save pictures. To restore the default path after a path is set, set it to "\".
- *User Name*

  The user name to login to the FTP server.
- *Login Password*

  The password to login to the FTP server.
- *Transfer Mode*

  The mode of transferring file.
  - **0** - Passive mode.
  - **1** - Active mode.
- *Operate Type*

  The mode of transferring picture after transfer fails.
  - **0** - Resume transferring the failed file.
  - **1** - Restart transferring the failed file from the beginning.
- *Report FTP*

  Whether to report **FTP**(ASCII)/(HEX) to the backend server after transferring a file.

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

✧ *File Name Prefix*

The file name prefix of transformed file. It should not include ".".

3.1.7 MSI (Multi Server Information)

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

Example:
AT+GTMSI=gv355ceu,,2,0,60.174.225.173,20581,0,0,,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	MSI	MSI
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Reserved	0		
	Server ID	1	2	2
	Report Mode	1	0 | 3	0
	Domain	<=60	ASCII (not including '=' and ',')	
	Port	<=5	0 - 65535	
	Heartbeat Interval	<=3	0 | 2 - 360(min)	0
	SACK Mode	1	0-2	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 "gv355ceu".

- *Server ID*
  The index of the Multi Server.
- *Report Mode*
  This parameter defines the communication method between the backend server and the terminal. Supported report modes are as follows:
  - **0** - Stop mode.
  - **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.
- *Domain*
  The IP address or the domain name of the primary server.
- *Port*
  The port number of the primary server.
- *Heartbeat Interval*
  The interval for sending heartbeat package message (**+ACK:GTHBD**) when report mode is TCP long-connection mode or UDP mode. If it is set to 0, no heartbeat package 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 after receiving the message from the terminal.
  - **1** - The backend server replies with the SACK message when receiving the message from the terminal.
  - **2** - The backend server replies with the SACK message when receiving the 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>.

3.1.8 MSF (Multi Server Filter)

The command **AT+GTMSF** is used to configure filtering rules for multiple server report and to allow certain messages to be reported to a certain server. When the terminal is configured correctly, it should be able to report data to the backend server according to the filtering rules.

Example: AT+GTMSF=gv355ceu,,2,0,3F,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	MSF	MSF
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Reserved	0		
	Server ID	1	0 | 2	
	Filter Mode	1	0-2	0
	Filter Mask	<=8	0 - FFFFFFFF	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 "gv355ceu".

✧ *Server ID*

The ID of the server.

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

✧ *Filter Mode*

It indicates the filtering method to be used.

- **0** - No filtering. All messages will be reported.
- **1** - Select report. Messages selected by <Filter Mask> will be reported, but all other messages in the protocol will not be reported.
- **2** - Filter report. Messages selected by <Filter Mask> will not be reported, but all other messages in the protocol will be reported.

✧ *Filter Mask*

Bitmask to configure which reports should be reported or filtered.

- **Bit 0** for **TTR** (ASCII)/(HEX)
- **Bit 1** for **TRL** (ASCII)/(HEX)
- **Bit 2** for **TRD** (ASCII)/(HEX)
- **Bit 3** for **FTP** (ASCII)/(HEX)
- **Bit 4** for **ACN** (ASCII)/(HEX)
- **Bit 5** for **+ACK:GTHBD** (ASCII)/(HEX)
- **Bit 6** for **+ACK:GTCAN** (ASCII)/(HEX)
- **Bit 7** for **+ACK:GTTTR** (ASCII)/(HEX)
- **Bit 8 - Bit 30** Reserved

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- **Bit 31** is reserved for expansion

3.1.9 TLS (TLS Data Encryption)

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

Example:
AT+GTTLS=gv355ceu,0,1,1,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	TLS	TLS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
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 "gv355ceu".

✧ *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.

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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=gv355ceu,,,,,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'	gv355ceu
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		

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

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".

✧ *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=gv355ceu,gv355ceu,GV355CEU,0,0.0,,,003F,1,00,7DEF,0,0,0,300,00,1,0,0,001F,0,4,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	CFG	CFG
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	New Password	4 - 20	'0'-'9' 'a'-'z' 'A'-'Z'	
	Device Name	<=20	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'	GV355CEU
	ODO Mode	1	0-2	0
	ODO Initial Mileage	<=9	0.0 - 4294967.0(km)	0.0
	Reserved	0		
	Reserved	0		
	Report Item Mask	<=4	0000 - FFFF	003F
	Power Saving Mode	1	0-2	1
	Position Append Mask	2	00 - FF	00
	Event Mask	<=8	00000000 - FFFFFFFF	7DEF
	Pin Mask	1	0 - F	0
	LED Mode	1	0-2	0
	Device Information Report	1	0 | 1	0

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Parts	Fields	Length	Range/Format	Default
	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	0 | 1 | 4 | 12	4
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 "gv355ceu".

✧ *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.
- **2** - Enable the odograph function to calculate the total mileage by CAN Module and GNSS. If the value of CAN Module is invalid, the device will 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.
- **Bit 2** - Reserved.

Note

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

✧ *Event Mask*

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

- **Bit 0** - for **PNA** (ASCII)/(HEX)
- **Bit 1** - for **PFA** (ASCII)/(HEX)
- **Bit 2** - for **MPN** (ASCII)/(HEX)
- **Bit 3** - for **MPF** (ASCII)/(HEX)
- **Bit 5** - for **BPL** (ASCII)/(HEX)
- **Bit 6** - for **BTC** (ASCII)/(HEX)
- **Bit 7** - for **STC** (ASCII)/(HEX)
- **Bit 8** - for **STT** (ASCII)/(HEX)
- **Bit 10** - for **PDP** (ASCII)/(HEX)
- **Bit 11** - for the power on **RTL** (ASCII)/(HEX)
- **Bit 12** - for the ignition report **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)

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- **Bit 14** - for **EXP** (ASCII)/(HEX)
- **Bit 15** - for **PNR** (ASCII)/(HEX)
- **Bit 16** - for **PFR** (ASCII)/(HEX)

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

Note

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

✧ *Pin Mask*

It configures the working mode of PIN on the connector.

- **Bit 3** - for PIN17. Set it to 0 as digital input 4, set it to 1 as output3.

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, analog input voltage, status of all digital inputs and outputs, 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.

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– **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.

- **0** - GPS and GLONASS positioning systems. In this mode, the device fixes positions with GPS and GLONASS systems.
- **1** - GPS positioning system. In this mode, the device fixes positions only with GPS system.
- **4** - GPS and Beidou positioning systems. In this mode, the device fixes positions with GPS and Beidou systems.
- **12** - GPS, Galileo and Beidou positioning systems. In this mode, the device fixes positions with GPS, Galileo and Beidou systems.

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=gv355ceu,1,60,30,0200,,1,0,,60,60,60,,,0,0013$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	DOG	DOG
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
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 - 4	0
	Reserved	0		
	No Network Interval	<=4	0 | 5 - 1440(min)	60
	No Activation Interval	<=4	0 | 5 - 1440(min)	60
	Send Failure Timeout	<=4	0 | 5 - 1440(min)	60
	Reserved	0		

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

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gv355ceu".

✧ *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".

✧ *Reboot Device Type*

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

- **0** - Reboot device.

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

3.2.4 GAM (GNSS-Assisted Motion)

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

Example:
AT+GTGAM=gv355ceu,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'	gv355ceu
Body	Mode	1	0 | 1	1
	Speed Mode	1	0 | 1	1
	Motion Speed Threshold	<=2	5 - 50(km/h)	25
	Motion Cumulative Time	<=3	10 - 100(s)	10
	Motionless Cumulative Time	<=3	10 - 250(s)	60
	GNSS Fix Failure Timeout	<=4	5 - 1800(s)	60
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".

✧ *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.

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- **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. There may be a maximum error of 4 seconds.

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=gv355ceu,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'	gv355ceu
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		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	

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Parts	Fields	Length	Range/Format	Default
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".

✧ *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> , <+DAT 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=gv355ceu,,,07F,9FEDFFF,9FEDFFF,000FF7F,FF,7F,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'	gv355ceu
Body	Reserved	0		
	Reserved	0		
	+ACK Mask	<=4	0 - FFFF	07F
	+RSP Mask	<=16	0 - FFFFFFFFFFFFFFF	9FEDFFF
	+EVT Mask	<=16	0 - FFFFFFFFFFFFFFF	9FEDFFF

Parts	Fields	Length	Range/Format	Default
	+INF Mask	<=16	0 - FFFFFFFFFFFFFFFF	000FF7F
	+HBD Mask	<=2	0 - FF	FF
	+DAT Mask	<=8	0 - FFFFFFFF	7F
	+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 "gv355ceu".

✧ *+ACK Mask*

Component mask of the acknowledgement received.

Mask Bit	Item
Bit 7	<ACK Expand Mask>
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>

✧ *+ACK Expand Mask*

Bit 8 - Bit-15 of <+ACK Mask>, component mask of the expand ack information report. Each bit indicates which expand information is included.

Mask Bit	Item
Bit 7	Reserved
...	
Bit 0	<Additional Number>

✧ *+RSP Mask*

Component mask of the location report message.

Mask Bit	Item
Bit 31	Reserved
Bit 30	Reserved
Bit 29	Reserved
Bit 28	Reserved
Bit 27	<RFID Length>

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Mask Bit	Item
Bit 26	<EIO100 IO Status>
Bit 25	<CAN Data>
Bit 24	<RFID>
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	<Analog Input2 Voltage>
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>
Bit 5	<Count Number>
Bit 4	<Send Time>
Bit 3	<MCC / MNC / LAC / Cell ID / Reserved>
Bit 2	<Altitude>
Bit 1	<Azimuth>
Bit 0	<Speed>

✧ *+EVT Mask*

Component mask of the event report message.

Mask Bit	Item
Bit 31	Reserved
Bit 30	Reserved
Bit 29	Reserved
Bit 28	Reserved
Bit 27	<RFID Length>
Bit 26	<EIO100 IO Status>

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Mask Bit	Item
Bit 25	<CAN Data>
Bit 24	<RFID>
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	<Analog Input2 Voltage>
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>
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

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Mask Bit	Item
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	+RESP:GTCIF
Bit 12	+RESP:GTSCS
Bit 11	Reserved
Bit 10	Reserved
Bit 9	Reserved
Bit 8	+RESP:GTWRT
Bit 7	Reserved
Bit 6	+RESP:GTCML
Bit 5	Reserved
Bit 4	Reserved
Bit 3	Reserved
Bit 2	+RESP:GTCVN
Bit 1	+RESP:GTUVN
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

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Mask Bit	Item
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>

✧ *+DAT Mask*

Component mask of the data report message.

Mask Bit	Item
Bit 7 - 31	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>

✧ *+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>

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Mask Bit	Item
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), 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=gv355ceu,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

Parts	Fields	Length	Range/Format	Default
	Command Word	3	OWH	OWH
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
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 - 4 | 9 - C	0
	Output ID	1	0 - 3 | 9 - C	0
	Output Status	1	0 - 2	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 "gv355ceu".

✧ *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.

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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=gv355ceu,1,11,,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	PDS	PDS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Mode	1	0-2	0
	Mask	<=4	0 - FFFF	0

Parts	Fields	Length	Range/Format	Default
	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 "gv355ceu".

✧ *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
- **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.

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Example:
AT+GTPIN=gv355ceu,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'	gv355ceu
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 "gv355ceu".
- *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=gv355ceu,+,3,52,0,20090917203500,1,,,,FFFF$

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

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Parts	Fields	Length	Range/Format	Default
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Sign	1	+|-	+
	Hour Offset	<=2	0 - 12	00
	Minute Offset	<=2	0 - 59	00
	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 "gv355ceu".
- *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 SMS function.

Example:
AT+GTWLT=gv355ceu,0,1,2,13813888888,13913999999,,,,,0018$

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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'	gv355ceu
Body	Call Filter	1	0 - 7	0
	Start Index	<=2	1 - 10	
	End Index	<=2	1 - 10	
	Phone Number List	<=20*10		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".

✧ *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.

✧ *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.

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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=gv355ceu,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'	gv355ceu
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 "gv355ceu".
- *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>.

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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).

Example:
AT+GTVVS=gv355ceu,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'	gv355ceu
Body	Ignition On Voltage	<=5	250 - 28000(mV)	13500
	Voltage Offset	<=4	200 - 2000(mV)	600
	Ignition On Debounce	<=3	5 - 255(x2s)	10
	Smart Voltage Adjustment	1	0 | 1	1
	Ignition Off Debounce	<=3	5 - 255(x2s)	10
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

- *Password*
  The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".
- *Ignition On Voltage*
  The external power voltage in ignition on state. Different vehicles have different voltage in ignition on state. This parameter should be set very close to the original external power so that the device can detect ignition event more accurately.
- *Voltage Offset*
  The offset from <Ignition On Voltage> used to determine ignition on or ignition off state.
  If the voltage of the external power is higher than **<Ignition On Voltage> - <Voltage Offset>** and is maintained for <Ignition On Debounce> seconds, the device will consider it as virtual ignition on state.
  If the voltage of the external power is lower than **<Ignition On Voltage> - <Voltage Offset>** and is maintained for <Ignition Off Debounce> seconds, the device will consider it as virtual ignition off state.
- *Ignition On Debounce*
  The debounce time before updating virtual ignition on state according to the external power voltage. Unit: second.
- *Smart Voltage Adjustment*
  Enable/disable smart voltage adjustment algorithm.

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- **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=gv355ceu,7,03,03,1,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	VMS	VMS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Virtual Ignition Mode	1	0 | 2 | 4 | 7	0
	Virtual Ignition On Mask	2	00 - 03	3
	Virtual Ignition Off Mask	2	00 - 03	3
	Virtual Ignition On Logic	1	0 | 1	1
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".

✧ *Virtual Ignition Mode*

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

- **0** - Disable the virtual ignition detection function.
- **2** - Voltage virtual ignition detection mode.
  The ignition state is related to the voltage of the external power supply. Please use the command (AT+GTVVS) to configure the parameters.
- **4** - Accelerometer virtual ignition detection mode.
  Ignition state can be indicated by the motion state determined by <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.

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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.

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=gv355ceu,1,0,AT+GTRTO=gv355ceu,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'	gv355ceu
Body	Mode	1	0 | 1	0
	Command ID	<=2	0 - 31	

Parts	Fields	Length	Range/Format	Default
	Command String	<=200	AT command	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gv355ceu".

✧ *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=gv355ceu,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'	gv355ceu
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	0 - FFFFF	0
	Outzizo Mask	<=5	0 - FFFFF	0

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Parts	Fields	Length	Range/Format	Default
	Command ID Mask	<=8	0 - FFFFFFFF	0
	Command Ack Mode	1	0 | 1	0
	Inpeo Mask	<=5	0 - FFFFF	0
	Outpeo Mask	<=5	0 - 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 "gv355ceu".

✧ *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

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ID	Bit	Item
12	Bit 11	GNSS is off
13	Bit 12	The device is stationary
14	Bit 13	The device is moving
15	Bit 14	External charge inserted
16	Bit 15	No external charge
17	Bit 16	The device is charging
18	Bit 17	The device is not charging
19	Bit 18	Digital input 2 is activated
20	Bit 19	Digital input 2 is inactivated
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
31	Bit 30	Digital input 3 is activated
32	Bit 31	Digital input 3 is inactivated
33	Bit 32	Backup battery inserted
34	Bit 33	No backup battery
35	Bit 34	No change of SIM card
36	Bit 35	SIM card change
37	Bit 36	Network jamming is detected
38	Bit 37	Network jamming is not detected
46	Bit 45	Digital input 4 is activated
47	Bit 46	Digital input 4 is inactivated
48	Bit 47	Driver authorized
49	Bit 48	Driver unauthorized
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

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

✧ *Outzizo Mask*

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

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ID	Bit	Item
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
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=gv355ceu,1,,GV355CEU%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'	gv355ceu
Body	Mode	1	0 | 1	1
	Reserved	0		
	Bluetooth Name	<=18	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_' '%'	GV355CEU%IMEI
	Reserved	0		
	Discoverable Mode	1	0-3	3
	Discoverable Time	<=4	0 - 1440(min)	0
	Bluetooth Report Mask	4	0000 - FFFF	0D03
	Bluetooth Event Mask	4	0000 - FFFF	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 "gv355ceu".

✧ *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=gv355ceu,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'	gv355ceu
Body	Index	1	0 - 9	0
	Accessory Type	<=2	0-2 | 6-8 | 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
	Reserved	0		
	Low Voltage Threshold	<=4	0 - 5000(mV)	2400
	Reserved	0		
	Accessory Parameters (Optional)			
	Reserved	0		
	Output ID	1	0 - 3 | 9 - C	0
	Output Status	1	0 - 2	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	$	$

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✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".

✧ *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.
- **6** - Multi-functional beacon sensor.
- **7** - Technoton accessory.
- **8** - External Input Output Bluetooth 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):
  - **0** - WTS300 (Temperature sensor)
  - **1** - Temperature ELA
- The model of multi-functional beacon sensor (<Accessory Type> is 6):
  - **2** - WTH300 (Temperature and humidity sensor)
  - **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 External Input Output Bluetooth accessory (<Accessory Type> is 8):
  - **0** - WBC300 (External input output sensor)

  Note

  The current version supports only one WBC300 configuration.
- The model of Mechatronics accessory (<Accessory Type> is 10):

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  - **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)
  - **1** - ZWP-Q80 (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 default value, the device will search for the Bluetooth accessory by accessory name.

✧ *Accessory Append Mask*

If the device is connected with the Bluetooth accessory, and Bit 8 (for <Bluetooth Accessory Data>) of <ERI Mask> is set to 1, the device will report Bluetooth accessory data via **ERI** (ASCII)/(HEX) instead of **FRI** (ASCII)/(HEX).

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

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

Mask Bit	Item	Description
Bit 0	<Accessory Name>	Accessory name
Bit 1	<Accessory MAC>	Accessory MAC
Bit 2	<Accessory Status>	Accessory Bluetooth connection status
Bit 3	<Accessory Battery Level>	Accessory battery level
Bit 4	<Accessory Temperature>	Accessory temperature
Bit 5	<Accessory Humidity>	Accessory humidity
Bit 6	Reserved	Reserved
Bit 7	<Accessory Input Output Data>	Including <Accessory Output status>, <Accessory Digital Input status>, <Accessory Analog Input voltage>

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Mask Bit	Item	Description
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>

✧ *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

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Fields	Length	Range/Format	Default
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 **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.

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- **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 **8** (External Input Output Bluetooth Accessory), <Accessory Parameters (Optional)> will be unfolded as follows.

Note

The input/output configuration of the accessory can be found in the commands (AT+GTIEX), (AT+GTAEX) and (AT+GTOEX).

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.

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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

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Interval> times of tire pressure reading based on reading timer of the tire pressure sensor. If <Alarm Send Interval> is set to 0, the device will only report the tire pressure alarm once.

- *Available Validity Time*

  If the device does not detect the tire pressure sensor in the <Available Validity Time>, the <Accessory Status> in the message **+RESP:GTERI** report messages will be 0.

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

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

- *Relay Event Notification*

  It configures whether to enable relay event notification function.

  – **0** - Disable.

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

- *Password*

  It is the current password for the accessory device.

- *New Password*

  It is set to change the current password.

Note

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

If the Accessory Type is **14** (Smart Cap Bluetooth accessory), this parameter will work as follows. For ZWP-Q80, not reserved parameters. For other smart cap sensor, five reserved parameters are used 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

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>.

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– **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 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 and report the scanning results via **+RESP:GTBID/+RESP:GTBIE** messages. To use this function, the parameter <Mode> in the command (AT+GTBTS) must be 1.

Example:
AT+GTBID=gv355ceu,1,1,4,0002,2400,,1,1,,,0,30,60,60,,2,1,7,0,,,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'	gv355ceu
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
	Reserved	0		
	Start Index	<=3	1 - 300	

Parts	Fields	Length	Range/Format	Default
	End Index	<=3	1 - 300	
	MAC List	<=12*75		
	Accessory Parameters(Optional)	0		
	OUI	6	000000 - FFFFFF	
	Output ID	1	0 - 3 | 9 - C	0
	Output Status	1	0 - 2	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 "gv355ceu".

✧ *Index*

The index of the beacon Bluetooth accessory. A Beacon ID Model can only be bound to one index.

✧ *Mode*

The working mode of this function.

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

✧ *Beacon ID Model*

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

- **0** - WKF300
- **1** - iBeacon E6
- **2** - ID ELA
- **4** - WID310

✧ *Accessory Append Mask*

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

- **Bit 0** - Reserved
- **Bit 1** - <Accessory MAC>
- **Bit 2** - Reserved
- **Bit 3** - <Accessory Battery Level> , iBeacon E6 is not supported.
- **Bit 4** - Reserved
- **Bit 5** - Reserved
- **Bit 6** - <Accessory Signal Strength>
- **Bit 7** - <Beacon Type> and <Beacon Data>

✧ *Low Voltage Threshold*

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It specifies the lower voltage limit. When the voltage of the Bluetooth accessory falls below this value, the device will report the message **+RESP:GTBAA** to the backend server. 0 means "Disable low voltage detection".

✧ *Start Index, End Index*

The index range of the MAC list to which the MAC addresses are to be updated.

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

✧ *MAC List*

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

Note

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

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

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

✧ *Accessory Parameters(Optional)*

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

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

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

- *Push Button Event*

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

- *Keyfob Detection Mode*

  It specifies the mode of detecting Keyfob.

  – **0** - Disable Keyfob detection.

  – **1** - 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 **1** (iBeacon E6), the following parameters are used:

Fields	Length	Range/Format	Default
Reserved	0		
E6 Detection Mode	1	0 - 2	0
E6 Detection Interval	<=3	30 - 600(s)	30
Reserved	0		
Reserved	0		

- *E6 Detection Mode*

  It specifies the mode of detecting Beacon E6.

  – **0** - Disable detection.

  – **1** - Enable detection: Allow the device to scan only once.
  After entering ignition on and moving state, the device will scan E6 one time for the time period specified by <E6 Detect Interval> and then it will send the message **+RESP:GTBID** to report information of E6. If more than 15 iBeacon E6 are detected, the message **+RESP:GTBID** contains the information about the top 15 iBeacon E6.

  – **2** - Enable detection: Allow the device to scan continuously.
  After entering ignition on and moving state, the device will keep scanning E6 continuously. If the device detects E6 or change of available E6, it will send the message **+RESP:GTBID** to report information of E6. If more than 15 iBeacon E6 are detected, the message **+RESP:GTBID** contains the information of the top 15 iBeacon E6.

- *E6 Detection Interval*

  The device scans E6 for the period specified by this parameter.

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

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

- *Alarm Mode*

  It specifies the mode of alarm report.

  – **0** - Disable alarm.

  – **1** - Alarm when receiving Bluetooth broadcast.

  – **2** - Alarm when Bluetooth broadcast is not received.

  – **3** - Alarm when receiving Bluetooth broadcast or exiting Bluetooth broadcast.

- *IDELA Detection Mode*

  It specifies the mode of detecting ID ELA.

  – **0** - Disable detection.

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

  After entering ignition on and moving state, the device will scan IDELA one time for the time period specified by <IDELA Detect Interval> and then it will send the message **+RESP:GTBID** to report information of IDELA. If more than 15 IDELA are detected, the message **+RESP:GTBID** contains the information of the top 15 IDELA.

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

  After entering ignition on and moving state, the device will keep scanning IDELA continuously. If the device detects IDELA or change of available IDELA, it will send the message **+RESP:GTBID** to report information of IDELA. If more than 15 IDELA are detected, the message **+RESP:GTBID** contains the information of the top 15 IDELA.

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

  If the device detects IDELA or change of available IDELA, it will send the message **+RESP:GTBID** to report information of IDELA. If more than 15 IDELA are detected, the message **+RESP:GTBID** contains the information of the top 15 IDELA.

- *IDELA Detection Interval*

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

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

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

- *Detection Mode*

  The parameter which specifies the mode of detecting WID310.

  – **0** - Disable detection.

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

  After entering ignition on and moving state, the device will keep scanning WID310 continuously. If the device detects WID310 or change of available WID310, it will send the **+RESP:GTBID** messages to report information of WID310. If more than 15 WID310 are detected, the message **+RESP:GTBID** contains the information of the top 15 WID310.

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

  The **+RESP:GTBID** message is sent to the backend server periodically according to the parameter <IGN Scan & Report Interval>/< IGF Scan & Report Interval>. If more than 15 WID310 are detected, the message **+RESP:GTBID** contains the information of the top 15 WID310.

- *Detection Interval*

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The device scans WID310 for the time specified by this parameter when <Detection Mode> is 2.

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

✧ *OUI*

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

For example, "AC233F" represents the Bluetooth iBeacon E6. The "AC23" is NAP, the "3F" is UAP. If the device detects this OUI, the message **+RESP:GTBID** will be reported. If the value is empty, it means "Disable this function".

3.3.4 AEX (Analog Input Expansion)

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

Example:
AT+GTAEX=gv355ceu,0,0,1,5,0,8000,32000,,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	AEX	AEX
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Analog Input Expansion Type	1	0	0
	Bind BAS Index	1	0 - 9	0
	Analog Input Number	1	1	
	Analog Input ID	1	5	
	Mode	1	0-2	0
	Min Threshold	<=5	8000 - 32000 (mV)	8000
	Max Threshold	<=5	8000 - 32000 (mV)	32000
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		

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

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".

✧ *Analog Input Expansion Type*

It indicates which extended device the following parameters are used for.

- **0** - Bluetooth Analog Input accessory setting.

✧ *Bind BAS Index*

It is used to bind the specific configuration in (AT+GTBAS).

✧ *Analog Input Number*

The total number of configured Bluetooth Analog Input Setting. In one configuration, <Analog Input ID>, <Mode>, <Min Threshold> and <Max Threshold> are included and others are reserved.

✧ *Analog Input ID*

The ID of 5 is Bluetooth Analog Input ID, the parameters <Accessory Type> and <Accessory Model> should be set in (AT+GTBAS).

✧ *Mode*

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

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

✧ *Min Threshold*

This parameter specifies the lower voltage limit for the analog input port to trigger the alarm when the <Mode> is set to 1 or 2.

✧ *Max Threshold*

This parameter specifies the upper voltage limit for the analog input port to trigger the alarm when the <Mode> is set to 1 or 2.

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=gv355ceu,0,1,,1,0000,0000,0,30,1000,1000,,0,600,00000000,,,0,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	FRI	FRI
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
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
	Reserved	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 "gv355ceu".

✧ *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.

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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 0** - For the <Digital Fuel Sensor Data> field in **+RESP:GTERI**.
  - **Bit 1** - For the <1-Wire Data> field in **+RESP:GTERI**.
  - **Bit 2** - For the <CAN Data> field in **+RESP:GTERI**. This mask just works in ASCII-formatted **+RESP:GTERI** message.
  - **Bit 3** - For the <Percentage> field in **+RESP:GTERI**. If it is set to 1, the data block <Fuel Sensor Data> will be present.
  - **Bit 4** - For the <Volume> field in **+RESP:GTERI**. If it is set to 1, the data block <Fuel Sensor Data> will be present.
  - **Bit 5** - Reserved.
  - **Bit 7** - For the <RF433 Accessory Data> field in **+RESP:GTERI**.
  - **Bit 8** - For the <Bluetooth Accessory Data> field in **+RESP:GTERI**.
  - **Bit 9** - Reserved.
  - **Bit 10** - For the <Fuel Temperature> field in **+RESP:GTERI**. It is only valid for <Digital Fuel Sensor Type> 2 and 6. For other fuel sensors, it will be reserved in the ASCII message and forced to 0x7F in the HEX message.
  - **Bit 13** - For the <RS485 Device Data> field in **+RESP:GTERI**.

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- **Bit 16** - For the <Temperature Data> field in **+RESP:GTERI**. If it is set to 1, the field <Temperature Data> will be present.

Note

Bit 3 and Bit 4 are related to (AT+GTFSC). If none of the calibration table is set or <Num of Node> is 0, the percentage and volume of the fuel will be shown as reserved in the message **+RESP:GTERI**.
Bit 1 is related to command (AT+GTACD) . If **AT+GTACD** is supported, the 1-Wire device number information will be included in the **+RESP:GTERI** message.

✧ *Wrap Corner Point*

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

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

Note

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

3.4.2 FFC (Frequency Change of FRI)

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

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

Example:
AT+GTFFC=gv355ceu,0,1,0,30,500,500,300,0,,,,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'	gv355ceu
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

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Parts	Fields	Length	Range/Format	Default
	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
	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 "gv355ceu".

✧ *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*

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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.

3.5 Alarm Settings

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

3.5.1 CRA (Crash Detection)

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

Example:
AT+GTCRA=gv355ceu,1,50,50,50,0,500,500,0,2,0,0,0,0,,,,,,,,,,,,0019$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	CRA	CRA
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Mode	1	0-2	0
	Threshold_X	<=3	0 - 160	50
	Threshold_Y	<=3	0 - 160	50
	Threshold_Z	<=3	0 - 160	50
	Sampling Start Mode	1	0 | 1	0
	Samples Before Crash	<=4	1 - 1500	500
	Samples After Crash	<=4	1 - 1500	500
	Output ID	1	0 - 3 | 9 - C	0
	Output Status	1	0 - 2	
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	Report ACC Mode	1	0 | 1	0
	Report GNSS Mode	1	0 | 1	0
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

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✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".

✧ *Mode*

The working mode of the crash detection function.

- **0** - Disable.
- **1** - Enable. In this mode, no three-axis self-calibration is required.
- **2** - Enable. In this mode, the acceleration sensor data will be converted in accordance with three-axis self-calibration.

  In the new coordinate system, the positive X-axis points in the direction the vehicle travels; the positive Y-axis is perpendicular to X-axis, and the direction conforms to the right-hand rule; and the positive Z-axis is the opposite direction of gravity.

Note

The device will keep monitoring crash event based on the original three-axis data from sensor until it detects the first **ASC** (ASCII)/(HEX) event.

✧ *Threshold_X*

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

✧ *Threshold_Y*

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

✧ *Threshold_Z*

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

✧ *Sampling Start Mode*

A numeral to indicate when to start sampling acceleration data.

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

✧ *Samples Before Crash*

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

✧ *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).

✧ *Report GNSS Mode*

A numeral which indicates whether to report the GNSS information of 10 seconds before/after crash to the backend server.

- **0** - Disable the GNSS information report.

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- **1** - Enable the GNSS information report. The device will report the GNSS information of 10s before crash and 10 seconds after crash to the backend server in the message **CRG** (ASCII)/(HEX).

3.5.2 DUC (Data Usage Consumption)

The command **AT+GTDUC** is used to get statistics about data usage.

Example:
AT+GTDUC=gv355ceu,1,0,10,1,50,3000,,,,,,,0015$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	DUC	DUC
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Mode	1	0 | 1	0
	Statistical Period	1	0 | 1	0
	Data Usage	<=8	0 - 99999999(Mbyte)	0
	Report Interval	<=2	0 - 30(day)	0
	Total Percentage	<=3	0 - 100(%)	0
	Day Data Usage	<=8	0 - 99999999(Kbyte)	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 "gv355ceu".

✧ *Mode*

The working mode of this function.

- **0** - Disable this function and clear the statistics of data usage.
- **1** - Enable this function.

✧ *Statistical Period*

The unit of statistics period. The device will clear the statistics before a new data usage cycle starts.

- **0** - Month
- **1** - Year

✧ *Data Usage*

The maximum data usage allowed in the <Statistical Period>.

✧ *Report Interval*

The interval for the report **DUC** (ASCII)/(HEX). If it is set to 0, this function will be disabled.

✧ *Total Percentage*

The **+RESP:GTDUC** will be reported when the total data usage reaches the level specified by this parameter.

✧ *Day Data Usage*

The **+RESP:GTDUC** will be reported when the daily data usage reaches the level specified by this parameter.

3.5.3 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=gv355ceu,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'	gv355ceu
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 - 3 | 9 - C	0
	Output Status	1	0 - 2	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

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Parts	Fields	Length	Range/Format	Default
	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 "gv355ceu".

✧ *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

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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.

3.5.4 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=gv355ceu,0,0,1,3,121.412240,31.187801,121.412248,31.187891,121.412258,31.187991,0,0,0,0,0,,,,,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'	gv355ceu
Body	ID	<=2	0 - 19	0

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Parts	Fields	Length	Range/Format	Default
	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 - 3 | 9 - C	0
	Output Status	1	0 - 2	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 "gv355ceu".

✧ *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.

3.5.5 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=gv355ceu,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'	gv355ceu
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

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Parts	Fields	Length	Range/Format	Default
	ΔVla	<=3	0 - 100(km/h)	0
	Reserved	0		
	Output ID	1	0 - 3 | 9 - C	0
	Output Status	1	0 - 2	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		
	Reserved	0		
	Brake Threshold	<=3	10 - 100	25
	Brake Duration	<=3	10 - 250(x10ms)	50
	Report 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 "gv355ceu".

✧ *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.

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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.

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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**.

Note

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

3.5.6 IDL (Excessive Idling Detection)

The command **AT+GTIDL** is used to detect the engine excessive idling (vehicle stays stationary while ignition is on). To use this command, the ignition signal must be connected to the device. 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=gv355ceu,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'	gv355ceu
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 - 3 | 9 - C	0
	Output Status	1	0 - 2	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	$	$

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- *Password*
  The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".
- *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.

3.5.7 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=gv355ceu,0,,10,10,1800,1,30,0,0,5,1,0,0,0,,,,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'	gv355ceu
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

Parts	Fields	Length	Range/Format	Default
	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
	Enable Siren	1	0 | 1	1
	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
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 "gv355ceu".

✧ *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.

✧ *Enable Siren*

It defines whether to control siren with digital output 2 in the current JBS state.

✧ *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.

✧ **Jamming Behavior Setting Reset Mode**

Example:
AT+GTJBS=gv355ceu,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'	gv355ceu
Body	Mode	1	2	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Mode*

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

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

3.5.8 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=gv355ceu,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'	gv355ceu
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 - 3 | 9 - C	0
	Output Status	1	0 - 2	
	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 "gv355ceu".

✧ *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.

3.5.9 RMD (Roaming Detection)

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

Example:
AT+GTRMD=gv355ceu,0,,,,,1,1,46003,,,2,2,46007,,,3,3,46001,,,7DEF,,,7DEF,,,,,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'	gv355ceu
Body	Mode	1	0 | 1	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Home Operator Start	<=2	1 - 10	

Parts	Fields	Length	Range/Format	Default
	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	7DEF
	Reserved	0		
	Reserved	0		
	Unknown Roaming Event Mask	<=6	000000 - FFFFFF	7DEF
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Output ID	1	0 - 3 | 9 - C	0
	Output Status	1	0 - 2	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 "gv355ceu".

✧ *Mode*

The working mode of the roaming detection function.

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

✧ *Operator Start*

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

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

✧ *Operator End*

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

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

✧ *Home Operator List*

An allowlist of PLMN operator numbers. The numbers are composed of MCC and MNC, both of which consist of 3 digits. And the last digit of MNC can be omitted, for example, both "46001F" and "46001" are the PLMN of CHINA UNICOM.

The operators in this list will be considered as in "Home" state. Two adjacent operator numbers are separated with ",". The number of the operators in the list is determined by the parameters <Operator Start> and <Operator End>. For example, if <Operator Start> is 1 and <Operator End> is 2, the operator list should include 2 operator numbers (empty value acceptable) and the two numbers are separated with ",".

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

✧ *Roaming Operator List*

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

✧ *Blocklist Operator*

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

Note

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

✧ *Known Roaming Event Mask*

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

- **Bit 0** - for **PNA** (ASCII)/(HEX)
- **Bit 1** - for **PFA** (ASCI)/(HEX)
- **Bit 2** - for **MPN** (ASCII)/(HEX)
- **Bit 3** - for **MPF** (ASCII)/(HEX)
- **Bit 5** - for **BPL** (ASCII)/(HEX)
- **Bit 6** - for **BTC** (ASCII)/(HEX)
- **Bit 7** - for **STC** (ASCII)/(HEX)
- **Bit 8** - for **STT** (ASCII)/(HEX)

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- **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 14** - for **EXP** (ASCII)/(HEX)
- **Bit 15** - for **PNR** (ASCII)/(HEX)
- **Bit 16** - for **PFR** (ASCII)/(HEX)

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

✧ *Unknown Roaming Event Mask*

It is mostly like <Known Roaming Event Mask>.

✧ *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.

3.5.10 SIM (Binding SIM Card)

The **AT+GTSIM** command is used to bind SIM card function. If the current SIM card is replaced by another SIM card, then the digital output will be triggered.

Example:
AT+GTSIM=gv355ceu,2,898600910909f0385552,,,0,0,0,0,,,,,0013$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	SIM	SIM
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Mode	1	0-2	0
	ICCID	20		
	Reserved	0		
	Reserved	0		
	Output ID	1	0 - 3 | 9 - C	0

Parts	Fields	Length	Range/Format	Default
	Output Status	1	0 - 2	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 "gv355ceu".

✧ *Mode*

A numeral that indicates whether to bind SIM card.

- **0** - Do not bind SIM card.
- **1** - Bind the current SIM card.
- **2** - Bind the specified SIM card by ICCID.

✧ *ICCID*

The ICCID of the SIM card to be bound.

✧ *Output Status*

After the SIM card is detected to have been replaced, the digital output port <Output ID> will output the status to indicate that the SIM card has been replaced.

3.5.11 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=gv355ceu,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	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu

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Parts	Fields	Length	Range/Format	Default
Body	Mode	1	0 | 2 | 4	0
	Digital Input ID	1	0 - 4 | 9 - C	0
	Reserved	0		
	Output ID	1	0 - 3 | 9 - C	0
	Output Status	1	0 - 2	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 "gv355ceu".

✧ *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. 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.

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3.5.12 BZA (Buzzer Alarm)

This command is used to set buzzer alarm. There are four kinds of alarms, and each alarm outputs a different buzzer sound. Before using these alarms, the output ID connected to the buzzer should be configured and enabled.

The overspeed alarm event (refer to the command (AT+GTSPA)) can trigger the buzzer alarm defined by this command.

Example:
AT+GTBZA=gv355ceu,2,,,,1,0,0,,,0,10,1,,,2,0,0,,,1,2,10,,,,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	BZA	BZA
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Output ID	1	0 | 2 - 3	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Alarm 1 Output Status	1	0-2	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	Reserved	0		
	Reserved	0		
	Alarm 2 Output Status	1	0-2	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	Reserved	0		
	Reserved	0		
	Alarm 3 Output Status	1	0-2	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	Reserved	0		
	Reserved	0		
	Alarm 4 Output Status	1	0-2	0
	Duration	<=3	0 - 255(x100ms)	0

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Parts	Fields	Length	Range/Format	Default
	Toggle Times	<=3	0 - 255	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 "gv355ceu".

✧ *Output ID*

The output port connected to the buzzer.

3.5.13 SPA (Overspeed Alarm)

This command is used to set the speed thresholds and bind an alarm type to each speed threshold for the buzzer alarm. If the current speed meets one of the thresholds, the buzzer will emit a sound corresponding to the alarm type.

Example:
AT+GTSPA=gv355ceu,1,50,,60,0,,,70,,60,0,,,90,,60,0,,,110,,60,0,,,,,,,,000C$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	SPA	SPA
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Mode	1	0-2	0
	Speed Threshold 1	<=3	0 - 400(km/h)	50
	Reserved	0		
	Validity	<=4	0 - 3600(s)	60
	Alarm Type	1	0 | 1 - 4	0
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	Reserved	0		
	Speed Threshold 2	<=3	0 - 400(km/h)	70
	Reserved	0		
	Validity	<=4	0 - 3600(s)	60
	Alarm Type	1	0 | 1 - 4	0
	Reserved	0		
	Reserved	0		
	Speed Threshold 3	<=3	0 - 400(km/h)	90
	Reserved	0		
	Validity	<=4	0 - 3600(s)	60
	Alarm Type	1	0 | 1 - 4	0
	Reserved	0		
	Reserved	0		
	Speed Threshold 4	<=3	0 - 400(km/h)	110
	Reserved	0		
	Validity	<=4	0 - 3600(s)	60
	Alarm Type	1	0 | 1 - 4	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 "gv355ceu".

✧ *Mode*

The working mode of the overspeed alarm function.

- **0** - Disable this function.
- **1** - Strict standard mode. In this mode, the device will check the speed and trigger the buzzer alarm when accelerating or decelerating.
- **2** - Warning mode. In this mode, the device will only check the speed and trigger the buzzer alarm when accelerating.

✧ *Speed Threshold*

The minimum speed to trigger the buzzer alarm.

✧ *Validity*

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

✧ *Alarm Type*

The alarm type for each speed threshold. 0 means "No buzzer alarm".

3.5.14 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=gv355ceu,1,0,0,60,300,0,0,0,0,0,,,,,,,,,,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'	gv355ceu
Body	Mode	1	0-4	0
	Min Speed	<=3	0 - 400(km/h)	0
	Max Speed	<=3	0 - 400(km/h)	0
	Validity	<=4	0 - 3600(s)	60
	Send Interval	<=4	30 - 3600(s)	300
	Output ID	1	0 - 3 | 9 - C	0
	Output Status	1	0 - 2	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	Report ID	<=2	0 - 15	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		

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

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".

✧ *Mode*

The working mode of the speed alarm function.

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

✧ *Min Speed*

The lower speed limit.

✧ *Max Speed*

The upper speed limit.

✧ *Validity*

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

✧ *Send Interval*

The interval for sending the speed alarm message.

✧ *Report ID*

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

3.5.15 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=gv355ceu,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'	gv355ceu
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
	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 "gv355ceu".

✧ *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*

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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.

3.5.16 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=gv355ceu,1,10,1,300,0,0,0,0,2,3,2,,,,,,,,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'	gv355ceu
Body	Mode	1	0 | 1	0
	Engine Off to Tow	<=2	5 - 15(min)	10
	Fake Tow Delay	<=2	0 - 10(min)	1
	Tow Interval	<=5	30 - 86400(s)	300
	Tow Output ID	1	0 - 3 | 9 - C	0
	Tow Output Status	1	0 - 2	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
	Reserved	0		
	Reserved	0		

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Parts	Fields	Length	Range/Format	Default
	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 "gv355ceu".

✧ *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

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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.

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=gv355ceu,1,0,10000,12000,1,,0,0,0,0,0,10,30,10,20,0,0,0,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	AIS	AIS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	ID	1	1 - 2	
	Mode	1	0-5	0
	Min Threshold	<=5	0 - 16000 | 0 - 30000(mV)	0
	Max Threshold	<=5	0 - 16000 | 0 - 30000(mV)	0
	Sample Rate	<=2	0 | 1 - 12(x2s)	0
	Reserved	0		
	Output ID	1	0 - 3 | 9 - C	0
	Output Status	1	0 - 2	
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	Sync with FRI	1	0 | 1	0
	Fuel Level Debounce	<=3	0 - 149	10
	Fuel Sensor Delay Time	<=3	0 - 600 (s)	30

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Parts	Fields	Length	Range/Format	Default
	Fuel Loss Alarm	<=2	0 - 50	10
	Sampling Number	<=3	1 - 150	20
	Fuel Level Change Threshold	<=2	0 - 50(%)	0
	Voltage Margin Error	<=3	0 - 100(x10mV)	0
	IGF Fuel Update	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 "gv355ceu".

✧ *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.
- **3** - Connect with special fuel level sensor to support fuel level reporting and monitoring.

  Note

  When the selected mode is 3, please do not choose the waveform 1 as the specified output waveform.
- **4** - No alarm mode. The range of the voltage will be ignored and no alarm will be triggered.
- **5** - Processed voltage mode. The range of the voltage will be ignored and no alarm will be triggered. However, the voltage will be processed before being reported.

✧ *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. The threshold range can be set to 30000mV if <ID> is set to 2.

✧ *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. The threshold range can be set to 30000mV if <ID> is set to 2.

Note

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

When <Mode> is set to 3, the value of <Min Threshold> should not be equal to the value of <Max Threshold>.

✧ *Sample Rate*

The sampling period for the analog input port.

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- *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).

- *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. If the analog input port is used to work with a fuel sensor and the <Sync with FRI> is enabled, the device will report the fuel level together with the FRI report.

- *Fuel Level Debounce*

  The number of the data discarded when calculating the fuel level.

- *Fuel Sensor Delay Time*

  After power on or enabling the fuel level reporting and monitoring function, the fuel sensor needs to delay for the time specified by <Fuel Sensor Delay Time> before reporting correct fuel level.

- *Fuel Loss Alarm*

  If the difference between the current fuel level after ignition on and the last measured fuel level before previous ignition off is greater than this value, an unusual fuel consumption alarm is sent with the event message **FLA** (ASCII)/(HEX).

- *Sampling Number*

  This parameter defines the total number of samples from the fuel sensor for calculating the current fuel level. And it must be greater than <Fuel Level Debounce>.

- *Fuel Level Change Threshold*

  This parameter defines the threshold for value changes. The value change must be greater than this threshold. And this value should be less than <Fuel Loss Alarm>, otherwise the **+RESP:GTFLA** may be reported incorrectly.

- *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.

- *IGF Fuel Update*

  If it is set to 1, the fuel level will be updated in real time in **+RESP:GTFRI** after ignition off is

detected.

If it is set to 0, the fuel level will not be updated in real time, but it will be updated when the device detects fuel loss alarm.

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=gv355ceu,0,,5,0,1,0,2,0,2,0,2,0,3,0,2,0,0,0,,,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'	gv355ceu
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
	Input ID 2	1	2	2
	Mode2	1	0 | 1	0
	Debounce Time2	<=2	0 - 20(x10ms)	2
	Validity Time2	<=2	0 | 1 - 12(x2s)	0
	Input ID 3	1	3	3
	Mode3	1	0 | 1	0
	Debounce Time3	<=2	0 - 20(x10ms)	2
	Validity Time3	<=2	0 | 1 - 12(x2s)	0
	Expand Input Numbers	1	0 - 1	0
	Input ID (Optional)	1		
	Mode (Optional)	1	0 | 1	0

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Parts	Fields	Length	Range/Format	Default
	Debounce Time (Optional)	<=2	0 - 20(x10ms)	2
	Validity Time (Optional)	<=2	0 | 1 - 12(x2s)	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 "gv355ceu".
- *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".
- *Expand Input Numbers*
  The expand number of digital input ports to be set. The optional parameters following this parameter will repeat <Expand Input Numbers> times.
- *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

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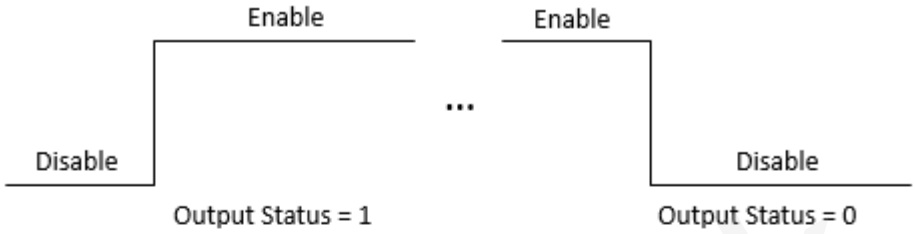
power off.

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.

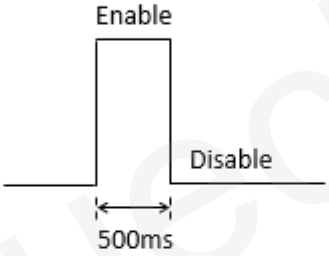
Wave Shape 1:

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



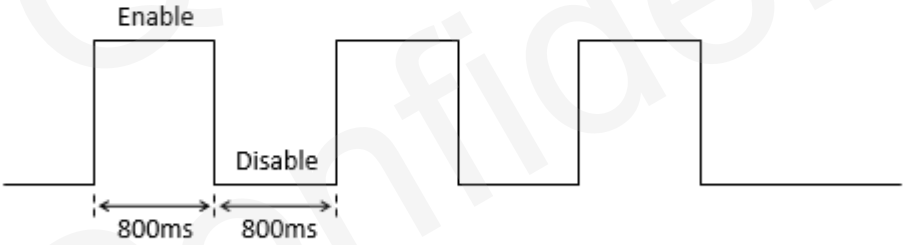
Wave Shape 2:

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



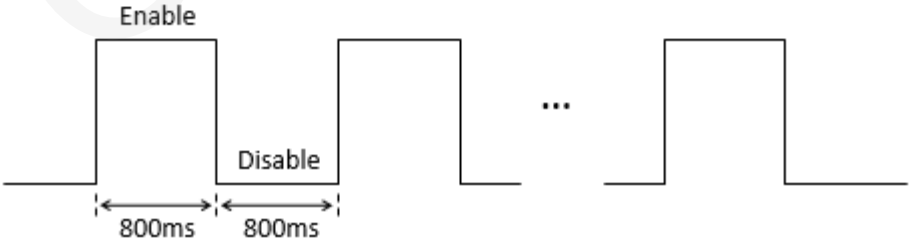
Wave Shape 3:

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



Wave Shape 4:

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



Example: AT+GTDOS=gv355ceu,0,1,2,1,,36,0,,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	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Command Frame Version	1	0	0
	Number of Output Ports	1	1 - 3	3
	Output ID	1	1 - 3	
	Output Status	1	0-2	
	Duration	<=3	0 - 255(x100ms)	
	Toggle Times	<=3	0 - 255	
	Long Operation	<=3	0 - 120(min)	
	Reserved	0		
	DOS Report	1	0 - 7	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 "gv355ceu".

