

GL520(M) & GL530(M) @Track Air Interface Protocol GSM/GPRS/GPS Tracker

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0. Revision History

Revision	Date	Author	Description of Change
1.00	2016-07-25	Shaking Wang	1. Initial.
1.01	2016-08-30	Shaking Wang	1. Added a new mask bit to <Event Mask> of the command AT+GTGBC .
1.02	2016-08-31	Shaking Wang	1. Added the parameter <Report Mode> to the command AT+GTLSA . 2. Modified the description of <GPS Accuracy> in the +RESP:GTCTN report. 3. Modified the description of <GSM Report> in the command AT+GTGBC . 4. Modified the description of Buffer Report when the report mode is forced SMS mode.
1.03	2017-01-12	Shaking Wang	1. Added the AT+GTDRS command to support device removal detection function.
1.04	2017-01-23	Shaking Wang	1. Added the AT+GTPDS command to preserve specified logic state of the device.
2.00	2017-04-26	Shaking Wang	1. Added the parameter <Week Report Selection> to the command AT+GTGBC .
	2017-05-02	Shaking Wang	2. Added the parameter <Component Expansion Mask> to the command AT+GTGBC .
	2017-06-08	Shaking Wang	3. Added the parameters <Report Count> and <Max Report> to the command AT+GTGBC .
3.00	2017-09-02	Joseph Tang	1. Added <Battery Type> to AT+GTGBC .
3.01	2017-11-28	Felix Jiang	1. Added the AT+GTNMD command for non-movement detection. 2. Added a new parameter <Sensor Enable> in the command AT+GTGBC .
4.00	2017-11-30	Felix Jiang	1. Added Mode 3 to <Start Mode> and the parameter <Alarm Time> in AT+GTGBC . 2. Added the AT+GTONE command to support the configuration of parameters of AT+GTQSS and AT+GTGBC for the device in one command. 3. Added the AT+GTABC command which is composed of abbreviated parameters from other commands.
5.00	2018-01-18	Joseph Tang	1. Added RTO sub command 0x20 to reset battery percentage.
5.01	2018-01-26	Felix Jiang	1. Added Bit 3 of parameter <Component Expansion Mask> in the command AT+GTGBC . 2. Added Mode 2 to the parameter <Continuous

			<i>Mode</i> > in the command of AT+GTGBC . 3. Changed the default value of the parameter < <i>Mask</i> > in AT+GTPDS to 0x808.
5.02	2018-01-26	Felix Jiang	1. Added the parameter < <i>Battery Percentage Mode</i> > in AT command AT+GTGBC .

1. Overview

1.1. Scope

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

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

1.2. Terms and Abbreviations

Table 1: Terms and Abbreviations

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

2. System Architecture

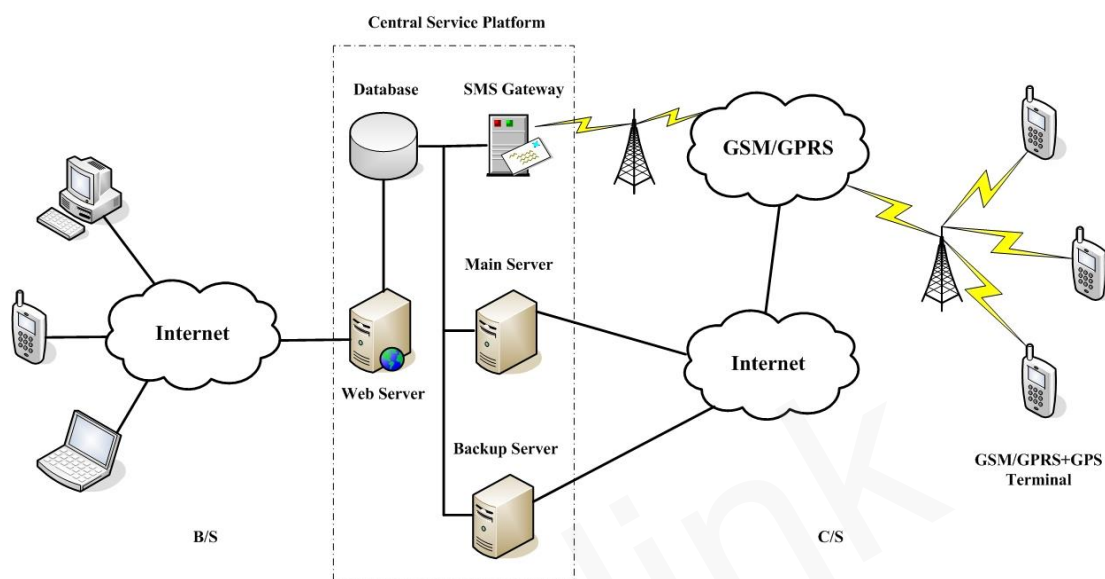


Figure 1: System Architecture

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

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

3. Message Description

3.1. Message Format

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

Message format	Message type
AT+GTXXX=<parameter1>, <parameter2>,...\$	Command
+ACK: GTXXX,<parameter1>,<parameter2>,...\$	Acknowledgement
+RESP:GTXXX,<parameter1>,<parameter2>,...\$	Report

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

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

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

Detailed information regarding each message format is available in the corresponding message sections.

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

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

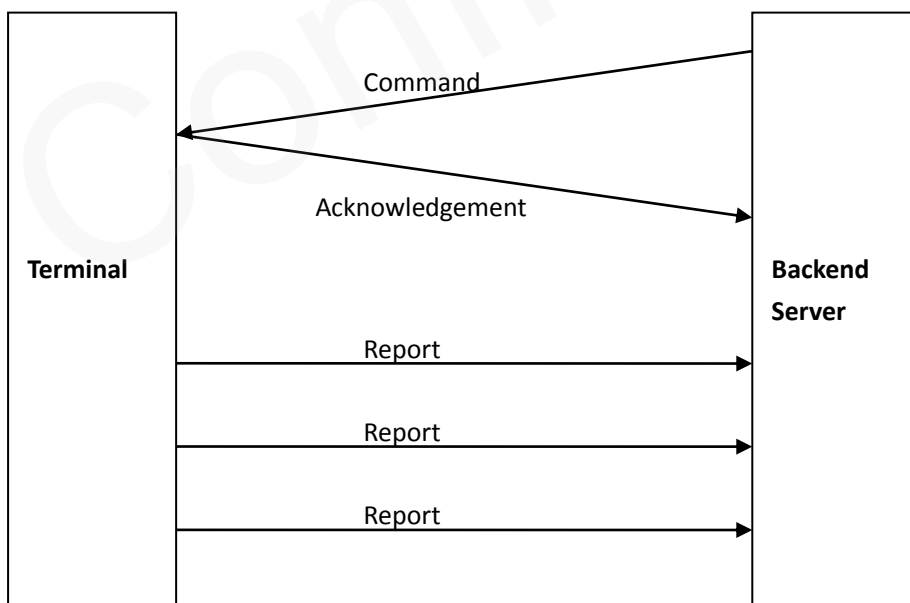


Figure 2: @Track Protocol Message Flow

When the device receives commands over the air, it supports several commands in one SMS or GPRS packet without separation symbol between two adjacent commands. But it is necessary to make sure the total size of the several commands is no more than 160 bytes if the commands are sent via SMS. Here is an example of sending three commands in one SMS.

```
AT+GTGBC=gl520,,GL520,,,003F,,,,1400,,24,6,1,1,2,15,,1,,,,2,,,,00A5$AT+GTGEO=gl520,0,3,101.4
12248,21.187891,,15,,,,,,,,,0008$ AT+GTLISA=gl520,1,5,10,300,1,2,,,,, FFFF$
```

It includes three commands (**AT+GTGBC**, **AT+GTGEO** and **AT+GTLISA**) in the message above. And the device will handle the three commands one by one after it receives the message via SMS and it will report the following three acknowledgement messages to the backend server one by one.

```
+ACK: GTGBC, 440100, 135790246811220,, 0,0005,20100310172900,1152$
```

```
+ACK: GTGEO, 440100, 135790246811220,, 0,0008,20100310172900,1153$
```

```
+ACK:GTLISA,440100,135790246811220,,0010, 20100310172900,1153$
```

3.2. Command and Acknowledgement

3.2.1. Quick Start Setting

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

➤ AT+GTQSS=

Example:			
AT+GTQSS=gl520,cmnet,,,3,,,116.226.44.17,9001,116.226.44.16,9002,,0,1,,,0001\$			
Parameter	Length (byte)	Range/Format	Default
Password	4 – 8	'0' – '9', 'a' – 'z', 'A' – 'Z'	gl520
APN	<=40		
APN User Name	<=30		
APN Password	<=30		
Report Mode	1	0 – 5	5
Reserved	0		
Buffer Enable	1	0 1	1
Main Server IP /	<=60		