✧ *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.

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- **2** - Gradual-progressive-wave-shape active 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.

- **Bit 0** - For output 1 (not) to report **+RESP:GTDOS**
- **Bit 1** - For output 2 (not) to report **+RESP:GTDOS**
- **Bit 2** - For output 3 (not) to report **+RESP:GTDOS**

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.

✧ *Long Operation*

The long operation time for output and it is valid only when the output wave shape is 1 or 4. The output wave will be stopped on the special output port after the length of time specified by the parameters.

✧ *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.

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Example:
AT+GTEPS=gv355ceu,0,250,12000,0,0,0,0,0,0,0,0,0,0007$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	EPS	EPS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Mode	1	0-2	0
	Min Threshold	<=5	0 - 32000 (mV)	0
	Max Threshold	<=5	0 - 32000 (mV)	0
	Sample Period	<=2	0 | 1 - 12(x2s)	0
	Debounce Time	1	0 - 5 (x1s)	0
	Output ID	1	0 - 3 | 9 - C	0
	Output Status	1	0 - 2	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 - 5(x1s)	0
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".

✧ *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*

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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.

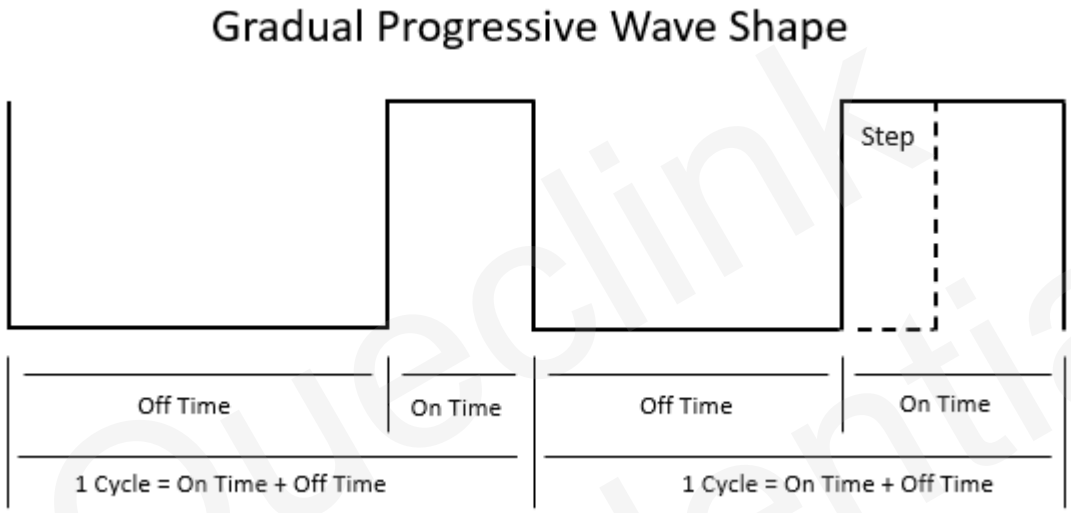
After the condition **On Time + Incremental Step >= Cycle Time** is reached, the output becomes

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.



Example:
AT+GTGDO=gv355ceu,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	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	First ON 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		

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

- *Password*
  The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".
- *First ON Time*
  The time that the output is in active state during the first cycle. 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> 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=gv355ceu,3,3,3,0,0,0,0,,,,,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'	gv355ceu
Body	ID	1	0 - 3	
	Input Mask	<=4	0000 - 0F1F	0
	Trigger Mask	<=4	0000 - 0F1F	0
	Input Sample Period	<=2	0 | 1 - 12 (x2s/x4s)	0
	Output ID	1	0 - 3 | 9 - C	0
	Output Status	1	0 - 2	0
	Duration	<=3	0 - 255(x100ms)	0

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Parts	Fields	Length	Range/Format	Default
	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 "gv355ceu".

✧ *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 2** - Digital input 2
- **Bit 3** - Digital input 3
- **Bit 4** - Digital input 4
- **Bit 8** - EIO100 input 9
- **Bit 9** - EIO100 input A
- **Bit 10** - EIO100 input B
- **Bit 11** - EIO100 input C

✧ *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 2** - Digital input 2
- **Bit 3** - Digital input 3
- **Bit 4** - Digital input 4
- **Bit 8** - EIO100 input 9
- **Bit 9** - EIO100 input A
- **Bit 10** - EIO100 input B
- **Bit 11** - EIO100 input C

✧ *Input Sample Period*

The interval for checking the state of all the digital input ports in one IO binding. **AT+GTIOB**

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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

If <Input Mask> includes EIO100 input, <Input Sample Period> should be multiplied by 4 seconds.
If <Output ID> indicates EIO100 output, only wave shape 1 is supported.

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 CDA (Configuration of DR100 Accessory)

The command **AT+GTCDA** is used for setting DR100 accessory.

Example:
AT+GTCDA=gv355ceu,0,6,FFFFFFFFFFFF,,,2,quec32_,st32,,,,,0011$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	CDA	CDA
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Read Mode	1	0-3	0
	Data Block	<=2	0 - 62	6
	Key	12	'0'-'9' 'A'-'F'	FFFFFFFFFFFF
	Reserved	0		
	Reserved	0		
	Prefix Number	<=2	0 - 10	
	Prefix String <n>	<=15	ASCII (not including '=' and ',')	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		

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

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gv355ceu".

✧ *Read Mode*

It configures the mode of DR100 reading card data.

- **0** - Do not check prefix string, output card ID directly.
- **1** - Do not check prefix string, output card memory data directly.
- **2** - Check prefix string with card memory data and output card ID.
- **3** - Check prefix string with card memory data and output card memory data.

✧ *Data Block*

It specifies which block of DR100 memory will be used to save the card key.

Note

The blocks for saving card key ranges from 0 to 62, but block (4n-1), such as block 3, 7, 11 cannot be used to save card key.

✧ *Key*

It is used as card key for checking.

✧ *Prefix Number*

It specifies the number of prefix string groups.

✧ *Prefix String <n>*

The prefix string is used to check card memory data. If the card memory data does not contain prefix string, the DR100 will not respond to the current card reading action.

Note

The value of <Prefix String <n>> cannot contain "=" and "," characters.

3.7.2 CMS (Camera Setting)

The **AT+GTCMS** command is used for setting camera parameters.

Example:
AT+GTCMS=gv355ceu,0,1,5,150,2,0,0003,0,0,0,0,0,0,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	CMS	CMS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Camera ID	1	0 - 3	
	Number	<=2	1 - 10	1

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Parts	Fields	Length	Range/Format	Default
	Interval	<=2	1 - 60(s)	5
	Photo Compression Ratio	<=3	20 - 250	150
	Photo Resolution	1	1-3	2
	Digital Input ID	1	0 | 1 - 4	0
	Attribute Mask	<=4	0000 - FFFF	3
	Server Type	1	0 | 1	0
	EHD Support	1	0 | 1	0
	Output ID	1	0 - 3	0
	Output Status	1	0 - 2	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 "gv355ceu".

✧ *Number*

The number of pictures taken in one continuous shoot.

✧ *Interval*

The interval between two pictures in one continuous shoot.

✧ *Photo Compression Ratio*

The compression ratio of picture. The smaller the compression ratio, the better the picture quality.

✧ *Photo Resolution*

The resolution of picture.

- **1** - 160*120
- **2** - 320*240
- **3** - 640*480

✧ *Digital Input ID*

The input ID used to trigger photographing.

✧ *Attribute Mask*

The <Attribute Mask> in the messages **PHL** (ASCII)/(HEX) and **PHD** (ASCII)/(HEX) in HEX format.

Bit	Item
Bit 15	Reserved

Bit	Item
...	Reserved
Bit 2	Reserved
Bit 1	<Photo Time>
Bit 0	<Camera ID>

✧ *Server Type*

The server to which the picture is transferred.

- **0** - Backend server
- **1** - FTP server

✧ *EHD Support*

Whether to pack picture data by **+RESP:GTEHD** instead of **+RESP:GTPHD** in HEX format. **+RESP:GTEHD** can support a larger picture size in HEX format.

Note

The output settings are used to output special wave when the camera is photographing or trying to photograph and data is being transmitted between the camera and the device.

3.7.3 TAP (Take-Picture)

The **AT+GTTAP** command is used for real-time photographing.

Example:
AT+GTTAP=gv355ceu,0,,,1,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	TAP	TAP
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Camera ID	1	0 - 3	
	Reserved	0		
	Reserved	0		
	Photo Resolution	1	1 - 3	
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

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✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gv355ceu".

Note

When **AT+GTTAP** is used to take pictures, the basic settings of camera such as <Photo Compression Ratio>, <Attribute Mask>, <Output ID>, <Output Status>, <Duration> and <Toggle Times> are the same as those in (AT+GTCMS).

3.7.4 DAT (Transparent Data)

The command **AT+GTDAT** is used to transmit data between the backend server and the equipment connected to the secondary serial port,Bluetooth of the device. Data to the backend server is wrapped into the message **DAT** (ASCII)/(HEX) and sent to the backend server while data to the equipment is directly output to the secondary serial port, Bluetooth unrestricted by the @Track protocol. And all data is transparent to the device. Before using this command, the parameters of the secondary serial port should be set in the command (AT+GTURT).the parameters of the Bluetooth should be set in the command (AT+GTBTS).

Example:
AT+GTDAT=gv355ceu,0,,wferyhtrhtrh,0,0,,,0017$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	DAT	DAT
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Command Type	1	0-5	
	Reserved	0		
	Data	<= (200|1280)	ASCII String	
	Need ACK	1	0 | 1	
	Hex Convert	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

"gv355ceu".

✧ *Command Type*

The command type which indicates how to send data.

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

✧ *Data*

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

Note

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

✧ *Need ACK*

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

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

✧ *Hex Convert*

If this parameter is set to 1, <Data> will be converted to HEX format before being sent to the serial port. This parameter is valid only when the <Command Type> is 1 or 3.

3.7.5 TKS (TPT2 Setting)

The **AT+GTTKS** command is used to query basic information via RS232, such as data, hour, GNSS fix and GPRS connection status. When the device receives this command by RS232 and <Mode> in (AT+GTURT) is 28, it needs to reply to TPT2 the (+RESP:GTTKS) message without sending any information to backend server.

Example:
AT+GTTKS=gv355ceu,1,,,0018$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	TKS	TKS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Command Type	1	1 | 2	
	Reserved	0		

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

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gv355ceu".

✧ *Command Type*

This parameter is used to set the query type, and different types will get different information.

- **1** - Short information type.
  In this type, the device will send <GNSS Accuracy>, <GPRS Signal>, <Digital Inputs> and <Digital Outputs> to TPT2 through RS232.
- **2** - Long information type.
  In this type, the device will not only send <GNSS Accuracy>, <GPRS Signal>, <Digital Inputs> and <Digital Outputs> and other information to TPT2 through RS232.

3.7.6 EFS (External Digital Fuel Sensor)

The command **AT+GTEFS** is used to configure the parameters of the external digital fuel sensor. If <Mode> in (AT+GTURT) is set to 4, the parameters of this command are used.

Example:
AT+GTEFS=gv355ceu,,,9999,,10,,0,10,0,0,300,,10,5,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	EFS	EFS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Reserved	0		
	Reserved	0		
	Ex Full Value	<=5	0 - 65535	9999
	Reserved	0		
	Ex Fuel Loss Alarm IGF	<=2	0 - 50(%)	10
	Reserved	0		
	Unsolicited Enable Ex	1	0 | 1	0
	Ex Detection Frequency	<=3	5 - 600(s)	10
	Ex Filter Factor	1	0-9	0
	Report Sensor Data	1	0 | 1	0

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Parts	Fields	Length	Range/Format	Default
	Ex Detection Frequency IGF	<=4	30 - 1800(s)	300
	Reserved	0		
	IGN Sample Count	<=2	3 - 30	10
	Ex Fuel Loss Alarm IGN	<=3	0 - 100(%)	5
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 "gv355ceu".

✧ *Ex Full Value*

The value read from the sensor when the fuel tank is full.

Note

This value now only needs to be set for UFSxxx and DUT-E SUM, while other sensors ignore this value. The unit of UFSxxx is 0.1mm. Set the unit of DUT-E sensor connected to DUT-E SUM to liter. If the **AT+GTEFS** command is executed and <Ex Full Value> is not set to the default value, DUT-E can use <Ex Full Value> to calculate the percentage of fuel level.

✧ *Ex Fuel Loss Alarm IGF*

If the difference between the current fuel level after ignition off and the last measured fuel level is greater than this value, an abnormal fuel consumption alarm is sent with the event message **FLA** (ASCII)/(HEX). 0 means "Disable this function".

✧ *Unsolicited Enable Ex*

If this parameter is enabled, the device will not send command to the fuel sensor, and the sensor must be set to periodic data output. QFS100 and UFS100 do not support this function.

✧ *Ex Detection Frequency*

If <Unsolicited Enable Ex> is disabled, the device will send READ command to the fuel sensor and read the data based on this parameter setting.

✧ *Ex Filter Factor*

The filter factor of the sensor. Now only QFS100 supports this factor, and for other sensors, this parameter is ignored.

- **0** - No filter
- **1** - 12 seconds
- **2** - 24 seconds
- **3** - 36 seconds
- **4** - 60 seconds
- **5** - 120 seconds
- **6** - 180 seconds
- **7** - 240 seconds
- **8** - 480 seconds
- **9** - 960 seconds

✧ *Report Sensor Data*

A numeral to indicate whether to report raw data from fuel sensor to the backend server with

FSD (ASCII)/(HEX). Only report of the raw data from UFSxxx is supported now.

- **0** - Do not report raw data from fuel sensor.
- **1** - Report raw data from fuel sensor.

✧ *Ex Detection Frequency IGF*

If <Unsolicited Enable Ex> is disabled, the device will send READ command to the fuel sensor and read the data at this frequency while the ignition is off.

✧ *IGN Sample Count*

The count of readings of fuel level used for fuel alarm detection after ignition on.

Ignition-on fuel alarm detection time = <IGN Sample Count>* <Ex Detection Frequency>.

✧ *Ex Fuel Loss Alarm IGN*

If the difference between the current fuel level after ignition on and the last measured fuel level is greater than this parameter value during the time **<IGN Sample Count> * <Ex Detection Frequency>**, an abnormal fuel consumption alarm is sent via the event message **+RESP:GTFLA**. 0 means "Disable this function".

3.7.7 FSC (Fuel Sensor Calibration)

The command **AT+GTFSC** is used to set the calibration table for fuel sensor.

Example:
AT+GTFSC=gv355ceu,,1,20,0,100,,3,16000,0,10000,50,250,100,,,,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	FSC	FSC
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Reserved	0		
	Table ID	1	0 - 4	1
	Sensor Type	<=2	0-6 | 9 | 20 | 21	20
	Mode	1	0 | 1	0
	Max Tank Volume	<=4	0 - 6000	100
	Reserved	0		
	Num of Node	<=2	0 | 2 - 11	0
	Node 1 Value	<=5	0 - 99999	
	Node 1 Percentage	<=3	0 - 100	
	...			
	Node N Value	<=5	0 - 99999	
	Node N Percentage	<=3	0 - 100	
	Reserved	0		

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Parts	Fields	Length	Range/Format	Default
	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 "gv355ceu".

- *Table ID*

  The ID of the currently set calibration table.

- *Sensor Type*

  The sensor type for the currently set table.

  - **0** - EPSILON ES2 or ES4
  - **1** - LLS 20160
  - **2** - DUT-E
  - **3** - QFS100
  - **4** - UFSxxx
  - **5** - Reserved
  - **6** - DUT-E SUM
  - **9** - UFS301 (RS485)
  - **20** - ADC1
  - **21** - ADC2

- *Mode*

  Enable/disable the table. If this table is disabled, the calculation of fuel level will be linearized.

- *Max Tank Volume*

  The maximum volume of tank. Unit: liter.

- *Num of Node*

  The number of the nodes.

- *Node N Value*

  The value of the node.

- *Node N Percentage*

  The corresponding percentage value of this node. This item must be arranged in ascending order, starting at 0% and ending at 100%.

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3.7.8 IDA (ID Authentication)

The command **AT+GTIDA** is used to protect against unauthorized use. This is achieved through an ID card reader/iButton reader for driver identification, and connecting an external relay (normally closed relay is recommended) to cut off the starter or the fuel pump.

To use this command, both the ID card reader/iButton reader and the external relay must be connected to the device. When the device reads an ID, it will report the event message **IDA** (ASCII)/(HEX) to the backend server. If the ID is in the allowlist of the ID numbers, it will be authorized until next time the ignition is turned off. After the ignition is turned off again, the authentication will last for a settable short period of time, during which the driver can turn on the engine again without the need to re-identify himself.

Example:
AT+GTIDA=gv355ceu,0,1,2,D2C4FBC5,87654321,30,0,30,,,,0,0,0,0,0,0,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	IDA	IDA
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Mode	1	0-2 | 4	0
	Start Index	<=3	1 - 250	
	End Index	<=3	1 - 250	
	ID Number List	<=8*28	'0'-'9' 'a'-'f' 'A'-'F'	
	Timeout after Ignition Off	<=3	0 | 15 - 600(s)	30
	Report Mode	1	0 - 7	0
	ID Validity Time	<=3	0 | 15 - 600(s)	30
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Output ID	1	0 - 3	0
	Output Status	1	0 - 2	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	RFID Report Mode	1	0 | 1	0
	ID List Type	1	0-2	0
	ID Filter Mode	1	0 | 1	0

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

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gv355ceu".

✧ *Mode*

The working mode of the ID authentication function.

- **0** - Disable this function.
- **1** - Authorized ID Unlock. Only authorized ID cards can unlock the vehicle.
- **2** - Any ID Unlock. Any ID card can unlock the vehicle.
- **4** - Any ID Unlock with Single Reporting. Any ID card can unlock the vehicle but the **+RESP:GTIDA** will be reported only once if the same ID is detected. And a new **+RESP:GTIDA** will be reported when a new ID card is detected. In this mode, **+RESP:GTIDA** is reported if new ID is detected in ignition on state.

✧ *Start Index, End Index*

The index range of the allowlist to which the ID 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 ID numbers in the allowlist will be updated by the numbers provided in the parameter <ID Number List>. <Start Index> and <End Index> determine the total amount of ID numbers that will be updated. If either one is empty, there should be no <ID Number List> following the empty value. A maximum of 8 numbers can be updated each time.

✧ *ID Number List*

A list of comma-separated ID numbers to be updated to the allowlist. The quantity of the ID numbers is determined by <Start Index> and <End Index>.

Note

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

✧ *Timeout after Ignition Off*

If the ignition is turned off, it will still be authorized for a short time. In this period, re-authentication is not needed. 0 means "Lock the vehicle when the ignition is turned off".

✧ *Report Mode*

The mode of reporting ID.

- **Bit 0** - Report the authorized ID.
- **Bit 1** - Reserved.
- **Bit 2** - Report the ID which has logged out. If authorized ID meets the trigger conditions <ID Validity Time> and <Timeout after Ignition Off>, then the **+RESP:GTIDA** report will be sent to indicate the logout event.

For each bit, set it to 1 to enable the report, and set it to 0 to disable. If <Report Mode> is 0,

no +RESP:GTIDA message will be reported.

✧ *ID Validity Time*

It will remain authorized for this period of time when the ID is valid.

✧ *Output ID*

It specifies the ID of the output port to output specified wave shape when it is authorized.

✧ *RFID Report Mode*

The mode of reporting the RFID number in HEX format **+RSP** and **+EVT** messages.

- **0** - Report the latest RFID number after getting the card ID.
- **1** - Report the latest RFID number when the ignition is turned on and the card is authorized, or the ignition is turned off and the timeout period specified by <Timeout after Ignition Off> is not reached.

Note

The messages (+RESP:GTIDA), (+RESP:GTIGF), (+RESP:GTIGN), (+RESP:GTVGF) and (+RESP:GTVGN) in HEX format will always report RFID number after the device gets the card ID.

✧ *ID List Type*

This parameter indicates which ID List to use.

- **0** - Use <ID Number List> in the command **AT+GTIDA**.
- **1** - Use <MAC List> and <Organization Unique Identifier> in the command (AT+GTBID). Please make sure the function (AT+GTBID) is configured properly.
  To enable this feature, the following conditions must be met:
  - WKF300: Set <Push Button Event> to 1 when the <Keyfob Detection Mode> is mode 1 and mode 2.
  - ID ELA: Enable <IDELA Detection Mode>, and there is at least one MAC address in the <MAC List>.
  - WID310: Enable <WID310 Detection Mode>, and there is at least one MAC address in the <MAC List>.
- **2** - Use <ID Number List> in the command (AT+GTIDS).

✧ *ID Filter Mode*

The mode of filtering ID.

- **0** - Each read ID will be checked by the device. The message **+RESP:GTIDA** will be reported when the device reads an ID.
- **1** - The same read ID will be filtered out. The message **+RESP:GTIDA** will be reported only once when the same ID is read continuously.

3.7.9 IDS (ID Setting)

The command **AT+GTIDS** is used to set ID Numbers for driver authentication.

Example: AT+GTIDS=gv355ceu,1,0,8,D2C4FBC58765432122222222,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	IDS	IDS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Mode	1	0 | 1	1
	ID Type	1	0	0
	Length of ID Number	<=2	8 - 28	
	ID Number List	<=1000	'0'-'9' 'a'-'f' 'A'-'F'	
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 "gv355ceu".

✧ *Mode*

The working mode of the ID authentication function.

- **0** - Delete ID Number. If <ID Number List> is empty, all ID Number will be deleted. Otherwise, the given ID Numbers in <ID Number List> will be deleted.
- **1** - Append ID Number. In this mode, all given ID Numbers will be appended to the saved ID Numbers.

✧ *ID Type*

A numeral to indicate the ID type.

✧ *Length of ID Number*

A numeral to indicate the length of ID Numbers in <ID Number List>.

✧ *ID Number List*

A list of ID numbers. It is necessary to set <Length of ID Number> so that the quantity of the ID Numbers can be calculated.

Note

The ID numbers with different length cannot be issued together, and only a maximum of (1000/<Length of ID Number>) IDs can be stored at a time.This command can be issued multiple times, but it can only store a maximum of 1000 IDs and the configured IDs are valid only if <ID List Type> is set to 2 in the (AT+GTIDA) command .

3.7.10 TTR (Transparent Tachograph Transmission)

The command **AT+GTTTR** is used to transfer data between the backend server and the terminal .

Data to the backend server is wrapped into the message **TTR** (ASCII)/(HEX) and sent to the backend server.
Before using this command, please enable the CAN chip in (AT+GTCAN).

Example:
AT+GTTTR=gv355ceu,1,0001,,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	TTR	TTR
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Command Type	<=2	0-9 | 10-13	
	TTR Parameters(Optional)	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 "gv355ceu".

✧ *Command Type*

Command type to indicate the message that the server sends to the device.

- **0** - DDD file request. The reserved parameters are used as follows.

Fields	Length	Range/Format	Default
Request ID	4	0000-FFFF	
Report Mode	1	0-2	
Read File Type	1	1 - 7	
Start Time	14	YYYYMMDDHHMMSS	
End Time	14	YYYYMMDDHHMMSS	
Segment Mask	1	0 - F	F

- **1** - Send authorization APDU to the device. Two reserved parameters are used as follows.

Fields	Length	Range/Format	Default
Sequence Number of APDU	4	0000 - FFFF	
APDU DATA	<=512		
Reserved	0		
Reserved	0		
Reserved	0		

- **2** - DDD file request cancel. Cancel the previous request.
- **3** - Debug mode. Read the state of the device. Please do not send this command during the interaction of DDD file.

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- **4** - To restart TachoReader manually.
- **5** - Inquiry Tachograph model.
- **6** - Inquiry status of the device.
- **7** - Inquiry Tachograph driver 1 ID, name and surname.
- **10** - Check the current TachoReader connection environment and if the device is ready to download DDD.
- **11** - Set the file format of tachograph. Two reserved parameters are used as follows.

Fields	Length	Range/Format	Default
Tachograph File Format	1	0-2	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

- **12** - Change the type of communication with the tachograph used for supporting Tachograph Stoneridge gen 2.

Fields	Length	Range/Format	Default
Tacho Communication Type	<=2	0 | 5	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		

- **13** - Inquiry Tachograph driver 2 id, name and surname.

Note

Please do not issue the query command when requesting DDD file.

✧ *Request ID*

The identifier of the authorization request. The settings are different for each request.

✧ *Report Mode*

It indicates how the DDD file is reported to the end user.

- **0** - Through the message **+RESP:GTTRD**.
- **1** - Through FTP, and the command (AT+GTFTP) should be set.
- **2** - This mode is very similar to mode 1, except that it works in diagnostic mode. The downloaded file will contain diagnostic data sent to the producer for analysis, not the actual contents of the tachograph or driver card file.

✧ *Read File Type*

The DDD file needs to be read.

- **Bit 0** - Request to read TACHOGRAPH memory.
- **Bit 1** - Request to read driver card in slot 1.
- **Bit 2** - Request to read driver card in slot 2.

✧ *Start Time*

Date and time at the beginning of the file to read from Tachograph. The value will transform

in Unix Timestamp. If the memory of the Tachograph is not read, the data can be any value. If this parameter is not set, the memory of the Tachograph will be read from the date of the last reading. If this parameter is an invalid value, the memory of the tachograph will be read from the data when previous read is performed.

✧ *End Time*

Date and time at the end of the file to read from Tachograph. The value will transform in Unix Timestamp. If the memory of the Tachograph is not read, the data can be any value. If this parameter is not set or invalid value, the memory of the Tachograph will be read from the current date.

Note

If <Start Time> and <End Time> are set to the future time, the memory of the Tachograph will be read from the date of the last reading.

✧ *Segment Mask*

It is additional markers for reading tachograph memory if <Read file Type> bit0 is set 1, excluding certain blocks from download to reduce the size of downloaded file.

- **Bit 0** - Download activities
- **Bit 1** - Download errors
- **Bit 2** - Download detailed speed
- **Bit 3** - Download technical data

✧ *Sequence Number of APDU*

The serial number of reply APDU, it should keep the same as that sent from the terminal to server.

✧ *APDU Data*

It is the APDU Data for CAN_Logistic.

And it is the ASCII form of hexadecimal value.

✧ *Tachograph File Format*

It indicates the file format of tachograph.

- **0** - DDD (most common European format)
- **1** - TGD (format required in Spain)
- **2** - V1B/C1B (according to French "Vehicule appendix 1 B")

✧ *Tacho Communication Type*

It gives the possibility to change the type of communication with the tachograph.

- **0** - Standard type of tacho communication.
- **5** - New type of tacho communication.

3.7.11 UDT (User-defined Data Transfer)

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

Example: AT+GTUDT=gv355ceu,0,,0,0,,1,,00087FFF,,,,,,0000$

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Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	UDT	UDT
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Mode	1	0-2	0
	Reserved	0		
	IGN Send Interval	<=3	0 | 5 - 250(s)	0
	IGF Sending Mode	1	0 | 1	0
	Reserved	0		
	Event Mask	<=8	00000000 - FFFFFFFF	1
	Reserved	0		
	Report Item Mask	<=8	00000000 - FFFFFFFF	00087FFF
	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 "gv355ceu".

✧ *Mode*

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

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

Note

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

✧ *IGN Send Interval*

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

✧ *IGF Sending Mode*

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

(AT+GTTOW).

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

✧ *Event Mask*

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

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

✧ *Report Item Mask*

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

- **Bit 0** - for Full Protocol Version, Firmware Version
- **Bit 1** - for Hardware Version
- **Bit 2** - for Unique ID
- **Bit 3** - for Device Name
- **Bit 4** - for Speed
- **Bit 5** - for Azimuth
- **Bit 6** - for Altitude
- **Bit 7** - for MCC, MNC, LAC, Cell ID and Position Append Mask.
- **Bit 8** - for Mileage
- **Bit 9** - for HMC
- **Bit 10** - for GSV
- **Bit 11** - for GEO State
- **Bit 12** - for Analog Input
- **Bit 13** - for Digital Input, Digital Output, Motion Status
- **Bit 14** - for External Power VCC, Backup Battery Level, Charging
- **Bit 15** - for GEO Status Mask
- **Bit 16** - for PEO State
- **Bit 17** - for PEO Status Mask
- **Bit 18** - Reserved
- **Bit 19** - for Send Time, the time when the message is generated.
- **Bit 20-31** - Reserved

3.7.12 URT (Serial Port Setting)

The serial port of the device is used to connect with external devices to extend the application of the device. The command **AT+GTURT** is used to configure the working mode of the serial port for different external devices and the parameters for the serial port communication.

Example: AT+GTURT=gv355ceu,0,12,8,1,0,0,,,,FFFF$

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Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	URT	URT
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Mode	<=2	0 | 1 | 3 | 4 | 6-9 | 20 | 22 | 28 | 32 | 33 | 41	0
	Baud Rate Index	<=2	1-12	12
	Data Bits	1	7 | 8	8
	Stop Bits	1	1-3	1
	Parity Bits	1	0-2	0
	Sleep Mode	1	0-3	0
	Reserved	0		
	Reserved (Optional)	0		
	Reserved (Optional)	0		
	Reserved (Optional)	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 "gv355ceu".

✧ *Mode*

It configures the working mode of **AT+GTURT**.

- **0** - Disable UART.
- **1** - Use UART to transfer data via (AT+GTDAT) and other protocol commands. When the (AT+GTDAT) command is executed, the device will respond with the execution result to the secondary serial port. "OK" is returned when the command is executed successfully, and "Error" is returned when the command fails to be executed.
- **3** - Used for specific RFID card reader to communicate with UART of the terminal. The terminal will report the card ID received from the card reader to the backend server via the message (IDA(ASCII))/(HEX).

Fields	Length	Range/Format	Default
RFID Type	1	2-4	4
Reserved	0		
Reserved	0		

- **4** - Used for digital fuel sensor.

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Fields	Length	Range/Format	Default
Digital Fuel Sensor Type	1	0-4 | 6 | 9	0
Reserved	0		
Reserved	0		

Note

Different fuel sensors support different baud rates, so make sure that the baud rate set is suited for the sensor.

- **6** - Used to transfer data from secondary serial port to the backend server. When the serial port receives a special byte defined in <Terminator Character>, the reserved parameters are used as follows. When the size of the data received exceeds 1280 bytes, it will also compose responses and send them to the server.

Fields	Length	Range/Format	Default
Format	1	0 - 1	0
Terminator Character	2	0x00 - 0xFF	0D
Reserved	0		

- **7** - Used for transparent transfer based on <Interval> and <Length>. The hexadecimal data in (+RESP:GTDTT) is packed in ASCII format codes. The reserved parameters are used as follows.

Fields	Length	Range/Format	Default
Interval	<=4	1-3600(s)	
Length	<=4	1 - 640	
Format	1	0 - 1	0

- **8** - Used for transparent transfer based on <Interval> and <Length>. The data in **+RESP:GTDTT** is packed in raw HEX format codes. The reserved parameters are used as follows.

Fields	Length	Range/Format	Default
Interval	<=4	1-3600(s)	
Length	<=4	1 - 1280	
Format	1	0 - 1	0

- **9** - Used for camera.
- **20** - Used for sending out NMEA sentences. All the following types of NMEA sentences are selectable.

Fields	Length	Range/Format	Default
NMEA Send Mask	<=4	0000 - FFFF	7F
Reserved	0		
Reserved	0		

The bitwise mask to configure whether to output the specific NMEA sentence:

- Bit 0 for $RMC
- Bit 1 for $GSV

- Bit 2 for $GSA
- Bit 3 for $GGA
- Bit 4 for $GLL
- Bit 5 for $VTG
- Bit 6 for $TXT

Note

GPGSV is the statement for GPS satellites in view; GLGSV is the statement for GLONASS satellites in view; GNGSV is the statement for more than one constellation, such as GPS+GLONASS; and BDGSV is the statement for Beidou satellites in view.

Note

The When the parameter <Mode> is set to 20, the Baud Rate needs to be set to greater than or equal to 33900.

- **22** - Used for the WRT100 accessory. In this mode, configure the following settings: 9600 baud rate, 8 data bits, no parity and 1 stop bit.

Fields	Length	Range/Format	Default
Reserved	0		
Reserved	0		
Reserved	0		

- **28** - Used for communication with TPT2. When the TPT2 sends any AT protocol command to the terminal by RS232, the terminal needs to execute the AT command, reply the ACK confirmation to TPT2 by RS232, and then send the **+RESP:** message to the backend server. If TPT2 sends any other message that does not begin with AT command, the terminal will send the **DAT** (ASCII)/(HEX) message to the backend server.

Fields	Length	Range/Format	Default
Reserved	0		
Reserved	0		
Reserved	0		

- **32** - Used for thermograph. The reserved parameters are used as follows.

Fields	Length	Range/Format	Default
Thermograph Type	1	0-2	0
Reserved	0		
Reserved	0		

- **33** - Use UART to transfer data via (AT+GTMCT) and other protocol commands. When the (AT+GTMCT) command is executed, the device will respond with the execution result to the secondary serial port. "OK" is returned when the command is executed successfully, and "Error" is returned when the command fails to be executed.

Fields	Length	Range/Format	Default
Hex Convert Mode	1	0 | 1	0
Reserved	0		
Reserved	0		

- **41** - Used for the TPM (Tire Pressure Monitoring), the device will report the tire data to the server with the report **TPM** (ASCII)/(HEX).

Note

When the <Accessory Type> is set to 0 in mode 41, the following settings are required: 9600 baud rate, 8 data bits, no parity bits, and 1 stop bit.

✧ *Baud Rate Index*

The index of the supported baud rate of the serial port. All supported baud rates are listed below:

Index	Baud Rate
1	1200
2	2400
3	4800
4	7200
5	9600
6	14400
7	19200
8	28800
9	33900
10	38400
11	57600
12	115200

✧ *Data Bits*

The data bits of the UART. The parameter value can be 7 or 8.

✧ *Stop Bits*

Stop bits of the UART. The parameter value can be 1, 2 or 3.

- **1** - 1 Stop bit
- **2** - 2 Stop bits
- **3** - 1.5 Stop bits

✧ *Parity Bits*

The parity bits of the UART. The parameter value can be 0, 1, 2.

- **0** - None parity
- **1** - Odd parity
- **2** - Even parity

✧ *Sleep Mode*

The device supports the sleep mode which helps reduce power consumption. When the device enters the sleep mode, the response to the serial port will be very slow unless the device is waked up. This parameter is used to enable/disable the sleep mode of the device.

- **0** - Disable the sleep mode and enable automatic online mode.
- **1** - Enable the sleep mode and enable automatic online mode.
- **2** - Disable the sleep mode and disable automatic online mode.
- **3** - Enable the sleep mode and disable automatic online mode.

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Note

If the working mode of (AT+GTURT) is 12, this parameter should be set to 2 or 3.

✧ *Digital Fuel Sensor Type*

The type of the digital fuel sensor connected with serial port.

- **0** - EPSILON ES2 or ES4
- **1** - LLS 20160
- **2** - DUT-E
- **3** - QFS100
- **4** - UFSxxx
- **6** - DUT-E SUM
- **9** - Genesis Fuel_Con

✧ *RFID Type*

The type of RFID connected with serial port.

- **2** - MR2. 9600 baud rate, 8 data bits, 1 stop bit and no parity.
- **3** - VD RFID. 9600 baud rate, 8 data bits, 1 stop bit and no parity.
- **4** - DR100. 19200 baud rate, 8 data bits, 1 stop bit and no parity.

✧ *Format*

It controls the format of data transfer from secondary serial port to backend server when <Mode> is 6, 7, 8.

- **0** - Short format
- **1** - Long format

✧ *Interval*

If <Mode> is 7 or 8 and no data is received for a period longer than <Interval>, the data in UART buffer will be sent.

✧ *Terminator Character*

When secondary serial port receives this character, data in front of <Terminator Character> will be packed into the message **+RESP:GTDTT** and sent to the backend server. This parameter is valid when <Mode> is 6.

✧ *Length*

The maximum length of data in the message **+RESP:GTDTT** when <Mode> is 7 or 8.

✧ *Thermograph Type*

The type of thermometer connected to the serial port.

- **0** - FMA1000.
- **1** - TRANSCAN-2. The thermograph supports a full-duplex RS232 message protocol with 8-bit characters and no parity operating at the user specified baud rate (300 to 9600).
- **2** - TRANSCAN-ADVANCE. The thermograph supports a full-duplex RS232 message protocol with 8-bit characters and no parity operating at a baud rate of 19200.

✧ *Hex Convert Mode*

Whether to convert received HEX data into ASCII format.

- **0** - Disable.
- **1** - Convert the received HEX data into ASCII format.

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3.7.13 WRT (RF433 Accessory)

The command **AT+GTWRT** is used to configure the parameters for RF433 accessories.

Before using this command, the <Mode> in the (AT+GTURT) command should be set to 22.

Example:
AT+GTWRT=gv355ceu,1,0,2,1,4,5,,,,,0005$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	WRT	WRT
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Accessory Type ID	1	0 | 1	1
	Sample Interval	<=3	0 | 3 - 255(x10s)	0
	Temperature Threshold	<=2	2 - 30(x1 Centigrade)	2
	Humidity Threshold	<=3	1 - 100(x1%)	1
	Pair Count	<=2	0 - 10	4
	Pair Time	<=2	1 - 30(min)	5
	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 "gv355ceu".

✧ *Accessory Type ID*

The ID which indicates the type of the accessory.

- **0** - Wireless temperature sensor (WTS100)
- **1** - Wireless temperature & humidity sensor (WTH100)

✧ *Sample Interval*

It is used to set the sample interval. If sample interval is set to 0, the sensors will collect the data every 5 minutes and the data will be reported only when:

|Current temperature value - last reported temperature value| >=Temperature Threshold

or

|Current humidity value - last reported humidity value| >= Humidity Threshold

✧ *Temperature Threshold*

It is used to set the temperature change threshold. Temperature threshold will be ignored if <Sample Interval> is not 0.

✧ *Humidity Threshold*

It is used to set the humidity change threshold. Humidity threshold will be ignored if <Sample Interval> is not 0.

Note

It is only used when <Accessory Type ID> is 1.

✧ *Pair Count*

The count of accessories. When the count of pairing reaches <Pair Count>, the device will stop pairing.

✧ *Pair Time*

The time for pairing accessory. When the time of pairing reaches <Pair Time>, the device will stop pairing.

Note

All the parameters can be configured independently except <Pair Count> and <Pair Time>.

3.7.14 HUM (Humidity Alarm)

This command is used to set a humidity alarm range for the terminal. According to the working mode, the terminal will report the event message **HUM** (ASCII)/(HEX) to the backend server when the humidity outside or within the range is detected.

Example:
AT+GTHUM=gv355ceu,0,1,28131A4103000056,,,0,30,,,2,10,,,2,0,178,207,,,,,0010$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	HUM	HUM
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Alarm ID	1	0 - 3	
	Mode	1	0-3	0
	Sensor ID	16	'0'-'9' 'a'-'f' 'A'-'F'	
	Reserved	0		
	Reserved	0		
	Low Humidity	<=3	0 - 100(%RH)	0
	High Humidity	<=3	0 - 100(%RH)	0
	Reserved	0		
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	Validity	<=2	1 - 10	2
	Send Interval	<=2	0 - 60	10
	Reserved	0		
	Reserved	0		
	Output ID	1	0 - 3	0
	Output Status	1	0 - 2	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 "gv355ceu".

✧ *Alarm ID*

The ID of the humidity alarm. A total of four samples are supported.

✧ *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 is within/outside the humidity range defined by <Low Humidity> and <High Humidity>. In this mode, <Send Interval> will be ignored.

✧ *Sensor ID*

The ID of the humidity sensor. A total of four sensors are supported.

✧ *Low Humidity*

The lower humidity limit.

✧ *High Humidity*

The upper humidity limit.

✧ *Validity*

If the humidity sensor detects that the ambient humidity meets the alarm condition, it will continuously check the humidity based on the <Data Read Timer> set in (AT+GTACD). If the humidity keeps meeting the alarm condition for <Validity> times, the humidity alarm will be triggered.

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✧ *Send Interval*

After <Validity> checking, the device will report humidity alarm every <Send Interval> times of humidity reading based on reading timer of humidity sensor. If <Send Interval> is set to 0, it will report the humidity alarm only once.

3.7.15 ACD (1-Wire Setting)

The command **AT+GTACD** is used to configure the parameters of 1-Wire devices.

Example: AT+GTACD=gv355ceu,1,0,0,0,0,10,0,,1,,0005$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	ACD	ACD
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	ID Read Timer	<=2	0 | 1 - 10(s)	0
	Output ID	1	0 - 3	0
	Output status	1	0 - 2	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Timer	<=3	0 - 255	0
	Data Read Timer	<=3	0 | 10 - 255(s)	0
	EIO100 Connection	1	0 | 1	0
	Reserved	0		
	1-wire Data Mask	<=2	0 - FF	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 "gv355ceu".

✧ *ID Read Timer*

The interval for searching the 1-wire ID, including iButton, DR200 ID. A specified wave shape can be configured to the specified output port when the device reads 1-wire ID. And 1-Wire ID information is reported in the message **+RESP:GTIDA** (ASCII)/(HEX).

Note

The iButton ID number is in the reverse order of the number printed on iButton. The ID consists of **<1 Byte Family ID> + <6 Byte Serial Number> + <1 Byte CRC>**. And the first byte of ID number

is family ID of iButton, DR200.

✧ *Data Read Timer*

The interval for reading the 1-wire sensor data. If more than one sensor is connected to 1-wire, the device will read the sensor data from the 1-wire sensors one by one at the interval specified by <Data Read Timer>. 0 means "Disable 1-wire sensor data detection".

✧ *EIO100 Connection*

A numeral to indicate whether EIO100 is connected to 1-Wire.

- **0** - EIO100 is not connected to 1-Wire.
- **1** - EIO100 is connected to 1-Wire.

✧ *1-wire Data Mask*

Bitwise mask to control the composition of data types read by <Data Read Timer>. 1-Wire data information is reported in the message **+RESP:GTERI** (ASCII)/(HEX).

- **Bit 0** - Temperature data.
- **Bit 1** - Humidity data.

Note

The maximum number of 1-wire devices is one ID read sensor and four other sensors.

3.7.16 IEX (Input Expansion)

The command **AT+GTIEX** is used to configure the parameters of expanded inputs. If the logic status is changed on one of the expanded input ports, the device will report the message **DIS** (ASCII)/(HEX) to the backend server.

Example:
AT+GTIEX=gv355ceu,0,,1,9,0,,,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	IEX	IEX
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Input Expansion Type	1	0 | 1	0
	Bind BAS Index	1	0 - 9	0
	Input Number	1	1 | 1 - 4	
	Input ID	1	8 | 9 - C	
	Sample Period	<=2	0 | 1 - 12(x4s)	0
	Reserved	0		
	Reserved	0		
	Reserved	0		

Parts	Fields	Length	Range/Format	Default
	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 "gv355ceu".

✧ *Input Expansion Type*

It is used to indicate which extended device the following parameters are used for.

- **0** - EIO100 Setting. In this mode, it's necessary to enable EIO100 device.
- **1** - Bluetooth Accessory Input Setting. In this mode, it's necessary to enable external Input/Output Bluetooth Accessory.

Note

Due to the limitation of the detection mechanism, changing the input state in a short time may not be detected.

✧ *Bind BAS Index*

It is used to bind the specific configuration in (AT+GTBAS) when <Input Expansion Type> is set to 1, and it will be ignored if <Input Expansion Type> is set to 0.

✧ *Input Number*

The total number of the configured inputs.

If <Input Expansion Type> is set to 0, it indicates the number of configured EIO100 inputs. In one configuration, <Input ID> and <Sample Period> are included.

If <Input Expansion Type> is set to 1, it indicates the number of configured Bluetooth Input Setting. In one configuration, <Input ID> is included and others are reserved.

✧ *Input ID*

The ID of the configured inputs.

The ID ranges from 9 to C in HEX format is EIO100 input.

The ID of 8 is Bluetooth accessory input and the parameters <Accessory Type> and <Accessory Model> should be set in (AT+GTBAS).

✧ *Sample Period*

The sampling period for reading EIO100 input status. It will be ignored if the <Input Expansion Type> is set to 1.

3.7.17 OEX (Output Expansion)

The **AT+GTOEX** command is used to output wave shape 1 on expanded output.

Example:
AT+GTOEX=gv355ceu,0,,1,9,0,0,0,,,0,,,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	OEX	OEX
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Output Expansion Type	1	0 | 1	0
	Bind BAS Index	1	0 - 9	0
	Output Number	1	1 - 2 | 1 - 4	
	Output ID	1	7 - 8 | 9 - C	
	Status	1	0 | 1	0
	Duration	<=3	0 - 255(x100ms)	0
	Toggle Times	<=3	0 - 255	0
	Reserved	0		
	Reserved	0		
	DOS Report	1	0 - F	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 "gv355ceu".

✧ *Output Expansion Type*

It's used to indicate which extended device the following parameters are used for.

- **0** - EIO100 Setting. In this mode, it's necessary to enable EIO100 device.
- **1** - Bluetooth Output Accessory Setting. In this mode, it's necessary to enable external Input/Output Bluetooth Accessory.

✧ *Output Number*

It is used to indicate the number of the following special parameters.

If <Output Expansion Type> is set to 0, it indicates the number of configured EIO100 outputs. In one set of output configuration, <Output ID>, <Status>, <Duration> and <Toggle Times> are included and others are reserved.

If <Output Expansion Type> is set to 1, it indicates the number of configured Bluetooth Output Setting. In one configuration, <Bind BAS Index>, <Output ID>, <Status>, <Duration>, <Toggle Times>, <Reserved>, <Reserved> and <DOS Report> are included and others are reserved.

✧ *Output ID*

The ID of the configured outputs.

The ID ranges from 9 to C in HEX format is EIO100 output.

The ID ranges from 7 to 8 is Bluetooth accessory output and the parameters <Accessory Type> and <Accessory Model> should be set in (AT+GTBAS).

✧ *DOS Report*

Whether to report **DOS** (ASCII)/(HEX) when the state of output wave shape 1 changes. 1 means "Report **+RESP:GTDOS**", and 0 means "Do not report **+RESP:GTDOS**".

If <Output Expansion Type> is set to 0:

- **Bit 0** - For EIO100 output 9 (not) to report **+RESP:GTDOS**.
- **Bit 1** - For EIO100 output A (not) to report **+RESP:GTDOS**.
- **Bit 2** - For EIO100 output B (not) to report **+RESP:GTDOS**.
- **Bit 3** - For EIO100 output C (not) to report **+RESP:GTDOS**.

If <Output Expansion Type> is set to 1:

- **Bit 0** - For EIO100 output 7 (not) to report **+RESP:GTDOS**.
- **Bit 1** - For EIO100 output 8 (not) to report **+RESP:GTDOS**.

3.7.18 TMP (Temperature Alarm)

The command **AT+GTTMP** is used to set a temperature alarm range for the terminal. According to the working mode, the terminal will report the event message **TMP** (ASCII)/(HEX) to the backend server when the temperature outside or within the range is detected.

Example:
AT+GTTMP=gv355ceu,0,1,28131A4103000056,,,-20,50,,,2,10,,,0,0,0,0,,,,,000C$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	TMP	TMP
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Alarm ID	1	0 - 3	
	Mode	1	0-3	0
	Sensor ID	16	'0'-'9' 'a'-'f' 'A'-'F'	
	Reserved	0		
	Reserved	0		
	Low Temperature	<=3	-55 - 125(centigrade)	0
	High Temperature	<=3	-55 - 125(centigrade)	0
	Reserved	0		
	Reserved	0		
	Validity	<=2	1 - 10	2
	Send Interval	<=2	0 - 60	10
	Reserved	0		

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Parts	Fields	Length	Range/Format	Default
	Reserved	0		
	Output ID	1	0 - 3	0
	Output Status	1	0 - 2	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 "gv355ceu".

✧ *Alarm ID*

The ID of the temperature alarm. A total of four samples (0-3) are supported.

✧ *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 is within or outside the temperature range defined by <Low Temperature> and <High Temperature>. In this mode, <Send Interval> will be ignored.

✧ *Sensor ID*

The ID of the temperature sensor. A total of four sensors are supported.

✧ *Low Temperature*

The lower temperature limit.

✧ *High Temperature*

The upper temperature limit.

✧ *Validity*

If the temperature sensor detects that the ambient temperature meets the alarm condition, it will continuously check the temperature based on the reading timer <Data Read Timer> set in the command (AT+GTACD). If the temperature keeps meeting the alarm condition for <Validity> times, the temperature alarm will be triggered.

✧ *Send Interval*

After <Validity> checking, the device will report temperature alarm every <Send Interval> times of temperature reading based on temperature sensor's reading timer. If <Send Interval> is set to 0, it will only report the temperature alarm once.

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3.7.19 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=gv355ceu,1,30,60,C00FFFFF,3,,1FFFFF,1,C0,0,50,1,3,1200,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'	gv355ceu
Body	Mode	1	0-3	0
	CAN Report Interval	<=5	0 | 5 - 86400(s)	0
	CAN Report Interval IGF	<=5	0 | 5 - 86400(s)	0
	CAN Report Mask	<=8	0 - FFFFFFFF	C00FFFFF
	Additional Event Mask	<=2	0 - FF	0
	Reserved	0		
	CAN Report Expansion Mask	<=8	0 - FFFFFFFF	1FFFFF
	GNSS Assisted Mode	1	0 | 1	0
	Electric Report Mask	<=8	0 - FFFFFFFF	C0
	Tacho Report Mask	<=8	0 - FFFFFFFF	0
	Tacho Report Interval	<=5	0 | 5 - 86400	0
	CAN Report Expansion Mask1	<=8	0 - FFFFFFFF	1
	Tachograph Driver1 Working Time Mask	<=8	0 - FFFFFFFF	0
	Tachograph Driver2 Working Time Mask	<=8	0 - FFFFFFFF	0
	Reserved	0		
	Reserved	0		
	Tacho Driver Work Time Mode	1	0-3	2
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 "gv355ceu".

✧ *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.
- **2** - Enable the CAN chip. In this mode, only the Tachograph information will be reported.
- **3** - Enable the CAN chip. In this mode, both CANBUS and Tachograph 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.
- **Bit 1** - When the value of <Tachograph Driver 1 Card Number> changes.
- **Bit 2** - When the value of <Tachograph Driver 2 Card Number> changes.
- **Bit 3** - When the Driver1 working status in the parameter <Tachograph Information> changes.
- **Bit 4** - When the Driver2 working status in the parameter <Tachograph Information> changes.
- **Bit 5** - When the value of <Ignition Key> changes.
- **Bit 6** - When the "Out of Scope" condition in the parameter <Tachograph Information Expand> changes.

✧ *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 30	<GNSS Information>	Including <GNSS Accuracy>, <Speed>, <Azimuth>, <Altitude>, <Longitude>, <Latitude>, <GNSS UTC Time>.
Bit 29		If this bit is set to 1, the parameter <CAN

Bit	Item	Description
	<CAN Report Expansion Mask>	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	<Electric Report Mask>	If this bit is set to 1, the parameter <Electric Report Mask> in **AT+GTCAN** is valid. If this bit is set to 0, the parameter <Electric Report Mask> in **AT+GTCAN** is invalid.
Bit 27	<Handbrake Applies During Ride Count>	Counts events when handbrake is pulled-up while driving (speed is greater than 5 km/h).
Bit 26	<Total Engine Cold Running Time>	Total driving time with cold engine (engine coolant temperature below 70 degrees centigrade).
Bit 25	<Engine Starts by Ignition Count>	Total number of Engine starts by ignition.
Bit 24	<Engine All Starts Count>	Total number of Engine starts.
Bit 23	<Engine Cold Starts Count>	Number of cold Engine starts.
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 CAN Module configuration.
Bit 20	<Total Vehicle Overspeed Time>	The total time when the vehicle speed is greater than the limit defined in CAN Module 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.

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Bit	Item	Description
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 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	<CAN Report Expansion Mask1>	If this bit is set to 1, the parameter <CAN Report Expansion Mask1> in **AT+GTCAN** is valid.
		If this bit is set to 0, the parameter <CAN Report Expansion Mask1> in **AT+GTCAN** is invalid.

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Bit	Item	Description
Bit 30	<Tachograph Information Expand>	A 4-byte hexadecimal number. It is an expansion of the parameter <Tachograph Information>.
Bit 29	<Gaseous Fuel Level>	The alternative fuel levels.
Bit 28	<DTC Codes>	
Bit 27	<Tachograph Driver2 Working Time Mask>	If this bit is set to 1, the parameter <Tachograph Driver2 Working Time Mask> in **AT+GTCAN** is valid.
		If this bit is set to 0, the parameter <Tachograph Driver2 Working Time Mask> in **AT+GTCAN** is invalid.
Bit 26	<Tachograph Driver1 Working Time Mask>	If this bit is set to 1, the parameter <Tachograph Driver1 Working Time Mask> in **AT+GTCAN** is valid.
		If this bit is set to 0, the parameter <Tachograph Driver1 Working Time Mask> in **AT+GTCAN** is invalid.
Bit 25	<Ambient Temperature>	
Bit 24	<Service Distance>	It describes distance left to diagnostic car review.
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 CAN Module 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 CAN Module 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

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Bit	Item	Description
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 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

✧ *Electric Report Mask*

Bitwise mask to configure the composition of electric vehicle information in the **+RESP:GTCAN** message.

Bit	Item	Description
Bit 31	Reserved	
...		

Bit	Item	Description
Bit 16	<Charge State Optimization>	Use <Charging States> if available or "Speed = 0 and Engine speed = 0 and (Battery Charging Current > 0 or Battery Level keep increasing within 3 minutes)" or "Ignition off and (Battery Charging Current > 0 or Battery Level keep increasing within 3 minutes)"
Bit 15	Reserved	
Bit 14	<Total Energy Charged>	Sum of energy transmitted to battery from external charger.
Bit 13	<Total Energy Used When Idling>	With vehicle speed 0 km/h.
Bit 12	<Total Energy Used>	Sum of energy used by vehicle's engine and equipment; recuperated energy does not affect this parameter.
Bit 11	<Battery State of Health (SoH)>	For electric vehicles, it represents the battery general condition. 100% means brand new, 0% means totally damaged.
Bit 10	<Battery Instantaneous Power>	For electric vehicles, it represents instantaneous power used by (positive values) or recuperated from (negative values) the vehicle.
Bit 9	<Battery Charging Current>	It indicates the electric vehicle's battery charging current.
Bit 8	<Battery Temperature>	It indicates the battery temperature.
Bit 7	<Charging States>	The status of battery charging and charging cable connection.
Bit 6	<Battery Level>	The battery charge level.
Bit 5	Reserved	
Bit 4	Reserved	
Bit 3	Reserved	
Bit 2	<Total Energy Recuperated>	Sum of energy transmitted to battery with no charger connected.
Bit 1	<Battery Charging Cycles Count>	For electric vehicles, it counts cycles of battery charging (increments at every finished cycle of charging).
Bit 0	<Battery Instantaneous Voltage>	For electric vehicles, it represents instantaneous high voltage of battery cells (Read from BMS).

✧ *GNSS Assisted Mode*

It specifies whether to use GNSS to calculate total distance when the communication between

the device and CAN Module is abnormal.

- **0** - Disable.
- **1** - Enable. When the communication between the device and CAN Module 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.

✧ *Tacho Report Mask*

A bitwise numeral to control whether to send the **+RESP:GTACN** message by tacho report mask, 0 means "Do not report **+RESP:GTACN** message".

Bit	Item	Description
Bit 31	Reserved	Reserved For Expansion
...		
Bit 3	<Tachograph Driver 2 Card Number>	The card number of tachograph driver 2
Bit 2	<Tachograph Driver 1 Card Number>	The card number of tachograph driver 1
Bit 1	<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 0	<Ignition State>	The state of ignition, the hard-wired ignition line must be connected.

✧ *Tacho Report Interval*

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

✧ *CAN Report Expansion Mask1*

It expands CANBUS information in **+RESP:GTCAN**. Bitwise report mask to configure the composition of expanded CANBUS information of **+RESP:GTCAN**.

Bit	Item	Description
Bit 13 - 31	Reserved	
Bit 12	<Expansion2 Information>	A hexadecimal number. Each bit contains information of one indicator.
Bit 11	<VIN of Trailer>	Vehicle identification number.
Bit 10	<DPF Soot Level>	DPF soot level.
Bit 9	<Current Gear Number>	Current Gear Number.
Bit 8	<Axle Weight 7th>	Weight of vehicle's seventh axle.
Bit 7	<Axle Weight 6th>	Weight of vehicle's sixth axle.
Bit 6	<Axle Weight 5th>	Weight of vehicle's fifth axle.
Bit 5	<Oil Level>	Engine oil level, 100% is the maximum level allowed by producer.
Bit 4	<Oil Temperature>	Oil temperature.

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Bit	Item	Description
Bit 3	Reserved	
Bit 2	<Tacho Timestamp>	Real time clock is a date and time displayed on the vehicle's dashboard, usually read from tachograph.
Bit 1	<Power Mode>	Power mode.
Bit 0	<Retarder Usage>	The usage of Retarder.

✧ *Tachograph Driver1 Working Time Mask*

It expands CANBUS information in **+RESP:GTCAN**. Bitwise report mask to configure the composition of expanded CANBUS information of **+RESP:GTCAN**.

Bit	Item	Description
Bit 31	Reserved	
Bit 30	Reserved	
Bit 29	<Drv1 Maximum Daily Driving Time>	Driver 1: Maximum daily driving time.
Bit 28	<Drv1 Cumulative Uninterrupted Rest Time>	Driver 1: Cumulative uninterrupted rest time.
Bit 27	<Drv1 Current Weekly Driving Time>	Driver 1: Current weekly driving time.
Bit 26	<Drv1 Current Daily Driving Time>	Driver 1: Current daily driving time.
Bit 25	<Drv1 Accumulated Driving Time Previous and Current Week>	Driver 1: Accumulated driving time previous and current week.
Bit 24	<Drv1 Current Duration of Selected Activity>	Driver 1: Current duration of selected activity.
Bit 23	<Drv1 Cumulative Break Time>	Driver 1: Cumulative break time.
Bit 22	<Drv1 Continuous Driving Time>	Driver 1: Continuous driving time.
Bit 21	Reserved	Reserved for Additional information.
Bit 20	<Drv1 Open Compensation in 2nd Week before Last>	Driver 1: Open compensation in the second week before last.
Bit 19	<Drv1 Open Compensation in Week before Last>	Driver 1: Open compensation in week before last.

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Bit	Item	Description
Bit 18	<Drv1 Open Compensation in the Last Week>	Driver 1: Open compensation in the last week.
Bit 17	<Drv1 Minimum Weekly Rest>	Driver 1: Minimum weekly rest.
Bit 16	<Drv1 Time Left until New Weekly Rest Period>	Driver 1: Time left until new weekly rest period.
Bit 15	<Drv1 Remaining Driving Time of Current Week>	Driver 1: Remaining driving time of current week.
Bit 14	<Drv1 Minimum Daily Rest>	Driver 1: Minimum daily rest.
Bit 13	<Drv1 Time Left until New Daily Rest Period>	Driver 1: Time left until new daily rest period.
Bit 12	<Drv1 Remaining Driving Time on Current Shift>	Driver 1: Remaining driving time on current shift.
Bit 11	<Drv1 Duration of Next Driving Period>	Driver 1: Duration of next driving period.
Bit 10	<Drv1 Time Left until Next Driving Period>	Driver 1: Time left until next driving period.
Bit 9	<Drv1 Remaining Time of Current Break Rest>	Driver 1: Remaining time of current break rest.
Bit 8	<Drv1 Duration of Next Break Rest>	Driver 1: Duration of next break rest.
Bit 7	<Drv1 Remaining Time until Next Break or Rest>	Driver 1: Remaining time until next break or rest.
Bit 6	<Drv1 Remaining Current Drive Time>	Driver 1: Remaining current drive time.
Bit 5	<Drv1 Number of Used Reduced Daily Rest Periods>	Driver 1: Number of times 9h daily driving times exceeded.
Bit 4	<Drv1 Number of Times 9h Daily Driving Times Exceeded>	Driver 1: Number of times 9h daily driving times exceeded.
Bit 3	<Drv1 Maximum Daily Period>	Driver 1: Tachograph drivers' maximum daily period.
Bit 2	<Drv1 End of Second Last Weekly Rest Period>	Driver 1: End of second last weekly rest period.

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Bit	Item	Description
Bit 1	<Drv1 End of Last Weekly Rest Period>	Driver 1: End of last weekly rest period.
Bit 0	<Drv1 End of Last Daily Rest Period>	Driver 1: End of last daily rest period.

✧ *Tachograph Driver2 Working Time Mask*

It expands CANBUS information in **+RESP:GTCAN**. Bitwise report mask to configure the composition of expanded CANBUS information of **+RESP:GTCAN**.

Bit	Item	Description
Bit 31	Reserved	
Bit 30	Reserved	
Bit 29	<Drv2 Maximum Daily Driving Time>	Driver 2: Maximum daily driving time.
Bit 28	<Drv2 Cumulative Uninterrupted Rest Time>	Driver 2: Cumulative uninterrupted rest time.
Bit 27	<Drv2 Current Weekly Driving Time>	Driver 2: Current weekly driving time.
Bit 26	<Drv2 Current Daily Driving Time>	Driver 2: Current daily driving time.
Bit 25	<Drv2 Accumulated Driving Time Previous and Current Week>	Driver 2: Accumulated driving time previous and current week.
Bit 24	<Drv2 Current Duration of Selected Activity>	Driver 2: Current duration of selected activity.
Bit 23	<Drv2 Cumulative Break Time>	Driver 2: Cumulative break time.
Bit 22	<Drv2 Continuous Driving Time>	Driver 2: Continuous driving time.
Bit 21	Reserved	Reserved for Additional information.
Bit 20	<Drv2 Open Compensation in 2nd Week before Last>	Driver 2: Open compensation in the second week before last.
Bit 19	<Drv2 Open Compensation in Week before Last>	Driver 2: Open compensation in week before last.
Bit 18	<Drv2 Open Compensation in the Last Week>	Driver 2: Open compensation in the last week.

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Bit	Item	Description
Bit 17	<Drv2 Minimum Weekly Rest>	Driver 2: Minimum weekly rest.
Bit 16	<Drv2 Time Left until New Weekly Rest Period>	Driver 2: Time left until new weekly rest period.
Bit 15	<Drv2 Remaining Driving Time of Current Week>	Driver 2: Remaining driving time of current week.
Bit 14	<Drv2 Minimum Daily Rest>	Driver 2: Minimum daily rest.
Bit 13	<Drv2 Time Left until New Daily Rest Period>	Driver 2: Time left until new daily rest period.
Bit 12	<Drv2 Remaining Driving Time on Current Shift>	Driver 2: Remaining driving time on current shift.
Bit 11	<Drv2 Duration of Next Driving Period>	Driver 2: Duration of next driving period.
Bit 10	<Drv2 Time Left until Next Driving Period>	Driver 2: Time left until next driving period.
Bit 9	<Drv2 Remaining Time of Current Break Rest>	Driver 2: Remaining time of current break rest.
Bit 8	<Drv2 Duration of Next Break Rest>	Driver 2: Duration of next break rest.
Bit 7	<Drv2 Remaining Time until Next Break or Rest>	Driver 2: Remaining time until next break or rest.
Bit 6	<Drv2 Remaining Current Drive Time>	Driver 2: Remaining current drive time.
Bit 5	<Drv2 Number of Used Reduced Daily Rest Periods>	Driver 2: Number of times 9h daily driving times exceeded.
Bit 4	<Drv2 Number of Times 9h Daily Driving Times Exceeded>	Driver 2: Number of times 9h daily driving times exceeded.
Bit 3	<Drv2 Maximum Daily Period>	Driver 2: Tachograph drivers' maximum daily period.
Bit 2	<Drv2 End of Second Last Weekly Rest Period>	Driver 2: end of second last weekly rest period.
Bit 1	<Drv2 End of Last Weekly Rest Period>	Driver 2: end of last weekly rest period.
Bit 0	<Drv2 End of Last Daily Rest Period>	Driver 2: end of last daily rest period.

✧ *Tacho Driver Work Time Mode*

The working mode of querying tachograph about drivers' working times.

- **0** - Querying is disabled at all. Drivers' working times are not available.
- **1** - Querying is enabled only when ignition is on (for vehicles which don't support ignition signal from CANBUS when engine is on). When ignition/engine is off, times are not updated.
- **2** - Querying is enabled when CANBUS is active. When car goes into sleep mode, querying is continued until all drivers with cards inserted have changed their working mode to REST. Then querying stops. When car's CAN-bus gets active again, querying is resumed.
- **3** - Querying is always enabled, even if car is in sleep mode. Caution! This may keep the tachograph awake and lead to increased power consumption by car's components.

3.7.20 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=gv355ceu,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
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Group ID	<=2	0 - 19	0
	Mode	1	0 | 1	0
	Debounce Time	<=3	0 - 255(x1s)	0
	CAN Data Mask	8	00000000 - FFFFFFFF	000FFFFF
	Alarm Mask 1	<=8	0 - FFFFFFFF	0
	Alarm Mask 2	<=8	0 - FFFFFFFF	0

Parts	Fields	Length	Range/Format	Default
	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 - 3 | 9 - C	0
	Output Status	1	0 - 2	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 "gv355ceu".

✧ *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.

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Bit	Item	Description
Bit 28	Reserved	
Bit 27	<Handbrake Applies During Ride Count>	Counts events when handbrake is pulled-up while driving (speed is greater than 5 km/h).
Bit 26	<Total Engine Cold Running Time>	Total driving time with cold engine (engine coolant temperature below 70 degrees Centigrade).
Bit 25	<Engine Starts by Ignition Count>	Total number of Engine starts by ignition.
Bit 24	<Engine All Starts Count>	Total number of Engine starts.
Bit 23	<Engine Cold Starts Count>	Number of cold Engine starts.
Bit 21	<Total Vehicle Engine Overspeed Time>	The total time when the vehicle engine speed is greater than the limit defined in CAN Module configuration.
Bit 20	<Total Vehicle Overspeed Time>	The total time when the vehicle speed is greater than the limit defined in CAN Module 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

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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.

Note

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

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)

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Bit	Alarm Mask 1
Bit 24	ESP - ESP failure indicator (1 - on, 0 - off or not available)
Bit 23	ABS - ABS failure indicator (1 - on, 0 - off or not available)
Bit 22	EH - engine hot indicator (1 - on, 0 - off or not available)
Bit 21	OP - oil pressure indicator (1 - on, 0 - off or not available)
Bit 20	BF - brake system failure indicator (1 - on, 0 - off or not available)
Bit 19	BAT - battery indicator (1 - on, 0 - off or not available)
Bit 18	CLL - coolant level low indicator (1 - on, 0 - off or not available)
Bit 17	BFL - brake fluid low indicator (1 - on, 0 - off or not available)
Bit 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

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Bit	Alarm Mask 2
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	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
...	...

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Bit	Alarm Mask 3
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 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 28	<DTC Codes>	
Bit 27	Reserved	
Bit 26	Reserved	
Bit 25	<Ambient Temperature>	
Bit 24	<Service Distance>	The parameter describes distance left to diagnostic car review.
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 CAN Module settings of speed increase time and value.

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

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

✧ *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.

3.7.21 RCS (RS485 Configuration)

The command **AT+GTRCS** is used to configure RS485 related settings for the device to be connected with multiple external devices via RS485.

Example:
AT+GTRCS=gv355ceu,,,12,8,1,0,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	RCS	RCS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Reserved	0		
	Reserved	0		
	Baud Rate Index	<=2	1-12	12
	Data Bits	1	7 - 8	8
	Stop Bits	1	1-3	1
	Parity Bits	1	0-2	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 "gv355ceu".

✧ *Baud Rate Index*

The index of the supported baud rate of the serial port. All supported baud rates are listed below:

Baud Rate Index	Baud Rate
1	1200
2	2400
3	4800
4	7200
5	9600
6	14400
7	19200
8	28800
9	33900
10	38400
11	57600
12	115200

✧ *Data Bits*

The data bits of the UART. The parameter value can be 7 or 8.

✧ *Stop Bits*

Stop bits of the UART. The parameter value can be 1, 2 or 3.

- **1** - 1 Stop bit
- **2** - 2 Stop bits

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- **3** - 1.5 Stop bits

✧ *Parity Bits*

The parity bits of the UART. The parameter value can be 0, 1 or 2.

- **0** - None parity
- **1** - Odd parity
- **2** - Even parity

3.7.22 RAS(RS485 Accessory Setting)

The command **AT+GTRAS** is used to configure RS485 accessory settings for the device to be connected with multiple external devices via RS485. Before using this command, please ensure that the configuration of RS485 in (AT+GTRCS) command is matched with <RS485 Device Model>.

Example:
AT+GTRAS=gv355ceu,3,,3,,02,,,13,3,FF,1,0,8,5,5,,5,0,1,10,FF00,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	RAS	RAS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Index	1	0 - 4	
	Reserved	0		
	RS485 Device Model	1	0-3	0
	Reserved	0		
	Device ID List	<=10		
	Reserved	0		
	Reserved	0		
	Optional Parameter Number	1	0 | 13 | 14	0
	Optional Parameter	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 "gv355ceu".

✧ *RS485 Device Model*

The following is supported:

- **0** - No RS485 device.

- **1** - UFS301 digital fuel sensor. 115200 baud rate, 8 data bits, 1 stop bit, and no parity. For this fuel sensor, the parameter <Temperature> in <RS485 Sensor Data> of the message **+RESP:GTERI** is reserved in ASCII format and forced to 0x7F in HEX format. In this mode, <Optional Parameter Number> is always 0.
- **2** - Escort TD500 digital fuel sensor. 19200 baud rate, 8 data bits, 1 stop bit, and no parity. In this mode, <Optional Parameter Number> is always 0.
- **3** - Modbus communication equipment. In this mode, the information will not be reported in <RS485 Sensor Data> of the message **+RESP:GTERI**.

✧ *Device ID List*

A list of RS485 Device ID to be updated to the Device ID list. Device ID is a one-byte hexadecimal value represented by two ASCII bytes. The range of device ID is from 0x01 to 0xFF. For example, if there are three device ID 0x01, 0x12 and 0x8A need to be set, the <Device ID List> should be 01128A.

✧ *Optional Parameter Number*

The <Optional Parameter Number> is used to control the number of **Optional Parameters**. For example, the **Optional Parameters** does not exist if <Optional Parameter Number> is 0, and the number of **Optional Parameters** is 13 if <Optional Parameter Number> is 13.

When <RS485 Device Model> is 3, the Modbus communication equipment is connected, and the following is supported:

Fields	Length	Range/Format	Default
Optional Parameter Number	1	13 | 14	13
Operating Mode	1	1 - 3	
Report Mask	<=2	0x0 - 0xFF	0x00
Read Function Code	<=2	0x0 - 0x10	0x00
Read Data From	<=4	0x0 - 0xFFFF	0x0000
Read Data To	<=4	0x0 - 0xFFFF	0x0000
Read Response Time	<=3	1 - 600 (x100ms)	10
Read Interval	<=4	0 | 5 - 3600(s)	5
Reserved	0		
Write Function Code	<=2	0x0 - 0x10	0x00
Write Data From	<=4	0x0 - 0xFFFF	0x0000
Write Data To	<=4	0x0 - 0xFFFF	0x0000
Write Response Time	<=3	1 - 600 (x100ms)	10
Write Data	<=500	'0'-'9' | 'A'-'F'	
Protocol Type	1	0 | 1	0

- *Operating Mode*

  The operating mode of ModBus feature.

  – **1** - Read Data
  – **2** - Write Data
  – **3** - Read and write Data

- *Report Mask*
  Bitwise mask to configure which event report should be sent to the backend server.
  - Bit 0: Read Data Response Timeout.
  - Bit 1: Write Data Response Timeout.
  - Bit 2: Read Data Success.
  - Bit 3: Write Data Success.
  - Bit 4: Modbus Error.
- *Read Data From, Read Data To*
  Read the data from parameter <Read Data From> to parameter <Read Data To>. If reading the registers, this parameter indicates the cutoff register address, value of parameter <Read Data To> minus <Read Data From> cannot be greater than 125(decimal). If reading the coils, this parameter indicates the number of coils to be read, value of parameter <Read Data To> cannot be greater than 2000(decimal).
- *Write Data From, Write Data To*
  Write the data from parameter <Write Data From> to parameter <Write Data To>. If writing the registers, this parameter indicates the cutoff register address, value of parameter <Write Data To> minus <Write Data From> cannot be greater than 125(decimal). If writing the coils, this parameter indicates the number of coils to be written, value of parameter <Write Data To> cannot be greater than 2000(decimal).
- *Read Response Time, Write Response Time*
  Time in milliseconds allowed by the Modbus Master for the slave to respond. If the slave does not respond within this time, the Modbus Master will retry the request or terminate the request with an error. The retry times is 2.
- *Read Interval*
  The interval for reading Modbus Slave data, set it to 0 means that the Modbus Slave data will be read once.
- *Write Data*
  The content of data written by Master to Slave.
- *Read Function Code, Write Function Code*
  The modbus function codes that are supported.
  - **0x00** - Reserved
  - **0x01** - Read Coils
  - **0x02** - Read Discrete Inputs
  - **0x03** - Read Holding Registers
  - **0x04** - Read Input Registers
  - **0x05** - Write Single Coil
  - **0x06** - Write Single Register
  - **0x07 - 0x0E** - Reserved
  - **0x0F** - Write Multiple Coils
  - **0x10** - Write Multiple Registers

Note

There are two formats for <Write Data>. The format can be indicated by <Write Function Code>. Here is the detail of this parameter:

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- For registers, each register has two bytes data. For example, <Write Data From> = 0x1800, <Write Data To>=0x1803, <Write Data> = 0x0123456701234567

H(1800)	L(1800)	H(1801)	L(1801)	H(1802)	L(1802)	H(1803)	H(1803)
01	23	45	67	01	23	45	67

- For coils, each bit of <Write Data> indicates the value of corresponding coil. Here is an example for two bytes. <Write Data From> = 0x0014, <Write Data To>=0x000A, <Write Data> = 0xCD01.

Addr	H(0014)								H(0014)							
Bit	1	1	0	0	1	1	0	1	0	0	0	0	0	0	0	1
Coil	21	20	19	18	17	16	15	14	29	28	27	26	25	24	23	22

- Here is an example for one byte. Start coil number is 10, writing the 5 coils, <Data From> = 0x0014, <Data To>=0x0005, <Write Data> = 0x0D.

Addr	(0014)							
Bit	0	0	0	0	1	1	0	1
Coil				14	13	12	11	10

✧ *Protocol Type*

This parameter indicates the type of MODBUS protocol supported.

- **0** - RTU format.
- **1** - ASCII format.

Note

The modbus data field supports 4 kinds of byte order, the default supported byte order is 1-0-3-2.

FLOAT (Floating-point numbers IEEE 754)

Data Length = 4 bytes (2 registers)

S = sign, E = exponent, M = mantissa

Byte 3	Byte 2	Byte 1	Byte 0
SEEEEEEE	EMMMMMMM	MMMMMMMM	MMMMMMMM

Bytes order of float:

Selection	1st	2nd	3rd	4th
1 - 0 - 3 - 2	Byte 1	Byte 0	Byte 3	Byte 2
0 - 1 - 2 - 3	Byte 0	Byte 1	Byte 2	Byte 3
2 - 3 - 0 - 1	Byte 2	Byte 3	Byte 0	Byte 1
3 - 2 - 1 - 0	Byte 3	Byte 2	Byte 1	Byte 0

INTEGER

Data Length = 2 bytes (1 register)

Byte 1	Byte 0
Most significant byte (MSB)	Least significant byte (LSB)

Bytes order of integer:

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Selection	1st	2nd
1 - 0 - 3 - 2 3 - 2 - 1 - 0	Byte 1 (MSB)	Byte 0 (LSB)
0 - 1 - 2 - 3 2 - 3 - 0 - 1	Byte 0 (LSB)	Byte 1 (MSB)

3.7.23 MCT (Multiple Command Transfer)

The command **AT+GTMCT** is used to transfer data between the device and the equipment connected through serial port. Data to the backend server is wrapped into message **DAT** (ASCII)/(HEX) and sent to the backend server while data to the equipment is directly output to the serial port unrestricted by the @Track protocol. Transparent transfer is used to transmit the data to the device.

Before this command is used, the (AT+GTURT) command should be used to set the parameters of the secondary serial port.

Example:
AT+GTMCT=gv355ceu,0,300,2,1,3,1,313233,1,343536,1,373839,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	MCT	MCT
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Group ID	1	0 - 4	
	Send Interval	<=5	0 | 80 - 86400(s)	0
	Send Debounce	1	0 - 5(s)	2
	Start Index	<=2	1 - 40	1
	End Index	<=2	1 - 40	1
	Command Select	1	0 | 1	0
	Command Data	<=28	HEX	
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 "gv355ceu".

✧ *Group ID*

The ID of the command group. One group contains up to 40 indexes of commands. A total of 5 groups are supported.

- *Send Interval*
  The period for sending same group data, 0 means this group is disabled.
- *Send Debounce*
  The time for switching command index in same group, 0 means all data in one group will be sent at once.
- *Start Index*
  The start index of the command content formed by <Command Select> and <Command Data>.
- *End Index*
  The end index of the command content formed by <Command Select> and <Command Data>.
- *Command Select*
  Whether to transfer data to the serial port.
  - **0** - Disable this parameter.
  - **1** - Enable this parameter to transfer data to the serial port.
- *Command Data*
  Data to be transferred to the serial port of the device. The input data consists of decimal digits, each 2 digits form a byte represented by hexadecimal.

3.7.24 TPM(Tire Pressure Monitoring)

The command **AT+GTTPM** is used to configure the parameters of tire pressure monitoring system. The message **TPM** (ASCII)/(HEX) will be reported to the backend server.

Example:
AT+GTTPM=gv355ceu,1,,,,,,60,,3F,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	TPM	TPM
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Mode	1	0 - 1	0
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Reserved	0		
	Send Interval	<=5	10 - 86400 (s)	60
	Reserved	0		
	Append Mask	<=4	0 - FFFF	3F

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

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gv355ceu".

✧ *Mode*

The working mode of the tire pressure monitoring.

- **0** - Disable the tire monitoring function.
- **1** - Fixed Time Report. The tire monitoring message **+RESP:GTTPM** is sent to the backend server periodically according to the parameter <Send Interval>.

✧ *Send Interval*

The report interval for tire monitoring message **+RESP:GTTPM**.

✧ *Append Mask*

Bitwise mask to configure the composition of appended items in the **+RESP:GTTPM** message. Each bit represents a field to be appended in the **+RESP:GTTPM** message. If a bit is set to 1, the corresponding field will be present in the message **+RESP:GTTPM**.

Mask Bit	Item
Bit 0(0001)	Tire Position (Optional)
Bit 1(0002)	Sensor ID (Optional)
Bit 2(0004)	Sensor Bat Vol (Optional)
Bit 3(0008)	Tire Pressure (Optional)
Bit 4(0010)	Tire Temperature (Optional)
Bit 5(0020)	Tire Status (Optional)
Bit 6(0040)	Reserved
Bit 7(0080)	Reserved
Bit 8(0100)	Reserved
Bit 9(0200)	Reserved
Bit 10(0400)	Reserved
Bit 11(0800)	Reserved
Bit 15(8000)	Reserved

3.7.25 CAS (CAN Module Settings)

The command **AT+GTCAS** is used to configure the CAN Module and get it running when needed. Each configuration change results in a re-initialization of the CAN Module and may affect the calculation of logistic parameters.

Example:
AT+GTCAS=gv355ceu,,,130,62,0,12,33,12,33,,0001$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	CAS	CAS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Reserved	0		
	Reserved	0		
	Speed Limit	<=3	1 - 250 (km/h)	130
	Over Engine Speed Limit	<=3	1 - 250 (x64 rpm)	62
	Lower Engine Speed Limit	<=3	0 - 249 (x64 rpm)	0
	AT	<=2	0 - 20	12
	AS	<=3	1 - 255	33
	BT	<=2	0 - 20	12
	BS	<=3	1 - 255	33
	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 "gv355ceu".

✧ *Speed Limit*

This speed limit refers to over-speed value. For example, if the vehicle speed exceeds the <Speed Limit>, it will count the over-speed time to <Total Vehicle Overspeed Time>.

✧ *Over Engine Speed Limit, Lower Engine Speed Limit*

This engine speed limit refers to engine speed value. For example, if the vehicle engine speed exceeds the <Speed Limit>, it will count the engine over-speed time to <Total Vehicle Engine Overspeed Time>.

The <Total Effective Engine Speed Time> is defined as time when engine speed is between <Over Engine Speed Limit> and <Lower Engine Speed Limit>.

Note

Lower engine speed limit (RL) must not be greater than Over engine speed limit (R).

✧ *AT-AS*

It affects the parameter <Rapid Accelerations>. The pair AT-AS defines parameters of rapid acceleration. This is when vehicle speed increases at least the value of AS during time AT or less.

- **AT** - maximum measured acceleration time (resolution 0.25s). If AT is 0, rapid accelerations will not be counted (function disabled).

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- **AS** - minimum vehicle speed increase, which will be considered as rapid acceleration.

✧ *BT-BS*

It affects the parameter <Rapid Brakings>. The pair BT-BS defines parameters of rapid braking. This is when vehicle speed decreases at least the value of BS during time BT or less.

- **BT** - maximum measured braking time (resolution 0.25s). If BT is 0, rapid braking will not be counted (function disabled).
- **BS** - minimum vehicle speed decrease, which will be considered as rapid braking.

The default setting for rapid acceleration and braking is 3 m/s2 (~0.3 G) in a time of 3 seconds (AT=12, AS=33, BT=12, BS=33).

Note

To ensure that this **AT+GTCAS** command can be executed successfully, it is recommended to issue this command after the car is engine off and stationary.

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=gv355ceu,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'	gv355ceu
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'	

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Parts	Fields	Length	Range/Format	Default
	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 "gv355ceu".
- *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=gv355ceu,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'	gv355ceu
Body	Max Download Retry	1	0 - 3	0
	Download Timeout	<=2	5 - 30(min)	10
	Download Protocol	1	0	0

Parts	Fields	Length	Range/Format	Default
	Report Mode	1	0 | 1	0
	Update Interval	<=4	0 - 8760(h)	0
	Download URL	<=100	Legal URL	
	Mode	1	0 | 1	0
	Reserved	0		
	Extended Status Report	1	0 | 1	0
	Identifier Number	8	00000000 - FFFFFFFF	0
	Reserved	0		
	Update Status Mask	1	0 - F	3
Tail	Serial Number	4	0000-FFFF ('0'-'9', 'A'-'F')	
	Tail	1	$	$

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z' and 'A' - 'Z'. The default value is "gv355ceu".

✧ *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).

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- **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=gv355ceu,0,0,20,0,,,http://60.174.225.173:10050/GV355CEU/deltabin/GV355CEU_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'	gv355ceu
Body	Sub Command	1	0	
	Max Download Retry	1	0 - 3	0

Parts	Fields	Length	Range/Format	Default
	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 | 4-6 | 9	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 "gv355ceu".

- *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
  - **5** - CAN Module firmware update
  - **6** - UFS xxx fuel sensor update
  - **9** - CAN Module configuration update

- *Extended Status Report*

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

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- **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=gv355ceu,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'	gv355ceu
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".

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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.

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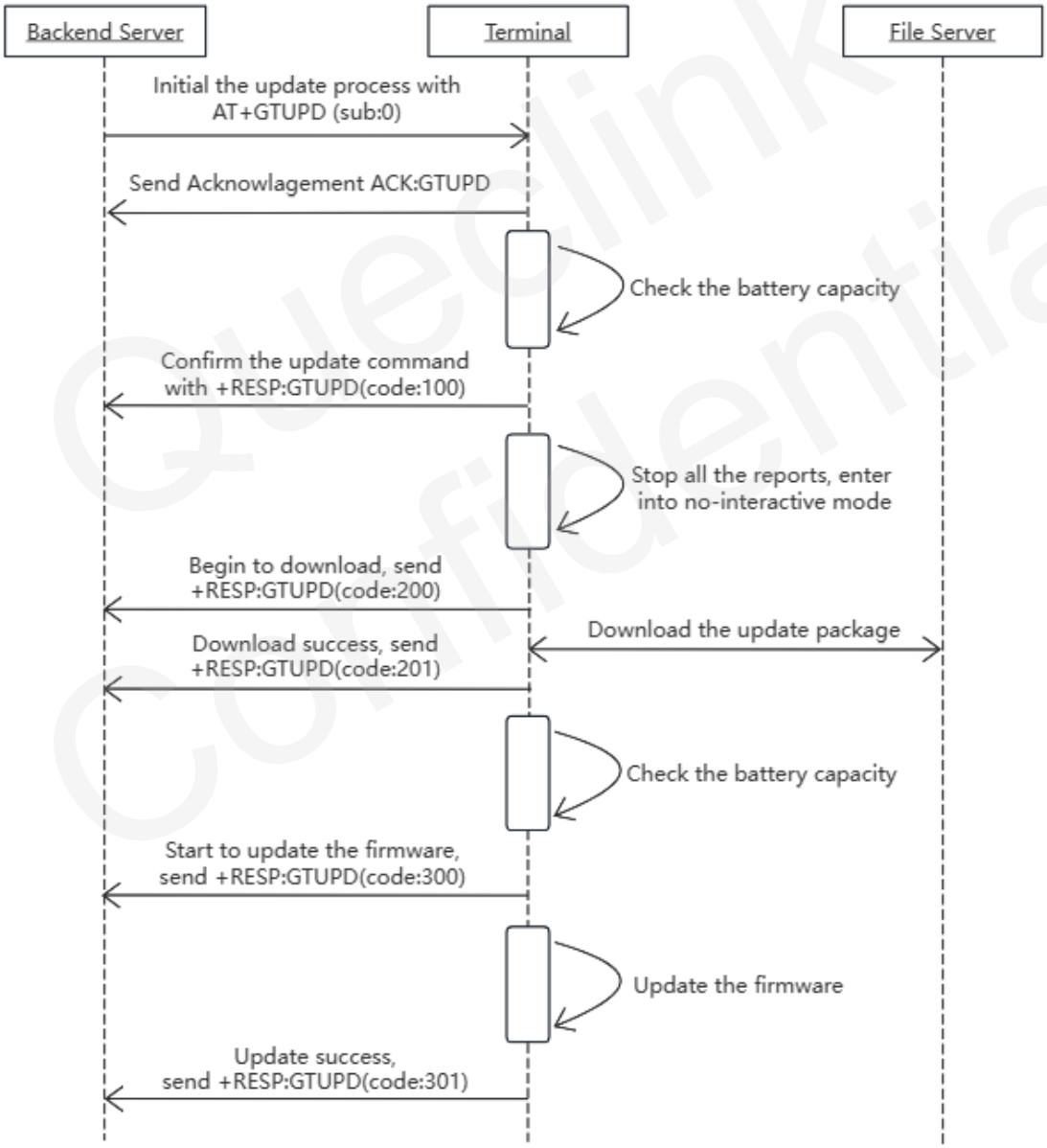
3.8.3.3.4 Update of the Firmware

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



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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=gv355ceu,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'	gv355ceu
Body	Sub Command	<=2	0-E | 10-12 | 16 | 1C | 1D | 22 | 25 | 27 | 2F | 31 | 38 | 3A | 3C	
	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 "gv355ceu".
- *Sub Command*
  A HEX value which indicates the sub command of **AT+GTRTO**.
- *Parameter 1-5*
  Refer to the following description.

3.9.1.1 Sub Command

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

✧ **E** - GSV/BSV/RSV/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	0-3	0
Reserved	0		
Reserved	0		
Reserved	0		

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

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

✧ **11** - UVN. Get the version number information of UFSxxx fuel sensor via the message **UVN**(ASCII)/(HEX). Only when the working mode of (AT+GTURT) is 4 and <Digital Fuel Sensor Type> is 4, the **+RESP:GTUVN** message is valid.

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

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

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

✧ **16** - GTS. Get the device state via the message **GTS**(ASCII).

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

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

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

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✧ **1D** - QDA. Get DR100 accessory information via the message **QDA**(ASCII).

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

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

Parameter	Length	Range/Format	Default
CAN Module Operation Mode	1	0-3	
Output Direction|CAN Module Car Model ID	1 | 1-5	0-3 | 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	0-3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **27** - RF433. Set the working mode for the RF433 accessories.

Parameter	Length	Range/Format	Default
RF433 Accessory Working Mode	1	0 - 2	
Output Direction	1	0-3	0
Reserved	0		
Reserved	0		
Reserved	0		

✧ **2F** - CAN Query Mode. Query the information related to CAN and report them via **CIF**(ASCII)/(HEX) message. When querying CAN Car Name and CAN Car Model ID, it also needs to enable the <Mode> of (AT+GTCAN).

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Parameter	Length	Range/Format	Default
CAN Information Mask	<=4	0000 - FFFF	
Output Direction	1	0-3	
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		

✧ **38** - DUC. Get the statistics of data usage via the message **DUC**(ASCII)/(HEX).

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

✧ **3C** - TPMS. Get the tire data via the message **+RESP:GTTPM**.

Parameter	Length	Range/Format	Default
TPMS Working Mode	1	1 - 2	
Output Direction	1	0-3	
Reserved	0		
Reserved	0		
Reserved	0		

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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=gv355ceu,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=gv355ceu,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=gv355ceu,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=gv355ceu,4,FRI:OWH:SRI,,,,,0015$**. The buffered messages saved can be deleted with the command **AT+GTRTO=gv355ceu,4,BUF,,,,,000F$**. The mileage value saved during <GNSS assisted mode> enabling can be reset with the command **AT+GTRTO=gv355ceu,4,DST,,,,,000F$**.

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

✧ *Reset Level*

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

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

✧ *Satellite Information Mask*

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

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

Bit	Message Name	Description
Bit 3	+RESP:GTASV	Report Galileo satellite information
Bit 2	+RESP:GTBSV	Report Beidou satellite information

Bit	Message Name	Description
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
Bit 19	Sensor ID
Bit 20	Modem IMEI
Bit 21 - Bit 31	Reserved

✧ *CAN Module 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 <CAN Module Car Model ID> parameter to set car model.
- **2** - Start CAN Module automatic synchronization. The synchronization result is reported via the **+RESP:GTCML** message.

Note

The entire synchronization takes about 10-40s, and CAN Module 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.

- **3** - Clear current supported car model.

✧ *CAN Module Car Model ID*

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

✧ *SCS Action*

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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.

✧ *RF433 Accessory Working Mode*

If the sub command is **27**, this parameter will work as follows.

- **0** - Start learning mode.
- **1** - Read the RF433 accessories which are paired.
- **2** - Clear the current paired list of RF433 accessories.

✧ *CAN Information Mask*

If <Sub Command> is set to **2F**, configuration information for a specific can information mask can be obtained via the message **CIF** (ASCII)/(HEX). The Configuration Mask must be 2 bytes.

- *CAN Information Mask Table*

Mask Bit	Item
Bit 15	Reserved For Extend
...	Reserved
Bit 11	Tacho Driver Work Time Mode
Bit 10	Extend Tachograph Communication Debug
Bit 9	CAN Configure Version
Bit 8	CAN Configure Deep Sleep Mode Switch
Bit 7	Reserved For Extend
Bit 6	Hardware Information
Bit 5	Standard Debug Information
Bit 4	Extended Debug Information
Bit 3	CAN Car Model ID
Bit 2	CAN Car Name
Bit 1	CAN Serial Number
Bit 0	CAN Version Number

✧ *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.
- **2** - The message will be output to the secondary serial port.

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- **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.

✧ *TPMS Working Mode*

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

- **1** - Read the TPMS accessories which are paired.
- **2** - Clear the current paired list of TPMS accessories.

3.9.2 SMS (SMS Text Sending)

The command **AT+GTSMS** is used to send SMS text to a target phone number.

Example:
AT+GTSMS=gv355ceu,,,0,"http://www.queclink.com",13812341234,,,FFFF$

Parts	Fields	Length	Range/Format	Default
Head	Header	5	AT+GT	AT+GT
	Command Word	3	SMS	SMS
	Leading Symbol	1	=	=
	Password	4-20	'0' - '9' 'a' - 'z' 'A' - 'Z'	gv355ceu
Body	Reserved	0		
	Reserved	0		
	SMS Message Format	1	0	0
	SMS Text	<=160		
	Target Number	<=20		
	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 "gv355ceu".

✧ *SMS Message Format*

It defines the format of the SMS content.

- **0** - ASCII format.

✧ *SMS Text*

A string including quotes. This string will be sent to the <Target Number> via SMS. This field

cannot be empty and the parameter value cannot be a string which represents a command of this protocol.

✧ *Target Number*

The phone number that the SMS text will be sent to. This field cannot be empty.

3.9.3 SMS Location Request

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

Item	Format
Command	Get Position

✧ *Command*

The detailed command string received via SMS.

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

3.9.4 RTP (Remote File Transfer)

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

Example:
AT+GTRTP=gv355ceu,0,0,0,http://60.174.225.173:20581/GV355CEU/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'	gv355ceu
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		

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

✧ *Password*

The valid characters for the password include '0' - '9', 'a' - 'z', and 'A' - 'Z'. The default value is "gv355ceu".

✧ *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.

3.9.5 LTP (Local File Transfer)

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

Example:
AT+GTLTP=gv355ceu,,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'	gv355ceu
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		

Parts	Fields	Length	Range/Format	Default
	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 "gv355ceu".

✧ *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.

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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,8020050905,864292043426376,,0000,20200613114927,FFFF$

+ACK:GTXXX,8020050905,864292043426376,,0000,20200613114927,FFFF$

The Option field is included.

+ACK:GTGEO,8020050905,135790246811220,GV355CEU,0,000A,20090214093254,11F0$

+ACK:GTPEO,8020050905,135790246811220,GV355CEU,0,000B,20090214093254,11F0$

+ACK:GTIOB,8020050905,135790246811220,GV355CEU,0,0006,20090214093254,11F0$

+ACK:GTTMP,8020050905,135790246811220,GV355CEU,0,000C,20090214093254,11F0$

+ACK:GTCLT,8020050905,135790246811220,GV355CEU,0,000D,20090214093254,FFFF$

+ACK:GTCMD,8020050905,135790246811220,GV355CEU,0,0005,20100310172830,11F0$

+ACK:GTUDF,8020050905,135790246811220,GV355CEU,0,0005,20100310172830,11F0$

+ACK:GTFSC,8020050905,135790246811220,GV355CEU,0,0004,20090214093254,11F0$

+ACK:GTTTR,8020050905,135790246811220,GV355CEU,0,FFFF,20090214093254,11F0$

+ACK:GTBAS,8020050905,135790246811220,GV355CEU,0,0005,20090214093254,11F0$

+ACK:GTRTO,8020050905,135790246811220,GV355CEU,GPS,0015,20090214093254,11F1$

+ACK:GTHUM,8020050905,135790246811220,GV355CEU,0,000C,20090214093254,11F0$

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+ACK:GTRAS,8020050905,865585040007340,,FFFF,20190525022311,3C00$

+ACK:GTMCT,8020050905,135790246811220,,0018,20090214093254,11F0$

+ACK:GTIDS,8020050905,862170013895931,,0,FFFF,20110101000009,0088$

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, 802005 means GV355CEU. 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

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

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

- **AT+GTTMP** - This field represents the TMP alarm ID.

Parts	Fields	Length	Range/Format
Body	Alarm 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+GTFSC** - This field represents the FSC table ID.

Parts	Fields	Length	Range/Format
Body	Table ID	1	0 - 4

- **AT+GTTTR** - This field represents the TTR command Type.

Parts	Fields	Length	Range/Format
Body	Command Type	1	0-9 | 10-13

- **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

- **AT+GTHUM** - This field represents the HUM alarm ID.

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

- **AT+GTRAS** - This field represents the RAS alarm ID.

Parts	Fields	Length	Range/Format
Body	Index	1	0 - 4

- **AT+GTMCT** - This field represents the MCT group ID.

Parts	Fields	Length	Range/Format
Body	Group ID	1	0 - 4

- **AT+GTIDS** - This field represents the IDS group ID.