Domain Name			
Main Server Port	<=5	0 – 65535	0
Backup Server IP	<=15		0.0.0.0
Backup Server Port	<=5	0 – 65535	0
SMS Gateway	<=20		
Heartbeat Interval	<=3	0 5 – 360min	5
SACK Enable	1	0 1	0
SMS Confirmation Enable	1	0 1	0
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- ✧ <Password>: The valid characters for the password include '0'-9', 'a'-z', and 'A'-Z'. The default value is "gl520".
- ✧ <APN>: Access point name (APN).
- ✧ <APN User Name>: The GPRS APN User Name. If the parameter field is empty, the current value for the parameter will be cleared.
- ✧ <APN Password>: The GPRS APN Password. If the parameter field is empty, the current value for the parameter will be cleared.
- ✧ <Report Mode>: Supported report modes are as follows:
 - 0: Stop mode.
 - 1: TCP short-connection preferred mode. The connection is based on TCP protocol. The device connects to the backend server every time it needs to send data and will shut down the connection when the device finishes sending data. If the device fails to establish a TCP connection with the backend server (including Main Server and Backup Server), it will try to send data via SMS.
 - 2: TCP short-connection forced mode. The connection is based on TCP protocol. The device connects to the backend server every time it needs to send data and will shut down the connection when the device finishes sending data. If the device fails to establish a TCP connection with the backend server (including Main Server and Backup Server), the data will be stored in the BUFFER (if the BUFFER function is enabled, i.e. <Buffer Enable> is set to 1) or discarded (if the BUFFER function is disabled).
 - 3: TCP long-connection mode. The connection is based on TCP protocol. The device connects to the backend server and maintains the connection using the heartbeat data. Please note that in this mode the backend server should respond to the heartbeat data from the devices.
 - 4: UDP mode. The device will send data to the backend server by UDP protocol. It supports receiving protocol command via UDP. Make sure the IP address and UDP port of the device can be visited over the internet, and this is generally realized by heart beat package and the message **+RESP:GTPDP**.
 - 5: Forced SMS mode. Only SMS is used for data transmission.
- ✧ <Reserved>: Not used at present. Please keep it empty.

- ✧ <Buffer Enable>: Enable/disable the Buffer function. Please refer to Chapter 3.3.4 for details about BUFFER function.
 - 0: Disable the Buffer function.
 - 1: Enable the Buffer function.
- ✧ <Main Server IP / Domain Name>: The IP address or the domain name of the main server.
- ✧ <Main Server Port>: The port of the main server.
- ✧ <Backup Server IP>: The IP address of the backup backend server.
- ✧ <Backup Server Port>: The port of the backup server.
- ✧ <SMS Gateway>: A maximum of 20 characters including the optional national code starting with “+” for sending SMS messages. Short code (for example, 10086) is also supported.
- ✧ <Heartbeat Interval>: The interval for the device sending heartbeat messages to the backend server. If it is set to 0, no heartbeat package is sent.
- ✧ <SACK Enable>: A numeral to indicate whether the backend server should reply with a SACK message to the device.
 - 0: The backend server does not reply with a SACK message after receiving a message from the device.
 - 1: The backend server should reply with a SACK message after receiving a message from the device.
- ✧ <SMS Confirmation Enable>: This parameter defines whether the ACK confirmation should be returned via SMS when the command is sent via SMS.
 - 0: The device will not send the ACK confirmation via SMS to the phone number from which the command is sent via SMS.
 - 1: The device will send the ACK confirmation by SMS to the phone number from which the command is sent via SMS.
- ✧ <Serial Number>: The serial number for the command. It will be included in the ACK message of the command.
- ✧ <Tail Character>: A character to indicate the end of the command. And it should be ‘\$’.

Note: If <Report Mode> is set to 4 (UDP mode), it is strongly recommended to enable SACK or heartbeat mechanism (<Heartbeat Interval> is not 0).

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

➤ **+ACK:GTQSS,**

Example:			
+ACK:GTQSS,440100,135790246811220,,0001,20100310172830,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- ✧ <Protocol Version>: The combination of the device type and the version number of the applied protocol. The first two characters “XX” indicate the device type. “44” represents GL520(M) or GL530(M). The middle two characters are the major version number and the last two characters are the minor version number. Both the major version and the minor version are hex digits. For example, “0100” means version 1.00.
- ✧ <Unique ID>: The ID of the device, i.e. the IMEI of the current SIM card in the device.
- ✧ <Device Name>: Please refer to the parameter <Device Name> in the command **AT+GTGBC**.
- ✧ <Serial Number>: The same serial number which is sent to the device with the corresponding command. The backend server could use it to distinguish which command the ACK message is for.
- ✧ <Send Time>: The local time to send the ACK message.
- ✧ <Count Number>: The self-increasing Count Number will be included into every acknowledgment message and report message. The count begins from 0000 and increases by 1 every time. It will roll back after “FFFF”.

3.2.2. Bearer Setting Information

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

➤ **AT+GTBSI=**

Example: AT+GTBSI=gl520,cmnet,,,,,,,,,0002\$			
Parameter	Length (byte)	Range/Format	Default
Password	4 – 8	'0' – '9', 'a' – 'z', 'A' – 'Z'	gl520
APN	<=40		
APN User Name	<=30		
APN Password	<=30		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

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

➤ **+ACK:GTBSI,**

Example: +ACK:GTBSI,440100,135790246811220,,0002,20100310172830,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9'}	

Unique ID	15	IMEI	
Device Name	<=10		
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

3.2.3. Backend Server Registration Information

The command **AT+GTSRI** is used to configure the information of the backend server that the device reports to and the report mode that defines the communication method between the backend server and the device.

➤ **AT+GTSRI=**

Example:			
AT+GTSRI=gl520,3,,,116.226.44.17,9001,116.226.44.16,9002,,0,1,,,,,0003\$			
Parameter	Length (byte)	Range/Format	Default
Password	4 – 8	'0' – '9', 'a' – 'z', 'A' – 'Z'	gl520
Report Mode	1	0 – 5	5
Reserved	0		
Buffer Enable	1	0 1	1
Main Server IP / Domain Name	<=60		
Main Server Port	<=5	0 – 65535	0
Backup Server IP	<=15		0.0.0.0
Backup Server Port	<=5	0 – 65535	0
SMS Gateway	<=20		
Heartbeat Interval	<=3	0 5 – 360min	5
SACK Enable	1	0 1	0
SMS Confirmation Enable	1	0 1	0
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

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

➤ **+ACK:GTSRI,**

Example:	
+ACK:GTSRI,440100,135790246811220,,0003,20100310172830,11F0\$	

AGPS Mode	1	0 2	0
Week Report Selection	14		10101010101010
Resend Interval	<=4	0 30 – 1380min	0
Component Expansion Mask	<=4	0000 – FFFF	0
Report Count	<=5	0 – 65535	0
Max Count	<=5	1 – 65535	1100
Battery Type	1	0 1	0
Alarm Time	<=200	0 – 9 '*' '+' ' '	
Battery Percentage Mode	1	0 1 2	0
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- ✧ <Reserved>: The parameter field is reserved.
- ✧ <Device Name>: An ASCII string which represents the name of the device.
- ✧ <New Password>, <New Password>: New password for the device. Two <New Password> must be identical. **Note:** If the parameter is valid, next time the command is sent, this new password must be used to replace the old password. The valid characters for the password are '0'-'9', 'a'-'z', and 'A'-'Z'. The default value is "gl520".
- ✧ <Event Mask>: A Hex value to configure which event reports can be sent to the backend server. Each bit corresponds to a report message. If a bit is set to 1, its corresponding report message can be sent to the backend server. Otherwise, it cannot be sent to the backend server. Here is the mapping between each bit and each report message.
 - Bit 0(0001): **+RESP:GTPNA**
 - Bit 1(0002): **+RESP:GTBPL**
 - Bit 2(0004): **Reserved**
 - Bit 3(0004): **+RESP:GTPDP**
 - Bit 4(0010): **+RESP:GTCID**
- ✧ <GPS Enable>: Enable/disable GPS fix.
 - 0: Disable GPS fix: The device will report **+RESP:GTLBS** instead of messages which contain GPS information.
 - 1: Enable GPS fix: The device reports messages containing GPS information normally.
- ✧ <GPS Fix Delay>: This is the time to wait after GPS fix succeeds. After GPS fix succeeds, the device will wait for a period of time (defined by <GPS Fix Delay>) and then get the result of GPS fix because the position got immediately after GPS fix succeeds may not be accurate. For example, if <GPS Fix Delay> is set to 7, the device will wait for 7 seconds after GPS fix succeeds and then get the position result. The range of the parameter is 5 – 60, and the default value is 5. Unit: second.
- ✧ <Start Mode>: The mode indicates the way to calculate the wakeup time.
 - 0: First wakeup at the time defined by <Specified Time of Day>. **Note:** If the local time is 18:30 and the <Specified Time of Day> is 16:30, the first report message is 16:30 next day.
 - 1: First wakeup time is calculated as follows: First wakeup time = Current time +