Parts	Fields	Length	Range/Format
Body	Result Code	<=2	0 - 2
	Additional Number(optional)	<=4	0 - 5000

- *Result Code*
  A numeral to indicate the result of issuing (AT+GTIDS).
  - **0** - Successful. <Additional Number> indicates the number of IDs that are configured.
  - **1** - ID Number list is full. <Additional Number> indicates the number of IDs that are discarded.
  - **2** - Many duplicate IDs are discarded. <Additional Number> indicates the number of duplicated IDs.
- 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)

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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,8020050905,866775051628568,GV355CEU,,00,1,1,0.0,320,57.7,117.129193,31.839564,20230818092040,0460,0000,550B,085BE2AA,01,12,50.0,20230818172041,1907$

+RESP:GTDIS,8020050905,866775051622785,GV355CEU,,11,1,1,0.0,0,59.6,117.129050,31.839308,20230911111338,0460,0000,550B,B7B1,01,12,0.0,20230911111338,03D6$

+RESP:GTIOB,8020050905,866775051622785,GV355CEU,,01,1,1,0.0,0,59.6,117.129050,31.839308,20230911111517,0460,0000,550B,B7B1,01,12,0.0,20230911111517,03DD$

+RESP:GTSPD,8020050905,866775051628568,GV355CEU,,01,1,1,75.9,88,37.3,117.164517,31.853223,20230818013558,0460,0000,550A,082B97AE,01,9,52652.9,20230817180559,0907$

+RESP:GTSOS,8020050905,866775051628568,GV355CEU,,10,1,1,0.0,359,104.9,117.129269,31.839238,20230818064033,0460,0000,550B,B1E2,01,12,50.0,20230817231033,11FB$

+RESP:GTRTL,8020050905,866775051628568,GV355CEU,,00,1,3,0.0,173,110.6,117.129311,31.838546,20230818082705,0460,0000,550B,085BE2AE,01,4,52646.0,20230818162706,1751$

+RESP:GTDOG,8020050905,866775051628568,GV355CEU,,23,1,3,0.0,106,78.2,117.129290,31.838893,20230818065400,0460,0000,550B,B7B1,01,4,52646.0,20230818145401,12F8$

+RESP:GTIGL,8020050905,866775051628568,GV355CEU,,01,1,3,0.0,173,110.6,117.129311,31.838546,20230818082721,0460,0000,550B,085BE2AE,01,4,52646.0,20230818162722,1759$

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+RESP:GTVGL,8020050905,866775051628568,GV355CEU,,70,1,1,0.0,0,93.7,117.129270,31.839082,20230821022416,0460,0000,550B,085BE2AA,01,10,52655.2,20230821102417,75F9$

+RESP:GTHBM,8020050905,866775051628568,GV355CEU,,21,1,1,61.9,78,37.6,117.188341,31.855328,20230818013808,0460,0000,550A,05C47C2E,01,10,52655.2,20230817180808,0921$

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 - F)Y(0 - 9)
	Number	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 - FF
	GNSS Satellite Number (Optional)	<=2	0 - 24
	GNSS Trigger Type (Optional)	1	0-4
	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**.
- The type of speed alarm which triggers the report message **+RESP:GTSPD**.
- For other messages, it will always be 0.

Report type has different meanings in different messages as follows:

- In the **+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
  - 7 - Reboot RF message for network watchdog
  - 8 - Reboot RF message for EGPRS/LTE watchdog
  - 9 - Reboot RF message for send failure watchdog
- In the (virtual) ignition on/off message **+RESP: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

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  - 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.

✧ *GNSS Trigger Type*

The trigger type of GNSS point has the following meanings.

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

✧ *Mileage*

The current total mileage.

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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,8020050905,864696060004173,GV355CEU,11985,10,1,1,0.0,0,118.5,117.129306,31.839197,20230808033438,0460,0001,DF5C,05FE6667,03,15,0,123.5,00123:04:44,75,28880,,100,210000,,,,20230808033438,01B3$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	FRI
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	External Power Voltage	<=5	0 - 32000 (mV)
	Report ID / Report Type	2	X(1-5)Y(0-6)
	Number	<=2	1 - 15
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	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)|F(0 - 100)

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Parts	Fields	Length	Range/Format
	Analog Input 2	<=5	0 - 30000(mV)|F(0 - 100)
	Reserved	0	
	Backup Battery Percentage	<=3	0 - 100
	Device Status	6 | 10	000000 - FFFFFF | 0000000000 - 0F0FFFFFFF
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *External Power Voltage*

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

✧ *Report ID / Report Type*

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

Report ID has several meanings as follows.

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

Report Type has the following meanings.

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

✧ *Number*

The number of the GNSS positions included in the report message. In the message

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

✧ *Position Append Mask*

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

✧ *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.

✧ *GNSS Trigger Type*

The trigger type of GNSS point has the following meanings.

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

✧ *Hour Meter Count*

If the hour meter count function is enabled by the command (AT+GTHMC), total hours the meter counts when the engine is on will be reported in this field. It consists of three parts separated by ":", the first part is the hour digit and the length of it is between 5 to 7 bytes, the second part is the 2-byte minute digit, and the last part is the 2-byte second digit. And it ranges from 00000:00:00 to 1193000:00:00. If the function is disabled, this field will be empty.

✧ *Analog Input 1-2*

The voltage of the analog input or the fuel level measured by the fuel sensor connected to the corresponding analog input port. If the command (AT+GTAIS) is configured for the device to report the analog input information periodically with fixed report, the device will send the current voltage of the analog input or the fuel level in the format of "FXX" along with the **+RESP:GTFRI** message to the backend server. If **AT+GTAIS** is not configured, 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 EIO100 input status, the second two bytes indicate EIO100 output status, the third two bytes indicate the current motion status of the device, the fourth two bytes indicate the status of input ports, and the last two bytes indicate the status of output ports.

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.

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- **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.

If EIO100 device is not connected or <EIO100 Connection> in command (AT+GTACD) is 0, the optional bits will not be included.

Mask Bit	Item
Bit 35 (Optional)	EIO100 input C
Bit 34 (Optional)	EIO100 input B
Bit 33 (Optional)	EIO100 input A
Bit 32 (Optional)	EIO100 input 9
...(Optional)	Reserved
Bit 27 (Optional)	EIO100 output C
Bit 26 (Optional)	EIO100 output B
Bit 25 (Optional)	EIO100 output A
Bit 24 (Optional)	EIO100 output 9
Bit 16-23	Motion status of the device
Bit 12	Digital input 4
Bit 11	Digital input 3
Bit 10	Digital input 2
Bit 9	Digital input 1
Bit 8	Ignition detection
...	Reserved
Bit 2	Digital output 3
Bit 1	Digital output 2
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,8020050905,864696060004173,GV355CEU,00000100,,10,1,1,0.0,0,115.8,117.129356,31.839248,20230808061540,0460,0001,DF5C,05FE6667,03,15,3,4.0,0000102:34:33,13,1153

8,,100,210000,7,1,0,06,12,0,001A42A2,0617,TMPS,08351B00043C,1,26,65,20231030085704,20231030085704,0017$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	ERI
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	ERI Mask	8	00000000 - FFFFFFFF
	External Power Supply	<=5	0 - 32000(mV)
	Report ID / Report Type	2	X(1-5)Y(0-6)
	Number	<=2	1 - 15
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	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)|F(0 - 100)
	Analog Input 2	<=5	0 - 30000(mV)|F(0 - 100)
	Reserved	0	
	Backup Battery Percentage	<=3	0 - 100
	Device Status	6|10	000000 - FFFFFF | 0000000000 - 0F0FFFFFFF
	UART Device Type	1	0 | 1 | 7 | 8

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Parts	Fields	Length	Range/Format
	Digital Fuel Sensor Data(Optional)	<=20	
	1-wire Data (Optional)		
	CAN Data (Optional)	<=1000	
	Fuel Sensor Data (Optional)		
	RF433 Accessory Data (Optional)		
	Bluetooth Accessory Data (Optional)		
	RS485 Sensor Data (Optional)		
	Temperature 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.

✧ *UART Device Type*

The type of device connected to the secondary serial port.

- **0** - No device connected
- **1** - Digital fuel sensor
- **7** - WRT100 accessory
- **8** - Thermograph

✧ *Digital Fuel Sensor Data*

The raw data read from the digital fuel sensor. If Bit 0 of <ERI Mask> in (AT+GTFRI) is enabled, this field will be displayed; otherwise, it will not be displayed.

✧ *1-wire Data (Optional)*

Fields	Length	Range/Format
1-wire Device Number	<=2	0 - 19
1-wire Device ID	16	
1-wire Device Type	<=2	1 | 4
1-wire Device Data	<=40	

- *1-wire Device Number*

  The number of 1-wire devices.

  If it is 0, the following fields <1-wire Device ID>, <1-wire Device Type> and <1-wire Device

Data> will not be displayed.

If there are more than one 1-wire devices connected, the following fields <1-wire Device ID>, <1-wire Device Type> and <1-wire Device Data> will appear repeatedly showing the information of all connected 1-wire devices.

If Bit 1 of <ERI Mask> in (AT+GTFRI) is enabled, the information contained in the <1-wire Data> field will be displayed; otherwise, <1-wire Data> related information will not be displayed.

- *1-wire Device ID*

  It indicates the device ID read from the 1-wire device.

- *1-wire Device Type*

  It indicates the type of the 1-wire device.

  – **1** - Temperature sensor.

  – **4** - TH200 sensor.

- *1-wire Device Data*

  It indicates the data read from the 1-wire devices.

  If <1-wire Device Type> is 1, this parameter indicates the temperature value and it is in two's complement format (refer to Appendix). To get the real temperature in degrees Centigrade, please convert the data to a decimal value according to the calculation in Appendix first and then multiply the decimal value by 0.0625.

  If <1-wire Device Type> is 4, this parameter indicates a hexadecimal value. The first two bytes represent <Data Mask>, the middle four bytes represent <Humidity>, and the last four bytes represent <Temperature>. For example, 03BFFF0190 means <Data Mask> is 0x03, <Humidity> is 0xBFFF and <Temperature> is 0x0190. If the bit in <Data Mask> is 0, the data corresponding to the subsequent field does not exist. For example, 020190 means <Data Mask> is 0x02, <Temperature> is 0x0190, but no <Humidity>.

Fields		Length	Range/Format
1-wire Device Data	Data Mask	2	00 - 03
	Humidity	4	0000 - FFFF
	Temperature	4	0000 - FFFF

  – *Data Mask*

  A bitwise numeral to control whether to include the corresponding fields in each position after <1-wire Device Data>.

  - Bit 0 for <Humidity>.

    If <1-wire Device Type> is 4, Humidity = <Humidity>*0.0625.

  - Bit 1 for <Temperature>. Temperature = <Temperature>*0.0625.

✧ *CAN Data*

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

✧ *Fuel Sensor Data (Optional)*

Fields	Length	Range/Format
Sensor Number	<=3	0 - 100
Sensor Type	<=2	0-6 | 9 | 20 | 21
Percentage (Optional)	<=5	0 - 100.0

Fields	Length	Range/Format
Volume (Optional)	<=6	0 - 6000.0
Fuel Temperature (Optional)	<=3	-40 - 85(x1 Centigrade)

- *Fuel Temperature*
  The real-time temperature detected by the digital fuel sensor.
  If Bit 10 of <ERI Mask> in (AT+GTFRI) is set to 1 and <Digital Fuel Sensor Type> is set to 2 or 6 <Sensor Type> is set to 9, <Fuel Temperature> will be present.
- *Sensor Type*
  The sensor type for the currently set table.
  - **0** - EPSILON ES2 or ES4
  - **1** - LLS 20160
  - **2** - DUT-E
  - **3** - QFS100
  - **4** - UFSxxx (RS232)
  - **5** - Reserved
  - **6** - DUT-E SUM
  - **9** - UFS301 (RS485)
  - **20** - ADC1
  - **21** - ADC2

✧ *RF433 Accessory Data (Optional)*

Fields	Length	Range/Format
Accessory Number	<=2	0 - 10
Accessory Serial Number	5	00001 - FFFFE
Accessory Type	1	1 | 2
Temperature	<=3	-20 - 60(x1 Centigrade)
Humidity (Optional)	<=3	0 - 100(x1%)

- *Accessory Number*
  The number of paired RF433 accessories.
- *Accessory Serial Number*
  The serial number of WPB100, WTS100 or WTH100.
- *Accessory Type*
  It indicates the type of the accessory.
  - **1** - Wireless temperature sensor (WTS100)
  - **2** - Wireless temperature & humidity sensor (WTH100)
- *Temperature*
  The real-time temperature detected by the sensor.
- *Humidity*
  The real-time humidity detected by the sensor. If <Accessory Type> is 2, <Humidity> will be present.

✧ *Bluetooth Accessory Data(Optional)*

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Fields	Length	Range/Format
Bluetooth Accessory Number	<=2	0 - 10
Index	2	00 - 09
Accessory Type	<=2	0-2 | 6-8 | 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	-70 - 255(Centigrade)
Accessory Humidity(Optional)	<=3	0 - 100%(rh)
Accessory Output status(Optional)	2	00 - 03
Accessory Digital Input status(Optional)	2	00 - 01
Accessory Analog Input voltage(Optional)	<=5	0 - 32000(mV)
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.

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✧ *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>.

- **WTH300**

  It is a four-byte hexadecimal value. The higher 2 bytes of the hexadecimal value indicate temperature, the lower 2 bytes indicate humidity. The high byte is the integer part and the low byte is the fractional part.

  Temperature is equal to the low byte divided by 256 plus the high byte, in degree Centigrade. Humidity is equal to the low byte divided by 256 plus the high byte, and the unit is rh.

- **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").

- **WTS300**

  It is a four-byte hexadecimal value. The higher 2 bytes of the hexadecimal value indicate battery voltage in millivolt, the lower 2 bytes indicate temperature. The high byte is the integer part and the low byte is the fractional part.

  Temperature is equal to the low byte divided by 256 plus the high byte, in degree Centigrade.

- **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

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Mask Bit	Item	Description
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
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 Output status*

The status of Bluetooth accessory output. Each bit indicates the status of one output.

For example, 0X01 indicates that Output ID 7 is enabled and Output ID 8 is disabled.

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- *Accessory Digital Input status*
  The status of Bluetooth accessory digital input.
- *Accessory Analog Input voltage*
  The status of Bluetooth accessory analog input voltage.
- *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.
- *RS485 Sensor Data (Optional)*

Fields	Length	Range/Format
RS485 Device Number	<=2	0 - 25
RS485 Device Model	1	1 | 2
RS485 Device ID	<=3	1 - 255
Volume (Optional)	<=5	0 - 10000
Temperature (Optional)	<=3	-40 - 85(x1 Centigrade)

  - *RS485 Device Number*
    It indicates the number of RS485 digital fuel sensor connected to the device.
  - *RS485 Device Model*
    It indicates the model of the fuel sensor. Please refer to command (AT+GTRAS) for detailed information.
  - *RS485 Device ID*
    It indicates the logical address to specify RS485 digital fuel sensor. Please refer to the parameter <Device ID Start> in the command (AT+GTRAS) for detailed information.
  - *Volume*
    It is read from digital fuel sensor and used to calculate the oil pressure. If the digital fuel

sensor is removed for more than a few minutes, this field will change to 0XFFFF.

✧ *Temperature Data*

If Bit 16 of the <ERI Mask> is set to 1, this field will be included in the **+RESP:GTERI** report. Otherwise, it will not be included.

Fields	Length	Range/Format
Sensor Type	1	0 - 2
Sensor Number	<=2	0 - 99
Temperature Value	<=4	-99.9 - 99.9

- *Sensor Type*
  The type of the thermograph connected to the serial port.
- *Sensor Number*
  The number of temperature sensor.
- *Temperature Value*
  The value obtained from temperature sensor.

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,8020050905,135790246811220,GV355CEU,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,8020050905,135790246811220,GV355CEU,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	,

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Parts	Fields	Length	Range/Format
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	External Power Voltage/Analog Input VCC	<=5	0 - 32000(mV)|0 - 30000(mV)
	Report ID / Report Type	2	X(0-2)Y(0 | 1)
	Number	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 - 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	$

✧ *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,8020050905,135790246811220,GV355CEU,13275605061,1,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,01,1,20090214093254,008E$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	LBC
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Call Number	<=20	phone number
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	GNSS Satellite Number (Optional)	<=2	0 - 24
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

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✧ *Call Number*

The phone number of the incoming call which triggers the report message.

4.2.6 IDA(ID Authentication Alarm)

If <Mode> in (AT+GTIDA) is set to 1, **+RESP:GTIDA** will be reported according to the setting.

If <Mode> in (AT+GTIDA) is set to 0, **+RESP:GTIDA** will always be reported without checking the status of ID authorization.

Example:
+RESP:GTIDA,8020050905,862170013895931,GV355CEU,,D2C4FBC5,1,1,1,0.8,0,22.2,117.19863
0,31.845229,20120802121626,0460,0000,5663,2BB9,01,15,0.0,,,,,20120802121627,008E$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	IDA
	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	<=28	ASCII (not including '=' and ',')
	ID Report Type	1	0-2
	Number	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 - FF
	GNSS Satellite Number (Optional)	<=2	0 - 24

Parts	Fields	Length	Range/Format
	Mileage	<=9	0.0 - 4294967.0 (km)
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *ID*

The ID that is read currently. If the driver does not place ibutton at the end of the alarm, the ID will be replaced by FFFFFFFFFFFFFFF.

✧ *ID Report Type*

A numeral to indicate the type of reported ID.

- **0** - The ID is unauthorized or IDA function is disabled.
- **1** - The ID is authorized.
- **2** - The ID has logged out.

4.2.7 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,8020050905,864696060004173,GV355CEU,,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)

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Parts	Fields	Length	Range/Format
	Number	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 - 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 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.

4.2.8 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,8020050905,866775051509693,GV355CEU,,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,8020050905,866775051509693,GV355CEU,,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		
	Parameter 4		
	Parameter 5		
	Reserved	0	
	Number	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 - FF
	GNSS Satellite Number (Optional)	<=2	0 - 24
	Mileage	<=9	0.0 - 4294967.0 (km)
Tail	Send Time	14	YYYYMMDDHHMMSS

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Parts	Fields	Length	Range/Format
	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 19** - For Circular ID 19

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.

4.2.9 Google Maps Hyperlink

If the Google Maps hyperlink reporting feature in parameter <Location Request Mask> of the command (AT+GTCFG) is enabled, the device will send its current position to the mobile phone which makes the call request or SMS request via SMS with a Google Maps hyperlink.

Example:

LBC: GV355CEU

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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	Type Name	<=10	'0'-'9' 'a'-'z' 'A'-'Z' '-' '_'
	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)

- *Type Name*
  A string that includes the device name and GNSS positioning type. ("SOS", "IN GEO-i", "OUT GEO-i", "LBC")
- *Google Maps Hyperlink*
  A string of a Google Maps hyperlink.
- *GNSS Fix*
  The accuracy of the location information. F0 means "No GNSS fix".
- *Battery Percentage*
  The percentage of the backup battery.
- *Ignition Status*
  The status of ignition. 0 means "Ignition off", and 1 means "Ignition on".
- *Speed*
  The current speed. Unit: km/h.

4.2.10 TRL(Tachographer Real Location)

This message is used to report location position and DDD information before reporting DDD data, and it can only be sent via GPRS even if the report mode is forced SMS mode.

Example:
+RESP:GTTRL,8020050905,867995030090222,GV355CEU,0002,C_20190712_0700_DARIUS_TAMASAUSKAS_V100000108084000.DDD,0,0.0,0,101.1,117.129125,31.839185,20190712065656,0460,0000,550B,B969,01,1,,,,,20190712145659,1802$

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

Parts	Fields	Length	Range/Format
	Message Name	3	TRL
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	File Download Count	4	0001 - FFFF
	DDD File Name	<=128	
	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
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *File Download Count*

A number that marks the messages between **+RESP:GTTRD** and **+RESP:GTTRL**.

✧ *DDD File Name*

The file name of DDD.

4.2.11 GSM(Cells Information)

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

Example:
+RESP:GTGSM,8020050905,866775051622785,ERI,0460,0000,550B,085BE2AA,42,,0460,0000,550B,085BE2A8,17,,0460,0011,691D,0690271C,52,,0460,0011,691D,0DE98A34,38,,0460,0011,691D,0DE98A34,27,,0460,0011,691D,0DE98A34,29,,0460,0000,550B,05DB2F2C,0,00,20221201035626,2855$

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
	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	

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Parts	Fields	Length	Range/Format
	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.

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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,8020050905,135790246811220,GV355CEU,16,898600810906F8048812,16,0,1,12000,0,4.40,0,0,,,20230214013254,,15063,22165,,0000,0001,+0800,0,20230214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	INF
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Motion Status	2	11 | 12 | 21 | 22 | 41 | 42 | 1A | 16
	ICCID	20	
	CSQ RSSI|RSRP	<=3	0 - 31 | 99 | 0 - 97 | 255
	CSQ BER	<=2	0 - 7 | 99
	External Power Supply	1	0 | 1
	External Power Voltage	<=5	0 - 32000(mV)
	Network Type	<=2	0 | 1 | 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	1	0 - F
	Analog Input Voltage1	<=5	F(0 - 100)|0 - 16000(mV)
	Analog Input Voltage2	<=5	F(0 - 100)|0 - 30000(mV)
	Reserved	0	
	Digital Input	<=4	0000 - 0F1F
	Digital Output	<=4	0000 - 0F07
	Time Zone Offset	5	+|-HHMM
	Daylight Saving	1	0 | 1
Tail	Send Time	14	YYYYMMDDHHMMSS

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Parts	Fields	Length	Range/Format
	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*

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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.

If EIO100 device is not connected or the <EIO100 Connection> of (AT+GTACD) is 0, the optional bits will not be included.

Mask Bit	Item
Bit 15 (Optional)	Reserved
...(Optional)	Reserved
Bit 11 (Optional)	EIO100 input C
Bit 10 (Optional)	EIO100 input B
Bit 9 (Optional)	EIO100 input A
Bit 8 (Optional)	EIO100 input 9
...	Reserved
Bit 4	Digital input 4
Bit 3	Digital input 3
Bit 2	Digital input 2
Bit 1	Digital input 1
Bit 0	Ignition detection

✧ *Digital Output*

A bitwise hex integer to represent the logic status of the digital output.

If EIO100 device is not connected or the <EIO100 Connection> of (AT+GTACD) is 0, the

optional bits will not be included.

Mask Bit	Item
Bit 15 (Optional)	Reserved
...(Optional)	Reserved
Bit 11 (Optional)	EIO100 output C
Bit 10 (Optional)	EIO100 output B
Bit 9 (Optional)	EIO100 output A
Bit 8 (Optional)	EIO100 output 9
...	Reserved
Bit 2	Digital output 3
Bit 1	Digital output 2
Bit 0	Digital output 1

✧ *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,8020050905,135790246811220,GV355CEU,,,,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

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Parts	Fields	Length	Range/Format
	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,8020050905,866775051629715,GV355CEU,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	1 - 999
	Total Packets	<=2	1 - 99
	Current Packet	<=2	1 - 99
	BSI	3	BSI
	APN	<=64	

Parts	Fields	Length	Range/Format
	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,8020050905,864696060004173,GV355CEU,89860118801541301090,20230810112751,04EA$

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

Parts	Fields	Length	Range/Format
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,8020050905,135790246811220,GV355CEU,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

CSQ RSRP	Signal Strength (dBm)
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,8020050905,135790246811220,GV355CEU,802005,0100,0101,20090214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	VER
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Device Type	6	802005
	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,8020050905,135790246811220,GV355CEU,1,12000,,4.40,0,0,20230524052049,11F0$

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 - 32000(mV)
	Reserved	0	
	Backup Battery Voltage	4	0.00 - 4.50 (V)
	Charging	1	0 | 1
	LED State	1	0 | 1
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.4.7 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,8020050905,135790246811220,GV355CEU,,12,32,,01,00,20090214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	IOS
	Leading Symbol	1	,

Parts	Fields	Length	Range/Format
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Pin Mask	<=2	0 - F
	Analog Input VCC1	<=5	0 - 16000(mV)|F(0 - 100)
	Analog Input VCC2	<=5	0 - 30000(mV)|F(0 - 100)
	Reserved	0	
	Digital Input	<=4	0000 - 0F1F
	Digital Output	<=4	0000 - 0F07
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,8020050905,866775051508042,GV355CEU,+0000,0,0,20220630032656,2B45$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	TMZ
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Time Zone Offset	5	+|-HHMM
	Daylight Saving	1	0 | 1
	Network Time Checking	1	0 - 1
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

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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,8020050905,866775051629715,GV355CEU,cmnet,cmnet_name,cmnet_password,3gnet,3gnet_name,3gnet_password,898600e0123955608398,24,0,B7B1,10.57.5.91,211.138.180.4,211.138.180.5,,,,,20231218061747,714A$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	AIF
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	APN	<=64	
	APN User Name	<=30	
	APN Password	<=30	
	Backup APN	<=64	
	Backup APN User Name	<=30	
	Backup APN Password	<=30	
	ICCID	20	
	CSQ RSSI|RSRP	<=3	0 - 31 | 99 | 0 - 97 | 255
	CSQ BER	<=2	0 - 7 | 99
	Cell ID	4|8	XXXX/XXXXXXXX
	IP Address	<=15	0.0.0.0
	Main DNS	<=15	0.0.0.0
	Backup DNS	<=15	0.0.0.0
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *CSQ RSSI/RSRP*

The signal strength level.

For 2G/3G network:

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

For 4G network:

CSQ RSRP	Signal Strength (dBm)
0	<-140
1	-140
2 - 96	-139 - -44
97	>= -44
255	Unknown

- *CSQ BER*

  The quality of GSM signal. Its range is from 0 to 7, and 99 indicates unknown signal strength.
- *Cell ID*

  The serving cell ID in HEX format.
- *IP Address*

  The IP address of the device.
- *Main DNS*

  The main DNS server.
- *Backup DNS*

  The backup DNS server.

4.4.10 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,8020050905,359464036001111,GV355CEU,11,30,24,31,30,32,28,32,29,12,0,14,17,16,18,20,0,22,24,24,0,25,0,20230524052627,000F$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	GSV
	Leading Symbol	1	,

Parts	Fields	Length	Range/Format
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	SV Count	<=2	0-24
	SV ID	<=3	>=0
	SV Power	<=2	>=0
	...		
	SV ID	<=3	>=0
	SV Power	<=2	>=0
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

- *SV Count*
  The count of satellites found by GPS.
- *SV ID*
  Satellite ID. If there is no satellite, the field is filled with zero.
- *SV Power*
  Satellite power. If there is no satellite, the field is filled with zero.

4.4.11 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,8020050905,867995030082104,GV355CEU,6,3,43,16,25,22,11,25,39,29,40,31,40,20190417011932,000E$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	RSV
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	SV Count	<=2	0 - 24
	SV ID	<=3	>=0
	SV Power	<=2	>=0

Parts	Fields	Length	Range/Format
	...		
	SV ID	<=3	>=0
	SV Power	<=2	>=0
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *SV Count*

The count of satellites found by GLONASS.

✧ *SV ID*

Satellite ID. If there is no satellite, this field is filled with zero.

✧ *SV Power*

Satellite power. If there is no satellite, this field is filled with zero.

4.4.12 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,8020050905,359464036001111,GV355CEU,11,30,24,31,30,32,28,32,29,12,0,14,17,16,18,20,0,22,24,24,0,25,0,20230524052627,000F$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BSV
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	SV Count	<=2	0 - 24
	SV ID	<=3	> =0
	SV Power	<=2	> =0
	...		
	SV ID	<=3	> =0
	SV Power	<=2	> =0
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *SV Count*

The count of satellites found by Beidou.

✧ *SV ID*

Satellite ID. If there is no satellite, the field is filled with zero.

✧ *SV Power*

Satellite power. If there is no satellite, the field is filled with zero.

4.4.13 GTS(Device State Information)

After the device receives the command (AT+GTRTO) to get the network registration status information of the device, it will send the message **+RESP:GTGTS**. This report does not support the HEX format.

Example:
+RESP:GTGTS,8020050905,867995030082104,GV355CEU,1,1,2|2,27|0,0|0,,,20190416093016,0A54$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	GTS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	CS State	1	0 - 5
	PS State	1	0 - 5
	Send State | PDP State	2	0 - 5 | 0 - 3
	CSQ RSSI/RSRP | BER	<=5	0 - 31 | 99 | 0 - 97 | 255 | 0 - 7 | 99
	Message Queued Number | Message Buffered Number	<=6	0 - 100 | 0 - 10000
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *CS State*

The state of Circuit Switching Domain network.

- **0** - Not registered, not searching for a new operator
- **1** - Registered
- **2** - Not registered, searching for a new operator

- **3** - Registering
- **4** - Unknown
- **5** - Registered, roaming

✧ *PS State*

The state of Packet Switching Domain network.

- **0** - Not registered, not searching for a new operator
- **1** - Registered
- **2** - Not registered, searching for a new operator
- **3** - Registering
- **4** - Unknown
- **5** - Registered, roaming

✧ *Send State*

The state of sending data.

- **0** - Initial state
- **1** - No service
- **2** - Idle state
- **3** - Activating GPRS
- **4** - Establishing TCP or UDP connection
- **5** - Sending data to the backend server
- **6** - Reset

✧ *PDP State*

The state of PDP context activation.

- **0** - PDP context is deactivated.
- **1** - PDP context is being activated.
- **2** - PDP context is activated.
- **3** - PDP context is being deactivated.

✧ *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

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CSQ RSRP	Signal Strength (dBm)
255	Unknown

- *CSQ BER*

  The quality of the GSM signal. The range is 0-7, and 99 is for unknown strength of signal.
- *Message Queued Number*

  It represents the number of messages in the queue to be sent.
- *Message Buffered Number*

  It represents the number of messages to be buffered.

4.4.14 UVN(UFSxxx Version Information)

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

Example:
+RESP:GTUVN,8020050905,869158008709145,GV355CEU,2,02,B,,,,,20150323013012,2153$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	UVN
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Sensor Protocol Version	1	
	Sensor SW Version	2	
	Sensor HW Version	1	
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

- *Sensor Protocol Version*

  The protocol version of the UFSxxx fuel sensor.
- *Sensor SW Version*

  The software version of the UFSxxx fuel sensor.
- *Sensor HW Version*

The hardware version of the UFSxxx fuel sensor.

4.4.15 CVN(CAN Version Information)

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

Example:
+RESP:GTCVN,8020050905,869158008709145,GV355CEU,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	CAN Module SW Version	<=7	'0' - '9' 'a' - 'z'
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *CAN Module SW Version*
The software version of the CAN Module device.

4.4.16 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,8020050905,866775051622785,GV355CEU,00181031,0509,0101,0201,0104,67,867564050607529,20230922121122,8B26$

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

Parts	Fields	Length	Range/Format
	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'
	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.

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4.4.17 QDA(DR100 Accessory Information)

After the device receives the command (AT+GTRTO) to get the DR100 accessory information, it will send the information to the backend server via the message **+RESP:GTQDA**.

Example:
+RESP:GTQDA,8020050905,869158008709145,GV355CEU,0,6,FFFFFFFFFFFF,,,1,quec_,,,,,20150323013841,2166$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	QDA
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	DR100 Read Mode	1	0 - 3
	Data Block	<=2	
	Key	12	'0' - '9' | 'A' - 'F'
	Reserved	0	
	Reserved	0	
	Prefix Number	<=2	0 - 10
	Prefix String <n>	<=15	ASCII (not including '=' and ',')
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.4.18 CML(CAN Module Synchronization)

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

Example:
+RESP:GTCML,8020050905,866775051508042,GV355CEU,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	CAN Module Car Model ID	<=5	0-65535
	CAN Module Car Name	<=50	ASCII
	CAN Module Sync Status	1	1-4
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

- *CAN Module Car Model ID*
  The car model ID of the CAN Module device. If the value is 0, it means that no model has been obtained.
- *CAN Module Car Name*
  Car Name is human-readable make and model of the car. If this string value is equal to "sync", the queried <CAN Module Car Model ID> is the synchronized class ID.
- *CAN Module Sync Status*
  - **1** - The synchronization is successful.
  - **2** - CAN Module is not properly connected to the CAN-bus or ignition is switched off.
  - **3** - The car is not supported by the firmware version of CAN Module or CAN-bus codes has not been recognized.
  - **4** - CAN Module is not responding.

4.4.19 WRT(RF433 Accessory Information)

After the device receives the command (AT+GTRTO) to read information of the paired RF433 accessories, it will send the information to the backend server via the message **+RESP:GTWRT**.

Example:
+RESP:GTWRT,8020050905,866775051508042,GV355CEU,3,1,000D5,2,0003D,1,000B8,20220629110943,1775$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	WRT
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Accessory Number	<=2	0 - 10
	Accessory Type	1	1 - 2
	Accessory Serial Number	5	00001 - FFFFE
	...		
	Accessory Type	1	1 - 2
	Accessory Serial Number	5	00001 - FFFFE
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.4.20 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,8020050905,865585040006649,GV355CEU,2,-0.06,0.88,-0.48,-0.97,0.05,0.22,0.22,0.48,0.85,20230524132442,1F59$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	SCS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Self Calibration Status	1	0-2
	X_Forward	<=5	-1.00 - 1.00
	Y_Forward	<=5	-1.00 - 1.00
	Z_Forward	<=5	-1.00 - 1.00
	X_Side	<=5	-1.00 - 1.00

Parts	Fields	Length	Range/Format
	Y_Side	<=5	-1.00 - 1.00
	Z_Side	<=5	-1.00 - 1.00
	X_Vertical	<=5	-1.00 - 1.00
	Y_Vertical	<=5	-1.00 - 1.00
	Z_Vertical	<=5	-1.00 - 1.00
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Self Calibration Status*

The status of the self-calibration for Acceleration Data.

- **0** - Self-calibration is disabled.
- **1** - Self-calibration is not done.
- **2** - Self-calibration is successful.

✧ *X_Forward, Y_Forward, Z_Forward*

The factors to calculate the new acceleration in forward direction. The formula to calculate the acceleration in Forward direction Xnew is **Xnew = <X_Forward> * X + <Y_Forward> * Y + <Z_Forward> * Z**.

✧ *X_Side, Y_Side, Z_Side*

The factors to calculate the new acceleration in side direction. The formula to calculate the acceleration in Side direction Ynew is **Ynew = <X_Side> * X + <Y_Side> * Y + <Z_Side> * Z**.

✧ *X_Vertical, Y_Vertical, Z_Vertical*

The factors to calculate the new acceleration in vertical direction. The formula to calculate the acceleration in Vertical direction Znew is **Znew = <X_Vertical> * X + <Y_Vertical> * Y + <Z_Vertical> * Z**.

Note

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

4.4.21 CIF(CANBUS Information)

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

Example:
+RESP:GTCIF,8020050905,866775051508042,GV355CEU,F,3.0.5c,3800883,Citroen Berlingo (08-),1,,20220630054713,303A$

Parts	Fields	Length	Range/Format
Head	Header	3	+RESP:GT
	Message Name	3	CIF
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' - '_'
Body	CAN Information Mask	2	00 - FF
	CAN Version Number(optional)	<=7	'0' - '9' 'a' - 'z'
	CAN Serial Number(optional)	<=10	'0' - '9' 'a' - 'z'
	CAN Car Name(optional)	<=50	'0' - '9' 'a' - 'z'
	CAN Car Model ID(optional)	<=5	0-65535
	Extended Debug Information(optional)	<=500	'0' - '9' 'A' - 'F'
	Standard Debug Information(optional)	<=500	'0' - '9' 'A' - 'F'
	Hardware Information(optional)	<=500	'0' - '9' 'A' - 'F'
	CAN Info Mask Extend(optional)	<=2	00 - FF
	CAN Configure Deep Sleep Mode Switch(optional)	1	0 | 1
	CAN Configure Version(optional)	<=7	ASCII
	Extend Tachograph Communication Debug(optional)	<=500	'0' - '9' 'A' - 'F'
	Tacho Driver Work Time Mode(optional)	1	0 - 3
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

- *CAN Information Mask*
  The configuration information of the specific CAN information mask that can be obtained.
- *CAN Version Number*
  The firmware version of the CAN device.
- *CAN Serial Number*
  The serial number of the CAN device.
- *CAN Car Name*
  The car name is human-readable make and model of the car.
- *CAN Car Model ID*
  The car model ID of the CAN device. If the value is 0, it means that no models have been obtained.

- *Extended Debug Information*
  It is intended to be sent to producer for expanded diagnostics when requested.
- *Standard Debug Information*
  The standard debug information is accessible for developer.
- *Hardware Information*
  The related hardware information of CAN.
- *CAN Info Mask Extend*
  When bit7 of <CAN Information Mask> is 1, this mask will be obtained and represent the high byte portion of the <CAN Information Mask> in (AT+GTRTO).
- *CAN Configure Version*
  The configure version of the CAN device.
- *CAN Configure Deep Sleep Mode Switch*
  It is used to control whether CAN configuration has enabled deep-sleep mode.
  - **0** - CAN Module will enter deep sleep (very low power consumption mode) when vehicle's CANBUS (and entire car) goes sleep. CAN-Logistic uses very little energy in deep-sleep mode, but it takes more time to wake it up and some information may be lost in some cases.
  - **1** - CAN Module will not enter deep-sleep mode.
- *Extend Tachograph Communication Debug*
  The Extended tachograph communication debug information is accessible for developer.
- *Tacho Driver Work Time Mode*
  An numeral to indicate the working mode of querying tachograph about drivers' working times.
  - **0** - Querying is disabled at all. Drivers' working times are not available.
  - **1** - Querying is enabled only when ignition is on (for vehicles which don't support ignition signal from CANBUS when engine is on). When ignition/engine is off, times are not updated.
  - **2** - Querying is enabled when CANBUS is active. When car gets into sleep mode, querying is continued until all drivers, who's cards are inserted change their work mode to REST. Then querying stops. When car's CAN bus gets active again, querying is resumed.
  - **3** - Querying is always enabled, even if car is in sleep mode. Caution! This may keep the tachograph awake and lead to increased power consumption by car's components.

Note

As <Hardware Information>, <Standard Debug Information> and <Extended Debug Information> contain many bytes, it is recommended to query only one set of debug message at a time.

4.4.22 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.

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Example:
+RESP:GTASV,8020050905,359464036001111,GV355CEU,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
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,8020050905,135790246811220,GV355CEU,20230524052727,11F0$

+RESP:GTPFA,8020050905,135790246811220,GV355CEU,20230524052727,11F0$

+RESP:GTPDP,8020050905,135790246811220,GV355CEU,20230524052727,11F0$

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

4.5.2 MPN | MPF | BTC

- ✧ MPN(Main Power Connection)
  The report for connecting the main power supply.
- ✧ MPF(Main Power Disconnection)
  The report for disconnecting the main power supply.
- ✧ BTC(Battery Starts Charging)
  Report when backup battery starts charging.

Example:
+RESP:GTMPN,8020050905,866775051616928,GV355CEU,3,0.0,69,75.7,117.129442,31.838805,20230815021527,0460,0000,550B,B7B1,01,12,20230815021527,22C4$

+RESP:GTMPF,8020050905,866775051618676,GV355CEU,0,10.2,354,83.1,117.129362,31.839521,20230821100830,0460,0000,550B,085BE2AA,01,12,20230821100854,0CB7$

+RESP:GTBTC,8020050905,866775051618676,GV355CEU,1,0.0,351,84.1,117.129520,31.839398,20230821105111,0460,0000,550B,085BE2AA,01,12,20230821105111,0E39$

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

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Parts	Fields	Length	Range/Format
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX/XXXXXXXX
	Position Append Mask	2	00 - FF
	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,8020050905,866775051616993,GV355CEU,3,0,61.0,151,53.3,116.978634,31.967512,20231111033150,0460,0000,691D,6141,01,7,20231111113422,3054$

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

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 - FF
	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,8020050905,866775051616993,GV355CEU,2,3,0,61.0,151,53.3,116.978634,31.967512,20231111033150,0460,0000,550B,085BE2AA,01,12,20231111114612,3082$

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

Parts	Fields	Length	Range/Format
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Jamming Status	1	1 | 2
	Jamming Net	1	1-3
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	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,8020050905,866775051618676,GV355CEU,,1,0.0,174,82.1,117.129393,31.839150,20230821100737,0460,0000,550B,085BE2AE,01,10,20230821100738,0CA8$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	STC
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	0	
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	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,8020050905,866775051618486,GV355CEU,3.70,1,0.0,200,55.6,117.129532,31.839303,20221110113021,0460,0000,550B,085BE2AA,01,12,20221110193021,69AC$

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

Parts	Fields	Length	Range/Format
	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
	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	0 - FF
	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,8020050905,866775051622785,GV355CEU,22,0,0.0,167,118.6,117.129491,31.839504,20231201032436,0460,0000,550B,085BE2AA,01,11,20231201032437,276E$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	STT
	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	Motion Status	2	11 | 12 | 21 | 22 | 41 | 42 | 16
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	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,8020050905,866775051622785,GV355CEU,3,2,0.3,179,126.0,117.129688,31.837718,20231201032607,0460,0000,550B,085BE2AA,01,10,00020:30:42,0.0,20231201032607,277F$

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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)
	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
	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.

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4.5.9 VGN(Virtual Ignition-on Report)

Example:
+RESP:GTVGN,8020050905,866775051622785,GV355CEU,00,4,178,1,0.0,0,72.8,117.129555,31.839368,20231129065034,0460,0001,DE10,027A4F1F,01,10,12345:12:34,0.0,20231129065036,009D$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	VGN
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	2	00
	Report Type	1	0-4 | 7
	Duration of Ignition Off	<=6	0 - 999999(s)
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	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.

- **0** - Reserved
- **1** - Sensor state mode
- **2** - External power voltage mode (virtual ignition detection)
- **3** - Reserved
- **4** - Accelerometer mode (virtual ignition detection)
- **7** - Combined detection mode. In this mode, ignition on/off trigger conditions can be selected using parameters <Virtual Ignition On Mask> and <Virtual Ignition Off Mask> in the command (AT+GTVMS).

Note

<Virtual Ignition off Mask> must contain <Virtual Ignition On Mask> to prevent logic errors.

✧ *Duration of Ignition Off*

Duration since last time the ignition is off. If it is greater than 999999 seconds, it is reported as 999999 seconds.

✧ *Hour Meter Count*

If the hour meter count function is enabled by the command (AT+GTHMC), total hours the meter has counted when the engine is on will be reported in this field. It is formatted with 5 to 7 hour digits, 2 minute digits and 2 second digits. If the function is disabled, this field will be empty.

4.5.10 IGF(Ignition-off Report)

Example:
+RESP:GTIGF,8020050905,866775051622785,GV355CEU,73842,1,0.3,179,130.0,117.129695,31.837757,20231201032604,0460,0000,550B,085BE2AA,01,10,00020:30:42,0.0,20231201032604,2778$

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

Parts	Fields	Length	Range/Format
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	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*

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,8020050905,866775051622785,GV355CEU,00,4,108,1,0.0,0,72.8,117.129555,31.839368,20231129065222,0460,0001,DE10,027A4F1F,01,12,12345:12:34,0.0,20231129065224,00A6$

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

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Parts	Fields	Length	Range/Format
	Report Type	1	0-4 | 7
	Duration of Ignition On	<=6	0 - 999999(s)
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	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.

✧ *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 IDN(Enter Idle State)

Report when the vehicle enters the idle state.

Example:
+RESP:GTIDN,8020050905,866775051628626,GV355CEU,,,0,62.0,359,38.8,117.097050,31.845507,20231111072948,0460,0000,550B,05DB052C,01,10,9.6,20231111073205,12E3$

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

4.5.13 IDF(Exit Idle State)

Report when the vehicle exits the idle state.

Example:
+RESP:GTIDF,8020050905,866775051628626,GV355CEU,22,81,1,57.2,270,41.6,117.111587,31.832048,20231111073325,0460,0000,550B,05DB052C,01,10,10.3,20231111073327,12EA$

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

Parts	Fields	Length	Range/Format
	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 | 22
	Duration of Idling Status	<=6	0 - 999999 (s)
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	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	$

✧ *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.

4.5.14 GSS(GNSS Signal Status)

Example:
+RESP:GTGSS,8020050905,866775051508042,GV355CEU,0,0,11,,0,0.0,0,102.0,117.129455,31.838977,20230630061839,0460,0011,691D,06919837,01,1,20230630061939,30D0$

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Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	GSS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	GNSS Signal Status	1	0 | 1
	Satellite Number	<=2	0 - 15
	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 - FF
	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.

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- **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.

4.5.15 STR | STP | LSP

- ✧ STR: Enter Start State
- ✧ STP: Enter Stop State
- ✧ LSP: Enter Long Stop State

Example:
+RESP:GTSTR,8020050905,866775051628626,GV355CEU,,,1,61.6,270,43.1,117.102025,31.832092,20231111072735,0460,0000,550B,05DB052C,01,12,7.6,20231111072736,12D7$

+RESP:GTSTP,8020050905,866775051628626,GV355CEU,,,0,62.0,359,38.8,117.097050,31.845507,20231111072948,0460,0000,550B,05DB052C,01,7,9.6,20231111073205,12E4$

+RESP:GTLSP,8020050905,866775051628626,GV355CEU,,,1,0.0,269,44.2,117.116741,31.832053,20231111073304,0460,0000,550B,05DB052C,01,12,9.9,20231111073305,12E8$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	STR | STP | LSP
	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

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Parts	Fields	Length	Range/Format
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	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	$

4.5.16 FLA(Unusual Fuel Consumption Alarm)

Example:
+RESP:GTFLA,8020050905,135790246811220,GV355CEU,2,92,70,0,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,01,1,20090214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	FLA
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Input ID	1	0 - 3
	Last Fuel Level	<=3	0 - 100
	Current Fuel Level	<=3	0 - 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
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS

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

✧ *Input ID*

The ID of the input to which the fuel sensor is connected. 0 means "Connected with serial port".

✧ *Last Fuel Level*

The fuel level saved before the fuel loss alarm event occurs.

✧ *Current Fuel Level*

The current fuel level when the fuel loss alarm event occurs.

4.5.17 DOS(Wave Shape 1 Output Status)

Example:
+RESP:GTDOS,8020050905,866775051616985,GV355CEU,2,1,2,0.0,17,89.2,117.129262,31.839184,20221115092710,0460,0001,DE10,027A4F1F,01,7,20231115163711,002D$

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 - 3 | 7 - C
	Wave1 Output Active	1	0 - 2
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx

Parts	Fields	Length	Range/Format
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	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 .

4.5.18 TMP(Temperature Alarm)

Example:
+RESP:GTTMP,8020050905,862170013894694,GV355CEU,,12183,01,1,2,0.0,266,88.9,117.129568,31.837759,20230628081232,0460,0000,550B,085B,01,1,0.0,12345:12:34,1387,20,,01,01,,,,28131A4103000056,,28,20130627054009,0028$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	TMP
	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	
	External Power Voltage	<=5	0 - 32000(mV)
	Report ID / Report Type	2	X(0 - 3)X(0 - 1)
	Number	1	0 - 1
	GNSS Accuracy	<=2	0 - 50

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Parts	Fields	Length	Range/Format
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	Mileage	<=9	0.0 - 4294967.0 (km)
	Hour Meter Count	11 - 13	00000:00:00 - 1193000:00:00
	Analog Input Voltage1	<=5	0 - 16000(mV)|F(0 - 100)
	Analog Input Voltage2	<=5	0 - 30000(mV)|F(0 - 100)
	Reserved	0	
	Digital Input	2	00 - 1F
	Digital Output	2	00 - 07
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Temperature Sensor Device ID	16	'0'-'9' 'a'-'f' 'A'-'F'
	Reserved	0	
	Temperature Sensor Device Data	<=3	-55 - 125(Centigrade)
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: The ID of the temperature alarm.

Report Type:

- **Bit 0** - 0 means "Outside the predefined temperature range". 1 means "Within the predefined temperature range".
- **Bit 1** - 0 means "Temperature decreases". 1 means "Temperature increases".

- *Temperature Sensor Device ID*
  The ID of the temperature sensor.
- *Temperature Sensor Device Data*
  The current temperature the sensor detects.

4.5.19 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,8020050905,866775051616993,GV355CEU,0,2,0.0,0,83.2,117.129367,31.838250,20231110085628,0460,0000,550B,085BE2AA,01,2,20231110085629,1E88$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	RMD
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Roaming State	1	0 - 3
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	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

4.5.20 PHL(Location Information for CMS)

This message is used for reporting location information before reporting photo data, and it is only sent via GPRS even if the report mode is forced SMS mode.

Example:
+RESP:GTPHL,8020050905,862170019025640,GV355CEU,0,,20131018075847,0,0.0,0,69.4,117.201431,31.833073,20131018075848,0460,0000,5678,2D7E,01,1,,,,,20131018075849,0058$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	PHL
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Camera ID	1	0 - 3
	Reserved	0	
	Photo Time	14	YYYYMMDDHHMMSS
	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

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Parts	Fields	Length	Range/Format
	GNSS Satellite Number (Optional)	<=2	0 - 24
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

4.5.21 FTP(Transfer File Alarm)

Report location information after transferring a file to FTP server.

Example:
+RESP:GTFTP,8020050905,862170011507322,GV355CEU,,862170011507322_20140606080837.jpg,0,1.3,0,87.6,117.201577,31.832981,20230606080843,0460,0000,5678,2D7E,01,1,20230606080903,002B$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	FTP
	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	
	File Name	<=100	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_' '.'
	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

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

✧ *File Name*

The name of the file transferred to FTP server. It is combined with <File Name Prefix>, "_" and time information.

For example:

If <File Name Prefix> is **GV355CEU**, <File Name> is **GV355CEU_20230723120304.jpg**.