- 24/ <Initial Report Frequency>.
- 2: The terminal will first wake up at the wake-up time point (calculated based on <Specified Time of Day> and <Initial Report Frequency>) nearest to the current time. Wake-up time points are the time that the terminal should wake up at each day. For example, if <Specified Time of Day> is 0300 and <Wakeup hour interval> is 4 hours, then the wake-up time points are 03:00, 07:00, 11:00, 15:00, 19:00, 23:00. If the current time is 15:30, then the nearest wake-up time is 19:00.
 - 3: The terminal will wake up according to the <Alarm Time> setting and ignore the parameters <Specified Time of Day>, <Adjustment Enable>, <Initial Report Frequency>, <Final Report Frequency> and <Hold Days>, but it is still controlled by <Week Report Selection>.
- ✧ <Specified Time of Day>: The start time for the device to wake up. The value range of “HH” is “00” – “23”. The value range of “MM” is “00” – “59”.
 - ✧ <Adjustment Enable>: Enable/disable the frequency adjustment of the wakeup interval.
 - 0: Disable frequency adjustment.
 - 1: Enable frequency adjustment.
 - ✧ <Initial Report Frequency>: A numeral to determine the initial wake up times one day. ‘24’ means “Wake up once an hour”, and ‘1’ means “Wake up once a day”. The wakeup frequency can be changed by frequency adjustment.
 - ✧ <Final Report Frequency>: A numeral to determine the final wakeup times one day. Wakeup frequency obtained by frequency adjustment can’t be less than this parameter value, and the device report frequency will finally remain at this value. **Note:** <Final Report Frequency> must be less than <Initial Report Frequency> when the frequency adjustment of the wakeup interval is enabled.
 - ✧ <Hold Days>: The number of days for which the current wakeup frequency is held unchanged before next frequency adjustment is made.
 - ✧ <Continuous Mode>: It configures the mode the device works in.
 - 0: Power saving mode. The device is activated at specified time and the mode lasts 5 minutes before the device will go into deep sleep mode.
 - 1: Continuous mode. The device reports the message **+RESP:GTCTN** periodically according to <Continuous Send Interval> when <GPS Enable> is enabled; otherwise **+RESP:GTLBS** is reported. The device is always active, which makes it possible to remotely control the device at any time and immediately receive ACK information from the device.
 - 2: Automatic mode. In this mode, if <Continuous Send Interval> is less than 10 minutes, the device behaves like it is in continuous mode. Otherwise, the device will enter power saving mode, and wake up at an interval of <Continuous Send Interval>.
 - ✧ <Continuous Send Interval>: The time interval for sending the message **+RESP:GTCTN** (when <Continuous Mode> is set to 1) or **+RESP:GTLBS** (<Trigger Type> is 1) when <GPS Enable> is disabled. If <Continuous Mode> is set to 2 (Automatic Mode), <Continuous Send Interval> works as described in automatic mode. The value range is 1–1440 and the unit is minute. If the value is set to 0, the device will not report message.
 - ✧ <Battery Low Percentage>: If the battery percentage is lower than this parameter value, the

device will report the message **+RESP:GTBPL** when GPS is enabled. Otherwise the device will report **+RESP:GTLBS** instead.

- ✧ *<Sensor Enable>*: Enable/disable the sensor function. If the sensor is enabled, and movement is detected, the terminal will enter the continuous mode, and perform GPS fix and report the message **+RESP:GTCTN** periodically according to *<Continuous Send Interval>*.
- ✧ *<GSM Report>*: It controls how or when to report cell information (including **+RESP:GTSTR**, **+RESP:GTCTN**, **+RESP:GTRTL** and **+REPS:GTNMR**). The message **+RESP:GTGSM** is only sent via TCP short connection even if the report mode is forced SMS mode. Make sure server configuration settings are correct when the report mode is forced SMS mode, otherwise the **+RESP:GTGSM** can't be sent normally. **Note:** This function is only valid when *<GPS Enable>* is set to '1'.

- 0: Do not allow the cell information report.
- 1: Report the message **+RESP:GTGSM** after failing to get GPS position if cell information is available.
- 2: Report the message **+RESP:GTGSM** after getting GPS position successfully every time if cell information is available.
- 3: Report the message **+RESP:GTGSM** regardless of whether getting GPS position is successful or not every time if cell information is available.

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

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

- ✧ *<Week Report Selection>*: It configures the report mode for each day in one week. There are seven 2-character combinations. The seven combinations represent seven days of one week respectively. The first two characters represent Sunday, and last two characters represent Saturday.

The first character of each combination defines whether the terminal will report the **+RESP:GTSTR** message to the backend server on this day of the week, and the second character defines whether the report message should contain GPS information when the first character is set to 1.

The 14-digit format can be configured as follows.

Example: 11000000101011. It means the report message on Sunday and Saturday will contain GPS information, no report message will be reported on Monday, Tuesday or Wednesday, and report messages for Thursday and Friday will not contain GPS information.

Note:

<Week Report Selection> defines whether the terminal will report the **+RESP:GTSTR** or **+RESP:GTLBS** message. If *<GPS Enable>* is enabled and *<Week Report Selection>* defines the report message should contain GPS information, the terminal will report the **+RESP:GTSTR** message which contains GPS information. If *<GPS Enable>* is disabled, no matter whether *<Week Report Selection>* defines the report message should contain GPS information, the terminal will report the **+RESP:GTLBS** message.

- ✧ *<Resend Interval>*: It specifies the time interval for reboot to resend a message which has failed to be sent. In power saving mode, the device will resend the failed message

periodically according to the *<Resend Interval>* setting. It can reboot at most 3 times before the next normal boot. 0 means “Don’t reboot the device to resend a failed message”.

- ✧ *<Component Expansion Mask>*: Bitwise mask to configure the composition of a report message.
 - Bit 0 for Current GSM signal level in position related reports
 - Bit 1 for Satellite number
 - Bit 2 for *<Report Count>* and *<Max Count>* in messages
 - Bit 3 for *<Report Count>*. If the value of Bit 2 is 1, this bit will be invalid.
- ✧ *<Report Count>*: The number of messages that have already been reported.
- ✧ *<Max Count>*: The total number of packets reported. For GL530(M), the default value of this parameter is 1100 as shown in the table above. For GL520(M), the default value is 730.
- ✧ *<Battery Type>*: The battery type.
 - 0: Panasonic
 - 1: GP
- ✧ *<Alarm Time>*: It specifies the alarm time at which the terminal should wake up. 1 – 7 represents Monday to Sunday respectively, ‘*’ is used to separate days and the alarm times on those specific days, ‘+’ is used to separate different alarms, and ‘|’ is used to separate settings of different days. Take 12*1200+1300|34*0800+1130+1400+1800|7*1200 as an example. It means the terminal wakes up at 12:00 and 13:00 on Monday and Tuesday and at 08:00, 11:30, 14:00 and 18:00 on Wednesday and Thursday, does not wake up on Friday and Saturday, and wakes up at 12:00 on Sunday. There are a total of 70 alarms, and the interval between two adjacent alarms must be greater than 30 minutes.
- ✧ *<Battery Percentage Mode>*: A numeral to indicate which battery calculation mode will be used.
 - 0: Calculate the battery percentage by device usage and the voltage of battery.
 - 1: Calculate the battery percentage by *<Report Count>* and *<Max Count>*.
 - 2: Calculate the battery percentage by device usage.
- ✧ *<Serial Number>*: The serial number for the command. It will be included in the ACK message of the command.
- ✧ *<Tail Character>*: A character to indicate the end of the command. It must be ‘\$’.

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

➤ **+ACK:GTGBC,**

Example:			
+ACK:GTGBC,440100,135790246811220,,0008,20100310172830,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

3.2.5. Time Adjustment

The command **AT+GTTMA** is used to adjust local time. If the GPS fix is successful, the local time will be automatically adjusted according to the GPS UTC Time.