The Suffix	Description
.jpg	A picture file
.DDD	A Tachograph file

4.5.22 EXP(Information of Digital Fuel Sensor)

This message is used for reporting the malfunction information of digital fuel sensor.

Example:
+RESP:GTEXP,8020050905,866775051616993,GV355CEU,4,,0,0002,1,0.0,0,52.9,117.129266,31.839196,20231108091100,0460,0000,550B,085BE2AA,01,7,20231108091101,08F6$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	EXP
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Digital Fuel Sensor Type	1	2 | 4
	Reserved	0	
	Reserved Parameters	<=3	
	HW Fault Code	4	0000 - FFFF
	GNSS Accuracy	<=2	0 - 50

Parts	Fields	Length	Range/Format
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	GNSS Satellite Number (Optional)	<=2	0 - 24
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Digital Fuel Sensor Type*

For details, please refer to <Digital Fuel Sensor Type> in (AT+GTURT).

- **2** - DUT-E
- **4** - UFSxxx

✧ *HW Fault Code*

The malfunction code has different meanings for different digital fuel sensors.

- **For DUT-E:**
  - **Bit 0** - Sensor is not calibrated. The difference between calibration frequencies of signal generator for minimum and maximum fuel levels is 100 Hz.
  - **Bit 1** - Sensor is not calibrated for maximum fuel level.
  - **Bit 2** - Signal generator is not functioning. Possible short circuit in measuring probe tubes.
  - **Bit 3** - The difference between calibration values for minimum and maximum fuel levels in the sensor is less than 5 Hz.
  - **Bit 4** - EEPROM error. Hardware failure of the sensor.
  - **Bit 5** - Current frequency of the signal generator is more than fixed one when calibrating for minimum fuel level, and the difference is more than 100 Hz.
  - **Bit 6 - 15** - Reserved.
- **For UFSxxx:**
  - **Bit 0** - The detector of the fuel sensor is not connected or the signal extension cable is broken.
  - **Bit 1** - The detector of the fuel sensor is detached from the fuel tank.
  - **Bit 2** - The input power source is too low.
  - **Bit 3** - Abnormal reset of the system.

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- **Bit 4** - The value of analog output is abnormal.
- **Bit 5** - The current fuel level is in the blind zone.
- **Bit 6 - 15** - Reserved.

4.5.23 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,8020050905,866775051616928,GV355CEU,0,00000000,00000000,00000002,,,2FBFFFFF,1G1BL52P7TR115520,1,H20,100000.06,5000,60,210,H999.9,L100.00,99999990,100,9999.99,9999.99,9999.99,100000.06,4498,0000,FFBF,00,3F,1799998.00,1799998.00,10000,20000,30000,3600,40000,13FFFFFF,P99.60,32125,32125,32125,0,0,0,11760,9999999,999999,999999,99999.99,99999.99,99999.99,999999,queclink01,queclink02,CAR1NAME,CAR2NAME,05663,3FFE,999999,999999,100,-160000,210,2,022E03,619902,,,1,0.0,184,106.0,117.129195,31.839723,20230818051236,0460,0000,550B,085BE2AE,00,20230818051236,1260$

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
	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	<=3	0 - 455(km/h)

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Parts	Fields	Length	Range/Format
	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)
	Engine Cold Starts Count	<=8	0 - 16449535
	Engine All Starts Count	<=8	0 - 16449535
	Engine Starts by Ignition Count	<=8	0 - 16449535
	Total Engine Cold Running Time	<=9	0 - 421108120(s)
	Handbrake Applies During Ride Count	<=5	0 - 64255
	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

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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(%)
	Service distance	<=8	-160635 - 327675(km)
	Ambient Temperature	<=4	-40 - +215(Celsius)
	DTC Number	<=2	0 - 99
	DTC 1	<=6	'0'-'9' 'a'-'z' 'A'-'Z'
	...		
	DTC N	<=6	'0'-'9' 'a'-'z' 'A'-'Z'
	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

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

4.5.24 RTP(Remote File Transfer)

Report file transfer information.

Example:
+RESP:GTRTP,8020050905,862170019025640,GV355CEU,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	$

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- *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.

4.5.25 TRD(DDD Data Report)

This message is used to report DDD data and can only be sent via GPRS even if the report mode is forced SMS mode.

Example:
+RESP:GTTRD,8020050905,867995030090222,GV355CEU,000A,,,0,18,490,303834303030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF011F5631303030303031303830383430303 0FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0208015D1205395D12E4E1011F5631303030303031303830383430303 0FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF011F5631303030303031303830383430303 0FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0108015D1339F75D1587A9011F5631303030303031303830383430303 030FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF011F5631303030303031303830383430303 0FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF0108015D15DFB15D196460011F563130303030,,,,,2019071015 3859,0956$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	TRD
	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	File Download Count	4	0001 - FFFF
	Reserved	0	
	Reserved	0	
	File Frame End flag	1	0 | 1
	Current Frame Index	<=3	
	DDD Data Length	<=3	
	DDD Data	<=684	
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *File Frame End Flag*

The flag of last frame.

- **0** - Not the last frame of file.
- **1** - The last frame of file.

✧ *Current Frame Index*

The index of frames.

✧ *DDD Data Length*

The length of DDD data in current frame.

✧ *File Download Count*

A number that marks the messages between **+RESP:GTTRD** and **+RESP:GTTRL**.

4.5.26 PNR(Power-on Reason)

This message indicates the reason for power on.

Example:
+RESP:GTPNR,8020050905,863835020303983,GV355CEU,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

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Parts	Fields	Length	Range/Format
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Power On Reason	1	0-3 | 6
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Power On Reason*

It indicates the reason for power on.

- **0** - Normal power on
- **1** - FOTA reboot
- **2** - RTO reboot
- **3** - Watchdog reboot
- **6** - Configuration upgrade reboot

4.5.27 PFR(Power-off Reason)

This message indicates the reason for power off.

Example:
+RESP:GTPFR,8020050905,863835020303983,GV355CEU,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	

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Parts	Fields	Length	Range/Format
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

4.5.28 LBA(Low Power Alarm for RF433)

The low power alarm (less than 2.4V) event message for the RF433 accessories.

Example:
+RESP:GTLBA,8020050905,135790246811220,GV355CEU,1,00001,0,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,01,1,20090214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	LBA
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Accessory Type	1	1-3
	Accessory Serial Number	5	00001 - FFFFE
	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

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

✧ *Accessory Type*

It indicates the type of the accessory.

- **1** - Wireless temperature sensor (WTS100)
- **2** - Wireless temperature & humidity sensor (WTH100)
- **3** - Wireless panic button (WPB100)

Note

The **+RESP:GTLBA** message will be reported according to the parameter <Sample Interval> when the parameter <Accessory Type> is 1 or 2. When <Accessory Type> is 3, the **+RESP:GTLBA** message will be reported according to the trigger event of the button.

4.5.29 WPB(Button Alarm for WPB100)

The button alarm event message for WPB100 accessory.

Example:
+RESP:GTWPB,8020050905,135790246811220,GV355CEU,00001,0,4.3,92,70.0,121.354335,31.222073,20090214013254,0460,0000,18d8,6141,01,1,20090214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	WPB
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Accessory Serial Number	5	00001 - FFFFE
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)

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

4.5.30 CRA(Crash Alarm)

Example:
+RESP:GTCRA,8020050905,866775051622785,GV355CEU,00,0,0.0,0,78.4,117.129089,31.840011,20221201062515,0460,0000,550B,085BE2AE,01,6,20221201062516,2BF5$

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

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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
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.

4.5.31 BCS(Bluetooth Connection Report)

Example:
+RESP:GTBCS,8020050905,866775051618486,GV355CEU,,1,0.0,0,83.1,117.129299,31.839167,20221111031634,0460,0000,550B,085BE2AA,01,12,0D03,GV355CEU_BT,02E9AB5F3C84,0,1,6B676EBE877E,,,,,20221111111635,6B82$

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

Parts	Fields	Length	Range/Format
	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	
	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

4.5.32 BDS(Bluetooth Disconnection Report)

Example:
+RESP:GTBDS,8020050905,866775051618486,GV355CEU,,1,0.0,0,83.1,117.129299,31.839167,20221111031726,0460,0000,550B,085BE2AA,01,12,0D03,GV355CEU_BT,02E9AB5F3C84,0,1,6B676EBE877E,0,,,,20221111111727,6B89$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	BDS
	Leading Symbol	1	,

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Parts	Fields	Length	Range/Format
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	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
	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.

4.5.33 ASC(Acceleration Calibration Alarm)

The report for calibration data.

Example:
+RESP:GTASC,8020050905,866775051616985,GV355CEU,0.93,0.32,-0.20,0.32,-0.95,-0.03,-0.20,-0.04,-0.98,1,7.5,359,44.5,117.092284,31.817024,20221130063207,0460,0000,550B,045E83ED,01,12,20221130134207,45B1$

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

Parts	Fields	Length	Range/Format
	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
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**.

4.5.34 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,8020050905,866775051616985,GV355CEU,,2,1,1,7.5,359,44.5,117.092284,31.817024,20231130063207,0460,0000,550B,045E83ED,01,12,001800170055,000E0000004B,21,23.0,20231130134207,45B4$

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

Parts	Fields	Length	Range/Format
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Reserved	0	
	Self Calibration Status	1	0-2
	Harsh Behavior Type	1	0-4
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	0000 - FFFF|00000000 - FFFFFFFF
	Position Append Mask	2	00 - FF
	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.

4.5.35 BAA(Bluetooth Accessory Alarm)

Example:
+RESP:GTBAA,8020050905,866775051622785,GV355CEU,00,1,3,0A,011F,1_3_Anglesensor,F022A2143F36,1,3400,0,4,0,2,0.0,0,167.2,117.129277,31.839664,20240226054631,0460,0000,550B,085BE2AA,01,12,20240226134632,0DF1$

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) 00 - 09 | 0xFF | 0XFE
	Accessory Type	<=2	0-3 | 6 | 11-14
	Accessory Model|Beacon ID Model	1	0-5
	Alarm Type	2	0-4 | 7-A | C-18
	Append Mask	4	0000 - FFFF

Parts	Fields	Length	Range/Format
	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)
	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	0000 - 0001
	GNSS Satellite Number(Optional)	<=2	0 - 24
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF

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Parts	Fields	Length	Range/Format
	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.
- **0D** - Beacon event notification.
- **0E** - Tire pressure alarm: The current Tire pressure value is lower than <Low Tire pressure> set in the **AT+GTBAS** command.

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- **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 7** - <Accessory Input Output Data>, including <Accessory Output Status>, <Accessory Digital Input Status>, <Accessory Analog Input Voltage>
- **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> = 0x081F0007, 0x081F indicates bit 15 - bit 0, 0x0007 indicates bit 31 - bit 16.

✧ *Accessory Name*

The name of the Bluetooth accessory.

✧ *Accessory MAC*

The MAC address of the Bluetooth accessory.

✧ *Accessory Status*

A numeral to indicate whether the accessory is available.

- **0** - The accessory is not available.
- **1** - The accessory is available.

✧ *Accessory Battery Level*

The battery voltage of the Bluetooth accessory.

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- *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.

4.5.36 BID(Bluetooth Beacon ID Setting)

Example:
+RESP:GTBID,8020050905,867488060284402,GV355CEU,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

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Parts	Fields	Length	Range/Format
	Message Name	3	BID
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Number	<=2	0 - 3 | 0 - 15
	Beacon ID Model	1	0-2 | 4
	Accessory Append Mask	4	0000 - FFFF
	Accessory MAC (Optional)	12	'0' - '9' 'A' - 'F'
	Accessory Battery Level (Optional)	<=4	0 - 5000(mV)
	Accessory Signal Strength (Optional)	<=4	-120 - 0
	Beacon Type (Optional)	1	0 - 2
	Beacon Data (Optional)	<=100	
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	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	0000 - 0001
	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.
- **iBeacon E6** - The maximum value is 15.
- **IDELA** - The maximum value is 15.
- **WID310** - The maximum value is 15.

✧ *Beacon ID Model*

The model of the Bluetooth beacon accessory which is defined in (AT+GTBID).

✧ *Accessory Append Mask*

Bitwise mask defined in the **AT+GTBID** command to configure which data item is reported.

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

✧ *Accessory MAC*

The MAC address of the Bluetooth accessory.

✧ *Accessory Battery Level*

The voltage of Bluetooth accessory.

✧ *Accessory Signal Strength*

The signal strength of Bluetooth accessory.

✧ *Beacon type*

Types of beacons.

- **0** - "ID" Format
- **1** - "iBeacon" Format
- **2** - "Eddystone" Format

✧ *Beacon Data*

Select the data format according to <Beacon Type>:

- If <Beacon Type> is 0, the data format is as follows:

Fields	Length	Range/Format
ID_Mfr_Data	12	(HEX)

- If <Beacon Type> is 1, the data format is as follows:

Fields	Length	Range/Format
UUID	32	(HEX)
Major	4	(HEX)
Minor	4	(HEX)

- If <Beacon Type> is 2, the data format is as follows:

Fields	Length	Range/Format
NID	20	(HEX)
BID	12	(HEX)

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4.5.37 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,8020050905,866775051622785,GV355CEU,06,7,0,0007,S7,0018E9C336E0,0,,,,0,0.0,175,114.5,117.129323,31.839301,20240207063622,0460,0001,DF5C,02A90902,01,11,20240207160720,0022$

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
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	0000 - 0001

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Parts	Fields	Length	Range/Format
	GNSS Satellite Number(Optional)	<=2	0 - 24
Tail	Send Time	14	YYYYMMDDHHMMSS
	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)
PGN2	4	(HEX)
PGN Data2	<=42	(HEX)
PGN3	4	(HEX)
PGN Data3	<=42	(HEX)
PGN4	4	(HEX)
PGN Data4	<=42	(HEX)

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- *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.

4.5.38 RAS(RS485 Accessory Report)

Example:
+RESP:GTRAS,8020050905,866775051622785,GV355CEU,0,3,0,,03,,0100,0100,,,898600e012395
5608398,100,21,I1,1,1,0.0,165,104.6,117.129216,31.839160,20240228080810,0460,0000,550B,0
85BE2AA,00,20240228173810,0103$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	RAS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Index	1	0 - 4
	RS485 Device Type	1	3
	Message Type	1	0-4
	Reserved	0	
	Data ID	<=2	0 - FF
	Data Type	1	0 | 1
	Data From	4	0000 - FFFF
	Data To	4	0000 - FFFF
	Data	<=500	(0 - 250) * 2
	Reserved	0	
	ICCID	20	ICCID
	Backup Battery Level	1	0 - 100
	Motion Status	2	11 | 12 | 21 | 22 | 41 | 42 | 16 | 1A
	Ignition Status	2	I(0 | 1)

Parts	Fields	Length	Range/Format
	External Power Supply	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	0000 - 0001
	GNSS Satellite Number (Optional)	<=2	0 - 24
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *RS485 Device Type*

The following is supported:

- **3** - Modbus communication equipment.

✧ *Message Type*

Type of message to transmit Modbus data.

- **0** - Read Data Response Timeout.
- **1** - Write Data Response Timeout.
- **2** - Read Data Success .
- **3** - Write Data Success.
- **4** - Modbus Error.

✧ *Device ID*

Refer to the description of <Device ID List> in command (AT+GTRAS) for details.

✧ *Data Type*

A numeral to indicate the type of the <Data>.

- **0** - Register.
- **1** - Coil.

✧ *Data, Data From, Data To*

The response data and data address of the Modbus slave. An example of this parameter is as follows:

If reading the registers, <Data From> = 0x1800, <Data To>=0x1803, <Data> = 0x080123456701234567

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Length	H(1800)	L(1800)	H(1801)	L(1801)	H(1802)	L(1802)	H(1803)	L(1803)
08	01	23	45	67	01	23	45	67

If reading the coils, start coil number is 10, reading the 10 coils, <Data From> = 0x0014, <Data To>=0x0002, <Data> = 0x02CD01.

Length	Addr	H(0014)								H(0014)							
	Bit	1	1	0	0	1	1	0	1	0	0	0	0	0	0	0	1
02	Coil	17	16	15	14	13	12	11	10							19	18

If reading the coils, start coil number is 10, reading the 5 coils, <Data From> = 0x0014, <Data To>=0x0001, <Data> = 0x010D.

Length	Addr	(0014)							
	Bit	0	0	0	0	0	0	0	0
02	Coil				14	13	12	11	10

Note

If the message type is 4, the data of the <Data> field represents the Modbus exception code.

✧ *Ignition Status*

The status of ignition. I0 means "Ignition off" and I1 means "Ignition on".

4.5.39 HUM(Humidity Alarm)

Example:
+RESP:GTHUM,8020050905,866775051516144,GV355CEU,,11855,01,1,1,0.0,170,47.2,117.129404,31.839314,20220831083026,0460,0000,550B,085BE2AA,01,1,0.0,00000:00:00,0,,,01,00,,,,281405F70A0000D6,,27,20220831083027,DA19$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	HUM
	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	
	External Power Voltage	<=5	0 - 32000(mV)
	Report ID / Report Type	2	X(0 - 3)Y(0 - 1)
	Number	1	0 - 1
	GNSS Accuracy	<=2	0 - 50

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Parts	Fields	Length	Range/Format
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	GNSS Satellite Number (Optional)	<=9	0 - 24
	Mileage	<=2	0.0 - 4294967.0(km)
	Hour Meter Count	11-13	00000:00:00 - 1193000:00:00
	Analog Input VCC1	<=5	0 - 16000(mV)|F(0 - 100)
	Analog Input VCC2	<=5	0 - 30000(mV)|F(0 - 100)
	Reserved	0	
	Digital Input	2	00 - 1F
	Digital Output	2	00 - 07
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Humidity Sensor Device ID	16	'0'-'9' 'a'-'f' 'A'-'F'
	Reserved	0	
	Humidity Sensor Device Data	<=3	0 - 100(%RH)
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** - The ID of humidity alarm.
- **Report Type** - 0 means outside the predefined humidity range. 1 means within the predefined humidity range.

✧ *Humidity Sensor Device ID*

The ID of the humidity sensor.

✧ *Humidity Sensor Device Data*

The current humidity detected by the sensor.

4.5.40 TPM(Tire Pressure Monitoring)

The report is used for the TPMS (Tire Pressure Monitoring System).

Example:
+RESP:GTTPM,8020050905,866775051622785,,1,1,0.0,172,-10.0,117.129276,31.837962,20240606204834,0460,0001,DF5C,05A47666,00,003F,4,02,787378,3.0,0.00,24,68,01,69A778,3.0,0.00,26,6A,09,D53DE5,3.0,0.00,10,6A,08,D4154B,3.0,0.00,10,68,20240606204835,0259$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	TPM
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Report Type	2	00 - 02
	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
	Append Mask	4	0000 - FFFF
	Tire Number	<=2	0 - 24
	Tire Position (Optional)	2	00 - FF
	Sensor ID (Optional)	6	xxxxxx

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Parts	Fields	Length	Range/Format
	Sensor Bat Vol (Optional)	3	1.9 - 3.4 (V)
	Tire Pressure (Optional)	<=5	0.00 - 25.57 (Bar)
	Tire Temperature (Optional)	<=3	-50 - 205 (Centigrade)
	Tire Status (Optional)	2	00 - FF
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Report Type*

This parameter indicates the trigger source of the message **+RESP:GTTPM**.

- **00** - Tire data changes.
- **01** - Fixed time report.
- **02** - Triggered by **AT+GTRTO** command.

✧ *Tire Number*

Total number of tires in the message. The fields from <Tire Position> to <Tire Status> will be displayed for each tire.

✧ *Tire Position*

A numerical to indicate the tire position in vehicle.

The top 3 bits (bit 7-5) mean trailer number, low 5 bits (bit 4-0) mean tire serial number.

Note

The details can be seen in the example below, which represents the tire positions of a 3-axle truck and a 3-axle trailer.

Tracker						Trailer					
0X						2X					
		3		7			1		5		9
1		4		8			2		6		A
Heading left						Heading left					
2		5		9			3		7		B
		6		A			4		8		C

✧ *Sensor ID*

Tire pressure sensor ID.

✧ *Sensor Bat Vol*

Tire pressure sensor battery voltage.

✧ *Tire Pressure*

Tire pressure value.

✧ *Tire Temperature*

Tire temperature value.

✧ *Tire Status*

Tire pressure sensor status.

- **Bit7** - Sensor battery voltage status, 0 means normal, 1 means low battery voltage.

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- **Bit 6** - When there is no data received from the sensor for a long time (60 minutes), this bit is set to 1.
- **Bit 5** - 1 means automatic positioning on, 0 means off.
- **Bit 4** - 1 means high air pressure.
- **Bit 3** - 1 means low air pressure.
- **Bit 2** - 1 means high temperature, 0 means normal.
- **Bit 1 - 0**:
  - **00** - Normal state.
  - **01** - Emergency air leakage.
  - **10** - Slow air leakage.
  - **11** - Gas filling.

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 CRG(Crash GNSS Data Packet)

The **+RESP:GTCRG** message contains GNSS information before/after the crash. When crash is detected, GNSS information before the crash will be reported to the backend server. And the device will continue to record GNSS information after the crash and report the packed data to the backend server.

Example:
+RESP:GTCRG,8020050905,135790246811220,GV355CEU,1,10,1,1,19.1,165,54.8,121.390739,31.164275,20160202060648,10,1,24.8,176,51.3,121.390733,31.164220,20160202060649,3,1,14.0,173,47.3,121.390729,31.164224,20160202060650,4,1,8.5,173,46.4,121.390737,31.164227,20160202060651,5,1,8.1,194,46.1,121.390725,31.164225,20160202060652,6,1,12.3,229,46.6,121.390690,31.164227,20160202060653,7,1,17.6,258,43.9,121.390635,31.164223,20160202060654,8,1,6.8,268,43.8,121.390672,31.164269,20160202060655,9,1,2.2,229,44.8,121.390701,31.164282,20160202060656,10,1,2.8,229,44.3,121.390709,31.164306,20160202060657,20160202060658,01A8$

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

Parts	Fields	Length	Range/Format
Body	Data Type	1	0 | 1
	GNSS Validity Number	<=2	0 - 10
	GNSS Point Index	<=2	1
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	...		
	GNSS Point Index	<=2	10
	GNSS Accuracy	<=2	0|1 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Data Type*

The data reported to the backend server is recorded before crash or after crash.

- **0** - Before crash
- **1** - After crash

✧ *GNSS Validity Number*

The number of the successfully fixed GNSS positions included in the report message.

✧ *GNSS Point Index*

The index of GNSS point.

4.6.2 DUC(Data Usage Statistics)

This message is used to get statistics about data usage.

Example:
+RESP:GTDUC,8020050905,862170019025640,GV355CEU,0,0,90,,20201123064427,05D1$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	DUC
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Report Type	1	0 - 4
	Total Data Usage	<=8	0-99999999 (M)
	Day Data Usage	<=8	0-99999999 (Kbyte)
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Report Type*

The type of this report.

- **0** - Report triggered by <Mode> of (AT+GTRTO).
- **1** - Report triggered by <Report Interval> of (AT+GTDUC).
- **2** - Report triggered by <Total Percentage> of (AT+GTDUC).
- **3** - Report triggered by <Day Data Usage> of (AT+GTDUC).
- **4** - Report triggered by <Data Usage> of (AT+GTDUC).

✧ *Total Data Usage*

The total data that has been consumed.

✧ *Day Data Usage*

The data that has been consumed today.

4.6.3 FSD(Fuel Sensor Data Packet)

This message is used for reporting fuel sensor data.

Example:
+RESP:GTFSD,8020050905,862170016790444,GV355CEU,39,*QL,407D,01,00000,0132,0014,00000,0229#,,,,,20141021021206,0018$

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

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Parts	Fields	Length	Range/Format
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Data Length	2	
	Sensor Data	<=128	ASCII String
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Data Length*

The length of <Sensor Data>.

✧ *Sensor Data*

The fuel data from fuel sensor. It starts with "*" and ends with "#".

If <Sensor Type> is set to 9(Genesis Fuel_Con), <Sensor Data> starts with '$'.

4.6.4 PHD(Photo Data Packet)

This message is used for reporting photo data and only sent via GPRS even if the report mode is forced SMS mode.

Example:
+RESP:GTPHD,8020050905,862170019025640,GV355CEU,0,,20131018075847,20,20,8,AP/V/9k=,,,,,20131018075950,006C$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	PHD
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Camera ID	1	0 - 3
	Reserved	0	
	Photo Time	14	YYYYMMDDHHMMSS
	Total Frames	<=3	

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Parts	Fields	Length	Range/Format
	Current Frame Index	<=3	
	Photo Data Length	<=3	
	Photo Data	<=684	
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

- *Total Frames*
  The total frames of one picture.
- *Current Frame Index*
  The index of the current frame.
- *Photo Data Length*
  The length of picture data in the current frame.

4.6.5 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,8020050905,359231038715676,GV355CEU,00,00,3,1,0001000100550001000200510000000005500000001005200010001005600010001005300000000005400000001005100010000005400000001005300010001005500010000005300010001005400000003005100000001005300001ffff005300000001005300010000005200000000005400030001005300021ffff005300010001005200000002005100010003005300010000005300011ffff005400000001005200000003005500020001005300010000005200010001005500010001005400011ffff005300000002005300000000200056ffff000000530000000000520001000000520001000200520002000100540000000100541ffff000200520000000100510001ffff00530002ffff00540001fffe00520001ffff005300000002005200000002005200020001005200010001005600010001005200011ffff005300010002005600011ffff005100010001005500010000005300010001005400011ffff00530001000200510002000200530000000000550001000000520001000100550001000100053ffffffff00520000ffff005200010002005300020001005400010000005500010002005300010000005300000001005300010001005200001ffff005100010000005200020000005200021ffff005200010002005300000002005400000000005400011fffe00530001ffff005200010001005200010001005300001000100520000,20120330120443,005C$

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 backend server for the crash event.

✧ *Frame Number*

A numeral to indicate the sequence of the current message.

✧ *Data*

There are 1200 ASCII characters in one message at most which includes acceleration samples in 1 second at most. There are 12 characters in a group. The first 4 characters of these 12 characters represent X axis acceleration data, the middle 4 characters represent Y axis acceleration data and the last 4 characters represent Z axis acceleration data. The ASCII "0001"

is equal to 0x0001 in hex format, and the ASCII "afff" is equal to 0xAFFF in hex format. They are two's complement.

✧ *Example*

- +RESP:GTCRD,8020050905,359231038715676,,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,8020050905,359231038715676,,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.

4.6.6 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,8020050905,864292043426376,GV355CEU,FFFE0000007EFFFE0000007EFFFE0000007FFFFF0000007EFFFF0000007EFFFE0000007FFFFE0000007FFFFE0000007EFFFF0000007EFFFE0000007EFFFE0000007FFFFE0000007EFFFE0000007FFFFE0000007FFFFF0000007EFFFFFFFF007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFF0000007EFFFE0000007EFFFE0000007FFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007EFFFE0000007DFFFE0000007EFFFE0000007EFFFFFFFF007DFFFE0000007EFFFE0000007FFFFE0000007EFFFE0000007EFFFE0000007FFFFE0000007EFFFE0000007EFFFF0000007EFFFE0000007EFFFE0000007FFFFE0000007EFFFE0000007EFFFF0000007EFFFF0000007EFFFE0000007EFFFE0000007EFFFF0000007EFFFE0000007FFFFE0000007EFFFE0000007EFFFE0000007FFFFE0000007EFFFEFFFF007EFFFE0000007EFFFF0000007EFFFF0000007DFFFE0000007EFFFE0000007EFFFE0000007DFFFE0000007FFFFE0000007FFFFE0000007EFFFF0000007EFFFE0000007EFFFE0000007EFFFFFFFF007E,,,,2020062303 0020,863C$

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

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	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**,8020050905,864292043426376,,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**,8020050905,864292043426376,,ffffff10052…,,,,20200623030022,863E$

  This is the latest XYZ-axis acceleration data:

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

  Decimal format: X (axis acceleration data) = -1; Y = -15; Z = 82;

Note

Acceleration of gravity (+g) is 82 in decimal format and - g is -82. The linearized acceleration data 1312 represents +16g and -1312 represents -16g.

4.7 Data Transmission

This section describes the format of the data transmission messages. Please refer to the details below.

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4.7.1 DAT(Transparent Data Transmission)

The device supports transparent data transfer between the backend server and the peripheral device connected to its secondary serial port/Bluetooth. The device supports bi-directional data transmission. In both directions, the data is transparent to the device.

a) Transfer data from the peripheral device to the backend server:

According to <Working Mode> of the command (AT+GTURT), there are two ways for the peripheral device to communicate with the device.If the peripheral device supports the (AT+GTDAT) command, it can transfer data via this command. The peripheral device can send the command (AT+GTDAT) with the data to the serial port/Bluetooth. According to <Command Type> of (AT+GTDAT), the device wraps the corresponding data into the backend server with the **+RESP:GTDAT** message either in short format or in long format.

b) Transfer data from the backend server to the peripheral device:

If the backend server needs to send data to the peripheral device, it can send the command (AT+GTDAT) with the data to the device and the device will pick out the pure data and send it to the secondary serial port/Bluetooth. The peripheral device can thus get the data from the serial port/Bluetooth.

4.7.1.1 Short Format

Example:
+RESP:GTDAT,8020050905,135790246811220,GV355CEU,data,20111222122137,0017$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	DAT
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Data to the Backend Server	<=1280	ASCII Code
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

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4.7.1.2 Long Format

Example:
+RESP:GTDAT,8020050905,135790246811220,GV355CEU,3,,,1645026150,0,0.5,0,29.4,121.390923,31.164295,20111222022935,0460,0000,1806,2142,01,1,,,,,20111222022938,001A$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	DAT
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Report Type	1	0-2 | 28
	Reserved	0	
	Reserved	0	
	Data to the Backend Server	<=1280	ASCII String
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	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
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF

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Parts	Fields	Length	Range/Format
	Tail	1	$

✧ *Report Type*

It indicates where the data comes from.

- **0** - Reserved
- **1** - (AT+GTDAT) from serial port
- **2** - (AT+GTDAT) from Bluetooth
- **28** - (AT+GTDAT) from TPT2

Note

Data to the secondary serial port/Bluetooth starts with a new line and is terminated with \r\n.

4.7.2 UDT(UART Data Transfer)

If the parameter <Mode> in (AT+GTUDT) is enabled, or a GEO-Fence event occurs, the device will send the message **+RESP:GTUDT** at the sending interval to the destination specified by <Mode> in (AT+GTUDT).

Example:
+RESP:GTUDT,8020050905,0122,0105,,866775051508042,GV355CEU,0,,1,1,0.0,357,96.2,117.129344,31.839195,20220630085211,0460,0011,691D,0DE98A34,01,12,0.3,,00012:01:01,,,12,0,10563,26484,,00,00,21,12234,0.00,0,00000,1,00000,,20220630085212,0003$

Parts	Fields	Length	Range/Format
Head	Header	3	+RESP:GT
	Message Name	3	UDT
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Firmware Version	4	0000 - FFFF
	Hardware Version	4	0000 - FFFF
	Reserved	0	
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' - '_'
Body	Report Type	1	0-2
	Report ID	<=2	0 - 99
	Number	1	1
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359

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Parts	Fields	Length	Range/Format
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF
	GNSS Satellite Number (Optional)	<=2	0 - 24
	Mileage	<=9	0.0 - 4294967.0 (km)
	Reserved		
	Hour Meter Count	11 - 13	HHHHH:MM:SS
	Reserved	0	
	Reserved	0	
	GSV Number	<=2	00 - FF
	GEO-Fence State	1	0 | 1
	Analog Input VCC1	<=5	0 - 16000(mV)|F(0 - 100)
	Analog Input VCC2	<=5	0 - 30000(mV)|F(0 - 100)
	Reserved	0	
	Digital Input	2	00 - 1F
	Digital Output	2	00 - 07
	Motion Status	2	11 | 12 | 16 | 1A | 41 | 42 | 21 | 22
	External Power VCC	<=5	0 - 32000 (mV)
	Backup Battery Level	<=4	0.00 - 4.50 (V)
	Charging	1	0 - 1
	GEO Status Mask	5	00000 - FFFFF
	PEO-Fence State	1	0 | 1
	PEO Status Mask	5	00000 - FFFFF
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Report Type*

A numeral to indicate the type of the report.

- **0** - Timer event triggered.

- **1** - GEO-Fence event triggered.
- **2** - PEO-Fence event triggered.

✧ *Report ID*

GEO-Fence/PEO-Fence event triggered report ID. It is in HEX format.

✧ *GSV Number*

The number of satellites GNSS finds.

✧ *GEO-Fence State*

The activated GEO-Fence state. 0 means "Outside the GEO-Fence", and 1 means 'Inside the GEO-Fence".

✧ *GEO Status Mask*

GEO status mask. Bit 0 to Bit 19 represent the status of GEO 0 to 19 respectively. 0 means "Outside the GEO-Fence" or "The status is unknown", and 1 means "Inside the GEO-Fence".

✧ *PEO-Fence State*

The activated PEO-Fence state. 0 means "Outside the PEO-Fence", and 1 means "Inside the PEO-Fence".

✧ *PEO Status Mask*

Bit 0 - Bit 19 represent the status of PEO 0 - 19 respectively. 0 means "Outside the PEO-Fence" or "The status is unknown", and 1 means "Inside the PEO-Fence".

4.7.3 TKS(Basic Information)

✧ **Short Information Type**

When the parameter <Command Type> equals to **1**: AT+GTTKS=gv355ceu,1,,,0018$

Example:
+RESP:GTTKS(short),8020050905,866775051622785,1,1,0D,06,20221201084534,2E70$

Parts	Fields	Length	Range/Format
Head	Header	3	+RESP:GT
	Message Name	3	TKS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
Body	GNSS Accuracy	1	0 | 1
	GPRS Signal	1	0|1
	Digital Inputs	2	00 - 1F
	Digital Outputs	2	00 - 07
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

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✧ **Long Information Type**

When the parameter <Command Type> equals to **2**: AT+GTTKS=gv355ceu,2,,,0018$

Example:
+RESP:GTTKS(long),8020050905,866314060228424,1,1,01,00,20230724110041,12159,0.0,0,111.4,117.129368,31.839569,20230724110040,0.0,00006:43:33,100,0,0,,,,,,,,,0A7E$

Parts	Fields	Length	Range/Format
Head	Header	3	+RESP:GT
	Message Name	3	TKS
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
Body	GNSS Accuracy	1	0 | 1
	GPRS Signal	1	0|1
	Digital Inputs	2	00 - 1F
	Digital Outputs	2	00 - 07
	Send Time	14	YYYYMMDDHHMMSS
	External Power VCC	<=5	0 - 32000 (mv)
	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
	Mileage	<=9	0.0 - 4294967.0(km)
	Hour Meter Count	11 - 13	00000:00:00 - 1193000:00:00
	Backup Battery Percentage	<=3	0 - 100
	Analog Input1	<=5	0 - 16000(mV)|F(0 - 100)
	Analog Input2	<=5	0 - 30000(mV)|F(0 - 100)
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	

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

4.7.4 DTT(Data Transmission)

The device supports data transfer from the peripheral device to the backend server. According to <Working Mode> of the command (AT+GTURT), there are two ways for the peripheral device to communicate with the terminal device.

✧ **Short Format**

Example:
+RESP:GTDTT(short),8020050905,866775051622785,GV355CEU,,,0,7,1134122,20221201085334,2E9C$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	DTT
	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	
	Data Type	1	0 - 1
	Data Length	<=4	1 - 1280
	Data to the Backend Server	<=1280	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ **Long Format**

Example:
+RESP:GTDTT(long),8020050905,866775051622785,GV355CEU,,,0,9,1134122,0,0.0,173,72.7,117.129363,31.839142,20221201085356,0460,0000,550B,085BE2AA,01,6,,,,,20221201085357,2E9E$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	DTT
	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	
	Data Type	1	0 - 1
	Data Length	4	1 - 1280
	Data to the Backend Server	<=1280	
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Reserved	2	00
	Reserved	0	
	Reserved	0	
	Reserved	0	
	Reserved	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Data Type*

0 means "Binary data", and 1 means "Binary data written in hexadecimal ASCII format".

✧ *Data Length*

It represents the length of the original data.

✧ *Data to the Backend Server*

It is hexadecimal data if <Mode> in (AT+GTURT) is 7, and raw HEX data as is input through UART if <Mode> is 6 or 8.

4.7.5 TTR(Transparent Tachograph Transmission)

Data to the backend server is wrapped into the message **+RESP:GTTTR** and sent to the backend server.

Example:
+RESP:GTTTR,8020050905,866775051516177,GV355CEU,0004,0B,,00,FIN 1100000012845000*,Musterfrau 8 Krista 8*,,20221103110914,2E53$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	TTR
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Request ID	4	0000 - FFFF
	Message Type	2	0-6 | 8-B | D-10
	Reserved(option1)	0	
	Reserved(option2)	0	
	Reserved(option3)	0	
	Reserved(option4)	0	
	Reserved(option5)	0	
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Request ID*

It is the response to the server with the same field <Request ID> in the command (AT+GTTTR).

✧ *Message Type*

- **0** - Reply for DDD file request.

  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reply Result	1	0 - 4
Device Status	2	0x00 - 0xFF
File State In Memory	2	0x00 - 0xFF
Error Code	2	0x00 - 0xFF
Reserved	0	

- **1** - Authorization result.

In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reply Result	1	0 - 3
Device Status	2	0x00 - 0xFF
Reserved	0	
Error Code	2	0x00 - 0xFF
Reserved	0	

- **2** - APDU Data received from CAN_Logistic.

  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reserved	0	
APDU Sequence Number	4	
APDU DATA		
Reserved	0	
Reserved	0	

- **3** - The result of the process that CAN_Logistic reads file from tachograph.

  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reply Result	1	0 - 6
Device Status	2	0x00 - 0xFF
File State In Memory	2	0x00 - 0xFF
Error Code	2	0x00 - 0xFF
Reserved	0	

- **4** - Communication timeout.

  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reserved	0	
Reserved	0	
Reserved	0	
Reserved	0	
Reserved	0	

- **5** - Debug mode, the state of CAN_Logistic.

  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

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Fields	Length	Range/Format
Reserved	0	
Device Status	2	0x00 - 0xFF
File State In Memory	2	0x00 - 0xFF
Error Code	2	0x00 - 0xFF
Error Code Memory	2	0x00 - 0xFF

- **6** - FTP transfer event.

  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reply Result	<=2	0 - 14
Reserved	0	
Reserved	0	
Reserved	0	
Reserved	0	

- **8** - Restart TachoReader.

  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reply Result	1	0|1
Reserved	0	
Reserved	0	
Reserved	0	
Reserved	0	

- **9** - Tachograph details.

In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reserved	0	
Tachograph producer	2	
Tachograph model	<=40	
Reserved	0	
Reserved	0	

- **0A** - Inquiry status of the device.

  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reserved	0	
Reserved	0	

Fields	Length	Range/Format
Device status/Files in device memory	4	X(0 - FF)Y(0 - FF)
Reserved	0	
Reserved	0	

- **0B** - Inquiry Tachograph driver 1 ID, Name and surname. and driver time related states.
  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reserved	0	
Tachograph driver time related states	2	0x00 - 0xFF
Tachograph driver 1 id	<=40	
Tachograph driver 1 name and surname	<=40	
Reserved	0	

- **0D** - Check the current TachoReader connection environment and the device whether ready to download DDD.
  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
CAN2-bus or J1708-bus Status	1	0 - 3
Check Information	2	00 - FF
CAN1-bus Status	1	0-3
Reserved	0	
Reserved	0	

- **0E** - Reply Setting Tachograph File Format.
  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reply Result	2	00 | 09 | FF
Reserved	0	
Reserved	0	
Reserved	0	
Reserved	0	

- **0F** - Reply changing the type of communication with the tachograph.
  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

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Fields	Length	Range/Format
Reply Result	2	00 | 05 | FF
Reserved	0	
Reserved	0	
Reserved	0	
Reserved	0	

- **10** - Inquiry Tachograph driver 2 ID, name and surname, and driver time related states.

  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reserved	0	
Tachograph driver time related states	2	0x00 - 0xFF
Tachograph driver 2 id	<=40	
Tachograph driver 2 name and surname	<=40	
Reserved	0	

✧ *Reply Result*

If <Message Type> is 0(Reply for DDD file request), it is reply on inquiry read request.

- **0** - Request OK.
- **1** - Request busy: Advanced test.
- **2** - Request busy: CAN_Logistic is executing precious order.
- **3** - Request busy: Configuration of the cancel order.
- **4** - Request busy: The order is forbidden as the device is downloading files now.
- If <Message Type> is 1(Authorization result), it is reply on inquiry the status of the device:
  - **0** - Authorization OK.
  - **1** - Authorization fails.
  - **2** - Authorization timeout.
  - **3** - Authorization data error.
- If <Message Type> is 2, this field will be reserved.
- If <Message Type> is 3(file reading), it is result of file reading:
  - **0** - CAN_Logistic getting file from Tachograph OK.
  - **1** - CAN_Logistic getting file from Tachograph fail.
  - **2** - File mismatch.
  - **3** - CAN_Logistic getting file from Tachograph timeout.
  - **4** - Device getting file from CAN_Logistic timeout.
  - **5** - Device getting file from CAN_Logistic fail.
  - **6** - DDD file size error.

  Note

  Here are the timeout instructions for file reading.
  - <Read file Type> is 0x01

    CAN_Logistic getting file from Tachograph timeout is 15 minutes.

Device getting file from CAN_Logistic timeout is 5 minutes.

- <Read file Type> is 0x02 or 0x04
  CAN_Logistic getting file from Tachograph timeout is 5 minutes.
  Device getting file from CAN_Logistic timeout is 3 minutes.
- <Read file Type> is 0x03 or 0x05
  CAN_Logistic getting file from Tachograph timeout is 20 minutes.
  Device getting file from CAN_Logistic timeout is 10 minutes.
- <Read file Type> is 0x06
  CAN_Logistic getting file from Tachograph timeout is 10 minutes.
  Device getting file from CAN_Logistic timeout is 5 minutes.
- <Read file Type> is 0x07
  CAN_Logistic getting file from Tachograph timeout is 20 minutes.
  Device getting file from CAN_Logistic timeout is 10 minutes.

- If <Message Type> is 6, it is the event of FTP transfer.
  - **0** - FTP open server OK
  - **1** - Reserved
  - **2** - Reserved
  - **3** - Reserved
  - **4** - Reserved
  - **5** - Reserved
  - **6** - Reserved
  - **7** - Reserved
  - **8** - FTP open server error
  - **9** - Reserved
  - **10** - FTP send data OK
  - **11** - Reserved
  - **12** - FTP send data error
  - **13** - Reserved
  - **14** - Reserved
- If <Message Type> is 8(Restart TachoReader), it is result of command execution.
  - **0** - Command OK. The command is executed successfully by TachoReader.
  - **1** - Command Error. An unexpected error occurs while executing the command.
- If <Message Type> is 0x0E (Setting Tachograph File Format), it is result of setting tachograph file format.
  - **0x00** - Tachograph file format set successfully.
  - **0x09** - Reading tachograph files is disabled.
  - **0xFF** - Setting failure.
- If <Message Type> is 0x0F, it is result of changing the type of communication with the tachograph.
  - **0x00** - Standard type of tacho communication change successfully.
  - **0x05** - New type of tacho communication change successfully.
  - **0xFF** - Change failure.

✧ *APDU Sequence Number*

It is the serial number of APDU received from CAN_Logistic. Numbering starts from 0000 when

receiving a new DDD file request. This value is in ASCII hexadecimal format.

✧ *APDU DATA*

It is the APDU received from CAN_Logistic. The value is in ASCII hexadecimal format.

✧ *Device Status*

- Bit 0 = 1 - Authentication in progress
- Bit 1 = 1 - Authentication OK (bit is cleared at next read request)
- Bit 2 = 1 - Authentication ERROR (bit cleared at next read request)
- Bit 3 = 1 - CAN_Logistic is downloading files from tachograph
- Bit 4 = 1 - Data is ready to read from CAN_Logistic by master device. Bit is cleared after all awaiting data is read (If all bytes are sent in one frame, this bit will be cleared after sending this frame. If all bytes are sent in 3 frames, this bit will be cleared after sending 3 frames)
- Bit 7:Bit 5 = Details of the error - Flags bit 7:bit 5 and flag bit 2 must be treated as combined information. The information is split to maintain protocol's backward compatibility. Flags bit 7:bit 5 are cleared at next read request
- 000 - No error
- 001 - 24 hours passed after the ignition was turned off, tachograph is in power down mode (This error code is generated based on CAN_Logistic's timer, there is no attempt of connection with tachograph)
- 010 - It has been 2 hours since last authentication session, tachograph is in power down mode. (This error code is generated based on CAN_Logistic's timer, there is no attempt of connection with tachograph)
- 011 - No answer from tachograph (wrongly connected wires or CAN-C is off in tachograph)
- 100 - Cannot open communication session with tachograph (remote download function is off in tachograph)
- 101 - No answer or incorrect answer on company card inquiry (remote download function is off in tachograph)
- 110 - Error during file transfer
- 111 - Reserved for future use

✧ *File State In Memory*

- Bit 0 = 1 - Tachograph file is in CAN_Logistic memory
- Bit 1 = 1 - File from card in slot 1 is in CAN_Logistic memory
- Bit 2 = 1 - File from card in slot 2 is in CAN_Logistic memory
- Bit 3 - Not used (to be ignored)
- Bit 4 = 1 - File from tachograph is already read from CAN_Logistic (it is possible to read once more, bit 0 will be still set), this flag is set after read whole file from CAN_Logistic.
- Bit 5 = 1 - File from card in slot 1 is already read from CAN_Logistic (it is possible to read once more, bit 1 will be still set), this flag is set after reading whole file from CAN_Logistic.
- Bit 6 = 1 - File from card in slot 2 is already read from CAN_Logistic (it is possible to read once more, bit 2 will be still set), this flag is set after reading whole file from CAN_Logistic.
- Bit 7 - Not used (to be ignored)

✧ *Error Code*

Extended error code. A detailed description of the value of this byte is shown below:

Note

Following error codes can be found in protocol (CAN-Logistic v3 protocol XON-XOFF).

Extended errors before downloading:

- **0x00** - No error detected. Report to the device producer.
- **0x02** - No communication with tachograph. Switch the ignition on and try again. If it does not help, check out CANBUS connection to tachograph.
- **0x0A** - Invalid timestamps in read request, start time cannot be later than end time. Correct the request content.
- **0x0B** - CAN_Logistic does not receive real time clock from tachograph, so TSE in read request cannot be set to 0. Provide the TSE date in request command 7.3.1.
- **0x0C** - Invalid read request command. No file requested to download. Correct the request content.
- **0x0E** - Open session timeout. Report to the device producer.
- **0x0F** - Remote company card not ready (Timeout). Report to the device producer.

Extended errors during authentication:

- **0x11** - Timeout on waiting for data from company card. CAN_Logistic expected to get reply from company card, but it did not come. Check data transmission path between application server, AVL terminal and CAN_Logistic and try again.
- **0x18** - No data for company card from tachograph (Timeout). Report to the device producer
- **0x1B** - Data transfer error. Report to the device producer.

Extended errors during file reading:

- **0x20** - Error during the authorization process. Report to the device producer.
- **0x21** - Error while downloading the file from the tachograph to the CAN-Logistic memory. Report to the device producer.
- **0x22** - Requested to read activities part since date of last reading, but the date is not available. Correct the request content - set start date.
- **0x23** - Requested to read activities part since date of last reading, but the date is later than requested end time. Correct the request content - change end date.
- **0x30** - Error initializing authorization. Report to the device producer.
- **0x31** - Error during the authorization process. Report to the device producer.
- **0x32** - Error during the authorization process. Report to the device producer.
- **0x33** - Error during the authorization process. Report to the device producer.
- **0x34** - Error during the authorization process. Report to the device producer.
- **0x35** - Error closing session. Report to the device producer.
- **0x39** - Requested cards download, but no cards in tachograph's slots Insert card(s) into tachograph or correct the request content.
- **0x3A** - Error during the authorization process. Report to the device producer.
- **0x3B** - Error initializing authorization. Report to the device producer.
- **0x3C** - Error during the authorization process. Report to the device producer.
- **0x3D** - Error while downloading the file from the tachograph to the CAN-Logistic memory. Report to the device producer.
- **0x3E** - Error during the authorization process. Report to the device producer.
- **0x3F** - Error opening session. Report to the device producer.
- **0x40** - Downloading finished with no files, because of missing data (i.e. requested cards was removed) Try again. If the error persists, report to the device producer.

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- **0x41** - Error opening session. Report to the device producer.
- **0x42** - Error downloading file - invalid package sequence. Report to the device producer.
- **0x55** - Data access denied or communication error. Report to the device producer.
- **0x6A** - Remote Authentication Closed. Report to the device producer.
- **0x6C** - APDU error. Report to the device producer.
- **0x6E** - Authentication error. Check if company card is not expired. If not, report to the device producer.
- **0x70** - Too many authentication errors. Report to the device producer.
- **0x80** - Error opening session. Report to the device producer.
- **0x90** - Error while sending UDS packet. Report to the device producer.
- **0xE1** - There is no operation to perform. Bits SD, SC, SA in byte FL are set. Correct the request content.
- **0xEE** - Downloaded files exceed CAN_Logistic's memory. Repeat request with narrower activities range of tachograph DDD file.
- **0xEF** - Failed to write the file to CAN_Logistic's internal memory. Report to the device producer.
- **0xFE** - Request cancelled by command 7.3.2. Start new request whenever you are ready.
- **0xFF** - No reading requested since device restart. Start new request whenever you are ready.

✧ *Error Code Memory*

This is the error code byte <Error Code> stored when the next order of the download is sent.

✧ *Tachograph producer*

- **0x00** - None,
- **0x01** - VDO/Siemens,
- **0x02** - Efas,
- **0x03** - Stoneridge,
- **0x04** - Actia,
- **0x80** - Error of connection on D8 wire,
- **0x81** - Not supported format „2400” analogue tachographs.

✧ *Tachograph mode*

Tachograph name given by the manufacturer.

✧ *Tachograph driver time related states*

Driver time related state.

- **0** - normal/no limits reached
- **1** - 15 min before 4½ h
- **2** - 4½ h reached
- **3** - 15 min before 9 h
- **4** - 9 h reached
- **5** - 15 minute before 16 h (not having 8h rest during the last 24h)
- **6** - 16 h reached
- **7** - week's driving time limit about to be reached
- **8** - week's driving time limit exceeded
- **9** - fortnight's driving time limit about to be reached
- **A** - fortnight's driving time limit exceeded

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- **B** - driver's card validity term about to end
- **C** - driver's card reading time approaching soon
- **D** - other
- **E** - error on CAN-bus
- **F** - parameter currently not available

✧ *Tachograph driver 1 id*

Card number given in ASCII string terminated with „*”. First two or three letters are country code. Following is a SPACE character (0x20) and the 16-character long card number: e.g. PL 1820625133460000*

In addition to standard country codes, the following abbreviations also apply:

- „EC” - European Union,
- „EUR” - Rest of Europe,
- „WLD” - rest of the world.

✧ *Tachograph driver 1 name and surname*

Surname and name (names) of driver given in an ASCII string terminated with „*”. Each word is separated by a SPACE character (0x20).

Note

Number K will be returned if the card is not inserted into tachograph slot (or parameter currently not available; or card inserted, but no information read).

- K = 0x00 - Card not inserted,
- K = 0x01 - Card inserted, but no information read,
- K = 0xFF - Parameter currently not available.

✧ *CAN2-bus or J1708-bus Status*

It indicates the status of the CAN2-bus or J1708-bus.

- **0** - bus in sleep mode
- **1** - bus active
- **2** - bus error
- **3** - 2nd CANbus or J1708-bus not used

✧ *Check Information*

It indicates the set of states associated with the tachographer.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
R	R	F1	F0	T1	T0	D1	D0

R - Reserved

F1:F0 - remote DDD files downloading from tachograph

- b'00' - remote download disabled
- b'01' - remote download enabled
- b'10' - communication error
- b'11' - communication with tachograph not supported with current device settings

T1:T0 - communication with tachograph

- b'00' - no communication with tachograph
- b'01' - tachograph online
- b'10' - communication error
- b'11' - communication with tachograph not supported with current device settings

D1:D0 - D8 (K-Line) bus activity

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- b'00' - bus in sleep mode
- b'01' - bus active
- b'10' - bus error
- b'11' - bus not used

✧ *CAN1-bus Status*

It indicates the status of the CAN1-bus.

- **0** - bus in sleep mode
- **1** - bus active
- **2** - bus error
- **3** - 1st CANbus not used

4.8 CANBUS Information Report

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

4.8.1 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,8020050905,866775051616928,GV355CEU,03,1,FFFFFFFF,1G1BL52P7TR115520,2,H20,10000.06,5000,60,210,H999.9,L100.00,99999990,100,9999.99,9999.99,9999.99,100000.06,4498,0B0E,FFFF,3F,3F,1799998.00,1799998.00,10000,20000,30000,3600,40000,73FFFFFF,P99.60,32125,32125,32125,1,1,1,11760,9999999,999999,999999,99999.99,99999.99,99999.99,999999,queclink01,queclink02,CAR1NAME,CAR2NAME,05663,1FFE,999999,999999,100,-160000,210,2,022E03,619902,L250.00,C0D6D3D5,C0,80.00,03,,,1,0.0,146,62.7,117.129182,31.839282,20230802082742,0460,0001,DF5C,05FE6667,01,10,20230802175743,0F3A$

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(0-5)
	CANBUS Device State	1	0 | 1
	CANBUS Report Mask	<=8	0 - FFFFFFFF

Parts	Fields	Length	Range/Format
	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	<=3	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)
	Engine Cold Starts Count	<=8	0 - 16449535
	Engine All Starts Count	<=8	0 - 16449535
	Engine Starts by Ignition Count	<=8	0 - 16449535
	Total Engine Cold Running Time	<=9	0 - 421108120(s)
	Handbrake Applies During Ride Count	<=5	0 - 64255
	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)

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Parts	Fields	Length	Range/Format
	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
	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(%)
	Service Distance	<=8	-160635 - 327675(km)
	Ambient Temperature	<=4	-40 - +215 (Celsius)
	DTC Number	<=2	0 - 99
	DTC 1	<=6	'0'-'9' 'a'-'z' 'A'-'Z'
	...		
	DTC N	<=6	'0'-'9' 'a'-'z' 'A'-'Z'
	Gaseous Fuel Level	<=8	L(0.00 - 9999.99)/P(0.00 - 100.00)
	Tachograph Information Expand	8	00000000 - FFFFFFFF
	CAN Report Expansion Mask1	<=8	0 - FFFFFFFF
	Retarder Usage	<=3	0 - 125(%)
	Power Mode	<=2	0 - FF

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Parts	Fields	Length	Range/Format
	Tacho Timestamp	14	YYYYMMDDHHMMSS
	Oil Temperature	<=4	-40 - +215 (℃)
	Oil Level	<=8	L(0.00 - 9999.99) | P(0.00 - 100.00)
	Axle Weight 5th	<=5	0 - 65535 (kg)
	Axle Weight 6th	<=5	0 - 65535 (kg)
	Axle Weight 7th	<=5	0 - 65535 (kg)
	Current Gear Number	<=2	0 - FF
	DPF Soot Level	<=8	L(0.00 - 9999.99) | P(0.00 - 100.00)
	VIN of Trailer	17	'0' - '9' 'A' - 'Z' except 'I', 'O', 'Q'
	Expansion2 Information	<=8	0 - FFFFFFFF
	Electric Report Mask	<=8	0 - FFFFFFFF
	Battery Instantaneous Voltage	<=5	0 - 64255 (V)
	Battery Charging Cycles Count	<=5	0 - 64255 (Cycle)
	Total Energy Recuperated	<=10	0 - 4211081215 (Wh)
	Battery Level	<=8	P(0.00 - 100.00)
	Charge State	<=2	0 - FF
	Battery Temperature	<=4	-40 - +215 (Celsius)
	Battery Charging Current	<=3	0 - 125(A)
	Battery Instantaneous Power	<=7	-327680 - 325110 (W)
	Battery State of Health (SoH)	<=3	0 - 100 (%)
	Total Energy Used	<=10	0 - 4211081215 (Wh)
	Total Energy Used When Idling	<=10	0 - 4211081215 (Wh)
	Total Energy Charged	<=10	0 - 4211081215 (Wh)
	Charge State Optimization	<=2	0 - FF
	Tachograph Driver1 Working Time Mask	<=8	0 - FFFFFFFF
	Drv1 End Of Last Daily Rest Period	12	YYYYMMDDHHMM
	Drv1 End Of Last Weekly Rest Period	12	YYYYMMDDHHMM
	Drv1 End Of Second Last Weekly Rest Period	12	YYYYMMDDHHMM
	Drv1 Maximum Daily Period	<=3	0 - 250
	Drv1 Number Of Times 9h Daily Driving Times Exceeded	<=3	0 - 250

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Parts	Fields	Length	Range/Format
	Drv1 Number Of Used Reduced Daily Rest Periods	<=3	0 - 250
	Drv1 Remaining Current Drive Time	<=5	0 - 65535(min)
	Drv1 Remaining Time Until Next Break Or Rest	<=5	0 - 65535(min)
	Drv1 Duration Of Next Break Rest	<=5	0 - 65535(min)
	Drv1 Remaining Time Of Current Break Rest	<=5	0 - 65535(min)
	Drv1 Time Left Until Next Driving Period	<=5	0 - 65535(min)
	Drv1 Duration Of Next Driving Period	<=5	0 - 65535(min)
	Drv1 Remaining Driving Time On Current Shift	<=5	0 - 65535(min)
	Drv1 Time Left Until New Daily Rest Period	<=5	0 - 65535(min)
	Drv1 Minimum Daily Rest	<=5	0 - 65535(min)
	Drv1 Remaining Driving Time Of Current Week	<=5	0 - 65535(min)
	Drv1 Time Left Until New Weekly Rest Period	<=5	0 - 65535(min)
	Drv1 Minimum Weekly Rest	<=5	0 - 65535(min)
	Drv1 Open Compensation In The Last Week	<=5	0 - 65535(min)
	Drv1 Open Compensation In Week Before Last	<=5	0 - 65535(min)
	Drv1 Open Compensation In 2nd Week Before Last	<=5	0 - 65535(min)
	Drv1 Continuous Driving Time	<=5	0 - 65535(min)
	Drv1 Cumulative Break Time	<=5	0 - 65535(min)
	Drv1 Current Duration Of Selected Activity	<=5	0 - 65535(min)
	Drv1 Accumulated Driving Time Previous And Current Week	<=5	0 - 65535(min)
	Drv1 Current Daily Driving Time	<=5	0 - 65535(min)

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Parts	Fields	Length	Range/Format
	Drv1 Current Weekly Driving Time	<=5	0 - 65535(min)
	Drv1 Cumulative Uninterrupted Rest Time	<=5	0 - 65535(min)
	Drv1 Maximum Daily Driving Time	<=5	0 - 65535(min)
	Tachograph Driver2 Working Time Mask	<=8	0 - FFFFFFFF
	Drv2 End Of Last Daily Rest Period	12	YYYYMMDDHHMM
	Drv2 End Of Last Weekly Rest Period	12	YYYYMMDDHHMM
	Drv2 End Of Second Last Weekly Rest Period	12	YYYYMMDDHHMM
	Drv2 Maximum Daily Period	<=3	0 - 250
	Drv2 Number Of Times 9h Daily Driving Times Exceeded	<=3	0 - 250
	Drv2 Number Of Used Reduced Daily Rest Periods	<=3	0 - 250
	Drv2 Remaining Current Drive Time	<=5	0 - 65535(min)
	Drv2 Remaining Time Until Next Break Or Rest	<=5	0 - 65535(min)
	Drv2 Duration Of Next Break Rest	<=5	0 - 65535(min)
	Drv2 Remaining Time Of Current Break Rest	<=5	0 - 65535(min)
	Drv2 Time Left Until Next Driving Period	<=5	0 - 65535(min)
	Drv2 Duration Of Next Driving Period	<=5	0 - 65535(min)
	Drv2 Remaining Driving Time On Current Shift	<=5	0 - 65535(min)
	Drv2 Time Left Until New Daily Rest Period	<=5	0 - 65535(min)
	Drv2 Minimum Daily Rest	<=5	0 - 65535(min)
	Drv2 Remaining Driving Time Of Current Week	<=5	0 - 65535(min)

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Parts	Fields	Length	Range/Format
	Drv2 Time Left Until New Weekly Rest Period	<=5	0 - 65535(min)
	Drv2 Minimum Weekly Rest	<=5	0 - 65535(min)
	Drv2 Open Compensation In The Last Week	<=5	0 - 65535(min)
	Drv2 Open Compensation In Week Before Last	<=5	0 - 65535(min)
	Drv2 Open Compensation In 2nd Week Before Last	<=5	0 - 65535(min)
	Drv2 Continuous Driving Time	<=5	0 - 65535(min)
	Drv2 Cumulative Break Time	<=5	0 - 65535(min)
	Drv2 Current Duration Of Selected Activity	<=5	0 - 65535(min)
	Drv2 Accumulated Driving Time Previous And Current Week	<=5	0 - 65535(min)
	Drv2 Current Daily Driving Time	<=5	0 - 65535(min)
	Drv2 Current Weekly Driving Time	<=5	0 - 65535(min)
	Drv2 Cumulative Uninterrupted Rest Time	<=5	0 - 65535(min)
	Drv2 Maximum Daily Driving Time	<=5	0 - 65535(min)
	Reserved	0	
	Reserved	0	
	GNSS Accuracy	<=2	0 - 50
	Speed	<=5	0.0 - 999.9 (km/h)
	Azimuth	<=3	0 - 359
	Altitude	<=8	(-)xxxxx.x (m)
	Longitude	<=11	(-)xxx.xxxxxx
	Latitude	<=10	(-)xx.xxxxxx
	GNSS UTC Time	14	YYYYMMDDHHMMSS
	MCC	4	0XXX
	MNC	4	0XXX
	LAC	4	XXXX
	Cell ID	4|8	XXXX|XXXXXXXX
	Position Append Mask	2	00 - FF

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Parts	Fields	Length	Range/Format
	GNSS Satellite Number (Optional)	<=2	0 - 24
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	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.
  - **3** - Tachograph Driver Card ID changed event report.
  - **4** - Tachograph Driver working status or "Out of Scope" condition changed event report.
  - **5** - Ignition key changed 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.

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- *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.

✧ *Tachograph Information Expand*

Four bytes. The high byte describes driver working states, while the low byte describes tachograph other information and the middle two bytes describe driver 1 information and driver 2 information respectively.

Driver working states	Driver 1 information	Driver 2 information	Tachograph other information
High byte(T)	K1	K2	Low Byte(I)

- T: Driver working states:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
OUT1	OUT0	TD2	TD1	TD0	TP2	TP1	TP0

- OUT1: OUT0 - “out of scope” condition (2 bits)
  - b'00' - no out of scope condition opened, normal operation
  - b'01' - out of scope condition opened
  - b'10', b'11' - Invalid data.
- TD2: TD0 - Driver 2 working state (3 bits)
- TP2: TP0 - Driver 1 working state (3 bits)
  - b'000': Rest - sleeping.
  - b'001': Driver available - short break.
  - b'010': Work - loading, unloading, working in an office.
  - b'011': Drive - behind the wheel.
  - b'100', b'101' - reserved.
  - b'110', b'111' - Invalid data.
- K1 - Driver 1 information (card in slot 1)
- K2 - Driver 2 information (card in slot 2)

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1	1	KK1	KK0	CZ3	CZ2	CZ1	CZ0

- KK1 : KK0 - driver card
  - b'00' - no card in slot.
  - b'01' - card in slot.
  - b'10', b'11' - Invalid data.
- CZ3 : CZ0 - driver time related states (4 bits)
  - b'0000' - normal/no limits reached
  - b'0001' - 15 min before 4½ h
  - b'0010' - 4½ h reached
  - b'0011' - 15 min before 9 h
  - b'0100' - 9 h reached
  - b'0101' - 15 minute before 16 h (not having 8h rest during the last 24h)
  - b'0110' - 16 h reached

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- b'0111' - weekly driving time pre-warning active
- b'1000' - weekly driving time warning active
- b'1001' - 2 weeks driving time pre-warning active
- b'1010' - 2 weeks driving time warning active
- b'1011' - driver 1 card expiry warning active
- b'1100' - next mandatory driver 1 card download warning active
- b'1101' - other
- b'1110', b'1111' - Invalid data

- I - tachograph other information

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
F1	F0	P1	P0	K1	K0	R1	R0

- F1 : F0 - ferry/train crossing condition
  - b'00' - normal operation.
  - b'01' - ferry/train crossing condition enabled.
  - b'10', b'11' - Invalid data.
- R1 : R0 - vehicle motion
  - b'00' - vehicle motion not detected.
  - b'01' - vehicle motion detected.
  - b'10' - Invalid data.
- K1 : K0 - direction indicator
  - b'00' - forward.
  - b'01' - reverse.
  - b'10', b'11' - Invalid data.
- P1 : P0 - vehicle overspeed (it indicates whether the vehicle is exceeding the legal speed limit set in the tachograph)
  - b'00' - no overspeed
  - b'01' - overspeed
  - b'10', b'11' - Invalid data

✧ *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)

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- **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 CAN Module's configuration.

✧ *Total Vehicle Engine Overspeed Time*

The total time when the vehicle engine speed is greater than the limit defined in CAN Module'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.

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- *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** - Reserved
  - **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)

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- **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** - EPS - EPS 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)
- **Bit 13** - CHG - battery charging for electric cars (1 - battery is being charged, 0 - no charging)
- **Bit 14** - FS - fuel source - for vehicles equipped with factory gas installation (1 - engine powered by gas, 0 - engine powered by petrol)

✧ *Rapid Brakings*

The number of total rapid brakings since installation (calculation based on CAN Module settings of speed decrease time and value).

✧ *Rapid Accelerations*

The number of total rapid accelerations since installation (calculation based on CAN Module settings of speed increase time and value).

✧ *Engine Torque*

The engine torque. Unit: percentage.

✧ *Ambient Temperature*

A numerical value is used to indicate the ambient temperature.

✧ *DTC*

Diagnostic trouble codes read from the vehicle. The protocol is OBD II/SAE J2012.

Each diagnostic trouble code is a 3-byte element in following format:

Byte m								**Byte m+1**								**Byte m+2**							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
C1		C2		C3				C4				C5									T	P	C

- C1 - first DTC character
  - **b'00'** - P - powertrain
  - **b'01'** - C - chassis
  - **b'10'** - B - body
  - **b'11'** - U - network
- C2 - second DTC character (digit 0 to 3)
- C3, C4, C5 - consecutive DTC characters (hexadecimal digits 0 to F)
- T - DTC status flag: permanent (stored into non-volatile memory)
- P - DTC status flag: pending (detected during current or last driving cycle)
- C - DTC status flag: confirmed (stored)

  Each code may have one or multiple status flags set. For example:

  0x02 0x2E 0x03 is a code P022E with status pending and confirmed.

  0x61 0x99 0x02 is a code C2199 with status pending.

✧ *Gaseous Fuel Level*

The alternative fuel levels. When gas installation, LPG, is factory equipment and information is provided by vehicle. The unit is liter (L) or percentage (P).

✧ *Retarder Usage*

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The unit is percentage.

✧ *Power Mode*

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
R	R	PTO1	PTO0	R	R	R	R

- R - Reserved for future use (set to 1)
- PTO1:PTO0 - Power Take-Off
  - b'00' - PTO not engaged.
  - b'01' - PTO engaged.
  - b'10' - unknown state of PTO (not compliant with FMS 3.0 standard).
  - b'11' - parameter currently not available.

✧ *Tacho Timestamp*

Real time clock is a date and time displayed on the car's dashboard, usually read from tachograph.

✧ *Oil 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".

✧ *Battery Level*

The battery charge level for electric vehicles. The unit is percentage (P).

✧ *Charge State*

The status of battery charging and Charging cable connected in electric cars.

- **0x00** - Plug disconnected
- **0x01** - Plug connected, not charging
- **0x02** - Connecting (plug connected, but charging not started yet)
- **0x03** - Charging in progress
- **0x04** - Charging failure

✧ *Battery Instantaneous Voltage*

For electric cars this parameter stands for instantaneous high voltage of battery cells (read from BMS). The unit is voltage (V).

✧ *Battery Charging Cycles Count*

For electric cars this parameter counts cycles of battery charging (increments at every finished cycle of charging). The unit is cycle.

✧ *Total Energy Recuperated*

Sum of energy transmitted to battery with no charger connected. The unit is Wh.

✧ *Battery Temperature*

A numerical value is used to indicate the battery temperature.

✧ *Battery Charging Current*

A numerical value is used to indicate the electric car's battery charging current. The unit is ampere.

✧ *Battery Instantaneous Power*

For electric cars this parameter stands for instantaneous power used by (positive values) or recuperated from (negative values) the car. The unit is W.

✧ *Battery State of Health (SoH)*

For electric cars this parameter stands for battery general condition (100% means brand new, 0% totally damaged).

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- *Total Energy Used*
  Sum of energy used by car's engine and equipment; recuperated energy does not affect this parameter. The unit is Wh.
- *Total Energy Used When Idling*
  Sum of energy used by car's engine and equipment with vehicle speed 0 km/h; recuperated energy does not affect this parameter. The unit is Wh.
- *Total Energy Charged*
  Sum of energy transmitted to battery from external charger. The unit is Wh.
- *Charge State Optimization*
  The status of battery charging and Charging cable connected in electric cars.
  - **0x00** - Plug disconnected
  - **0x01** - Plug connected, not charging
  - **0x02** - Connecting (plug connected, but charging not started yet)
  - **0x03** - Charging in progress
  - **0x04** - Charging failure
- *Current Gear Number*
  - **0** - Neutral
  - **1 ~ 0xF** - Subsequent gears numbers (1 to 15)
  - **0x1D** - Reverse gear (-2)
  - **0x1E** - Reverse gear (-1)
  - **0x1F** - Parameter currently not available
  - **others** - Reserved for future use
- *Expansion2 Information*
  A hexadecimal number. Each bit contains information of one indicator.
  - **Bit 0** - Brake linings worn off indicator L. 1 - indicator on (brake linings to be replaced), 0 - indicator off (brake linings fine) or not available.
  - **Bit 1 - Bit 31** - Reserved for future use.

4.8.2 ACN(Additional CANBUS Device Information Report)

If the <Tacho Report Mask> and <Tacho Report Interval> are enabled by the command (AT+GTCAN), the device will send the additional information via the message **+RESP:GTACN** to the backend server periodically.

Example:
+RESP:GTACN,8020050905,866775051616928,GV355CEU,0,1,000F,1,0B0E,GV355CEU01,GV355CEU02,20230412064955,309D$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	ACN
	Leading Symbol	1	,

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Parts	Fields	Length	Range/Format
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Report Type	<=2	0 - 4
	CANBUS Device State	1	0 | 1
	CANBUS Report Mask	<=8	0 - FFFFFFFF
	Ignition State	1	0 | 1
	Tachograph Information	4	00 - FFFF
	Tachograph Driver 1 Card Number	<=40	ASCII
	Tachograph Driver 2 Card Number	<=40	ASCII
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Report Type*

It indicates the type of report type.

- **0** - Periodic report.
- **1** - Reserved.
- **2** - Ignition event report.
- **3** - Tachograph Driver Card ID changed event report.
- **4** - Tachograph Driver working status changed 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.

✧ *Tacho Report Mask*

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

✧ *Ignition State*

A numeral to indicate the ignition status.

- **0** - Ignition off
- **1** - Ignition on

✧ *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.

✧ *Tachograph Driver 1 Card Number*

The card number of tachograph driver 1.

✧ *Tachograph Driver 2 Card Number*

The card number of tachograph driver 2.

4.9 Update Configuration

This section describes the message related to firmware and configuration upgrade. Please refer to the details below.

4.9.1 UPC(Configuration Update Notification)

The report for over-the-air configuration update.

Example:
+RESP:GTUPC,8020050905,135790246811220,GV355CEU,0,100,http://www.GV355CEU.com/configure.ini,20150201000000,11F0$

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

Parts	Fields	Length	Range/Format
	Result	3	100-103 | 200-202 | 300-302 | 305 | 306
	Download URL	<=100	Complete URL
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000 - FFFF
	Tail	1	$

✧ *Command ID*

The command ID in the update configuration file. It is always 0 before the device starts to update the configuration (<Result><=300). It indicates the total number of the commands when <Result> is 301. It indicates the ID of the command which has wrong format when <Result> is 302.It is empty when <Result> is greater than 302.

✧ *Result*

A numeral to indicate whether the configuration is updated successfully.

- **100** - The update command is starting.
- **101** - The update command is confirmed by the device.
- **102** - The update command is refused by the device.
- **103** - The update process is refused because the battery is low.
- **200** - The device starts to download the package.
- **201** - The device finishes downloading the package successfully.
- **202** - The device fails to download the package.
- **300** - The device starts to update the device configuration.
- **301** - The device finishes updating the device configuration successfully.
- **302** - The device fails to update the device configuration.
- **303** - Reserved.
- **304** - Reserved.
- **305** - The update process is interrupted by abnormal reboot.
- **306** - The update process is interrupted by MD5 verification error.

✧ *Download URL*

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

4.9.2 UPD(Firmware Upgrade Report)

The report for over-the-air configuration update.

4.9.2.1 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,8020050905,135790246811220,GV355CEU,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).

4.9.2.2 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,8020050905,135790246811220,GV355CEU,200,1,20090101000000,11F0$

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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**.

4.9.2.3 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,8020050905,135790246811220,GV355CEU,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

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Parts	Fields	Length	Range/Format
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Code	3	
	New Version (Optional)	<=10	'0' - '9' 'a' - 'z' 'A' - 'Z'
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**.

✧ *New Version*

The version of the new firmware in the CAN Module , Tachograph or UFS xxx fuel sensor.

4.9.3 EUC(Extended Configuration Update Report)

Example:
+RESP:GTEUC,8020050905,135790246811220,GV355CEU,1,301,http://www.GV355CEU.com/configure.ini,ABCDABCD,,,,,20150201000000,11F0$

Parts	Fields	Length	Range/Format
Head	Header	8	+RESP:GT
	Message Name	3	EUC
	Leading Symbol	1	,
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Body	Command ID	<=3	
	Result	3	100-103 | 200-202 | 300-302 | 305 | 306
	Download URL	<=100	Complete URL
	Identifier Number	8	00000000 - FFFFFFFF

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

✧ *Command ID*

The command ID in the update configuration file. It is always 0 before the device starts to update the configuration. It indicates the total number of the commands when the response code is 301 or 306. It indicates wrong format of command ID when the response code is 302. It is empty when the response code is 304 or 305.

✧ *Result*

A numeral to indicate whether the configuration is updated successfully.

- **100** - The update command is starting.
- **101** - The update command is confirmed by the device.
- **102** - The update command is refused by the device.
- **103** - The update process is refused because the battery is low.
- **200** - The device starts to download the package.
- **201** - The device finishes downloading the package successfully.
- **202** - The device fails to download the package.
- **300** - The device starts to update the device configuration.
- **301** - The device finishes updating the device configuration successfully.
- **302** - The device fails to update the device configuration.
- **303** - Reserved.
- **304** - Reserved.
- **305** - The update process is interrupted by abnormal reboot.
- **306** - The update process is interrupted by MD5 verification error.

✧ *Download URL*

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

✧ *Identifier Number*

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

4.9.4 EUD(Extended Firmware Update Report in ASCII Format)

4.9.4.1 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,8020050905,135790246811220,GV355CEU,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	
	New Version (Optional)	<=20	ASCII
	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).

4.9.4.2 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,8020050905,135790246811220,GV355CEU,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**.

4.9.4.3 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,8020050905,135790246811220,GV355CEU,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	
	New Version (Optional)	<=20	ASCII
	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**.

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4.10SACK (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.

4.11HBD (Heartbeat Data)

4.11.1 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,8020050905,135790246811220,GV355CEU,20100214093254,11F0$

Parts	Fields	Length	Range/Format
Head	Header	4	+ACK
	Leading Symbol	1	:
	Command Word	5	'A'-'Z', '0'-'9'
	Full Protocol Version	10	8000000000 - 80FFFFFFFF
	Unique ID	15	IMEI
	Device Name	<=20	'0' - '9' 'a' - 'z' 'A' - 'Z' '-' '_'
Tail	Send Time	14	YYYYMMDDHHMMSS
	Count Number	4	0000-FFFF
	Tail	1	$

✧ *Command Word*

Corresponding to the "Command Word" in the configuration command. For example, it is **"GTHBD"**.

- *Full Protocol Version*

  The protocol version that the device conforms to. It is separated into 3 parts. The first two characters represent the device type. As shown in the example above, 802005 means GV355CEU. 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".

4.11.2 Heartbeat Acknowledgement

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

Example:
+SACK:GTHBD,8020050905,11F0$

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, 802005 means GV355CEU. 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.

4.12Buffer Report

4.12.1 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,8020050905,863286020684354,GV355CEU,,10,1,1,0.0,0,0.5,121.392413,31.164143,20160804044602,0460,0000,1877,03A3,00,104.8,,,,100,210100,,,,20140804044611,2E78$

4.12.2 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:
2B41434B017F24802005090504184756333530434555000007607E7091A05120A02253E6C0D0A

2B41434B047F24802005090501224756333530434555002D007E607080622733640E990D0A

2B41434B0B7F24802005090501224756333530434555002A07E60708061F3A328958620D0A

2B41434B107F24802005090501224756333530434555002D407E60708062D3A33BFF7340D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+ACK
	Message Type	1	
	Report Mask	1	00 - FF
Body	ACK Expand Mask	1	00 - FF
	Length	1	
	Device Type	3	802005
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	ID	1	
	Additional Number	2	0 - 1000
	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

Command	ID
AT+GTSRI	1
AT+GTQSS	2
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+GTSIM	19
AT+GTUPD	21
AT+GTPIN	22
AT+GTDAT	23
AT+GTOWH	24
AT+GTDOG	25
AT+GTAIS	26
AT+GTJDC	27
AT+GTIDL	28
AT+GTHBM	29
AT+GTHMC	30
AT+GTURT	32
AT+GTWLT	34
AT+GTHRM	35
AT+GTFFC	36
AT+GTJBS	37
AT+GTSSR	38
AT+GTEFS	41
AT+GTIDA	43
AT+GTACD	44
AT+GTPDS	45
AT+GTCRA	46
AT+GTBZA	47

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Command	ID
AT+GTSPA	48
AT+GTUDT	50
AT+GTTMP	51
AT+GTFSC	52
AT+GTRMD	53
AT+GTPEO	54
AT+GTCMS	55
AT+GTTAP	56
AT+GTCAN	57
AT+GTFTP	60
AT+GTCMD	61
AT+GTUDF	62
AT+GTGAM	65
AT+GTOEX	68
AT+GTIEX	69
AT+GTUPC	70
AT+GTCLT	71
AT+GTCDA	75
AT+GTASC	79
AT+GTFVR	81
AT+GTBTS	89
AT+GTVVS	91
AT+GTAVS	92
AT+GTGDO	93
AT+GTOWL	97
AT+GTRCS	100
AT+GTVMS	102
AT+GTBAS	103
AT+GTWRT	104
AT+GTTTR	105
AT+GTBID	109
AT+GTAEX	116
AT+GTDUC	117
AT+GTDOS	119
AT+GTSMS	128
AT+GTIDS	131

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Command	ID
AT+GTMSI	136
AT+GTMQT	138
AT+GTTLS	139
AT+GTRTP	141
AT+GTMSF	142
AT+GTHUM	143
AT+GTTPM	172
AT+GTMCT	201
AT+GTRAS	203
AT+GTCAS	205

✧ *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+GTTMP** - This field represents the TMP alarm 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+GTFSC** - This field represents the FSC table ID.
- **AT+GTBAS** - This field represents the BAS index.
- **AT+GTAIS** - This field represents the AIS index.
- **AT+GTMCT** - This field represents the MCT Group ID.
- **AT+GTRAS** - This field represents the RAS index.

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- **AT+GTIDS** - This field represents the IDS result of issuing **AT+GTIDS**.
- **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:

2B5253500109FEDFFF006680200509050418475633353043455500 2FFF000000000000160500010300000000F005506FB419D01E5CF9607E607010828380460001169 1D069198370000000000000000000000000000000000000000000000000000000000000000000 07E60701082839001A09AE0D0A

2B5253500E09FEDFFF006680200509050311475633313040C41556436B7366B36980003111C210101000000000000004B06FB40B801E5D2D607E70708063B2004600001DF5C027A4F1F0000000000000000001000B00000001000B0007E70708063B20087BC5580D0A

2B525350054FFEFFFF016D80200509050418475633353043455500 2FDC000000000000000000010019210510010000000000BB007906FB411F01E5D41F07E7091B071C2F04600000550B0000B7B1000000000000000101000514000000002B1000013FFFFFFF314731424C3532503754523131353532300200000014000F42400602BC003C00D2FF270F000000640000000000600 05F5E0F600640000270F630000270F630000270F63000F42400611923B3EFFBF003F0112A87E000112A87E0000000000002710004E2000753000000E109C40F3FFFFFF00637D7D7D7D7D7D01010100002DF00098967F000F423F000F423F0001869F630001869F630001869F63000F423F717565636C696E6B303100717565636C696E6B303200434152314E414D4500434152324E414D450030353633633003FFE000F423F000F423F640000000000D202022E03619902FF0000006028DBD6D3D50000000364FF000000C006000007E7091B0F1C2F619FA43C0D0A

2B525350064FFEFFFF016D80200509050418475633353043455500 2FDC000000000000000000010019210510010100000000BB007906FB411F01E5D41F07E7091B071C3004600000550B0000B7B1000000000000000101000517000000002B1300013FFFFFFF314731424C3532503754523131353532300200000014000F42400602BC003C00D2FF270F000000640000000000600 05F5E0F60064000

0270F630000270F630000270F63000F42400611923B3EFFBF003F0112A87E000112A87E0000000
000002710004E2000753000000E109C40F3FFFFF00637D7D7D7D7D01010100002DF0009896
7F000F423F000F423F0001869F630001869F630001869F63000F423F717565636C696E6B303100
717565636C696E6B303200434152314E414D4500434152324E414D4500303536363300 3FFE000
F423F000F423F640000000000D202022E03619902FF0000006028DBD6D3D50000000364FF0000
00C006000007E7091B0F1C3061A014930D0A

2B5253500509FEDFFF006680200509050418475633353043455500 2FF9000000000200160A1101
02000106000F006C06FB413401E5D0B807E60701082B0C04600011691D0691980500000000000
000000000000000000000000000007E60701082B0D0021278E0D0A

2B5253500909FEDFFF006680200509050418475633353043455500 2FE5000000000100220B0101
01000000000F006E06FB413D01E5D41B07E60701082E1A04600011691D0691980500000000000
000000000000000000000000000007E60701082E1B003CC35E0D0A

2B5253500B09FEDFFF006680200509050418475633353043455500300900000000000042060001
04001808000F001406FB426501E5C9B607E6070108242A04600011691D0DE98A3400000000000
000000000000000000000000000007E6070108242B00074FBC0D0A

2B5253500C09FEDFFF006680200509050418475633353043455500 2FE4000000000500210A2301
01000000000F006E06FB413D01E5D41B07E607010830110460001169 1D0691980500000000000
000000000000000000000000000007E60701083012004A11550D0A

2B5253500F09FEDFFF006680200509050418475633353043455500 2FE5000000000100220C1101
01000106014900750 6FB407B01E5D2DD07E607010831330460001169 1D0691983700000000000
000000000000000000000000000007E60701083134005EA7CB0D0A

2B5253501009FEDFFF006680200509050418475633353043455500 2FE5000000000000120901 01
01000000000F006E06FB413D01E5D41B07E60701082D3704600011691D0691980500000000000
000000000000000000000000000007E60701082D380037B9750D0A

2B5253501A09FEDFFF006680200509050418475633353043455500 2FEA000000000000220A200
10100030800BD004A06FB408D01E5D20A07E607010834260460001169 1D06919805000000000
000000000000000000000000000007E60701083427007C067D0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	Protocol Version	2	0000 - FFFF

Parts	Fields	Length	Range/Format
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	Battery Level	1	0 - 100
	External Power Voltage	2	0 - 32000
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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
	RFID Length	1	0 - 0E

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Parts	Fields	Length	Range/Format
	RFID	<=0E	HEX
	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 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
+RESP:GTIGL	16
+RESP:GTIDA	17
+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.

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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. The high 4 bits of the low byte are for analog input 2.

✧ *EIO100 Input Status*

The status of EIO100 inputs. For each bit, 0 means "Inactive status", and 1 means "Active status". If EIO100 device is not connected or the mode of (AT+GTURT) is not for EIO100, it is always "00".

- **Bit 0** For EIO100 input 9
- **Bit 1** For EIO100 input A
- **Bit 2** For EIO100 input B
- **Bit 3** For EIO100 input C
- **Bit 4 - 7** - Reserved

✧ *Digital Input Status*

Input Status Mask	ID
Ignition Detection	0x01
Digital Input1	0x02
Digital Input2	0x04
Digital Input3	0x08
Digital Input4	0x10

✧ *EIO100 Output Status*

The status of EIO100 outputs. For each bit, 0 means "Inactive status", and 1 means "Active status". If EIO100 device is not connected or the mode of (AT+GTURT) is not for EIO100, it is always "00".

- **Bit 0** - For EIO100 output 9
- **Bit 1** - For EIO100 output A
- **Bit 2** - For EIO100 output B
- **Bit 3** - For EIO100 output C
- **Bit 4 - 7** - Reserved

✧ *Digital Output Status*

Output Status Mask	ID
Digital Output1	0x01

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Output Status Mask	ID
Digital Output2	0x02
Digital Output3	0x04

- *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.

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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

✧ *RFID Length*

This is the length of the <RFID>. It is controlled by Bit 27 (for <RFID Length>) in <+RSP Mask>, and the default value of Bit 27 in <+RSP Mask> is 0.

✧ *RFID*

It is the card ID of RFID that is supported by the device. If Bit 27 (for <RFID Length>) in <+RSP Mask> is set to 1, the length of this field is defined by <RFID Length>. If Bit 27 in <+RSP Mask> is 0, its length is always 4 bytes.

RFID	0			
HEX	00	00	00	00

Note

If the device does not get the card ID and Bit 27 (for <RFID Length>) in <+RSP Mask> is 1, the <RFID Length> will be 0 and the <RFID> will be empty.

✧ *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:

2B525350070FFE3FFF016780200509050418475633353043455500 2FFB0000000100192109100101000000000BB007906FB411F01E5D41F07E7091B071B1404600000550B0000B7B100000000000000010100033800000000293400013FFFFFFF314731424C353250375452313135353230020000001400 0F42400602BC003C00D2FF270F000000640000000000600 05F5E0F600640000270F630000270F630000270F63000F42400611923B3EFFBF003F0112A87E000112A87E0000000000002710004

E2000753000000E109C40F3FFFFFF00637D7D7D7D7D01010100002DF00098967F000F423F000F423F0001869F630001869F630001869F63000F423F717565636C696E6B30310071756563 6C696E6B303200434152314E414D4500434152324E414D4500303536363300 3FFE000F423F000F423F640000000000D202022E03619902FF0000006028DBD6D3D50000000364FF000000C006000007E7091B0F1B166187B7520D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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

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Parts	Fields	Length	Range/Format
	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
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:
2B5253500309FEDFFF006D8020050905031147563331304C4155642FC10000000001002117007
018225889237F0101000000000000005306FB40B601E5D75807E707060911260460000 1DF5C027A
4F1F0000000200000064000 01D20000000003B0F0007E7070611112707FB0FDF0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP

Parts	Fields	Length	Range/Format
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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	
	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

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
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:

2B5253500A09FEDFFF006780200509050418475633353043455564300200000000300210C100
0010100000000B7FFFD06FB3FCD01E5D26307E60B1E02292C04600011691D02A9090200000000
00000000000000000000000000000007E60B1E02292C0744FC6A0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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
	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

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Parts	Fields	Length	Range/Format
	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.2.5 IDA(ID Authentication Alarm)

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

If <Mode> is set to 1 or 2, **+RESP:GTIDA** will be reported according to the <Report Mode> setting.
If <Mode> is set to 0, **+RESP:GTIDA** will always be reported without checking the status of ID authorization.
The location report message **+RESP:GTIDA** in HEX format is as below.

Example:
2B525350114FFEFFFF00CD802005090504184756333530434555003092000000000000000000010000220B000575ECFCFE0B000101000004007100 3706FB403A01E5D3D207E607040A2E2304600011691D0691980500000000000C3880200000000000000000000575ECFCFE0B00000FFFFF314731424C353250375452313135353230000000013880 00F4240061388003C00D2FF270F0000000000000000060005F5E0F60064000027 0F630000270F630000270F63000F42400611923B3EFFFF3F3F07E607040A2E24087949680D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	0 - 32000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Report ID | Report Type	1	00
	ID Length	1	00 - 0E
	ID	<=0E	ASCII (not including '=' and ',')
	ID Report Type	1	0-2
	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

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Parts	Fields	Length	Range/Format
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *ID*

The ID that is currently read.

✧ *ID Report Type*

The type of reported ID.

- **0** - The ID is unauthorized or IDA function is disabled.
- **1** - The ID is authorized.
- **2** - The ID has logged out.

5.2.6 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:
2B5253501209FE0FFF00000100018C802005090504184756333530434555000100220C10070A00
0800000000875742433330300078054104 6E9D0000000000001060200041AF83987003F5754483
3303000AC233FA35460010D201A3902060200041B233AB3003F57544833303000AC233FA354EE
010D111B3A03060200041B473997003F57544833303000AC233FA354F7010C0F1B39040602000
41B1C39B0003F57544833303000AC233FA35457010C841B3905060200041AEE3A9C003F575448
33303000AC233FA3545F010CBA1A3A06060200041B073973003F57544833303000AC233FA3545
E010CE41B3907060200041AF039D9003F57544833303000AC233FA35461010D3B1A39080C0000
04000B42A2061754504D530008351B00043C011A001B07E6061D0B1210090C000004000B43A2
061754504D530008351B000373011B001B07E6061D0B120D010100000000AE005F06FB402D01
E5D42807E6061D0B122E04600011691D0DE98A340000000000000000001000000000000000000
007E6061D0B123017E222230D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	ERI Mask	4	00000000 - FFFFFFFF

Parts	Fields	Length	Range/Format
	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Report ID | Report Type	1	
	UART Device Type	1	0-2 | 7 | 8
	Digital Fuel Sensor Data (Optional)	2	0000 - FFFF
	1-wire Data (Optional)		
	Fuel Sensor Data (Optional)		
	RF433 Accessory Data (Optional)		
	Bluetooth Accessory Data(Optional)		
	RS485 Device Data (Optional)		
	Temperature Data (Optional)		
	Number	1	1 - 15
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *UART Device Type*

The type of the device connected to the secondary serial port.

- **0** - No device connected
- **1** - Digital fuel sensor
- **2** - 1-wire bus
- **7** - WRT100 accessory
- **8** - Thermograph

✧ *Digital Fuel Sensor Data*

The raw data read from the digital fuel sensor. If Bit 0 of <ERI Mask> in (AT+GTFRI) is enabled, this field will be displayed. Otherwise, this field will not be displayed.

✧ **1-wire Data (Optional)**

Fields	Length	Range/Format
1-wire Device Number	1	0 - 19
1-wire Device ID	8	
1-wire Device Type	1	00 - FF
Device Data Length	1	00 - FF
1-wire Device Data	<=20	

- *1-wire Device Number*
  The number of 1-wire devices connected to AC100. If it is 0, the fields <1-wire Device ID>, <1-wire Device Type>, <Device Data Length>, and <1-wire Device Data> will not be displayed. If there are more than one 1-wire devices connected, the fields <1-wire Device ID>, <1-wire Device Type>, <Device Data Length>, and <1-wire Device Data> will be repeated for each 1-wire device so that the information of all connected 1-wire devices are displayed. If Bit 1 of <ERI Mask> in (AT+GTFRI) is enabled, the <1-wire Data> field will be displayed; otherwise, <1-wire Data> will not be displayed.
- *1-wire Device ID*
  It indicates the device ID read from the 1-wire device.
- *1-wire Device Type*
  It indicates the type of the 1-wire device.
  – **1** - Temperature sensor
  – **4** - TH200 sensor
- *Device Data Length*
  It indicates the length of <1-wire Device Data>.
- *1-wire Device Data*
  It indicates the data read from the 1-wire devices.
  If <1-wire Device Type> is 1, this parameter indicates the temperature value and it is in two's complement format (refer to Appendix). To get the real temperature in degrees Centigrade, please convert the data to a decimal value according to the calculation in Appendix first and then multiply the decimal value by 0.0625.

Fields		Length	Range/Format
1-wire Device Data	Temperature	2	0000 - FFFF

  If <1-wire Device Type> is 4 , this parameter indicates a hexadecimal value. The first two bytes represent <Data Mask>, the middle four bytes represent <Humidity>, and the last four bytes represent <Temperature>.
  For example, 03BFFF0190 means <Data Mask> is 0x03, <Humidity> is 0xBFFF and <Temperature> is 0x0190.
  If the bit in <Data Mask> is 0, the data corresponding to the subsequent field does not exist.
  For example, 020190 means <Data Mask> is 0x02, <Temperature> is 0x0190, but no <Humidity>.

Fields		Length	Range/Format
1-wire Device Data	Data Mask	1	00 - 03
	Humidity	2	0000 - FFFF
	Temperature	2	0000 - FFFF

  – *Data Mask*
    A bitwise numeral to control whether to include the corresponding fields in each position after <1-wire Device Data>.
    • Bit 0 for <Humidity>.
      If <1-wire Device Type> is 4, Humidity = <Humidity>*0.0625.
    • Bit 1 for <Temperature>. Temperature = <Temperature>*0.0625.

✧ **Fuel Sensor Data (Optional)**

Fields	Length	Range/Format
Sensor Number	1	0 - 99
Sensor Type	1	0-6 | 9 | 20 | 21
Reserved	1	0x00
Percentage (Optional)	2	0 - 100.0(%)
Volume (Optional)	2	0 - 6000.0
Fuel Temperature (Optional)	1	-40 - 85 (x1centigrade)

- *Percentage*

  The corresponding percentage value of fuel. This value needs to be divided by 10 to get the actual percentage value.

- *Volume*

  To get the actual volume value, this parameter value needs to be divided by 10.

✧ **RF433 Accessory Data (Optional)**

Fields	Length	Range/Format
Accessory Number	1	0 - 10
Accessory Serial Number	5	00001 - FFFFE
Accessory Type	1	1|2
Temperature	1	-20 - 60(x1Centigrade)
Humidity (Optional)	1	0 - 100(x1%)

✧ **Bluetooth Accessory Data(Optional)**

Fields	Length	Range/Format
Bluetooth Accessory Number	1	0 - 10
Index	1	0 - 9
Accessory Type	1	0-2 | 6-8 | 10-14
Accessory Model	1	0-5
Raw Data Length	2	0000 - FFFF
Raw Data(Optional)	<=4	
Accessory Append Mask	2	00000000 - FFFFFFFF
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	-70 - 255(Centigrade)
Accessory Humidity(Optional)	1	0 - 100%(rh)

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Fields	Length	Range/Format
Accessory Output Status(Optional)	1	00 - 03
Accessory Digital Input Status(Optional)	1	00 - 01
Accessory Analog Input Voltage(Optional)	2	0 - 32000(mV)
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
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
  - **6** - Beacon multi-functional sensor
  - **7** - Techonoton accessory
  - **8** - External Input Output Bluetooth 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).

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- *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.

✧ **RS485 Device Data (Optional)**

Fields	Length	Range/Format
RS485 Device Number	1	0 - 25
RS485 Device Model	1	1 | 2

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Fields	Length	Range/Format
RS485 Device ID	1	01 - FF
Volume(Optional)	2	0 - 10000
Temperature (Optional)	1	-40 - 85(Celsius)

✧ **Temperature Data (Optional)**

Fields	Length	Range/Format
Sensor Type	1	0 - 2
Sensor Number	1	0 - 99
Temperature Value	2	-999 - 999(0.1Centigrade)

- *Temperature Value*

  The temperature value of the current position. 2 bytes in total. The device converts the latitude to an integer with 1 implicit decimal and reports this integer in HEX format. If the value of the latitude is negative, it is represented in Two's complement format.

Temperature 25.8	258	
HEX	01	02

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)

5.2.7 GIN|GOT(Geo-Fence Information)

The messages **+RESP:GTGIN** and **+RESP:GTGOT** in HEX format are as below.

Example:

2B525350144FFEFFFF00CF802005090504184756333530434555003070000000000000000010000210A000100000000000001500010100000000B1004806FB407801E5D2A507E60705030F1004600011691D06919805000000000000C3880200000000000000000000575ECFCFE0B00000FFFFF0000000000000000000000000000000000000000001388000F4240061388003C00D2FF270F000000000000000060005F5E0F600640000270F630000270F630000270F63000F42400611923B3EFFFF3F3F07E60705030F1014D64EE00D0A

2B525350154FFEFFFF00CF802005090504184756333530434555003070000000000000000010000210A000100000000000002000101000000000B1004806FB407801E5D2A507E60705030F1004600011691D06919805000000000000C3880200000000000000000000575ECFCFE0B00000FFFFF0

0000000000000000000000000000000000000001388000F4240061388003C00D2FF270F0000000
000000000060005F5E0F600640000270F630000270F630000270F63000F42400611923B3EFFFF3F
3F07E60705030F1014D751A50D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+RSP
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	Battery Level	1	0 - 100
	External Power Supply Voltage	2	0 - 32000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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	

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
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.