➤ **AT+GTTMA=**

Example:			
AT+GTTMA=gl520,-,3,30,0,20090917203500,,,,,0006\$			
Parameter	Length (byte)	Range/Format	Default
Password	4 – 8	'0' – '9', 'a' – 'z', 'A' – 'Z'	gl520
Sign	1	+ -	+
Hour Offset	<=2	0 - 23	00
Minute Offset	<=2	0 - 59	00
Daylight Saving	1	0 1	0
UTC Time	14	YYYYMMDDHHMMSS	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

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

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

➤ **+ACK:GTTMA,**

Example:			
+ACK:GTTMA,440100,135790246811220,,0007,20100310172830,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
Serial Number	4	0000 – FFFF	

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

3.2.6. Geo-Fence Information

The command **AT+GTGEO** is used to configure the parameters of Geo-Fence. Geo-Fence is a virtual perimeter on a geographic area using location-based service. When the geo-fencing device enters or exits the area, a notification is generated. The notification can contain information about the location of the device and may be sent to the backend server. This feature only works when GPS is enabled.

➤ AT+GTGEO=

Example:			
AT+GTGEO=gl520,0,3,101.412248,21.187891,1000,15,,,,,,,,,0008\$			
Parameter	Length (byte)	Range/Format	Default
Password	4 – 8	'0' – '9', 'a' – 'z', 'A' – 'Z'	gl520
GEO ID	1	0 – 4	
Report Mode	1	0 – 3	0
Longitude	<=11	(-)xxx.xxxxxx	
Latitude	<=10	(-)xx.xxxxxx	
Radius	<=7	50 – 6000000m	50
Check Interval	<=4	0 5 – 1440 min	0
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- ✧ <GEO ID>: A numeral to identify the Geo-Fence.
- ✧ <Report Mode>: A numeral which indicates when to report the notification to the backend server based on the following:
 - 0: Disable the Geo-Fence of the specified GEO ID.
 - 1: Report the notification when entering the Geo-Fence.
 - 2: Report the notification when leaving the Geo-Fence.
 - 3: Report the notification when entering or leaving the Geo-Fence.
- ✧ <Longitude>: The longitude of a point which is defined as the center of the circular

Geo-Fence region. The format is “(-)xxx.xxxxx” and the value range is from “-180.000000” to “180.000000”. The unit is degree. West longitude is defined as negative starting with the minus sign “-” and east longitude is defined as positive without “+”.

- ✧ <Latitude>: The latitude of a point which is defined as the center of the circular Geo-Fence region. The format is “(-)xx.xxxxx” and the value range is from “-90.000000” to “90.000000”. The unit is degree. South latitude is defined as negative starting with the minus sign “-” and north latitude is defined as positive without “+”.
- ✧ <Radius>: The radius of the circular Geo-Fence region. The value range is (50-6000000) and the unit is meter.
- ✧ <Check Interval>: The interval of GPS checking position information against the Geo-Fence alarm.

Note: If the parameter <Check Interval> is set to 0, <Mode> will be set to 0 automatically.

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

➤ **+ACK:GTGEO,**

Example:			
+ACK:GTGEO,440100,135790246811220,,0,0008,20100310172830,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
GEO ID	1	0 – 4	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

3.2.7. Real Time Operation

The **AT+GTRTO** command is used to retrieve information from the device or control the device.

➤ **AT+GTRTO=**

Example:			
AT+GTRTO=gI520,1,,,,,,000B\$			
Parameter	Length (byte)	Range/Format	Default
Password	4 – 8	'0' – '9', 'a' – 'z', 'A' – 'Z'	gI520
Sub Command	1	1 – 9 D 20	
Single Configuration Command	3		
Output Direction	10	0 1	

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

- ✧ *<Sub Command>*: A numeral to indicate the sub command to be executed.
 - 1 (**RTL**): Request the device to report its current position. This command is not controlled by *<GPS Enable>*. The device will start GPS fixing and try to get the current position whenever receiving this command.
 - 2 (**READ**): Get the current configuration of the terminal via the message **+RESP:GTALL / +RESP:GTALS**.
 - 3 (**REBOOT**): Reboot the device remotely.
 - 4 (**RESET**): Reset all parameters except the parameters of **AT+GTBSI**, **AT+GTSRI**, and **AT+GTTMA** to factory default.
 - 5 (**PWROFF**): Power off the device remotely.
 - 6 (**CID**): Request the device to report the ICCID of the installed SIM card.
 - 7 (**CSQ**): Request the device to report the current GSM signal level.
 - 8 (**TMZ**): Get the time zone settings via the message **+RESP:GTTMZ**.
 - 9 (**DIF**): Request the device to report device information.
 - D (**DEL**): Delete all the buffered reports remotely.
 - 20 (**RSTBAT**): Reset battery percentage.
- ✧ *<Single Configuration Command>*: It can be used to get a specified command configuration of the device via the message **+RESP:GTALL / +RESP:GTALS**. The configuration of **AT+GTGBC** can be obtained by sending the command “**AT+GTRTO=gI520, 2, GBC,,,,, 000F\$**”. **Note**: This parameter is available only when *<Sub Command>* is set to 2.
- ✧ *<Output Direction>*: This parameter determines the destination that the response message of the RTO command will be reported to. This field is invalid for *<Sub Command>* 2(**READ**), 3(**REBOOT**), 4(**RESET**), 5(**PWROFF**), and D(**DEL**).
 - 0: The message will be output to the backend server.
 - 1: 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.

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

➤ **+ACK:GTRTO,**

Example:			
+ACK:GTRTO,440100,135790246811220,,GPS,000B,20100310172830,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF, X ∈ {'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
Sub Command	<=6	Sub Command string	

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

3.2.8. Auto-unlock PIN

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

➤ AT+GTPIN=

Example: AT+GTPIN=gl520,1,0000,,,,,0010\$			
Parameter	Length (byte)	Range/Format	Default
Password	4 – 8	'0' – '9' 'a' – 'z' 'A' – 'Z'	gl520
Enable Auto-unlock PIN	1	0 1	0
PIN	4 – 8	'0' – '9'	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

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

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

➤ +ACK:GTPIN,

Example: +ACK:GTPIN,440100,135790246811220,,0010,20090214093254,11F0\$			
Parameter	Length (byte)	Range/Format	Default

Protocol Version	6	XX0000 – XXXFFF, X ∈ {'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=10	'0' – '9' 'a' – 'z' 'A' – 'Z' ' ' ' _ ' ' ?'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

3.2.9. Light Sensor Alarm

The **AT+GTLSA** command is used to configure the light sensor alarm function. If <Mode> is 1 or 2, whether the light sensor alarm event will be triggered or not depends on the predefined sensitivity threshold.

➤ AT+GTLSA=

Example:			
AT+GTLSA=gl520,1,5,10,300,1,2,,,,,0004\$			
Parameter	Length (byte)	Range/Format	Default
Password	4 – 8	'0' – '9', 'a' – 'z', 'A' – 'Z'	gl520
Mode	1	0 1 2	0
Sensitivity Threshold	<= 2	1 – 10	3
Duration	<= 4	0 – 1200 (unit: 3sec)	1
Send Interval	<= 4	0 5 – 300 sec	0
End Report	1	0 1	0
Report Mode	1	1 2 3	2
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

✧ <Mode>: A numeral to indicate the working mode of the light sensor alarm.

- 0: Disable light sensor alarm.
- 1: Enable light sensor alarm: The device will send the **+RESP:GTLSA** message when the light intensity detected is higher than <Sensitivity Threshold>.
- 2: Enable light sensor alarm: The device will send the **+RESP:GTLSA** message when

the light intensity detected is lower than *<Sensitivity Threshold>*.

Note: When *<GPS Enable>* is disabled, the device will report **+RESP:GTLBS** instead of **+RESP:GTLSA**.

- ✧ *<Sensitivity Threshold>*: The level of sensitivity for light intensity detection. The smaller the parameter value is, the more sensitive the detection would be.
- ✧ *<Duration>*: If the light intensity is higher (when *<Mode>* is 1) or lower (when *<Mode>* is 2) than *<Sensitivity Threshold>* for a period of time specified by *<Duration>*, the light sensor alarm event will be triggered (Unit: 3sec).
- ✧ *<Send Interval>*: The time interval for sending the report of light sensor alarm (LSA) when the device is in the light sensor alarm report status. 0 means the light sensor alarm message is only reported once.
- ✧ *<End Report>*: If it is 1, the device will send a response to report current value when the device leaves the light sensor alarm report status.
- ✧ *<Report Mode>*: A numeral to indicate how to report **+RESP:GTLSA** when light status changes.
 - 1: Report last position fix.
 - 2: Report current position.
 - 3: Report last position fix immediately, and then turn on GPS to get the current position and report the current position information.

Note: When GPS is disabled, the device will report **+RESP:GTLBS** instead of **+RESP:GTLSA**, and this parameter is invalid.

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

➤ **+ACK:GTLSA,**

Example:			
+ACK:GTLSA,440100,135790246811220,,0010,20090214093254,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=10	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_' '?'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

3.2.10. Protocol Watchdog

The **AT+GTD0G** command is used to reboot the device in a time based manner. This helps the

device avoid working in an abnormal state for a long time.

➤ **AT+GTDG=**

Example:			
AT+GTDG=gl520,1,,1,0130,,1,1,,60,60,,0013\$			
AT+GTDG=gl520,0,,30,,,1,,,10,60,,0013\$			
Parameter	Length (byte)	Range/Format	Default
Password	4 – 8	'0' – '9' 'a' – 'z' 'A' – 'Z'	gl520
Mode	1	0 1	0
Reserved	0		
Interval	<=2	1 – 30 day	30
Time	4	HHMM	0200
Reserved	0		
Report Before Reboot	1	0 1	1
Reserved	0		
Reserved	0		
GSM Interval	4	0 5-1440 min	60
Send Failure Timeout	4	0 5-1440 min	60
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- ✧ <Mode>: The working mode of this function.
 - 0: Disable this function.
 - 1: Reboot periodically according to the <Interval> and <Time> settings.
- ✧ <Interval>: The interval (measured in days) for rebooting the device. Rebooting the device for the first time will ignore this interval.
- ✧ <Time>: The time to perform the reboot operation when <Interval> condition is met.
- ✧ <Report Before Reboot>: Whether to report the +RESP:GTDG message before reboot. 0 means “Do not report the message before reboot”, and 1 means “Report the message before reboot”. If this parameter is enabled, the device will initiate a real-time fix before sending the message with the current location information. When GPS is disabled, the device will report +RESP:GTLBS instead of +RESP:GTDG.
- ✧ <GSM Interval>: The interval for rebooting the device in no GSM signal situation. 0 means “Do not reboot the device”.
- ✧ <Send Failure Timeout>: The time in minutes before rebooting the device when the device cannot send a message successfully. 0 means “Do not reboot the device”.

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

➤ **+ACK:GTDG,**

Example: +ACK:GTDG,440100,135790246811220,,0013,20090214093254,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF, X∈{'A' – 'Z', '0' – '9'}	
Unique ID	15	IMEI	
Device Name	<=10	'0' – '9' 'a' – 'z' 'A' – 'Z' '-' '_'	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

3.2.11. Settings for Preserving Device's Specified Logic States

The command **AT+GTPDS** is used to preserve specified logic states of the device. The function works according to the *<Mode>* setting. Specified logical state(s) selected based on the value of *<Mask>* will be saved.

➤ **AT+GTPDS=**

Example: AT+GTPDS=gl520,1,0008,,,,,,001A\$			
Parameter	Length (byte)	Range/Format	Default
Password	4 – 6	'0' – '9' 'a' – 'z' 'A' – 'Z'	gl520
Mode	1	0 1 2	1
Mask	4	0000-FFFF	0x808
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			
Reserved			

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

- ✧ *<Mode>*: The working mode of preserving logic states of the device.
 - 0: Disable this function.
 - 1: Preserve the device’s specified logic state according to the value of *<Mask>*.
 - 2: Reset all the specified device logic states listed in the *<Mask>* after receiving the command, and then preserve specified logic state according to the value of *<Mask>*.
- ✧ *<Mask>*: Bitwise mask to configure which device states will be preserved. Each bit represents a state.
 - Bit 0: States of GEO
 - Bit 1: Reserved
 - Bit 2: Reserved
 - Bit 3: Information of last known position
 - Bit 4: Reserved
 - Bit 5: Reserved
 - Bit 6: Reserved
 - Bit 7: Reserved
 - Bit 8: Reserved
 - Bit 9: Reserved
 - Bit 10: Reserved
 - Bit 11: Indication of the **+RESP:GTBPL** message having been reported

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

➤ **+ACK:GTPDS,**

Example: +ACK:GTPDS,440100,135790246811220,, 0011, 20090214093254,FFFF\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {‘A’ – ‘Z’, ‘0’ – ‘9’}	
Unique ID	14	IMEI	
Device Name	<=10	‘0’ – ‘9’ ‘a’ – ‘z’ ‘A’ – ‘Z’ ‘-’ ‘_’	
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

3.2.12. Non-movement Detection

The **AT+GTNMD** command is used to configure the parameters for non-movement detection. This function works only when the *<Sensor Enable>* of **AT+GTGBC** is set to 1.

➤ **AT+GTNMD=**

Example: AT+GTNMD=gl520,F,2,4,15,10,,,,0005\$			
Parameter	Length (byte)	Range / Format	Default
Password	4 – 8	'0' – '9', 'a' – 'z', 'A' – 'Z'	gl520
Mode	1	0-F	0
Non-movement Duration	<=3	1 – 200(×15sec)	3
Movement Duration	<=2	3 – 50(×256ms)	3
Movement Threshold	2	5 – 25	6
Rest Send Interval	<=4	0 1 – 1440min	10
Reserved	0		
Reserved	0		
Reserved	0		
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

✧ *<Mode>*: A hex numeral to determine how the function works. Each bit of the hex number indicates a different action that device will perform. If a bit is set to 1, the device will perform the corresponding action as described below. If a bit is set to 0, the device will not perform the corresponding action.

- Bit 0: Suspend the report of **+RESP:GTCTN** and **+REGP:GTGEO** when non-movement is detected in power saving mode and enter into deep sleep 5 minutes after the non-movement detection.
- Bit 1: Report the message **+RESP:GTNMR** to the backend server when it detects non-movement.
- Bit 2: Report the message **+RESP:GTNMR** to the backend server when it detects movement.
- Bit 3: Change the GPS fix interval and the **+RSEP:GTCTN** report interval to *<Rest Send Interval>* when non-movement is detected in continuous mode. When the *<Rest Send Interval>* is set to 0, no report message will be sent. In the case, the function of Bit 0 will be disabled even if Bit 0 is 1.

✧ *<Non-movement Duration>*: A time parameter to measure whether the device enters non-movement state. If the motion sensor detects that the device stays in non-movement for a period of time specified by *<Non-movement duration>*, the device will be considered to be in non-movement state.

✧ *<Movement Duration>*: A time parameter to measure whether the device enters movement state. If the motion sensor detects that the device stays in movement for a period of time

- specified by *<Movement duration>*, the device will be considered to be in movement state.
- ✧ *<Movement Threshold>*: The threshold for the motion sensor to determine whether the device is in movement. The smaller the value, the more easily the device is considered to be in movement.
 - ✧ *<Rest Send Interval>*: The interval for sending the **+RSEP:GTCTN** report message when the device is in stationary state and Bit 3 of *<Mode>* is set to 1.

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

➤ **+ACK:GTNMD,**

Example:			
+ACK:GTNMD,440100,135790246811220,,0005,20100310172830,11F0\$			
Parameter	Length (byte)	Range / Format	Default
Protocol Version	6	XX0000 – XXXFFF, X ∈ {'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	10		
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

3.2.13. All in One Command

The **AT+GTONE** command is used to configure the parameters of **AT+GTQSS**, **AT+GTGBC** and **AT+GTLISA** for the device in one command.

➤ **AT+GTONE=**

Example:			
AT+GTONE=gl520,cmnet,3,1,116.226.44.17,9001,0,0,1200,4,5,10101010101010,,0,0,,0001\$			
Parameter	Length (byte)	Range/Format	Default
Password	4 – 8	'0' – '9', 'a' – 'z', 'A' – 'Z'	gl520
APN	<=40		
Report Mode	1	0 – 5	5
Buffer Enable	1	0 1	1
Main Server IP / Domain Name	<=60		
Main Server Port	<=5	0 – 65535	0
SMS Confirmation Enable	1	0 1	0
Continuous Mode	1	0 1 2	0
Specified Time of Day	4	HHMM	1200
Initial Report Frequency	<=2	24 12 8 6 4 3 2 1	4
Continuous Send Interval	<=4	0 1 – 1440min	5

Week Report Selection	14		10101010101010
GSM Report	1	0 1 2 3	0
Resend Interval	<=4	0 30 – 1380min	0
Alarm Time	<=200	0 – 9 '*' '+' ' '	
LSA Mode	1	0 1 2	0
LSA Sensitivity Threshold	<= 2	1 – 10	3
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

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

➤ **+ACK:GTONE,**

Example:			
+ACK:GTONE,440100,135790246811220,,0007,20100310172830,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF, X ∈ { 'A'-'Z', '0'-'9' }	
Unique ID	15	IMEI	
Device Name	<=10		
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

3.2.14. Abbreviation Command

The **AT+GTABC** command is composed of abbreviated parameters from other commands.