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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:
2B494E4601FFFFF147000C00C24756333530434555802005090504180105000000000000000000000000000000000000000011A002100070207E7091B09100D0000007F00000A00001E000000D02FDD000000898602C99917301004241800040800000404600000F550B0000B1E200270460000F550B00003D9300240460000F550B000023CB00220460000055OB0000B7B100160903110A0F0C0F170B19131C0F1D0E1F1320090145000000000000000000000020001000000007E7091B11100D67E1EC380D0A

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	802005
	Protocol Version	2	0000 - FFFF
	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:GTUVN)		

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Parts	Fields	Length	Range/Format
	(+RESP:GTCVN)		
	(+RESP:GTCML)		
	(+RESP:GTWRT)		
	(+RESP:GTSCS)		
	(+RESP:GTCIF)		
	Network Type	1	00 - FF
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:GTUVN	12
+RESP:GTCVN	13
Reserved	...
+RESP:GTRSV	21
+RESP:GTBSV	22
+RESP:GTCML	26
Reserved	...
+RESP:GTSCS	28
Reserved	...
+RESP:GTWRT	30
Reserved	...
+RESP:GTCIF	35
+RESP:GTASV	37

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✧ *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	
	Analog Input2 Voltage	2	
	Reserved	2	0000
	Reserved	1	00
	Reserved	2	0000
	Reserved	2	0000
	EIO100 IO Status	2	0000 - 0F0F
	Digital Input Status	1	00 - 1F
	Digital Output Status	1	00 - 07

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Message	Fields	Length	Range/Format
	Pin Mask	1	00 - 0F

✧ *EIO100 IO Status*

The status of EIO100 inputs and outputs. For each bit, 0 means "Disable status", and 1 means "Enable status". If EIO100 device is not connected or the mode of (AT+GTURT) is not for EIO100, it is always "0000".

- **Bit 0** - For EIO100 output 9
- **Bit 1** - For EIO100 output A
- **Bit 2** - For EIO100 output B
- **Bit 3** - For EIO100 output C
- **Bit 4 - 7** - Reserved
- **Bit 8** - For EIO100 input 9
- **Bit 9** - For EIO100 input A
- **Bit 10** - For EIO100 input B
- **Bit 11** - For EIO100 input C
- **Bit 12 - 15** - Reserved

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".

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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	0 - 32000(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*

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Bit 2 is for <Network Time Checking> which indicates whether to check GNSS UTC time with network time. Bit 1 is for <Enable Daylight Saving> which indicates whether the daylight saving function is currently enabled. Bit 0 is for <Time Zone Offset Sign> which indicates the positive or negative offset of the local time from UTC time. 1 means "negative offset".

GSM

Message	Fields	Length	Range/Format
+RESP:GTGSM	GIR Trigger Type	1	
	Cell Number	1	
	MCC	2	
	MNC	2	
	LAC	2	
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	00
	RX Level	1	
	...	2	
	MCC	2	
	MNC	2	
	LAC	2	
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	
	RX Level	1	

✧ *GIR Trigger Type*

The ID of fix type. It indicates what kind of GNSS fix this cell information is for.

- **INF** - This cell information is for INF request.
- **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

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Fix Type	ID
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	

UVN

Message	Fields	Length	Range/Format
+RESP:GTUVN	Sensor Protocol Version	1	
	Sensor SW Version	2	
	Sensor HW Version	1	

CVN

Message	Fields	Length	Range/Format
+RESP:GTCVN	CAN Module SW Version Length	1	0 - 10
	CAN Module SW Version	<=10	

CML

Message	Fields	Length	Range/Format
+RESP:GTCML	CAN Module Car Model ID	2	0x0000 - 0xFFFF
	CAN Module Car Name Length	1	0 - 50
	CAN Module Car Name	<=50	

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Message	Fields	Length	Range/Format
	CAN Module Sync Status	1	1 - 4

WRT

Message	Fields	Length	Range/Format
+RESP:GTWRT	Accessory Number	1	0 - 10
	Accessory Type	1	1|2
	Accessory Serial Number	5	00001 - FFFFE
	...		
	Accessory Type	1	1|2
	Accessory Serial Number	5	00001 - FFFFE

SCS

Message	Fields	Length	Range/Format
+RESP:GTSCS	Self Calibration Status	1	0 | 1 | 2
	X_Forward	1	-100 - 100
	Y_Forward	1	-100 - 100
	Z_Forward	1	-100 - 100
	X_Side	1	-100 - 100
	Y_Side	1	-100 - 100
	Z_Side	1	-100 - 100
	X_Vertical	1	-100 - 100
	Y_Vertical	1	-100 - 100
	Z_Vertical	1	-100 - 100

CIF

Message	Fields	Length	Range/Format
+RESP:GTCIF	CAN Module Information Mask	1	00 - FF
	CAN Module Version Length(optional)	1	0 - 10
	CAN Module Version Number(optional)	<=10	
	CAN Module Serial Length(optional)	1	0 - 10
	CAN Module Serial Number(optional)	<=10	
	CAN Module Car Model ID(optional)	2	0x0000 - 0xFFFF

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Message	Fields	Length	Range/Format
	CAN Module Car Name Length(optional)	1	0 - 50
	CAN Module Car Name(optional)	<=50	
	Extended Debug Information Length	1	00 - FF
	Extended Debug Information	<=250	
	Standard Debug Information Length	1	00 - FF
	Standard Debug Information	<=250	
	Hardware Information Length	1	00 - FF
	Hardware Information	<=250	
	CAN Module Info Mask Extend	1	00 - FF
	CAN Configure Deep Sleep Mode Switch	1	0 | 1
	CAN Module Configure Version Length	1	0 - 10
	CAN Module Configure Version	<=10	
	Extend Tachograph Communication Debug Length	2	0000 - FFFF
	Extend Tachograph Communication Debug	<=1000	
	Tacho Driver Work Time Mode	1	0 - 3

✧ *CAN Module Information Mask*

Configuration information for a specific CAN Module information mask that can be obtained and represent the low byte portion of the <CAN Module Information Mask> in (AT+GTRTO).

✧ *CAN Module Car Model ID*

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

✧ *CAN Module Car Name*

Car Name is human-readable make and model of the car. If this string value is equal to "sync", then the <CAN Module Car Model ID> of the query is a class ID that has been synchronized.

✧ *CAN Module Info Mask Extend*

When bit7 of <CAN Module Info Mask> is 1, this mask will be obtained and represent the high byte portion of the <CAN Module Information Mask> in (AT+GTRTO).

✧ *CAN Configure Deep Sleep Mode Switch*

It is used to control whether CAN configuration has enabled deep-sleep mode.

- **0** - CAN Module will enter deep sleep (very low power consumption mode) when vehicle's CANBUS (and entire car) goes sleep. CAN-Logistic uses very little energy in deep-sleep

mode, but it takes more time to wake it up and some information may be lost in some cases.

- **1** - CAN Module will not enter deep-sleep mode.

✧ *CAN Module Configure Version*

The configure version of the CAN device.

✧ *Extend Tachograph Communication Debug*

The Extended tachograph communication debug information is accessible for developer.

✧ *Tacho Driver Work Time Mode*

An numeral to indicate the working mode of querying tachograph about drivers' working times.

- **0** - Querying is disabled at all. Drivers' working times are not available.
- **1** - Querying is enabled only when ignition is on (for vehicles which don't support ignition signal from CANBUS when engine is on). When ignition/engine is off, times are not updated.
- **2** - Querying is enabled when CANBUS is active. When car gets into sleep mode, querying is continued until all drivers, who's cards are inserted change their work mode to REST. Then querying stops. When car's CAN bus gets active again, querying is resumed.
- **3** - Querying is always enabled, even if car is in sleep mode. Caution! This may keep the tachograph awake and lead to increased power consumption by car's components.

Note

As <Hardware Information>, <Standard Debug Information> and <Extended Debug Information> contain many bytes, it is recommended that only one set of debug messages be queried at a time.

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:
2B4154493A80200509050313563F0E06021C2A04001C133103130103030001030110010 4EFBA4 4563F0E06021C2A0407E7070D142826055B23980D0A

Parts	Fields	Length	Range/Format
Head	Message Header	4	+ATI
Body	Length	1	
	Device Type	3	802005
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	ATI Mask	4	00000000 - FFFFFFFF

Parts	Fields	Length	Range/Format
	Firmware Version	2	'0' - '9' 'A' - 'F'
	Hardware Version	2	'0' - '9' 'A' - 'F'
	BT Firmware Version	2	0000 - FFFF
	BT Boot Firmware Version	2	0000 - FFFF
	Sensor ID	1	00 - FF
	Modem IMEI	8	IMEI
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *ATI Mask*

This mask is set by the (AT+GTRTO) command and used to control parameter fields in **+ATI** message.

5.4 Event Reports

This section describes the message related to certain events. Please refer to the details below.

5.4.1 Generic Event Report

✧ **PNA** (Power-on Report)
✧ **PFA** (Power-off Report)
✧ **MPN** (Main Power Connection)
✧ **MPF** (Main Power Disconnection)
✧ **BTC** (Battery Starts Charging)
✧ **STC** (Stop Charging Notification)
✧ **STT** (Device Status Notification)
✧ **PDP** (GPRS Connection Establishment Report)
✧ **IDN** (Enter Idle State)
✧ **STR** (Enter Start State)
✧ **STP** (Enter Start State)
✧ **LSP** (Enter Start State)

Example:
2B4556540109FEDFFF006580200509050312475633313 04C4155640000000000000100413001000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000040C0007E7070C05101700EA3B7F0D0A

2B4556540209FEDFFF006580200509050313475633313 04C4155642C67000000000101211C0101

0000000000006106FB3F8901E5D3BD07E7070D02213B04600001DF5C05FE66670000000000000000000041600000001032400007E7070D0A220003AA6B490D0A

2B4556540309FEDFFF006580200509050312475633313040C4155002FA0000000000100221C0101000000000005806FB404D01E5D3AB07E7070C050D0E04600000550B0000B7B10000000000000000000000000000000001280007E7070C050D1000E08CF50D0A

2B4556540409FEDFFF006580200509050312475633313040C41550000000000000000000121C0101000000000005806FB404D01E5D3AB07E7070C050D0504600000550B0000B7B10000000000000000000C0000000001280007E7070C050D0600DAAAE40D0A

2B4556540709FEDFFF006580200509050418475633353043455500 2F960000000010022000100000000000000000000000000000000000000000000004600001DE1105FE66670000000000000000000000000000000000007E607060A3020028815400D0A

2B4556540809FEDFFF006580200509050418475633353043455500 2F960000000010022000100000000000000000000000000000000000000000000004600001DE1105FE66670000000000000000000000000000000000007E607060A3024028A5A8D0D0A

2B4556540909FEDFFF006580200509050418475633353043455500 2FA700000000010022070104000000001005706FB3FE501E5D2F407E607060A2D1404600001DE1105FE66670000000000000000000000000000000000007E607060A2D150272DFF40D0A

2B4556540C09FEDFFF006580200509050418475633353043455564 2E3F000000000100210301000020600B2005306FB404C01E5D14D07E607060B1C160000000000000000000000000000000000000000000000000007E607060B1D1E033BBB4A0D0A

2B4556541009FEDFFF006580200509050418475633353043455500 2FBF000000000100210001000000000000000000000000000000000000000000000004600001DE1105FE66670000000000000000000000000000000000007E607061232360296 2D5E0D0A

2B4556541709FEDFFF006580200509050418475633353043455500 2F7E000000000100220801040001020 0B9004306FB406301E5D00D07E607060B052904600001DE1105FE66670000000000000000000000000000000000007E607060B052B02C5367E0D0A

2B4556541809FEDFFF006580200509050418475633353043455500 2F7E000000000100220801040000000 0B9004306FB407801E5D02007E607060B052B04600001DE1105FE66670000000000000000000000000000000000007E607060B052D02C622980D0A

2B4556541D09FEDFFF006580200509050418475633353043455500 2F950000000001002108010500000000 B9004306FB407801E5D02007E607060B062B04600001DE1105FE66670000000000000000000000000000000000007E607060B062D02CA7A6B0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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)

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Parts	Fields	Length	Range/Format
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	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
+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:GTDAT	18
+RESP:GTJDR	20
+RESP:GTGSS	21
+RESP:GTFLA	22
+RESP:GTSTR	23
+RESP:GTSTP	24
+RESP:GTCRA	25
+RESP:GTDOS	27
+RESP:GTGES	28

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Message	ID
+RESP:GTLSP	29
+RESP:GTTMP	30
+RESP:GTDTT	31
+RESP:GTJDS	32
+RESP:GTRMD	33
+RESP:GTPHL	34
+RESP:GTEXP	35
+RESP:GTFTP	38
+RESP:GTUPC	40
+RESP:GTCLT	41
+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:GTLBA	60
+RESP:GTWPB	61
+RESP:GTTTR	62
+RESP:GTTRL	63
+RESP:GTBAA	65
+RESP:GTBID	67
+RESP:GTBAR	70
+RESP:GTEUC	84
+RESP:GTRTP	86
+RESP:GTRAS	87
+RESP:GTHUM	88
+RESP:GTTPM	106

✧ *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.

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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

✧ *RFID Length*

It indicates the length of <RFID>. It is controlled by Bit 27 in <+EVT Mask>, and the default value is 0.

✧ *RFID*

It is the card ID of RFID that is supported by the device. If Bit 27 (for <RFID Length>) in <+EVT Mask> is set to 1, the length of this field is defined by <RFID Length>. If Bit 27 in <+EVT Mask> is set to 0, its length is always 4 bytes.

Note

If the device does not get the card ID and Bit 27 in <+EVT Mask> is 1, <RFID Length> will be 0 and <RFID> will be empty.

5.4.2 BPL(Backup Battery Low Alarm)

The event report message **+RESP:GTBPL** in HEX format is as below.

Example:
2B4556540609FEDFFF006780200509050313475633313 04C4155130000000000000000011160E68
0100001504001E002606FB43A801E5D5CD07E7070E090C0E04600001DF5C027A4F1F000049000
000021D00000000000000000000007E7070F002A0909CD8FF40D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	Battery Level	1	0 - 100

Parts	Fields	Length	Range/Format
	External Power Voltage	2	0 - 32000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF

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Parts	Fields	Length	Range/Format
	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:
2B4556541409FEDFFF006680200509050313475633313 04C4155003087000000000100211703010100070900220031 06FB433601E5D09407E7070D0A0614000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000000007E7070D12070101B649F70D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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

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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	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:
2B4556542009FEDFFF006780200509050313475633313 04C4155003087000000000004111501030100000000022003106FB433601E5D09407E7070D0A093904600000550B0E9E309E000000000000000000000000000000000000007E7070D120C2801BE3D310D0A

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	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 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)

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Parts	Fields	Length	Range/Format
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	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:

2B4556540D09FEDFFF006980200509050311475633313 04C4155640000000000000100221C000000006010100000000000008C06FB408D01E5D66207E70706080D1704600001DF5C027A4F1F0000000000000000000000000000000000000007E70706100D1806B911AF0D0A

2B4556540E09FEDFFF006980200509050311475633313 04C4155643087000000000000121C000003DE0101000000000008C06FB408D01E5D66207E70706080D1104600001DF5C027A4F1F0000000000000000000000000000000000000007E70706100D1206B527CD0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	Protocol Version	2	0000 - FFFF

Parts	Fields	Length	Range/Format
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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
	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
	RFID Length	1	0 - 0E

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Parts	Fields	Length	Range/Format
	RFID	<=0E	HEX
	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:
2B4556542D09FEDFFF006B802005090503114756333130 4C41556438A6000000000000221C000700000061010100000000000008C06FB419F01E5D3B207E7070A031F1504600001DF5C027A4F1F00000000000000000000000000000000270F300007E7070A031F16144A42FC0D0A

2B4556542E09FEDFFF006B802005090504184756333530434555002FF900000000000011060004 0000008D01020000000000FFF506FB44A801E5D67207E60707032A2404600000550B0000B1E20 00000000000000000000000000000000000000007E60707032A2605617D030D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	

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Parts	Fields	Length	Range/Format
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Reserved	1	00
	Report Type	1	0-4 | 7
	Duration of Ignition On or Ignition Off	4	0 - 999999(s)
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	
	Longitude	4	
	Latitude	4	
	GNSS UTC Time	7	YYYYMMDDHHMMSS
	MCC	2	0000 - FFFF
	MNC	2	0000 - FFFF
	LAC	2	0000 - FFFF
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF

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Parts	Fields	Length	Range/Format
	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:
2B4556541109FEDFFF006980200509050313475633313 04C4155002F1C00000000010222190000
00820101000000000000006306FB407A01E5D41907E7070C0B163104600001DF5C027A4F1F00000
000000006400000405000000000405000 7E7070C0B1633008629E00D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Duration of Idling	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	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:
2B455654150DFEFFFF0070802005090505094756333535434555492DF900000000000000001000021000000000000010000000000000000000000000000000000000000000000000000000000000000000004600000550B085BE2AA000000000000003E0900010300000005092E0007E7010D06230F28FC371D0D0A

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	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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)

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Parts	Fields	Length	Range/Format
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	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 FLA(Unusual Fuel Consumption Alarm)

The HEX format of the event report message **+RESP:GTFLA** is as follows.

Example:
2B4556541609FEDFFF006880200509050314475633313O4C4155642FC1000000000100221C0010
000101000000000007006FB401801E5D3B907E7071405273A04600001DF5C05FE66670000000
1000000060701332800000022C070007E7071405273B25410C0F0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	

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Parts	Fields	Length	Range/Format
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Input ID	1	0 - 2
	Last Fuel Level	1	0 - 100
	Current Fuel Level	1	0 - 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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF

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Parts	Fields	Length	Range/Format
	Tail	2	0x0D 0x0A

- *Input ID*
  The ID of the input to which the fuel sensor is connected. 0 means "Connected with serial port".
- *Last Fuel Level*
  The fuel level saved before the fuel loss alarm event occurs.
- *Current Fuel Level*
  The current fuel level when the fuel loss alarm event occurs.

5.4.10 DOS(Wave Shape 1 Output Status)

The HEX format of the event report message **+RESP:GTDOS** is as follows.

Example:
2B4556541B09FEDFFF006780200509050418475633353043455500301900000000000011050101
0101000000000003006FB40A201E5D28D07E6070703383904600000550B0000B7A9000000000
00000000000000000000000000000007E6070703383A0587E1EF0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42

Parts	Fields	Length	Range/Format
			0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Wave1 Output ID	1	1 - 3 | 7 - C
	Wave1 Output Active	1	0 - 2
	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.11 GES(Parking-Fence Information)

The HEX format of the event report message **+RESP:GTGES** is as follows.

Example:
2B4556541C09FEDFFF007180200509050314475633313 04C4155643087000000000000111C0000
0115000001F40000000A010100000000C6006906FB406D01E5D49207E707130B050504600001D
F5C027A4F1F000000000000006400000000000000000000000007E70713142306201E693C0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	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.

5.4.12 TMP(Temperature Alarm)

The HEX format of the event report message **+RESP:GTTMP** is as follows.

Example:
2B4556541E09FEDFFF007280200509050418475633353043455500 2FC5000000000100210C000128D1A6F60A00005000001B0101000000000000005906FB3FA801E5D45507E6061D0A340E04600011691D0DE98A340000000000000000001000000000000000000000007E6061D0A340F16EEAFFB0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005

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	0 - 32000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Temperature Alarm ID	1	0 - 3
	Temperature Status	1	0 - 1
	Temperature Sensor device ID	8	'0'-'9' 'a'-'f' 'A'-'F'
	Reserved	1	00
	Temperature Sensor device Data	2	-55 - 125(centigrade)
	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

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

- *Temperature Alarm ID*

  The ID of temperature alarm.
- *Temperature Status*

  The status of current temperature.
  - **Bit 0** - 0 means "Outside the predefined temperature range". 1 means "Within the predefined temperature range".
- *Temperature Sensor Device ID*

  The ID of the temperature sensor.
- *Temperature Sensor Device Data*

  The current temperature the sensor detects.

5.4.13 RMD(Roaming State Report)

The HEX format of the event report message **+RESP:GTRMD** is as follows.

Example:
2B4556542109FEDFFF006680200509050418475633353043455500301700000000000011 10B0001010000000B0007606FB40AA01E5D35207E607070605030460000055 0B0000B1E200000000000000000000000000000000000000000000000000000000000000000000000007E60707060505066CBF020D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	Protocol Version	2	0000 - FFFF

Parts	Fields	Length	Range/Format
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX

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Parts	Fields	Length	Range/Format
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.14 PHL(Location Information for CMS)

The HEX format of the event report message **+RESP:GTPHL** is as follows, and it is only sent via GPRS even if the report mode is forced SMS mode.

Example:
2B4556542209FEDFFF007180200509050311475633313 04C4155642FE2000000000101211C0003
00080307E707070A3B370101000000000000 5406FB404D01E5D20307E707070A3B3704600001D
F5C027A4F1F0000000000000000000000000000000000007E707070A3B380253670A0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42

Parts	Fields	Length	Range/Format
			0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Attribute Mask	2	0000 - FFFF
	Attribute Length	2	
	Camera ID	1	0 - 3
	Photo Time	7	YYYYMMDDHHMMSS
	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Attribute Length*

The total length of attribute parameters which include <Camera ID> and <Photo Time>.

5.4.15 EXP(Information of Digital Fuel Sensor)

The HEX format of the event report message **+RESP:GTEXP** is as follows.

Example:
2B4556542309FEDFFF006980200509050314475633313O4C41556430C9000000000000111C0200
0001010100000000C6006906FB406D01E5D49207E707130B121604600001DF5C027A4F1F00000
0000000006400000000000000000000030007E707131430172035868A0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	Analog Input3 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Digital Fuel Sensor Type	1	2 | 4
	Reserved	1	00
	Reserved	1	00
	HW Fault Code	1	
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.16 FTP(Transfer File Alarm)

The event report message **+RESP:GTFTP** is for reporting location information after transferring a file to FTP server and the HEX format is as follows.

Example:
2B455654260FFEFFFF008880200509050509475633353543455500 30BC001123B323C700030000
210C526565736532303232313232393035353934362E6A706700010100000000000007606FB409
301E5D48007E60C1D053B3504600001DE10027A4F1F0000000000000000204000701000000150A
0E00000000000007E60C1D053B3606565BC30D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005

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	0 - 32000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	File Name	<=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
	RFID Length	1	0 - 0E

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Parts	Fields	Length	Range/Format
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *File Name*

The name of the file transferred to FTP server.

5.4.17 CLT(CANBUS Information Alarm)

The HEX format of the event report message **+RESP:GTCLT** is as follows.

Example:
2B455654294FFEDFFF0189802005090503114756333130 4C4155642FE20000000000000000100002 11C040000000000000010000000000101000000000006D06FB403701E5D38307E7070802202 804600001DF5C027A4F1F000000000000000000000000000000000000000001207FFFFF4C53564E5 934315A304232353231383934020000 04CE000000022E0361000A004DFE26B600000000000000 00613C000000000000000000005C000000003D000000001F0000000B140000000004423F3F000 0000008000000000000000000000FFFFFF00647D7E730D7752010101000186 9F0001105500017B4 800008D6F0000E509430000FE854800004B225E00016BDB3131313131313131313131003232323232 3232323232320031323334353637383930313233343536373839303132333435363738393061626 36465666768696A00393837363561626364656667686 96A33362353469756 56C6F706965646 A3564756562646B76646500353634373839333231340000000000000000000000000007E7070802 202905DAEB970D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	

Parts	Fields	Length	Range/Format
	Analog Input1 Voltage	2	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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	
	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS

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Parts	Fields	Length	Range/Format
	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.

5.4.18 PNR(Power-on Reason)

Example:
2B4556543009FEDFFF006680200509050313475633313O4C4155642FE2000000000100211C0601
0000000101530054O6FB407401E5D20107E7070D033405000000000000000000000000000000000
0006400000000000000640202000 7E7070D0D162C361D06650D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F

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Parts	Fields	Length	Range/Format
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Power On Reason	1	0-3 | 6
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	
	Longitude	4	
	Latitude	4	
	GNSS UTC Time	7	YYYYMMDDHHMMSS
	MCC	2	0000 - FFFF
	MNC	2	0000 - FFFF
	LAC	2	0000 - FFFF
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

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5.4.19 PFR(Power-off Reason)

Example:
2B4556543109FEDFFF006680200509050312475633313O4C4155003003000000000100211C0201
0100000000000006106FB3EDC01E5D45607E7070C050B0804600000550B0000B7B100000000000
000000000001C00000000002B0007E7070C050B0A00C121930D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	
	Longitude	4	

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.20 LBA(Low Power Alarm for RF433)

The low power alarm (less than 2.4V) event message for the RF433 accessories.

Example:
2B4556543C09FEDFFF006B802005090503124756333130 4C4155642FC1000000000100211C013
0303044350101000000000000006606FB3FFE01E5D44407E7070B022A2204600001DF5C027A4F1F
00000000000000000000E26000000000E260007E7070B022A2301F45F530D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name

Parts	Fields	Length	Range/Format
	Battery Level	1	0 - 100
	External Power Voltage	2	0 - 32000(mV)
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Accessory Type	1	0x01 - 0x03
	Accessory Serial Number	5	00001 - FFFFE
	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	

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Parts	Fields	Length	Range/Format
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.21 WPB(Button Alarm for WPB100)

The button alarm event message for WPB100 accessory.

Example:
2B4556543C09FEDFFF006B8020050905010E4756333035434555002F3E0000000010121080330
303033370101000000167FFFC06FB3F9801E5D53B07E6031D0938050460000550B0000B7B10
000010200000001050218140000001527120007E6031D093806A2486B0B0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	Analog Input3 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A

Parts	Fields	Length	Range/Format
	Satellites in Use	1	0 - 24
	Accessory Serial Number	5	00001 - FFFFE
	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.4.22 ASC(Acceleration Calibration Alarm)

The HEX format of the event report message **+RESP:GTASC** is as follows.

Example:
2B4556542F4FFEFFFF00C98020050905041847563335305F42000A000004210000000000000000
0010220C325601AB3200FF006301000019010000003506FB209C01E5F01807E607050521110460
0001DE1005A90B0E00000003000004FE0300001200000118 1F1B0000000FFFFF00000000000000
00000000000000000000000000000000000000000000000000000000000000000000000000000000

```
00000000000000000000000000000000000000000000000000000000000000000000000007E6070505
21116516C7A20D0A
```

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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)

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Parts	Fields	Length	Range/Format
	Azimuth	2	0 - 359
	Altitude	2	
	Longitude	4	
	Latitude	4	
	GNSS UTC Time	7	YYYYMMDDHHMMSS
	MCC	2	0000 - FFFF
	MNC	2	0000 - FFFF
	LAC	2	0000 - FFFF
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	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.

5.4.23 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:
2B455654334FFEFFFF00D28020050905041847563335305F42000C0000042100000000000000000010220C000200000D000B0056FFF5000000530000090100002207000300350 6FB209601E5EF4307E6070505210E04600001DE1005A90B0E00000002000004FE0300000F000001181F180000000FFFFF0000000000000000

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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Max Acceleration Data*

There are 12 characters in a group of acceleration data. It is the maximal value of acceleration data which triggers this harsh behavior report. The XYZ-axis of the <Max Acceleration Data> in the **+RESP:GTHBE** report correspond to those of the device's coordinate system.

The first 4 characters of these 12 characters represent X axis acceleration data, the middle 4 characters represent Y axis acceleration data and the last 4 characters are for Z axis acceleration data.

The ASCII "0001" indicates HEX value 0x0001, so it means the acceleration is 1. The ASCII "fffd" indicates HEX value 0xFFFD which is the compliment of -3, so it means the acceleration is -3. This value is only valid in Mode 5 of the (AT+GTHBM) command.

✧ *Average Acceleration Data*

There are 12 characters in a group of acceleration data. It is the average value of acceleration data which triggers this harsh behavior report.

The first 4 characters of these 12 characters represent X axis acceleration data, the middle 4 characters represent Y axis acceleration data and the last 4 characters are for Z axis acceleration data.

The ASCII "0001" indicates HEX value 0x0001, so it means the acceleration is 1. The ASCII "fffd" means HEX value 0xFFFD which is the compliment of -3, so it means the acceleration is -3. This value is only valid in Mode 5 of the (AT+GTHBM) command.

✧ *Harsh Behavior Duration*

The duration of the harsh behavior event. This value is only valid in Mode 5 of the (AT+GTHBM) command.

✧ *Self Calibration Status*

The status of the self-calibration for Acceleration Data.

- **0** - Self-calibration is disabled.
- **1** - Self-calibration is not done.
- **2** - Self-calibration is successful.

✧ *Harsh Behavior Type*

The type of the harsh behavior.

- **0** - Harsh braking behavior.
- **1** - Harsh acceleration behavior.
- **2** - Harsh cornering behavior.
- **3** - Harsh braking and cornering behavior.
- **4** - Harsh acceleration and cornering behavior.

5.4.24 CRA(Crash Alarm)

The HEX format of the event report message **+RESP:GTCRA** is as follows.

Example:
2B4556541909FEDFFF006680200509050313475633313O4C41550030A80000000000001A1C0B0
1000000000022004906FB405A01E5D4A107E7070D090A0F04600000550B0E9E30A50000000000
00000000001F34000000001F340007E7070D110A1000F6BD500D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	

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Parts	Fields	Length	Range/Format
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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
	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	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.

5.4.25 BCS(Bluetooth Connection Alarm)

The report for Bluetooth connection.

Example:
2B4556543409FEDFFF008380200509050311475633313O4C41556400000000000000000111C0D0
347563331304C415525494D45490001E42300AF89000160ABEB6F8AC20100000000000000006A06
FB40C301E5D40807E7070A071E2F04600001DF5C05FE6667000000000000000000000051400000
064161E0007E7070A071F190053548B0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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

Parts	Fields	Length	Range/Format
	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	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.

5.4.26 BDS(Bluetooth Disconnection Alarm)

The report for Bluetooth disconnection.

Example:
2B4556543509FEDFFF00848020050905031147563331304C41556400000000000000000111C0D0
347563331304C415525494D45490001E42300AF89000160ABEB6F8AC20001000000000000006A

06FB40C301E5D40807E7070A071F2F04600001DF5C05A476660000000000000000000000514000
00064161E0007E7070A071F36005526A60D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	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.

5.4.27 BAA(Bluetooth Accessory Alarm)

The HEX format of the event report message **+RESP:GTBAA** is as follows.

Example:
2B455654410FFEFFFF008C802005090505094756333535434555003OB4001123AA23BB00030000
220C090C000E061754504D530008351B00043C0117001407E60C1D070D3001010000000047004
006FB403701E5D3D807E60C1D070D3104600001DE10027A4F1F0000000100000002050034210O
0000161730000000000000007E60C1D070D310825BE6D0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	

Parts	Fields	Length	Range/Format
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 07
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 03
	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-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

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Parts	Fields	Length	Range/Format
	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 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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	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.
- **0D** - Beacon 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.

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- **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 7** - <Accessory Input Output Data>, including <Accessory Output Status>, <Accessory Digital Input Status>, <Accessory Analog Input Voltage>
- **Bit 8** - <Accessory EventNotification Data>, including <Accessory Mode>, <Accessory Event>
- **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> = 0x081F0007, 0x081F indicates bit 15 - bit 0, 0x0007 indicates bit 31 - bit 16.

✧ *Accessory Name*

The name of the Bluetooth accessory which ends with '0'(0x00). If the accessory name is not found, this filed will be filled with 0x00.

✧ *Accessory MAC*

The MAC address of the Bluetooth accessory.

✧ *Accessory Status*

A numeral to indicate whether the accessory is available.

- **0** - The accessory is not available.
- **1** - The accessory is available.

✧ *Accessory Battery Level*

The battery voltage of the Bluetooth accessory.

✧ *Accessory Temperature*

Temperature data of the Bluetooth accessory.

✧ *Enhanced Temperature*

It instructs Bluetooth accessories to measure high-precision temperature.

Note

The current temperature value. A total of 2 bytes. The 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.

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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.

5.4.28 BID(Bluetooth Beacon ID Setting)

The HEX format of the event report message **+RESP:GTBID** is as follows.

Example:
2B4556544309FEDFFF008C80200509050509475633353543455564 31B3000000000101220C0300004A78054101F5370BA3B500004A78054101F46D0A18AC00004A78054101F4790BBEB001010000000162006E06FB3FD001E5D53407E7041A051F0304600000550B085BE2AA00000000000000000000000000000000000000000000000007E7041A0F010409B07D040D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 15
	Number	1	0 - 15
	Beacon ID Model	1	0-2 | 4
	Accessory Append Mask	2	0000 - FFFF
	Accessory MAC (Optional)	6	'0' - '9' 'A' - 'F'
	Accessory Battery Level (Optional)	2	0 - 5000(mV)
	Accessory Signal Strength (Optional)	1	-120 - 0
	Beacon type (Optional)	1	0 - 2
	Beacon Data (Optional)	<=100	
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Number*

The number of Bluetooth beacon accessories.

- **WKF300**. The maximum value is 3.
- **iBeacon E6**. The maximum value is 15.
- **ID ELA**. The maximum value is 15.
- **WID310**. The maximum value is 15.

✧ *Beacon ID Model*

The model of the Bluetooth beacon accessory which is defined in (AT+GTBID).

✧ *Accessory Append Mask*

Bitwise mask defined in the (AT+GTBID) command to indicate the reported Bluetooth beacon accessory data fields.

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

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- *Accessory MAC*
  Bluetooth accessory MAC address.
- *Accessory Battery Level*
  The voltage of Bluetooth accessory.
- *Accessory Signal Strength*
  The signal strength of Bluetooth accessory.
- *Beacon type*
  Types of beacons.
  - **0** - "ID" Format
  - **1** - "iBeacon" Format
  - **2** - "Eddy stone" Format
- *Beacon Data*
  Select the data format according to <Beacon Type>:
  - If <Beacon Type> is 0, the data format is as follows:

Fields	Length	Range/Format
ID_Mfr_Data	6	(HEX)

  - If <Beacon Type> is 1, the data format is as follows:

Fields	Length	Range/Format
UUID	16	(HEX)
Major	2	(HEX)
Minor	2	(HEX)

  - If <Beacon Type> is 2, the data format is as follows:

Fields	Length	Range/Format
NID	10	(HEX)
BID	6	(HEX)

5.4.29 BAR(Bluetooth Accessory Report)

The HEX format of the event report message **+RESP:GTBAR** is as follows.

Example:
2B4556544609FEDFFF009480200509050314475633313 04C4155642FA0000000000100211C0407040007474E4F4D204450205337000101 82CD7CE0010148F76D014600000000FFFFFFFFFFFFFFFFFFFFFFFFFFFF010100000000000003906FB3F2A01E5D4B107E707180212120460000 1DF5C027A4F1F000000000000000000000033B00000000033B0007E707180212110055BBCA0D0A

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	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	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 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

- 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 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

- 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

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Fields	Length	Range/Format
PGN Data1	20	00000000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
PGN2	2	0000 - FFFF
PGN Data2	20	00000000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
PGN3	2	0000 - FFFF
PGN Data3	20	00000000000000000000000000000000000000000000 -- 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	00000000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
PGN2	2	0000 - FFFF
PGN Data2	20	00000000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
PGN3	2	0000 - FFFF
PGN Data3	20	00000000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF
PGN4	2	0000 - FFFF
PGN Data4	20	00000000000000000000000000000000000000000000 -- FFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFFF

5.4.30 TRL(Tachographer Real Location)

The HEX format of the event report message **+RESP:GTTRL** is as follows.

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Example:
2B4556543F0DFEFFFF00A88020050905050947563335354345550 02D760031002700000000000
10000210C0001435F32303233303131375F303232335F4D75737465726726175 5F385F4B72697
374615F385F313130303030303031323834353030302E444444000101000000008E00C206FB409
B01E5D36D07E701110217240460000055 0B085BE2AA0000000000000004100000421000000 5E26
1B0007E70111021725498CDE230D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	Reserved	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 0x0F
	File Download Count	2	0001 - FFFF
	DDD File Name	<=129	
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *File Download Count*

It is a number that indicates current download DDD file number of times.

✧ *DDD file name*

The file name of DDD which ends by "\0", the value is in ASCII format string.

5.4.31 RTP(Remote File Transfer)

The HEX format of the event report message **+RESP:GTRTP** is as follows.

Example:
2B4556543C09FEDFFF006B802005090502014756333130 4C4155003066000000000100211B033
030303337010100000000000005206FB40EB01E5D3C707E608170716350460000055 0B0E9E30A5
00000000000000000000000000000000000000007E608170F163767E7EF5F0D0A

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	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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
	MNC	2	0000 - FFFF
	LAC	2	0000 - FFFF

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	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.

5.4.32 RAS(RS485 Accessory Report)

The HEX format of the event report message **+RESP:GTRAS** is as follows.

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Example:
2B4556545709FEDFFF007C80200509050317475633303543455564 2F17000000000100210C0200000000000007B000000898600101223856921314901010100000000017005C06FB408B01E5D0B107E7050509192A04600000550B085BE2AA00000000000000000000000000000000000000007E7050509192C010448C90D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Index	1	0 - 4
	RS485 Device Type	1	3
	Message Type	1	0-4
	Data ID	1	0 - FF
	Data Type	1	0 | 1
	Data From	2	0x0000 - 0xFFFF
	Data To	2	0x0000 - 0xFFFF
	Data Length	2	
	Modbus Data	<=250	

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Parts	Fields	Length	Range/Format
	ICCID	10	ICCID
	Ignition Status	2	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Data Type*

A numeral to indicate the type of <Data>.

- **0** - Register
- **1** - Coil

5.4.33 HUM(Humidity Alarm)

The HEX format of the event report message **+RESP:GTHUM** is as follows.

Example:
2B4556545800FE7FBF007280200509050 50C564A58060000520400301A000000000100210B000

02E075084D98016AF0026010200000000A8006D06FB3F0E01E5D57707E70B02060B1704600000
550B085BE2AA0000000000000000000000000000000000007E70B02060B191A5DC0400D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Humidity Alarm ID	1	0 - 3
	Humidity Status	1	0 - 1
	Humidity Sensor Device ID	8	'0'-'9' 'a'-'f' 'A'-'F'
	Reserved	1	00
	Humidity Sensor Device Data	1	0 - 100(%RH)
	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	

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Parts	Fields	Length	Range/Format
	GNSS UTC Time	7	YYYYMMDDHHMMSS
	MCC	2	0000 - FFFF
	MNC	2	0000 - FFFF
	LAC	2	0000 - FFFF
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

- *Humidity Alarm ID*
  The ID of humidity alarm.
- *Humidity Status*
  he status of current humidity. 0 means outside the predefined temperature range. 1 means inside the predefined humidity range.
- *Humidity Sensor Device ID*
  The ID of the humidity sensor.
- *Humidity Sensor Device Data*
  The current humidity detected by the sensor.

5.4.34 TPM(Tire Pressure Monitoring)

The HEX format of the event report message **+RESP:GTTPM** is as follows.

Example:
2B4556546A09FEDFFF0076802005090508 1F4756333535434555642EFA000000000100210A01003F0102D53DE503000000FFF66A01020000000000004C06FB3F9701E5D18C07E80606023117046 00001DF5C05FE6667000000000000000000000000000000000000000007E806060231180013D3140D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 3F
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Report Type	1	
	Append Mask	2	0000 - FFFF
	Tire Number	1	0 - 24
	Tire Position (Optional)	1	00 - FF
	Sensor ID (Optional)	3	000000 - FFFFFF
	Sensor Bat Vol (Optional)	2	1.9 - 3.4 (V)
	Tire Pressure (Optional)	2	0.00 - 25.57 (Bar)
	Tire Temperature (Optional)	2	-50 - 205 (Centigrade)
	Tire status (Optional)	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	

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Sensor Bat Vol*

Tire pressure sensor battery voltage.

Sensor Bat Vol 1.9	0109	
HEX	01	09

✧ *Tire Pressure*

Tire pressure value.

Tire Pressure 8.50	0832	
HEX	08	32

✧ *Tire Temperature*

The temperature value of the current position. 2 bytes in total. The device converts the latitude to an integer with 1 implicit decimal and reports this integer in HEX format. If the value of the latitude is negative, it is represented in Two's complement format.

Temperature 128	128	
HEX	00	80

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

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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 PHD | EHD | CRG | DUC | FSD | TRD

PHD(Photo Data Packet)

EHD(Extend Photo Data Packet)
FSD(Fuel Sensor Data Packet)
CRG(Crash GNSS Data Packet)
DUC(Data Usage Statistics)
TRD(DDD Data Report)

Example:
2B444154010000007F023780200509050509475633353543455500030008000 7E60C1D053A061
11002005EB72ED8A38C77258FF9FC6B9D99B20D0C0CE9B9355CD20186806801C922A3EE760AA
3A92714D975AB08B86B953FEEF34D0880F8874FFF009EADFF007C9A06BFA7B1C79D8FAA914126
2F88AFA1BD300B790481739C7E14DD2FC3ED70A26BACAC67A2F7340EF631EFAD8DADECB00E4
23103E951A42ED222952371E38EB48AB9FFD5C5145400E14EA0001C9FA53C50038538530149C0
A70E05201C29C280027B7AD3850028A5CD0028E94A2801C29EB401FFD69696A500F5A9E31CD3
11BDA0C1BEE4C84711AFEA7FFAD9AE8298239ED666DF76CB9C8518158B31A1814E5E6ABB5202
334500477B646EACF68556C9CF2718AE52780C7232A9E01C1E7A517110956C123903BD464D00
4F66AA9324F310B1230273DEB6353F112247E5D91DCC47DEC70298B7306D5FCCBC569496C9C9
279CD4F7D3B46F1E01F973B4918F4A43EA7FFFD7C4A5A801C2949C0F7ED400ABC0C538500385
3850028E4FD29C0D00381A7668001C9CD3850028A5EA40A007528A0070A70A00FFD092945481
22D5A857269899D5E8B0795621C8C3487774EDD07F8FE357C9C0C9A63392BC937CAEC7AB126B
3E43CD0C48ACE6A061486478A5D9CD0239ED475DB98EEA682170221F2E3F9D51B69A22E0CA3E
5EE33D687A08E82CF4AB3961F395436EF7E2ABEA565E50F9523098EC297417A9CD4C70E547415
11A651634F52D720825768272BD69DA8F173B4BBB07E60C1D053A10064A7EA00D0A

2B444154030000007F023980200509050509475633353543455500030008000 7E60C1D05380C0
01900180200ADD07C63B5961D55491FF3D547F3140CF4ED10417F0ADC5ACC92C67BA9CD7AAF
C2DB05FEDAF3D81CC30B3AF1DCE17F931A62EA5CF1A468DACDE3E7040539FA20AF37B727C80
DEA493552068BF0CB13478675565F538E2B1356BCB621D166563D38E6A44E48CFFED9F207EEE3
CF39E6B32E355BA61F290A00C70283367FFFD7F2B14E06B201E39A53C90BEBD6801E29CA79A00
9074A786C0CFA5031F17039EA4D4C0D20245229CCD85E3AF4140891380066A41400F53EB4B11
EA4F739A00994E05482801EB5321E2803FFD0CF06A453CD6690172DB922BB3F03591BDF10D84
3FC225123646784F9BF5DB8FC6AD13D4F76AE33E26DE2C5A6DBDA03F3C8E5CF3D80C7F5FD2A9
6E37B1E3D78FC9E6B22E0E4F5A911424EA6AB5C245711982E2249A16EA920C8FF00EB52B0F739
1D63C2AC15A5D318C91F5303B7CCBFEE9EFF008D7237166D1CA559191D7AAB0C11F853116F46
D4350D2AE7CEB1BA9207FF0064F07EA3BD7D21F0BBC757BA6DAADCEB5601CCD1E079442923A

8383571B3766272B31DAFF8AAE7529A675863896572C3924807B13F4AE6E6BA70B8DD8FA512B
5F422E67CD2173C9CD5690E6A4456907EB54E4DCAF927205007FFD1F2BCD28AC407A9E285392
5BD7A5302414E1400F069C7A8140120352A9A403C5381CB8F4140C954D48A6810AC7385FEF71
F854C0D201CA6A5561401229A915B14C0FFD2CC56A963E407E60C1D05381C0630D4680D0A

2B444154020000007F005080200509050509475633353543455500272A514C2C343131442C303
12C30313538302C303244302C323230352C30313535312C6E756C6C2307E70110062103330E47
140D0A

2B444154040000007F011980200509050509475633353543455501 0A0101000000001006A06F
B401901E5D30407E7080A05201E02010000000001006A06FB401901E5D30407E7080A05201F03
010000000001006A06FB401901E5D30407E7080A05202004010000000001006A06FB401901E5D
30407E7080A05202105010000000001006A06FB401901E5D30407E7080A052022060100000000
01006A06FB401901E5D30407E7080A05202307010000000001006A06FB401901E5D30407E7080
A05202408010000000001006A06FB401901E5D30407E7080A05202509010000000001006A06FB
401901E5D30407E7080A0520260A010000000001006A06FB401901E5D30407E7080A05202707E
7080A0D2027CA4474450D0A

2B444154090000007F003080200509050509475633353543455500000000E0000018307E7080
A0D220ECA5372720D0A

2B444154050000007F021780200509050509475633353543455500010000000 1E8303030323030
303031393030303030324539343531313138313141443635333132303332333233373330333041
443330333733363335303037363043303030353030303030383030441303033313035323037 39
353130353031303030303041303130303030304331383335443030304338373030353031303130
303830324130344443433843374331334146353442353643353538333743433735383137463441
434141423042383734343639423746364330333145313834434532364545443743424635354137
394545414631453036463244324532424533373636454241443746394643313041454539344435
304132323544413438323432423636303843323334343637433846433736443531363535304337
424145374236353533363438373136374241414643424534344236394539414344373045343331
453544393734464232394631443431424445374244463346433239304333394531333337414636
313946353231374236344238323333444241384546414544344331303030303030433230363443
363846463236383539364138313144304644323536453141354545444442353739463243384445
414331394130364539353933393939323030463744434234423734393141393444364243344139
433541424638463244423037423100 07E70111021726498DF1140D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+DAT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005

Parts	Fields	Length	Range/Format
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	(+RESP:GTPHD)		
	(+RESP:GTEHD)		
	(+RESP:GTFSD)		
	(+RESP:GTCRG)		
	(+RESP:GTDUC)		
	(+RESP:GTTRD)		
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Message Type*

The ID of a specific data report message.

Message	ID
+RESP:GTPHD	1
+RESP:GTFSD	2
+RESP:GTEHD	3
+RESP:GTCRG	4
+RESP:GTTRD	5
+RESP:GTDUC	9

+RESP:GTPHD

Fields		Length	Range/Format
+RESP:GTPHD	Attribute Mask	2	0000 - FFFF
	Attribute Length	2	
	Camera ID	1	0 - 3
	Photo Time	7	YYYYMMDDHHMMSS
	Total Frames	1	
	Current Frame Index	1	
	Photo Data Length	2	
	Photo Data	<=512	

+RESP:GTEHD

Fields		Length	Range/Format
+RESP:GTEHD	Attribute Mask	2	0000 - FFFF

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Fields		Length	Range/Format
	Attribute Length	2	
	Camera ID	1	0 - 3
	Photo Time	7	YYYYMMDDHHMMSS
	Total Frames	2	
	Current Frame Index	2	
	Photo Data Length	2	
	Photo Data	<=512	

+RESP:GTFSD

Fields		Length	Range/Format
+RESP:GTFSD	Data Length	2	
	Sensor Data	<=128	

+RESP:GTCRG

Fields		Length	Range/Format
+RESP:GTCRG	Data Type	1	0|1
	GNSS Validity Number	1	0 - 10
	GNSS Point Index	1	1
	GNSS Accuracy	1	0 | 1 - 50
	Speed	3	0.0 - 999.9(km/h)
	Azimuth	2	0 - 359
	Altitude	2	(-)xxxxx.x (m)
	Longitude	4	(-)xxx.xxxxxx
	Latitude	4	(-)xx.xxxxxx
	GNSS UTC Time	7	YYYYMMDDHHMMSS
	...		
	GNSS Point Index	1	10
	GNSS Accuracy	1	0 | 1 - 50
	Speed	3	0.0 - 999.9(km/h)
	Azimuth	2	0 - 359
	Altitude	2	(-)xxxxx.x (m)
	Longitude	4	(-)xxx.xxxxxx
	Latitude	4	(-)xx.xxxxxx
	GNSS UTC Time	7	YYYYMMDDHHMMSS

+RESP:GTDUC

Fields		Length	Range/Format
+RESP:GTDUC	Report Type	1	0 - 4
	Total Data Usage	4	M

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Fields		Length	Range/Format
	Day Data Usage	4	Kbyte

+RESP:GTTRD

Fields		Length	Range/Format
+RESP:GTTRD	File Download Count	2	0001 - FFFF
	File Frame End flag	1	0|1
	Current Frame Index	2	
	DDD Data Length	2	
	DDD Data	<=684	
	Reserved	1	00

- *Report Mask*

  Please refer to <+DAT Mask> in (AT+GTHRM).
- *Attribute Length*

  The total length of attribute parameters which include <Camera ID> and <Photo Time>.
- *Total Frames*

  If the message is **+RESP:GTPHD** and the actual size of the picture is larger than 0xFF frames (255*512Bytes), its value will be 0 which indicates more frames wait to be received until the remaining frames is less or equal to 0xFF when its value equals to the remaining frames.
- *Data Type*

  The data reported to the backend server is recorded before crash or after crash.
  - **0** - Before crash.
  - **1** - After crash.
- *GNSS Validity Number*

  The number of the successfully fixed GNSS positions included in the report message.
- *GNSS Point Index*

  The index of GNSS point.
- *Report Type*

  The type of this report.
  - **0** - Report triggered by <Mode> of (AT+GTRTO).
  - **1** - Report triggered by <Report Interval> of (AT+GTDUC).
  - **2** - Report triggered by <Total Percentage> of (AT+GTDUC).
  - **3** - Report triggered by <Day Data Usage> of (AT+GTDUC).
  - **4** - Report triggered by <Data Usage> of (AT+GTDUC).
- *Total Data Usage*

  The total data that has been consumed.
- *Day Data Usage*

  The data that has been consumed today.