➤ **AT+GTABC =**

Example:			
AT+GTABC=gl520,rm:5,an:cmnet,ar:127.0.0.1,0001\$			
Parameter	Length (byte)	Range/Format	Default
Password	4 – 8	'0' – '9', 'a' – 'z', 'A' – 'Z'	gl520
Parameters (Optional)	<=140	ASCII Code	
Serial Number	4	0000 – FFFF	
Tail Character	1	\$	\$

✧ *<Parameters>*: It is composed of abbreviations of parameters and their values, formatted as *<abbreviation: value>*. Each two *<abbreviation: value>* are separated by ','.

Please find the abbreviation of each parameter below:

Abbreviation	Parameters
rm	Report mode

an	APN
be	Buffer Enable
dn	Main Server IP / Domain Name
pt	Main Server Port
hb	Heartbeat Interval
ss	SMS Confirmation Enable
ct	Continuous Mode
sm	Start Mode
st	Specified Time of Day
ae	Adjustment Enable
ir	Initial Report Frequency
fr	Final Report Frequency
hd	Hold Days
si	Continuous Send Interval
wr	Week Report Selection
em	Event Mask
ce	Component Expansion Mask
bl	Battery Low Percentage
ge	GPS Enable
as	AGPS Enable
gr	GSM Report
ri	Resend Interval
at	Alarm Time
lm	LSA Mode
ls	LSA Sensitivity Threshold
tz	time zone, starting with + or -

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

➤ **+ACK:GTABC,**

Example:			
+ACK:GTABC,440100,135790246811220,,0007,20100310172830,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z', '0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
Serial Number	4	0000 – FFFF	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

3.3. Report

3.3.1. Position Related Report

- **+RESP:GTCTN:** Report message for continuous mode.
- **+RESP:GTGEO:** Report message for **AT+GTGEO**
- **+RESP:GTRTL:** Report message for **AT+GTRTO-RTL**
- **+RESP:GTSTR:** Report message when *<GPS Enable>* and *<Week Report Selection>* are enabled in power saving mode
- **+RESP:GTDG:** Protocol watchdog reboot message
- **+RESP:GTLSA:** Light sensor event report
- **+RESP:GTNMR:** Message reported when the status changes between movement and non-movement.

Example:

```
+RESP:GTCTN,440100,135790246811220,GL520,0,0,,,81,0,0.1,0,0.3,121.390875,31.164600,2
0130312183936,0460,0000,1877,0873,,,,20130312190551,0304$
```

```
+RESP:GTGEO,440100,135790246811220,GL520,3,1,,,100,2,0.1,0,5.7,121.390839,31.164621,
20130311080111,0460,0000,1877,0873,,,,20130311080112,00A7$
```

```
+RESP:GTRTL,440100,135790246811220,GL520,0,0,,,100,2,0.0,0,48.9,117.201575,31.833101,
20160918053036,0460,0000,5678,2D80,,,,20160918053036,0012$
```

```
+RESP:GTSTR,440100,135790246811220,GL520,0,0,100,,,2,0.0,0,48.9,117.201574,31.833102,
20160918053046,0460,0000,5678,2D80,,,,20160918053046,0015$
```

```
+RESP:GTDG,440100,135790246811220,GL520,0,5,100,,,1,0.1,0,52.9,117.201498,31.83311
4,20160721054830,0460,0000,5663,B654,,,,20160721054830,000B$
```

```
+RESP:GTNMR,440100,135790246811220,GL520,0,0,1,,100,,,1,0.1,0,52.9,117.201498,31.833
114,20160721054830,0460,0000,5663,B654,,,,20160721054830,000B$
```

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9' '-' '_'}	
Unique ID	15	IMEI	
Device Name	<=10		
Report ID	1	0 – 4	
Report Type	1	0 1 2 4 5	
Movement Status	1	0 1 2	
Reserved	0		
Battery Percentage	3	0-100	
GPS Accuracy	<=2	0 1 – 50	
Speed	<=5	0.0 – 999.9km/h	

Azimuth	<=3	0 – 359	
Altitude	<=8	(-)xxxxx.x m	
Longitude	<=11	(-)xxx.xxxxxx	
Latitude	<=10	(-)xx.xxxxxx	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	0		
Reserved	0		
Component Expansion Mask	= 4	0000 – FFFF	0000
CSQ RSSI (Optional)	<=2	0 – 31 99	
CSQ BER (Optional)	<=2	0 – 7 99	
Number of Satellites (Optional)	<=2		
Report Count (Optional)	<=5	0-65535	
Max Count (Optional)	<=5	1-65535	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- ✧ <Report ID>: The ID of Geo-Fence in **+RESP:GTGEO**.
- ✧ <Report Type>: The type of the report **+RESP:GTCTN**, **+RESP:GTGEO** and **+RESP:GTDOG**. For other reports, it is 0.
 - For **+RESP:GTCTN**
 - 0: Triggered by command.
 - 2: Triggered by error of RTC which can not return to normal.
 - For **+RESP:GTGEO**
 - 0: Exit the corresponding Geo-Fence
 - 1: Enter the corresponding Geo-Fence
 - For **+RESP:GTDOG**
 - 0: Reboot message for time based working mode
 - 4: Reboot message for GSM watchdog
 - 5: Reboot message for send fail watchdog
 - For **+RESP:GTNMR**
 - 0: The state of the device changes from motion to rest.
 - 1: The state of the device changes from rest to motion.
 - For **+RESP:GTSTR**
 - 0: GPS information does not need to be reported.
 - 1: GPS information needs to be reported.

- ✧ <Movement Status>: The movement status of the terminal.
 - 0: Rest
 - 1: Motion
 - 2: Sensor disabled
 - ✧ <Battery Percentage>: The current volume of the battery in percentage.
 - ✧ <GPS Accuracy>: A numeral to indicate the GPS fix status and HDOP of the GPS position. 0 means the current GPS fix fails and the last known GPS position is used. A non-zero value (1 - 50) means the current GPS fix is successful and represents the HDOP of the current GPS position.
 - ✧ <Speed>: The speed from GPS.
 - ✧ <Azimuth> The azimuth from GPS.
 - ✧ <Altitude>: The height above sea level from GPS.
 - ✧ <Longitude>: The longitude of the current position. The format is “(-)xxx.xxx” and the value range is from “-180.000000” to “180.000000”. The unit is degree. West longitude is defined as negative starting with the minus sign “-” and east longitude is defined as positive without “+”.
 - ✧ <Latitude>: The latitude of the current position. The format is “(-)xx.xxx” and the value range is from “-90.000000” to “90.000000”. The unit is degree. South latitude is defined as negative starting with the minus sign “-” and north latitude is defined as positive without “+”.
 - ✧ <GPS UTC Time>: UTC Time from GPS.
 - ✧ <MCC>: Mobile country code. It is 3 digits in length and ranges from 000 – 999.
 - ✧ <MNC>: Mobile network code. It is 3 digits in length and ranges from 000 – 999.
 - ✧ <LAC>: Location area code in hex format.
 - ✧ <Cell ID>: Cell ID in hex format.
 - ✧ <CSQ RSSI>: The signal strength level. The parameter is controlled by Bit 0 of <Component Expansion Mask>.

CSQ RSSI	Signal Strength (dBm)
0	<-133
1	-111
2 – 30	-109 – -53
31	>-51
99	Unknown
 - ✧ <CSQ BER>: The quality of the GSM signal. The range is 0-7, and 99 is for unknown strength of signal. The parameter is controlled by Bit 0 of <Component Expansion Mask>.
 - ✧ <Number of Satellites>: The number of satellites. The parameter is controlled by Bit 1 of <Component Expansion Mask>.
 - ✧ <Report Count>: The number of messages already reported. The parameter is controlled by Bit 2 of <Component Expansion Mask>.
 - ✧ <Max Report>: The total number of packets reported. The parameter is controlled by Bit 2 of <Component Expansion Mask>.
- **+RESP:GTLSA**: The light sensor event report.

Example:

+RESP:GTL5A,440100,135790246811220,GL500,1,9,90,,0,0.2,0,55.3,117.201406,31.833033,20160115020539,0460,0000,5678,2079,,,,20160115100600,02B9\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z', '0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
Alarm Type	1	1 2	
Light Level	2	0 – 10	
Battery Percentage	3	0-100	
Reserved	0		
GPS Accuracy	<=2	0 1 – 50	
Speed	<=5	0.0 – 999.9km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	±XXXXX.X m	
Longitude	<=11	±XXX.XXXXXX	
Latitude	<=10	±XX.XXXXXX	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	0		
Reserved	0		
Component Expansion Mask	= 4	0000 – FFFF	0000
CSQ RSSI (Optional)	<=2	0 – 31 99	
CSQ BER (Optional)	<=2	0 – 7 99	
Number of Satellites (Optional)	<=2		
Report Count (Optional)	<=5	0-65535	
Max Count (Optional)	<=5	1-65535	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- ✧ <Alarm Type>: The type of light sensor alarm.
 - 1: The light intensity detected is higher than predefined sensitivity threshold.
 - 2: The light intensity detected is lower than predefined sensitivity threshold.
- ✧ <Light Level>: Current light level read from light sensor.
- ✧ <Battery Percentage>: The current volume of the battery in percentage.

3.3.2. Report for Querying

Listed below are the reports for real time querying via the command **AT+GTRTO**.

- **+RESP:GTDIF**: The report for real time operation of the subcommand **DIF**

Example:			
+RESP:GTDIF,440100,135790246811220,GL520,GL520,1,,100,0108,0101,0102,2016102807094,0,20161028071030,01A0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
Device Type	10	'0' – '9', 'a' – 'z', 'A' – 'Z'	GL520
Movement Status	1	0 1 2	
Reserved	0		
Battery Percentage	3	0-100	
Firmware Version	4	0000 – FFFF	
Hardware Version	4	0000 – FFFF	
MCU Version	4		
Last GPS Fix UTC Time	14	YYYYMMDDHHMMSS	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- ✧ *<Device Type>*: A string which represents the type of the device.
- ✧ *<Firmware Version>*: The firmware version of the device. The first two characters indicate the major version and the last two characters indicate the minor version. For example, 010A means the version 1.10.
- ✧ *<Hardware Version>*: The hardware version of the device. The first two characters indicate the major version and the last two characters indicate the minor version. For example, 010A means the version 1.10.
- ✧ *<MCU Version>*: The MCU version. The first two characters indicate the major version and the last two characters indicate the minor version. For example, 0103 means the version 1.03.
- ✧ *<Last GPS Fix UTC Time>*: The UTC time of the latest successful GPS fix.

- **+RESP:GTALL**: The report for real time operation of the subcommand **READ**

Example:			
+RESP:GTALL,440100,135790246811220,GL520,BSI,cmnet,,,,,,,,SRI,3,,1,220.178.67.210,8263,1,16.226.44.16,9002,,0,1,,,,GBC,,GL520,003F,0,5,0,1400,0,24,6,1,1,2,15,,1,,,,2,,0,,,,TMA,+0000,0,,,,NMD,6,3,3,6,30,,,,GEO,0,0,,,50,0,,,,,,,,,1,0,,,50,0,,,,,,,,,2,0,,,50,0,,,,,,,,,3,0,,,50,0,,,,,,,,,4,0,,			

50,0,,,,,,,,PIN,0,,,,,,,,LSA,0,3,1,0,0,2,,,,,,,,DOG,0,,30,0200,,1,,,60,60,,PDS,1,0008,,,,,,,,,20160905081245,000D\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF, X ∈ {'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
BSI	3	BSI	BSI
APN	<=40		
APN User Name	<=30		
APN Password	<=30		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
SRI	3	SRI	SRI
Report Mode	1	0 – 5	
Reserved	0		
Buffer Enable	1	0 1	
Main Server IP / Domain Name	<=60		
Main Server Port	<=5	0 – 65535	
Backup Server IP	<=15		
Backup Server Port	<=5	0 – 65535	
SMS Gateway	<=20		
Heartbeat Interval	<=3	0 10 – 360min	
SACK Enable	1	0 1	
SMS Confirmation Enable	1	0 1	0
Reserved	0		
Reserved	0		
Reserved	0		
GBC	3	GBC	GBC
Mobile Number	<=20	'0'-'9'	
Device Name	<=10	'0' – '9' 'a' – 'z' 'A' – 'Z'	GL520
Event Mask	<=4	0000-1FFF	001B
GPS Enable	1	0 1	0
GPS Fix Delay	<=2	0 5 – 60sec	5
Start Mode	1	0 – 3	0
Specified Time of Day	4	HHMM	1200
Adjustment Enable	1	0 – 1	0
Initial Report Frequency	<=2	24 12 8 6 4 3 2 1	4

Final Report Frequency	<=2	24 12 8 6 4 3 2 1	1
Hold Days	<=2	1 – 99	1
Continuous Mode	1	0 1 2	0
Continuous Send Interval	<=4	0 1 – 1440min	5
Battery Low Percentage	<=2	0 5 – 30	20
Sensor Enable	1	0 1	0
GSM Report	1	0 1 2 3	0
Reserved	0		
Reserved	0		
Reserved	0		
AGPS Mode	1	0 2	0
Week Report Selection	14		
Resend Interval	<=4	0 30 – 1380min	0
Component Expansion Mask	<=4	0000 – FFFF	
Report Count	<=5	0-65535	
Max Count	<=5	1-65535	
Battery Type	1	0 1	0
Alarm Time	<=200	0 – 9 '*' '+' ' '	
Battery Percentage Mode	1	0 1 2	0
TMA	3	TMA	TMA
Time Zone	5	- +HHMM	
Daylight Saving	1	0 1	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
NMD	3	NMD	NMD
Mode	1	0-F	
Non-movement Duration	<=3	1 – 200(x15sec)	
Movement Duration	<=2	3 – 50(x256ms)	
Movement Threshold	2	5 – 25	
Rest Send Interval	<=4	0 1 – 1440min	
Reserved	0		
Reserved	0		
Reserved	0		
GEO	3	GEO	GEO
GEO ID0	1	0	0

Report Mode	1	0 – 3	
Longitude	<=11	±xxx.xxxxxx	
Latitude	<=10	±xx.xxxxxx	
Radius	<=7	50 – 6000000m	
Check Interval	<=5	5 – 1440min	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved			
Reserved			
Reserved			
GEO ID1	1	1	1
Report Mode	1	0 – 3	
Longitude	<=11	±xxx.xxxxxx	
Latitude	<=10	±xx.xxxxxx	
Radius	<=7	50 – 6000000m	
Check Interval	<=4	5 – 1440min	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved			
Reserved			
Reserved			
GEO ID2	1	2	2
Report Mode	1	0 – 3	
Longitude	<=11	±xxx.xxxxxx	
Latitude	<=10	±xx.xxxxxx	
Radius	<=7	50 – 6000000m	
Check Interval	<=4	5 – 1440min	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved			
Reserved			
Reserved			
GEO ID3	1	3	3

Report Mode	1	0 – 3	
Longitude	<=11	±xxx.xxxxxx	
Latitude	<=10	±xx.xxxxxx	
Radius	<=7	50 – 6000000m	
Check Interval	<=4	5 – 1440min	
Reserved			
Reserved			
Reserved			
Reserved			
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
GEO ID4	1	4	4
Report Mode	1	0 – 3	
Longitude	<=11	±xxx.xxxxxx	
Latitude	<=10	±xx.xxxxxx	
Radius	<=7	50 – 6000000m	
Check Interval	<=4	5 – 1440min	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved			
Reserved			
Reserved			
Reserved			
PIN	3	PIN	PIN
Enable Auto-unlock PIN	1	0 1	
PIN	4 – 8	'0' – '9'	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
LSA	3	LSA	LSA
Mode	1	0 1 2	0
Sensitivity Threshold	<= 2	1 – 10	3
Duration	<= 4	0 – 1200 (unit: 3sec)	1
Send Interval	<= 4	0 5 – 300 sec	0
End Report	1	0 1	0

Report Mode	1	1 2 3	2
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
DOG	3	DOG	DOG
Mode	1	0 1	0
Reserved	0		
Interval	<=2	1 – 30 day	30
Time	4	HHMM	0200
Reserved	0		
Report Before Reboot	1	0 1	1
Reserved	0		
Reserved	0		
GSM Interval	4	0 5-1440 min	60
Send Failure Timeout	4	0 5-1440 min	60
Reserved	0		
PDS	3	PDS	PDS
Mode	1	0 1 2	
Mask	4	0000-FFFF	
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

Note: Regardless of the <Report Mode> setting, **+RESP:GTALL** is only reported through GPRS. If the current report mode is forced SMS mode, **+RESP:GTALL** will be reported via TCP short connection.

- **+RESP:GTALS:** The report for real time query of the configuration of a single command. The following takes **AT+GTSRI** as an example.