5.5.2 CRD(Crash Data Packet)

The HEX format of the report message **+RESP:GTCRD** is as follows.

Example:
2B435244007D028280200509050509564348B05101D4705082001010258FFE80015FFB4FFE80015FFB4FFE80015FFB4FFE90015FFB4FFE90015FFB5FFE80015FFB4FFE80015FFB4FFE80015FFB4FFE90015FFB4FFE80015FFB5FFE80015FFB4FFE80015FFB4FFE80015FFB4FFE80015FFB4FFE80015FFB5FFE80015FFB4FFE80015FFB4FFE80015FFB4FFE80015FFB4FFE80015FFB4FFE80015FFB4FFE80015FFB4FFE90015FFB4FFE80015FFB5FFE80015FFB4FFE80015FFB4FFE80015FFB4FFE80015FFB4FFE80015FFB4FFE80015FFB4FFE80015FFB4

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 600 bytes in one frame 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.

5.5.3 ACC(Acceleration Data Packet)

The HEX format of the report message **+RESP:GTACC** is as follows.

Example:
2B41434380200509055643 4B0509041606000 10007FFAD00010007FFAD00010007FFAD00010

5.6.1 DAT(Transparent Data Transmission)

The HEX format of the event report message **+RESP:GTDAT** is as follows.

Example:
2B455654124FFEFFFF017180200509050418475633530434555002FE300000000000000000000018110C000331323301010000000A4007506FB409501E5D3EE07E7091B0B0F1204600000550B0000B7B1000000000000000010100000000000004151800013FFFFFFF314731424C35325037545231313535323002000000014000F42400602BC003C00D2FF270F000000640000000000060005F5E0F600640000270F630000270F630000270F63000F42400611923B3EFFBF003F0112A87E000112A87E000000000002710004E2000753000000E109C40F3FFFFFF00637D7D7D7D7D7D01010100002DF00098967F000F423F000F423F0001869F630001869F630001869F63000F423F717565636C696E6B303100717565636C696E6B303200434152314E414D4500434152324E414D4500303536363003FFE000F423F000F423F640000000000D202022E03619902FF0000006028DBD6D3D50000000364FF000000C006000007E7091B130F136F513F500D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24

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Parts	Fields	Length	Range/Format
	Data Length	2	
	Data		
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	
	Longitude	4	
	Latitude	4	
	GNSS UTC Time	7	YYYYMMDDHHMMSS
	MCC	2	0000 - FFFF
	MNC	2	0000 - FFFF
	LAC	2	0000 - FFFF
	Cell ID	4	00000000 - FFFFFFFF
	Reserved	1	00
	Current Mileage	3	0.0 - 65535.0 (km)
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Data Length*

It indicates the length of the parameter <Data>.

5.6.2 DTT(Data Transmission)

The HEX format of the event report message **+RESP:GTDTT** is as follows.

Example:

2B4556541F09FEDFFF00728020050905031447563331304C41556430A8000000000000111C0000A31323334353536766467010100000000C6006906FB406D01E5D49207E707130B08390460000

1DF5C027A4F1F0000000000000064000000000000000000030007E7071314263A202F488C0D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Reserved	1	00
	Data Length	2	
	Data		
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	Azimuth	2	0 - 359
	Altitude	2	
	Longitude	4	
	Latitude	4	
	GNSS UTC Time	7	YYYYMMDDHHMMSS
	MCC	2	0000 - FFFF
	MNC	2	0000 - FFFF
	LAC	2	0000 - FFFF

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Data Length*

It indicates the length of the parameter <Data>.

5.6.3 TTR(Transparent Tachograph Transmission)

The HEX format of the event report message **+RESP:GTTTR** is as follows.

Example:

2B4556543E09FEDFFF007280200509050418475633353043455500308200000000100210C0001
0C0000FFFFFFFFFFFF000001010000000000007106FB409E01E5D41A07E6030705320E04600000
550B085BE2AA0000000000000000000000000000000000000007E603070532160E9B10180D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	

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Parts	Fields	Length	Range/Format
	Analog Input1 Voltage	2	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Request ID	2	0000 - FFFF
	Message Type	1	0-6 | 8-B | D-10
	Reserved(option1)		
	Reserved(option2)		
	Reserved(option3)		
	Reserved(option4)		
	Reserved(option5)		
	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
	RFID Length	1	0 - 0E

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Parts	Fields	Length	Range/Format
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Request ID*

It is the response to the server with the same field <Request ID> in the command **AT+GTTTR**.

✧ *Message Type*

- **0** - Reply for DDD file request.

  In this mode, <Reserved(option1)> ... <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reply Result	1	0 - 4
Device Status	1	0x00 - 0xFF
File State In Memory	1	0x00 - 0xFF
Error Code	1	0x00 - 0xFF
Reserved	1	00

- **1** - Authorization result.

  In this mode, <Reserved(option1)> ... <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reply Result	1	0 - 3
Device Status	1	0x00 - 0xFF
Reserved	1	00
Error Code	1	0x00 - 0xFF
Reserved	1	00

- **2** - APDU Data received from CAN_Logistic.

  In this mode, <Reserved(option1)> ... <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reserved	1	00
APDU Sequence Number	2	
APDU DATA Length	2	
APDU DATA		
Reserved	1	00

- **3** - The result of the process that CAN_Logistic reads file from tachograph.

  In this mode, <Reserved(option1)> ... <Reserved(option5)> represent the following

meanings:

Fields	Length	Range/Format
Reply Result	1	0 - 6
Device Status	1	0x00 - 0xFF
File State In Memory	1	0x00 - 0xFF
Error Code	1	0x00 - 0xFF
Reserved	1	00

- **4** - Communication timeout.

  In this mode, <Reserved(option1)> ... <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reserved	1	00
Reserved	1	00
Reserved	1	00
Reserved	1	00
Reserved	1	00

- **5** - Debug mode, the state of CAN_Logistic.

  In this mode, <Reserved(option1)> ... <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reserved	1	00
Device Status	1	0x00 - 0xFF
File State In Memory	1	0x00 - 0xFF
Error Code	1	0x00 - 0xFF
Error Code Memory	1	0x00 - 0xFF

- **6** - FTP transfer event.

  In this mode, <Reserved(option1)> ... <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reply Result	1	0 - 14
Reserved	1	00
Reserved	1	00
Reserved	1	00
Reserved	1	00

- **8** - Restart TachoReader.

  In this mode, <Reserved(option1)> ... <Reserved(option5)> represent the following meanings:

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Fields	Length	Range/Format
Reply Result	1	0|1
Reserved	1	00
Reserved	1	00
Reserved	1	00
Reserved	1	00

- **9** - Tachograph details.

Fields	Length	Range/Format
Reserved	1	00
Tachograph producer	1	HEX
Tachograph model	<=40	
Reserved	1	00
Reserved	1	00

- **0A** - Inquiry status of the device.

Fields	Length	Range/Format
Reserved	1	00
Reserved	1	00
Device status / Files in device memory	2	X(0 - FF)Y(0 - FF)
Reserved	1	00
Reserved	1	00

- **0B** - Inquiry Tachograph driver 1 ID, name and surname.

Fields	Length	Range/Format
Reserved	1	00
Tachograph driver time related states	1	0x00 - 0xFF
Tachograph driver 1 id	<=40	
Tachograph driver 1 name and surname	<=40	
Reserved	1	00

- **0D** - Check the current TachoReader connection environment and the device whether ready to download DDD.

Fields	Length	Range/Format
CAN2-bus or J1708-bus Status	1	00 - 03
Check Information	1	00 - FF
CAN1-bus Status	1	0-3
Reserved	1	00
Reserved	1	00

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- **0E** - Reply Setting Tachograph File Format.

Fields	Length	Range/Format
Reply Result	1	00 | 09 | FF
Reserved	1	00
Reserved	1	00
Reserved	1	00
Reserved	1	00

- **0F** - Reply changing the type of communication with the tachograph.

  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reply Result	1	00 | 05 | FF
Reserved	1	00
Reserved	1	00
Reserved	1	00
Reserved	1	00

- **10** - Inquiry Tachograph driver 2 ID, name and surname, and driver time related states.

  In this mode, <Reserved(option1)> - <Reserved(option5)> represent the following meanings:

Fields	Length	Range/Format
Reserved	1	00
Tachograph driver time related states	1	0x00 - 0xFF
Tachograph driver 2 id	<=40	
Tachograph driver 2 name and surname	<=40	
Reserved	1	00

✧ *Reply Result*

- If <Message Type> is 0 (Reply for DDD file request), it is reply on inquiry read request.
  - **0** - Request OK.
  - **1** - Request busy: Advanced test.
  - **2** - Request busy: CAN_Logistic is executing precious order.
  - **3** - Request busy: Configuration of the cancel order.
  - **4** - Request busy: The order is forbidden as the device is downloading files now.
- If <Message Type> is 1 (Authorization result), it is reply on inquiry the status of the device:
  - **0** - Authorization OK.
  - **1** - Authorization fail.
  - **2** - Authorization timeout.
  - **3** - Authorization data error.
- If <Message Type> is 2, this field is reserved.

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- If <Message Type> is 3 (file reading), it is result of file reading:
  - **0** - CAN_Logistic getting file from Tachograph OK.
  - **1** - CAN_Logistic getting file from Tachograph fail.
  - **2** - File mismatch.
  - **3** - CAN_Logistic getting file from Tachograph timeout.
  - **4** - Device getting file from CAN_Logistic timeout.
  - **5** - Device getting file from CAN_Logistic fail.
  - **6** - DDD file size error.

  Note

  Here are the timeout instructions for file reading.
  - <Read file Type> is 0x01
    - CAN_Logistic getting file from Tachograph timeout is 15 minutes.
    - Device getting file from CAN_Logistic timeout is 5 minutes.
  - <Read file Type> is 0x02 or 0x04
    - CAN_Logistic getting file from Tachograph timeout is 5 minutes.
    - Device getting file from CAN_Logistic timeout is 3 minutes.
  - <Read file Type> is 0x03 or 0x05
    - CAN_Logistic getting file from Tachograph timeout is 20 minutes.
    - Device getting file from CAN_Logistic timeout is 10 minutes.
  - <Read file Type> is 0x06
    - CAN_Logistic getting file from Tachograph timeout is 10 minutes.
    - Device getting file from CAN_Logistic timeout is 5 minutes.
  - <Read file Type> is 0x07
    - CAN_Logistic getting file from Tachograph timeout is 20 minutes.
    - Device getting file from CAN_Logistic timeout is 10 minutes.
- If <Message Type> is 6, it is the event of FTP transfer.
  - **0** - FTP open server OK.
  - **8** - FTP open server error.
  - **10** - FTP send data OK.
  - **12** - FTP send data error.
- If <Message Type> is 8 (Restart TachoReader), it is result of command execution.
  - **0** - Command OK. The command is executed successfully by TachoReader.
  - **1** - Command Error. An unexpected error occurs while executing the command.
- If <Message Type> is 0x0E (Setting Tachograph File Format.), it is result of setting tachograph file format.
  - 0x00: Tachograph file format set successfully.
  - 0x09: Reading tachograph files is disabled.
  - 0xFF: Setting failure.
- If <Message Type> is 0x0F, it is result of changing the type of communication with the tachograph.
  - **0x00** - Standard type of tacho communication change successfully.
  - **0x05** - New type of tacho communication change successfully.
  - **0xFF** - Change failure.

✧ *APDU Sequence Number*

It is the serial number of APDU received from CAN_Logistic. Numbering starts from 0001 when receiving a new DDD file request.

✧ *APDU DATA*

It is the APDU received from CAN_Logistic.

✧ *Device Status*

- Bit 0 = 1 - Authentication in progress,
- Bit 1 = 1 - Authentication OK (bit is cleared at next read request),
- Bit 2 = 1 - Authentication ERROR (bit cleared at next read request),
- Bit 3 = 1 - CAN_Logistic is downloading files from tachograph,
- Bit 4 = 1 - Data is ready to read from CAN_Logistic by master device. Bit is cleared after all awaiting data is read (If all bytes are sent in one frame, this bit will be cleared after sending this frame. If all bytes are sent in 3 frames, this bit will be cleared after sending 3 frames).
- Bit 7:Bit 5 = Details of the error. Flags bit 7:bit 5 and flag bit 2 must be treated as combined information. The information is split to maintain protocol's backward compatibility. Flags bit 7:bit 5 are cleared at next read request.
- 000 - No error
- 001 - 24 hours have passed after turning off the ignition, tachograph is in power down mode (This error code is generated based on CAN_Logistic's timer, there is no attempt of connection with tachograph)
- 010 - 2hours have passed after last authentication session, tachograph is in power down mode.(This error code is generated based on CAN_Logistic's timer, there is no attempt of connection with tachograph)
- 011 - No answer from tachograph (wrongly connected wires or CAN-C is off in tachograph)
- 100 - Cannot open communication session with tachograph (remote download function is off in tachograph)
- 101 - No answer or incorrect answer on company card inquiry (remote download function is off in tachograph).
- 110 - Error during file transfer.
- 111 - Reserved for future use.

✧ *File State In Memory*

- Bit 0 = 1 tachograph file is in CAN_Logistic memory,
- Bit 1 = 1 file from card in slot 1 is in CAN_Logistic memory,
- Bit 2 = 1 file from card in slot 2 is in CAN_Logistic memory,
- Bit 3 = not used (to be ignored),
- Bit 4 = 1 file from tachograph is already read from CAN_Logistic (it is possible to read once more, bit 0 will be still set), this flag is set after read whole file from CAN_Logistic.
- Bit 5 = 1 file from card in slot 1 is already read from CAN_Logistic (it is possible to read once more, bit 1 will be still set), this flag is set after reading whole file from CAN_Logistic.
- Bit 6 = 1 file from card in slot 2 is already read from CAN_Logistic (it is possible to read once more, bit 2 will be still set), this flag is set after reading whole file from CAN_Logistic.
- Bit 7 = not used (to be ignored).

✧ *Error Code*

Extended error code. A detailed description of the value of this byte is shown below:

- Extended errors before downloading.

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Note

Following error codes are valid only for firmware version 2 (2.0.0 and later). Error codes for firmware version 1 can be found in protocol (TachoReader_protocol_EN_20180417) or older.

- 0x00 - No error detected. Report to the device producer.
- 0x02 - No communication with tachograph. Switch the ignition on and try again. If it does not help, check out CANBUS connection to tachograph.
- 0x0A - Invalid timestamps in read request, start time cannot be later than end time. Correct the request content.
- 0x0B - CAN_Logistic does not receive real time clock from tachograph, so TS_E in read request (ODN.) cannot be set to 0. Check if CAN_Logistic reports active buses. If not - check out connection to tachograph (CANBUS and D8). If yes - tachograph may work improperly. As a short term solution - set up RTC with command and try again.
- 0x0C - Invalid read request command. No file requested to download. Correct the request content.
- 0x0E - Opening session timeout. Report to the device producer.
- 0x0F - Remote company card not ready (Timeout). Report to the device producer.

- Extended errors during authentication
  - 0x11 - Timeout on waiting for data from company card. CAN_Logistic expected to get reply from company card, but it did not come. Check data transmission path between application server, AVL terminal and CAN_Logistic and try again.
  - 0x18 - No data for company card from tachograph (Timeout). Report to the device producer.
  - 0x19 - Tachograph reports an authentication error (response to the last data package from company card),
  - 0x1B - Data transfer error. Report to the device producer.
- Extended errors during file reading:
  - 0x20 - Data read timeout. Report to the device producer.
  - 0x21 - Data read interrupted. Report to the device producer.
  - 0x22 - Cannot process request, because data of last reading is not known. Correct the request content - set start date.
  - 0x23 - Requested to read overview part since date of last reading, but the date is later than requested end time. Correct the request content - change end date.
  - 0x30 - Remote authentication timeout. Report to the device producer.
  - 0x31 - Error on download request. Report to the device producer.
  - 0x32 - DDD file download request error. Report to the device producer.
  - 0x33 - DDD file transmission error. Report to the device producer.
  - 0x34 - Error on download request: server busy. Report to the device producer.
  - 0x35 - Error closing session. Report to the device producer.
  - 0x39 - Requested cards download, but no cards in tachograph's slots Insert card(s) into tachograph or correct the request content.
  - 0x3A - Error during the authorization process. Report to the device producer.
  - 0x3B - Error initializing authorization. Report to the device producer.
  - 0x3C - Error during the authorization process. Report to the device producer.

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- 0x3D - Error while downloading the file from the tachograph to the CAN-Logistic memory. Report to the device producer.
- 0x3E - Error during the authorization process. Report to the device producer.
- 0x3F - Error opening session. Report to the device producer.
- 0x40 - Downloading finished with no files, because of missing data (i.e. requested cards was removed) Try again. If the error persists, report to the device producer.
- 0x41 - Error opening session. Report to the device producer.
- 0x42 - Error downloading file - invalid package sequence. Report to the device producer.
- 0x55 - DDD file download request timeout. Report to the device producer.
- 0x6A - Remote Authentication Closed. Report to the device producer.
- 0x6C - APDU error. Report to the device producer.
- 0x6E - Authentication error. Check if company card is not expired. If not, report to the device producer.
- 0x70 - Too many authentication errors. Report to the device producer.
- 0x80 - Error opening session. Report to the device producer.
- 0x90 - Error while sending UDS packet. Report to the device producer.
- 0xE1 - There is no operation to perform. Bits SD, SC, SA in byte FL are set. Correct the request content.
- 0xEE - Downloaded files exceed CAN-Logistic's memory. Repeat request with narrower activities range of tachograph DDD file.
- 0xEF - Failed to write the file to CAN-Logistic's internal memory. Report to the device producer.
- 0xFE - Request cancelled by command 2.2.5.
- 0xFF - No reading requested since device restart.

✧ *Error Code Memory*

This is the error code byte <Error Code> stored when the next order of the download is sent.

✧ *Tachograph producer*

- 0x00: None,
- 0x01: VDO/Siemens,
- 0x02: Efas,
- 0x03: Stoneridge,
- 0x04: Actia,
- 0x80: Error of connection on D8 wire,
- 0x81: Not supported format „2400” analogue tachographs.

✧ *Tachograph mode*

Tachograph name given by the manufacturer.

✧ *Tachograph driver 1 id*

Card number given in ASCII string terminated with „*”. First two or three letters are country code. Following is a SPACE character (0x20) and the 16-character long card number e.g. PL 1820625133460000*

In addition to standard country codes, the following abbreviations also apply:

- „EC” - European Union,
- „EUR” - Rest of Europe,

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- „WLD” - rest of the world.

✧ *Tachograph driver 1 name and surname*

Surname and name (names) of driver given in an ASCII string terminated with „*”. Each word is separated by a SPACE character (0x20).

Note

Number K will be returned if the card is not inserted into tachograph slot (or parameter currently not available; or card inserted, but no information read).

- K = 0x00 card not inserted,
- K = 0x01 card inserted, but no information read,
- K = 0xFF parameter currently not available.

✧ *CAN2-bus or J1708-bus Status*

It indicates the status of the CAN2-bus or J1708-bus.

- **0** - bus in sleep mode.
- **1** - bus active.
- **2** - bus error.
- **3** - 2nd CANbus or J1708-bus not used.

✧ *Check Information*

It indicates the set of states associated with the tachographer.

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
R	R	F1	F0	T1	T0	D1	D0

- R - Reserved
- F1:F0 - remote DDD files downloading from tachograph
  - b'00' - remote download disabled
  - b'01' - remote download enabled
  - b'10' - communication error
  - b'11' - communication with tachograph not supported with current device settings
- T1:T0 - communication with tachograph
  - b'00' - no communication with tachograph
  - b'01' - tachograph online
  - b'10' - communication error
  - b'11' - communication with tachograph not supported with current device settings
- D1:D0 - D8 (K-Line) bus activity
  - b'00' - bus in sleep mode
  - b'01' - bus active
  - b'10' - bus error
  - b'11' - bus not used

Note

If there is no data returned within 2s after the query command is issued due to abnormal communication, 00 or Reserved will be reported (Hex will report 00, string will report Reserved).

✧ *CAN1-bus Status*

It indicates the status of the CAN1-bus.

- **0** - bus in sleep mode
- **1** - bus active

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- **2** - bus error
- **3** - 1st CANbus not used

5.7 CANBUS Information Report

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

5.7.1 CAN(CANBUS Device Information)

The CANBUS device information report message **+RESP:GTCAN** uses the format below.

Example:
2B43414E01000007FF014580200509050509475633353543455500013FFFFFFF314731424C3532
503754523131353532300200000014000F4240061388003C00D2FF270F0000006400000000060005F5E0F600640000270F630000270F630000270F63000F42400611920B0EFFFF3F3F0112A87E000112A87E0000000000002710004E2000753000000E109C4073FFFFFF00637D7D7D7D7D7D01010100002DF00098967F000F423F000F423F0001869F630001869F630001869F63000F423F717565636C696E6B303100717565636C696E6B303200434152314E414D4500434152324E414D45003035363633001FFE000F423F000F423F64FFFD8F0000D202022E03619902FE000000FA00C0D6D3D5000000C0500003030000000000004906FB410A01E5D0E507E7080A05342004600000550B0000B7B10007E7080A0F16201B88B9380D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+CAN
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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(0-5)
	CANBUS Device State	1	0 | 1
	CANBUS Report Mask	4	0x00000000 - 0xFFFFFFFF
	VIN	17	
	Ignition Key	1	0-2
	Total Distance	4	H(0 - 99999999)/I(0 - 2147483647)
	Total Fuel Used	5	0.00 - 999999.99(L)

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Parts	Fields	Length	Range/Format
	Engine RPM	2	0 - 16383(rpm)
	Vehicle Speed	2	0 - 455(km/h)
	Engine Coolant Temperature	2	-40 - +215(℃)
	Fuel Consumption	3	L/100km(0.0 - 999.9)|L/H(0.0 - 999.9)
	Fuel Level (Liter)	5	L(0.00 - 9999.99)
	Fuel Level (Percentage)	5	P(0.00 - 100.00)
	Range	4	0 - 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 - 2147483647
	Engine Cold Starts Count	3	0 - 16449535
	Engine All Starts Count	3	0 - 16449535
	Engine Starts by Ignition Count	3	0 - 16449535
	Total Engine Cold Running Time	4	0 - 421108120(s)
	Handbrake Applies During Ride Count	2	0 - 64255
	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

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Parts	Fields	Length	Range/Format
	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
	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	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	2	0x0000 - 0xFFFF
	Rapid Brakings	4	0 - 16711679
	Rapid Accelerations	4	0 - 16711679
	Engine Torque	1	0 - 100(%)
	Service Distance	4	-160635 - 327675(km)
	Ambient Temperature	2	-40 - +215 (℃)
	DTC Number	1	00 - 99
	DTC 1	3	'0' - '9' 'a' - 'z' 'A' - 'Z'
	...		
	DTC N	3	'0' - '9' 'a' - 'z' 'A' - 'Z'
	Gaseous Fuel Level	6	L(0.00 - 9999.99)/P(0.00 - 100.00)
	Tachograph Information Expand	4	0000000 - FFFFFFFF
	CAN Report Expansion Mask1	4	0x00000000 - 0xFFFFFFFF
	Retarder Usage	1	0 - 125(%)
	Power Mode	1	0 - FF
	Tacho Timestamp	7	YYYYMMDDHHMMSS

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Parts	Fields	Length	Range/Format
	Oil Temperature	2	-40 - +215 (℃)
	Oil Level	6	L(0.00 - 9999.99) | P(0.00 - 100.00)
	Axle Weight 5th	2	0 - 65535 (kg)
	Axle Weight 6th	2	0 - 65535 (kg)
	Axle Weight 7th	2	0 - 65535 (kg)
	Current Gear Number	1	0 - FF
	DPF Soot Level	6	L(0.00 - 9999.99) | P(0.00 - 100.00)
	VIN of Trailer	17	'0' - '9' 'A' - 'Z' except 'I', 'O', 'Q'
	Expansion2 Information	4	00000000 - FFFFFFFF
	Electric Report Mask	4	0x00000000 - 0xFFFFFFFF
	Battery Instantaneous Voltage	2	0000 - 64255(V)
	Battery Charging Cycles Count	2	0000 - 64255(Cycle)
	Total Energy Recuperated	4	00000000 - 4211081215(Wh)
	Battery Level	2	0.00 - 100.00
	Charge State	1	0 - FF
	Battery Temperature	2	-40 - +215 (℃)
	Battery Charging Current	1	00 - 125 (A)
	Battery Instantaneous Power	4	-327680 - 325110 (W)
	Battery State of Health (SoH)	1	0 - 100(%)
	Total Energy Used	4	00000000 - 4211081215 (Wh)
	Total Energy Used When Idling	4	00000000 - 4211081215 (Wh)
	Total Energy Charged	4	00000000 - 4211081215 (Wh)
	Charge State Optimization	1	0 - FF
	Tachograph Driver1 Working Time Mask	4	0x00000000 - 0xFFFFFFFF
	Drv1 End Of Last Daily Rest Period	6	YYYYMMDDHHMM
	Drv1 End Of Last Weekly Rest Period	6	YYYYMMDDHHMM
	Drv1 End Of Second Last Weekly Rest Period	6	YYYYMMDDHHMM
	Drv1 Maximum Daily Period	1	0 - 250
	Drv1 Number Of Times 9h Daily Driving Times Exceeded	1	0 - 250

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Parts	Fields	Length	Range/Format
	Drv1 Number Of Used Reduced Daily Rest Periods	1	0 - 250
	Drv1 Remaining Current Drive Time	2	0 - 65535(min)
	Drv1 Remaining Time Until Next Break Or Rest	2	0 - 65535(min)
	Drv1 Duration Of Next Break Rest	2	0 - 65535(min)
	Drv1 Remaining Time Of Current Break Rest	2	0 - 65535(min)
	Drv1 Time Left Until Next Driving Period	2	0 - 65535(min)
	Drv1 Duration Of Next Driving Period	2	0 - 65535(min)
	Drv1 Remaining Driving Time On Current Shift	2	0 - 65535(min)
	Drv1 Time Left Until New Daily Rest Period	2	0 - 65535(min)
	Drv1 Minimum Daily Rest	2	0 - 65535(min)
	Drv1 Remaining Driving Time Of Current Week	2	0 - 65535(min)
	Drv1 Time Left Until New Weekly Rest Period	2	0 - 65535(min)
	Drv1 Minimum Weekly Rest	2	0 - 65535(min)
	Drv1 Open Compensation In The Last Week	2	0 - 65535(min)
	Drv1 Open Compensation In Week Before Last	2	0 - 65535(min)
	Drv1 Open Compensation In 2nd Week Before Last	2	0 - 65535(min)
	Drv1 Continuous Driving Time	2	0 - 65535(min)
	Drv1 Cumulative Break Time	2	0 - 65535(min)
	Drv1 Current Duration Of Selected Activity	2	0 - 65535(min)
	Drv1 Accumulated Driving Time Previous And Current Week	2	0 - 65535(min)
	Drv1 Current Daily Driving Time	2	0 - 65535(min)

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Parts	Fields	Length	Range/Format
	Drv1 Current Weekly Driving Time	2	0 - 65535(min)
	Drv1 Cumulative Uninterrupted Rest Time	2	0 - 65535(min)
	Drv1 Maximum Daily Driving Time	2	0 - 65535(min)
	Tachograph Driver2 Working Time Mask	4	0x00000000 - 0xFFFFFFFF
	Drv2 End Of Last Daily Rest Period	6	YYYYMMDDHHMM
	Drv2 End Of Last Weekly Rest Period	6	YYYYMMDDHHMM
	Drv2 End Of Second Last Weekly Rest Period	6	YYYYMMDDHHMM
	Drv2 Maximum Daily Period	1	0 - 250
	Drv2 Number Of Times 9h Daily Driving Times Exceeded	1	0 - 250
	Drv2 Number Of Used Reduced Daily Rest Periods	1	0 - 250
	Drv2 Remaining Current Drive Time	2	0 - 65535(min)
	Drv2 Remaining Time Until Next Break Or Rest	2	0 - 65535(min)
	Drv2 Duration Of Next Break Rest	2	0 - 65535(min)
	Drv2 Remaining Time Of Current Break Rest	2	0 - 65535(min)
	Drv2 Time Left Until Next Driving Period	2	0 - 65535(min)
	Drv2 Duration Of Next Driving Period	2	0 - 65535(min)
	Drv2 Remaining Driving Time On Current Shift	2	0 - 65535(min)
	Drv2 Time Left Until New Daily Rest Period	2	0 - 65535(min)
	Drv2 Minimum Daily Rest	2	0 - 65535(min)
	Drv2 Remaining Driving Time Of Current Week	2	0 - 65535(min)

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Parts	Fields	Length	Range/Format
	Drv2 Time Left Until New Weekly Rest Period	2	0 - 65535(min)
	Drv2 Minimum Weekly Rest	2	0 - 65535(min)
	Drv2 Open Compensation In The Last Week	2	0 - 65535(min)
	Drv2 Open Compensation In Week Before Last	2	0 - 65535(min)
	Drv2 Open Compensation In 2nd Week Before Last	2	0 - 65535(min)
	Drv2 Continuous Driving Time	2	0 - 65535(min)
	Drv2 Cumulative Break Time	2	0 - 65535(min)
	Drv2 Current Duration Of Selected Activity	2	0 - 65535(min)
	Drv2 Accumulated Driving Time Previous And Current Week	2	0 - 65535(min)
	Drv2 Current Daily Driving Time	2	0 - 65535(min)
	Drv2 Current Weekly Driving Time	2	0 - 65535(min)
	Drv2 Cumulative Uninterrupted Rest Time	2	0 - 65535(min)
	Drv2 Maximum Daily Driving Time	2	0 - 65535(min)
	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

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Parts	Fields	Length	Range/Format
	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.
- **3** - Tachograph Driver Card ID changed event report.
- **4** - Tachograph Driver working status or "Out of Scope" condition changed event report.
- **5** - Ignition key changed 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:

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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

✧ *Tachograph Information Expand*

Four bytes. The high byte describes driver working states, while the low byte describes tachograph other information and the middle two bytes describe driver 1 information and driver 2 information respectively.

Driver working states	Driver 1 information	Driver 2 information	Tachograph other information
High byte(T)	K1	K1	Low Byte(I)

- T - Driver working states:

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
OUT1	OUT0	TD2	TD1	TD0	TP2	TP1	TP0

- OUT1:OUT0 - "out of scope" condition (2 bits)
  - b'00' - no out of scope condition opened, normal operation
  - b'01' - out of scope condition opened
  - b'10', b'11' - Invalid data.
- TD2:TD0 - Driver 2 working state (3 bits)
- TP2:TP0 - Driver 1 working state (3 bits)
  - b'000' - Rest - sleeping.
  - b'001' - Driver available - short break.
  - b'010' - Work - loading, unloading, working in an office.
  - b'011' - Drive - behind the wheel.
  - b'100', b'101' - Reserved.
  - b'110', b'111' - Invalid data.

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- K1 - Driver 1 information (card in slot 1)
- K2 - Driver 2 information (card in slot 2)

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
1	1	KK1	KK0	CZ3	CZ2	CZ1	CZ0

- KK1:KK0 - driver card
  - b'00' - no card in slot.
  - b'01' - card in slot.
  - b'10', b'11' - Invalid data.
- CZ3:CZ0 - driver time related states (4 bits)
  - b'0000' - normal/no limits reached
  - b'0001' - 15 min before 4½ h
  - b'0010' - 4½ h reached
  - b'0011' - 15 min before 9 h
  - b'0100' - 9 h reached
  - b'0101' - 15 minute before 16 h (not having 8h rest during the last 24h)
  - b'0110' - 16 h reached
  - b'0111' - weekly driving time pre-warning active
  - b'1000' - weekly driving time warning active
  - b'1001' - 2 weeks driving time pre-warning active
  - b'1010' - 2 weeks driving time warning active
  - b'1011' - driver 1 card expiry warning active
  - b'1100' - next mandatory driver 1 card download warning active
  - b'1101' - other
  - b'1110', b'1111' - Invalid data
- I - tachograph other information

Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
F1	F0	P1	P0	K1	K0	R1	R0

- F1:F0 - ferry/train crossing condition
  - b'00' - normal operation.
  - b'01' - ferry/train crossing condition enabled.
  - b'10', b'11' - Invalid data.
- R1:R0 - vehicle motion
  - b'00' - vehicle motion not detected.
  - b'01' - vehicle motion detected.
  - b'10' - Invalid data.
- K1:K0 - direction indicator
  - b'00' - forward.
  - b'01' - reverse.
  - b'10', b'11' - Invalid data.
- P1:P0 - vehicle overspeed (it indicates whether the vehicle is exceeding the legal speed limit set in the tachograph)
  - b'00' - no overspeed
  - b'01' - overspeed

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  - b'10', b'11' - Invalid data

✧ *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

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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.

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- *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)
  - **Bit 13** - CHG - battery charging for electric cars (1 - battery is being charged, 0 - no charging)
  - **Bit 14** - FS - fuel source - for vehicles equipped with factory gas installation (1 - engine powered by gas, 0 - engine powered by petrol)
- *Rapid Brakings*

  The number of total rapid brakings since installation (calculation based on CAN Module settings of speed decrease time and value).
- *Rapid Accelerations*

  The number of total rapid accelerations since installation (calculation based on CAN Module settings of speed increase time and value).
- *Service Distance*

  The parameter describes distance left to diagnostic car review.

  Examples:
  - (0xFFFD8F00): -160 000 km (diagnostic review should be done long distance ago)

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- (0XFFFFFE0C): -500 km (diagnostic review should be done 500 km before)
- (0x000124F8): 75 000 km (diagnostic review to be done in 75000 km)

✧ *DTC*

Diagnostic trouble codes read from the vehicle. The protocol is OBD II/SAE J2012.

Each diagnostic trouble code is a 3-byte element in following format:

Byte m								**Byte m+1**								**Byte m+2**							
7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0	7	6	5	4	3	2	1	0
C1		C2		C3				C4				C5									T	P	C

- C1 - first DTC character
  - **b'00'** - P - powertrain
  - **b'01'** - C - chassis
  - **b'10'** - B - body
  - **b'11'** - U - network
- C2 - second DTC character (digit 0 to 3)
- C3, C4, C5 - consecutive DTC characters (hexadecimal digits 0 to F)
- T - DTC status flag: permanent (stored into non-volatile memory)
- P - DTC status flag: pending (detected during current or last driving cycle)
- C - DTC status flag: confirmed (stored)

  Each code may have one or multiple status flags set. For example:

  0x02 0x2E 0x03 is a code P022E with status pending and confirmed.

  0x61 0x99 0x02 is a code C2199 with status pending.

✧ *Gaseous Fuel Level*

6 bytes in total. The first byte indicates the unit. The unit L is represented as FE, and the unit P is represented as FF. The next 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.

✧ *Retarder Usage*

The unit is percentage.

✧ *Power Mode*

Bit 7	**Bit 6**	**Bit 5**	**Bit 4**	**Bit 3**	**Bit 2**	**Bit 1**	**Bit 0**
R	R	PTO1	PTO0	R	R	R	R

- R - Reserved for future use (set to 1)
- PTO1:PTO0 - Power Take-Off
  - b'00' - PTO not engaged.
  - b'01' - PTO engaged.
  - b'10' - unknown state of PTO (not compliant with FMS 3.0 standard).
  - b'11' - parameter currently not available.

✧ *Tacho Timestamp*

Real time clock is a date and time displayed on the car's dashboard, usually read from tachograph. 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

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- *Oil Temperature*

  The Oil Temperature of the vehicle. 2 bytes in total. If this value is negative, it is represented in Two's complement format.

- *Oil Level / DPF Soot Level*

  6 bytes in total. The first byte indicates the unit. The unit L is represented as FE, and the unit P is represented as FF. The next 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.

- *Current Gear Number*
  - **0** - Neutral
  - **1 ~ 0xF** - Subsequent gears numbers (1 to 15)
  - **0x1D** - Reverse gear (-2)
  - **0x1E** - Reverse gear (-1)
  - **0x1F** - Parameter currently not available
  - **others** - Reserved for future use
- *Expansion2 Information*

  A hexadecimal number. Each bit contains information of one indicator.
  - **Bit 0** - Brake linings worn off indicator L. 1 - indicator on (brake linings to be replaced), 0 - indicator off (brake linings fine) or not available.
  - **Bit 1 - Bit 31** - Reserved for future use.
- *Battery Level*

  2 bytes in total. The first byte is for the integer part of the battery level (percentage) and the last byte is for the fractional part. The fractional part has 2 digits. This field is controlled by Bit 6 in <Electric Report Mask>.

- *Charge State*

  1 byte in total. The status of battery charging and Charging cable connected in electric cars. This field is controlled by Bit 7 in <Electric Report Mask>.
  - **0x00** - Plug disconnected
  - **0x01** - Plug connected, not charging
  - **0x02** - Connecting (plug connected, but charging not started yet)
  - **0x03** - Charging in progress
  - **0x04** - Charging failure
- *Battery Instantaneous Voltage*

  For electric cars this parameter stands for instantaneous high voltage of battery cells (read from BMS). The unit is voltage (V).

- *Battery Charging Cycles Count*

  For electric cars this parameter counts cycles of battery charging (increments at every finished cycle of charging). The unit is cycle.

- *Total Energy Recuperated*

  Sum of energy transmitted to battery with no charger connected. The unit is Wh.

- *Battery Temperature*

  A numerical value is used to indicate the battery temperature.

- *Battery Charging Current*

  A numerical value is used to indicate the electric car's battery charging current. The unit is ampere.

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✧ *Battery Instantaneous Power*

For electric cars this parameter stands for instantaneous power used by (positive values) or recuperated from (negative values) the car. The unit is W. offset -327680 W.

Examples:

- (0x8000): 32768 decimal 0 W (neither power usage nor recuperation).
- (0x8010): 32784 decimal 60 W (power taken from the battery).
- (0x7F11): 32529 decimal -2.39 kW (the battery is being charged, includes recuperation).
- (0xFF00 to 0xFFFF): 65280 to 65535 decimal (parameter unavailable).

✧ *Battery State of Health (SoH)*

For electric cars this parameter stands for battery general condition (100% means brand new, 0% totally damaged).

✧ *Total Energy Used*

Sum of energy used by car's engine and equipment; recuperated energy does not affect this parameter. The unit is Wh.

✧ *Total Energy Used When Idling*

Sum of energy used by car's engine and equipment with vehicle speed 0 km/h; recuperated energy does not affect this parameter. The unit is Wh.

✧ *Total Energy Charged*

Sum of energy transmitted to battery from external charger. The unit is Wh.

✧ *Charge State Optimization*

The status of battery charging and Charging cable connected in electric cars.

- **0x00** - Plug disconnected
- **0x01** - Plug connected, not charging
- **0x02** - Connecting (plug connected, but charging not started yet)
- **0x03** - Charging in progress
- **0x04** - Charging failure

✧ *Drv1 End Of Last Daily Rest Period*

Stands for card in tachograph's slot 1 end of last daily rest period, Dates and times are provided in universal time (UTC). 6 bytes in total. The first 2 bytes are for year, and the other 5 bytes are for month, day, hour and minute respectively.

Send Time	**2011**		**01**	**31**	**06**	**29**
HEX	07	DB	01	1F	06	1D

✧ *Drv1 End Of Last Weekly Rest Period*

End Of Last Weekly Rest Period, Dates and times are provided in universal time (UTC). 6 bytes in total. The first 2 bytes are for year, and the other 5 bytes are for month, day, hour and minute respectively.

✧ *Drv1 End Of Second Last Weekly Rest Period*

End Of Second Last Weekly Rest Period, Dates and times are provided in universal time (UTC). 6 bytes in total. The first 2 bytes are for year, and the other 5 bytes are for month, day, hour and minute respectively

✧ *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.

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Send Time	2011		01	31	06	29	11
HEX	07	DB	01	1F	06	1D	0B

5.7.2 ACN(Additional CANBUS Device Information)

The HEX format of the additional CANBUS device information report message **+RESP:GTACN** is as follows.

Example:
2B41434E01000007F000468020050905050947563335354345550001000000F010B0E717565636C696E6B30310071756563 6C696E6B30320007E7080A0F16201B8900210D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+ACN
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
	Report Type	1	0-4
	CANBUS Device State	1	0 | 1
	Tacho Report Mask	4	0x00000000 - 0xFFFFFFFF
	Ignition State	1	0 | 1
	Tachograph Information	2	00 - FFFF
	Tachograph Driver 1 Card Number	<=40	ASCII
	Tachograph Driver 2 Card Number	<=40	ASCII
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Message Type*

The ID of the ACN report message.

Message	ID
+RESP:GTACN	1

- *Report Mask*
  Please refer to <+CAN Mask> in (AT+GTHRM). No matter whether bit0, bit1, bit2 and bit3 are selected, the corresponding parameter is not reported.
- *Report Type*
  Report type has the following meanings as follows.
  - **0** - Periodic report.
  - **1** - RTO CAN report.
  - **2** - Ignition event report.
  - **3** - Tachograph Driver Card ID changed event report.
  - **4** - Tachograph Driver working status or "Out of Scope" condition changed event report.
- *Tacho Report Mask*
  Please refer to <Tacho Report Mask> in (AT+GTCAN).

5.8 Update Configuration

This section describes the message related to firmware and configuration upgrade. Please refer to the details below.

5.8.1 UPC(Configuration Update Notification)

The HEX format of the event report message **+RESP:GTUPC** is as follows.

Example:
2B4556542809FEDFFF009E802005090504184756333530434555003016000000000011A0C0000C8687474703A2F2F36302E3137342E3232352E3137323A31303034302F47563335304345552F64656C746162696E2F3435363062696E000101000000015F005806FB407F01E5D35F07E60707060D0904600000550B0000B1E2000000000000000000000000000000000000007E60707060D0A067B24750D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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)

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Parts	Fields	Length	Range/Format
	Analog Input Mode	2	
	Analog Input1 Voltage	2	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	Motion Status	1	0x11 | 0x12 0x21 | 0x22 0x41 | 0x42 0x16 | 0x1A
	Satellites in Use	1	0 - 24
	Command ID	1	
	Result	2	100-103 | 200-202 | 300-302 | 305 | 306
	Download URL	<=101	Complete URL
	Number	1	1
	GNSS Accuracy	1	0 - 50
	Speed	3	0.0 - 999.9 (km/h)
	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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	

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Parts	Fields	Length	Range/Format
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

✧ *Command ID*

The command ID in the update configuration file. It is always 0 before the device starts to update the configuration (<Result><=300). It indicates the total number of the commands when <Result> is 301. It indicates the ID of the command which has wrong format when <Result> is 302.It is empty when <Result> is greater than 302.

✧ *Result*

A numeral to indicate whether the configuration is updated successfully.

- **100** - The update command is starting.
- **101** - The update command is confirmed by the device.
- **102** - The update command is refused by the device.
- **103** - The update process is refused because the battery is low.
- **200** - The device starts to download the package.
- **201** - The device finishes downloading the package successfully.
- **202** - The device fails to download the package.
- **300** - The device starts to update the device configuration.
- **301** - The device finishes updating the device configuration successfully.
- **302** - The device fails to update the device configuration.
- **303** - Reserved.
- **304** - Reserved.
- **305** - The update process is interrupted by abnormal reboot.
- **306** - The update process is interrupted by MD5 verification error.

✧ *Download URL*

The complete URL to download the configuration. It includes the file name and ends by 0x00.

5.8.2 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:
2B4556540F09FEDFFF006880200509050418475633353043455500302E00000000000011090064
0101000000000000FFF506FB44A801E5D67207E60707032F2404600000550B0000B1E200000000
00000000000000000000000000000007E60707033018056B90020D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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

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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
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.8.3 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:
2B455654284FFEFFFF0185802005090502134756333130 4C41556430260000000000000000000100011211C000066313233000101000000000003D06FB408E01E5D3A307E7010A052F1404600000550B0000B7B1000000000000006400000238000000680A110001207FFFFF4C53564E5934315A304232353231383934020000 04CE000000022E1770000A004DFE26B6000000000000000000613C000000000000000000005C000000003D000000001F0000000B1400000000044200000000000080000000000000000000FFFFFF00647D7E730D77520101010001869F0001105500017B4800008D6F0000E509430000FE854800004B225E00016BDB3131313131313131313100323232323232323232003132333435363738393031323334353637383930313233343536373839306162636465666768696A00393837363561626364656667686 96A33363235346975656C6F706965646A3564756562646B7664650035363437383933323134000000000000000000000000007E7010A052F140163AC220D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+EVT
	Message Type	1	
	Report Mask	4	00000000 - FFFFFFFF
Body	Length	2	
	Device Type	3	802005
	Protocol Version	2	0000 - FFFF

Parts	Fields	Length	Range/Format
	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	
	Analog Input2 Voltage	2	
	EIO100 Input Status	1	00 - 0F
	Digital Input Status	1	00 - 1F
	EIO100 Output Status	1	00 - 0F
	Digital Output Status	1	00 - 07
	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	
	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)

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Parts	Fields	Length	Range/Format
	Total Mileage	5	0.0 - 4294967.0 (km)
	Current Hour Meter Count	3	HHMMSS
	Total Hour Meter Count	6	HHHHHHHHMMSS
	RFID Length	1	0 - 0E
	RFID	<=0E	HEX
	CAN Data	<=400	
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

5.9 HBD (Heartbeat Data)

5.9.1 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:
2B484244EF228020050905010556 2E600600044D0707E70802093A200DA54FD50D0A

Parts	Fields	Length	Range/Format
Head	Header	4	+HBD
	Report Mask	1	00 - FF
Body	Length	1	
	Device Type	3	802005
	Protocol Version	2	0000 - FFFF
	Firmware Version	2	0000 - FFFF
	Unique ID	8	IMEI/Device Name
Tail	Send Time	7	YYYYMMDDHHMMSS
	Count Number	2	0000 - FFFF
	Checksum	2	0000 - FFFF
	Tail	2	0x0D 0x0A

- *Report Mask*
  Please refer to <+HBD Mask> in (AT+GTHRM).
- *Unique ID*

If Bit 4 of <+HBD Mask> is 0, the IMEI of the device is used as the unique ID of the device.
IMEI is a 15-digit string. In the HEX format message, each 2 digits are encoded into one byte as an integer.

IMEI	13	57	90	24	68	11	22	0
HEX	0D	39	5A	18	44	0B	16	00

If Bit 4 of <+HBD Mask> is 1, the device name is used as the unique ID of the device.
Device name is an 8-byte string, please refer to <Device Name> in (AT+GTCFG). If the length of <Device Name> is more than 8 bytes, the device will only acquire the first 8 bytes.
In the Hex format message, each byte is encoded into one byte as an integer. If the device name is less than 8 bytes, the remaining bytes are set to 0.

Device Name	q	u	e	c	l	i	n	k
HEX	71	75	65	63	6C	69	6E	6B

If the mask of <UID> in <+HBD Mask> of (AT+GTHRM) is set to 0, the heartbeat message will not report device name or IMEI information. If the mask of <UID> is set to 1, then the heartbeat message will report device name or IMEI information according to the mask of <Device Name>.

5.10Buffer 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.

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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

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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
WTS300	2	0	0 - 3	001F
Temperature ELA		1	0 - 3	081F
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 25ODS7		2		0007
GN0M DDE S7		3		0007
GNOM DP S7		4		0007
WBC300	8	0		0087
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
ZWP-Q80		1	16 | 17	2007

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

Property	Value
Polynomial	0x31 ($X^8 + X^5 + X^4 + 1$)
Initialization	FFH (0xFF)
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;
}
```

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