Example:

```
+RESP:GTALS,440200,135790246811220,GL520-31,SRI,2,,1,180.167.27.58,10116,192.0.0.0,0,,5,1,0,,,,,20170830080912,0436$
```

Parameter	Length (byte)	Range / Format	Default
Protocol Version	6	XX0000 – XXFFFF,	

		$X \in \{'A'-'Z', '0'-'9'\}$	
Unique ID	15	IMEI	
Device Name	20		
SRI	3	SRI	SRI
Report Mode	1	0 – 5	
Reserved	0		
Buffer Enable	1	0 1	
Main Server IP / Domain Name	<=60		
Main Server Port	<=5	0 – 65535	
Backup Server IP	<=15		
Backup Server Port	<=5	0 – 65535	
SMS Gateway	<=20		
Heartbeat Interval	<=3	0 10 – 360min	
SACK Enable	1	0 1	
SMS Confirmation Enable	1	0 1	
Reserved	0		
Reserved	0		
Reserved	0		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- **+RESP:GTCID:** The report for real time operation of the subcommand CID.

Example:			
+RESP:GTCID,440100,135790246811220,,898600810906F8048812,20100214093254,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF, $X \in \{'A'-'Z', '0'-'9'\}$	
Unique ID	15	IMEI	
Device Name	<=10		
ICCID	20		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- **+RESP:GTCSQ:** The report for real time operation of the subcommand CSQ.

Example:			
+RESP:GTCSQ,440100,135790246811220,,16,0,20100214093254,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF,	

		$X \in \{'A'-'Z', '0'-'9'\}$	
Unique ID	15	IMEI	
Device Name	≤ 10		
CSQ RSSI	≤ 2	0 – 31 99	
CSQ BER	≤ 2	0 – 7 99	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

➤ **+RESP:GTTMZ:** The report for real time operation of the subcommand **TMZ**.

Example:			
+RESP:GTTMZ,440100,135790246811220,-0330,0,20100214093254,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, $X \in \{'A'-'Z', '0'-'9'\}$	
Unique ID	15	IMEI	
Device Name	≤ 10		
Time Zone Offset	5	\pm HHMM	
Daylight Saving	1	0 1	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

3.3.3. Event Report

The following event reports are triggered when certain event occurs.

+RESP:GTPNA: The device is activated.

+RESP:GTBPL: Battery low report

+RESP:GTPDP: GPRS PDP connection report

+RESP:GTGSM: The report for the information of the serving cell and the neighbor cells

+RESP:GTLBS: Location by base station. It is reported when *<GPS Enable>* is disabled.

When *<GPS Enable>* is enabled, the last known GPS information and the current GSM network information are included in the **+RESP:GTBPL** event reports.

➤ **+RESP:GTPNA,**

Example:			
+RESP:GTPNA,440100,135790246811220,gl520,4,20100214093254,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, $X \in \{'A'-'Z', '0'-'9'\}$	

Unique ID	15	IMEI	
Device Name	<=10		
Power On Type	1	2- 8 10	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

◇ <Power On Type>: The type of device activation.

- 1: Device activated by sensor motion
- 2: Device activated at specified time
- 3: Device activated by light sensor event
- 4: First power on by hand
- 5: Power on by RTO reboot command and DOG reboot
- 6: Device rebooted due to MCU error
- 7: Device rebooted due to RTC error
- 8: Device rebooted due to FOTA process.
- 10: Device rebooted due to BB error

➤ +RESP:GTPDP,

Example:			
+RESP:GTPDP,440100,135790246811220,,20100214093254,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

➤ +RESP:GTBPL,

Example:			
+RESP:GTBPL,440100,135790246811220,GL520,,,10,0,0.5,0,0.1,121.390978,31.164529,20130228202357,0460,0000,1877,0873,,,,,20130228202742,018B\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
Movement Status	1	0 1 2	
Reserved	0		
Battery Voltage	<=3	0 – 100	

Percentage			
GPS Accuracy	<=2	0 1 – 50	
Speed	<=5	0.0 – 999.9km/h	
Azimuth	<=3	0 – 359	
Altitude	<=8	±XXXXX.X m	
Last Longitude	<=11	±XXX.XXXXXX	
Last Latitude	<=10	±XX.XXXXXX	
GPS UTC Time	14	YYYYMMDDHHMMSS	
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4	XXXX	
Cell ID	4	XXXX	
Reserved	0		
Reserved	0		
Component Expansion Mask	= 4	0000 – FFFF	0000
CSQ RSSI (Optional)	<=2	0 – 31 99	
CSQ BER (Optional)	<=2	0 – 7 99	
Number of Satellites (Optional)	<=2		
Report Count (Optional)	<=5	0-65535	
Max Count (Optional)	<=5	1-65535	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

✧ <Last Longitude>: The longitude of the last position. The format is “(-)xxx.xxxxx” and the value range is from “-180.000000” to “180.000000”. The unit is degree. West longitude is defined as negative starting with the minus sign “-” and east longitude is defined as positive without “+”.

✧ <Last Latitude>: The latitude of the last position. The format is “(-)xx.xxxxx” and the value range is from “-90.000000” to “90.000000”. The unit is degree. South latitude is defined as negative starting with the minus sign “-” and north latitude is defined as positive without “+”.

➤ **+RESP:GTGSM,**

Example:
+RESP:GTGSM,440100,135790246811220,CTN,0460,0000,1877,0871,27,,0460,0000,1806,315
2,27,,0460,0000,1806,2152,17,,0460,0000,1877,03A3,13,,,,,,,,,,,,,0460,0000,1877,0873,31,,20
130316013544,034B\$

Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈	

		{'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Fix Type	3	STR CTN RTL NMR	
MCC1	4	0XXX	
MNC1	4	0XXX	
LAC1	4		
Cell ID1	4		
RX Level1	2	0-63	
Reserved	0		
MCC2	4	0XXX	
MNC2	4	0XXX	
LAC2	4		
Cell ID2	4		
RX Level2	2	0-63	
Reserved	0		
MCC3	4	0XXX	
MNC3	4	0XXX	
LAC3	4		
Cell ID3	4		
RX Level3	2	0-63	
Reserved	0		
MCC4	4	0XXX	
MNC4	4	0XXX	
LAC4	4		
Cell ID4	4		
RX Level4	2	0-63	
Reserved	0		
MCC5	4	0XXX	
MNC5	4	0XXX	
LAC5	4		
Cell ID5	4		
RX Level5	2	0-63	
Reserved	0		
MCC6	4	0XXX	
MNC6	4	0XXX	
LAC6	4		
Cell ID6	4		
RX Level6	2	0-63	
Reserved	0		
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4		

Cell ID	4		
RX Level	2	0-63	
Battery Percentage	3	0-100	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

- ✧ **<Fix Type>**: A string to indicate what kind of GPS fix this cell information is for.
 - "STR": This cell information is for STR request.
 - "CTN": This cell information is for CTN request.
 - "RTL": This cell information is for RTL request.
 - "NMR": This cell information is for NMR request.
- ✧ **<MCC (i)>**: MCC of the neighbor cell *i* (*i* is the index of the neighbor cell).
- ✧ **<MNC (i)>**: MNC of the neighbor cell *i*.
- ✧ **<LAC (i)>**: LAC (in hex format) of the neighbor cell *i*.
- ✧ **<Cell ID (i)>**: Cell ID (in hex format) of the neighbor cell *i*.
- ✧ **<RX Level (i)>**: The signal strength of the neighbor cell *i*. This parameter is a 6-bit value coded in 1 dB steps:
 - 0: -110 dBm
 - 1 to 62: -109 to -48 dBm
 - 63: -47 dBm
- ✧ **<MCC>**: MCC of the 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 only several neighbor cells (or even no neighbor cell). If there is no neighbor cell, all the fields of the neighbor cell will be empty.
2. "ffff" in the fields of **<LAC(i)>** and **<Cell ID(i)>** means the device doesn't know the value.
3. This message cannot be sent via SMS.

➤ **+RESP:GTLBS,**

Example:			
+RESP:GTLBS,440100,135790246811220,GL520,0,0,25,0,,,,,0460,0000,5663,5a02,13,,0460,0000,5678,2079,8,,0460,0000,5678,2d80,3,,0460,0000,5678,2078,3,,0460,0000,5663,b654,3,,,,,,,,,0460,0000,5663,5a01,5,,20161009201000,0228\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXXFFF, X ∈ {'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
Trigger Type	1	0 – 4 6	

Report Type	1	0 1 2 4 5	
Battery Percentage	3	0-100	
Light Level	2	0 – 10	
Movement Status	1	0 1 2	
Reserved	0		
Reserved	0		
Component Expansion Mask	= 4	0000 – FFFF	0000
MCC1	4	0XXX	
MNC1	4	0XXX	
LAC1	4		
Cell ID1	4		
RX Level1	2	0-63	
Reserved	0		
MCC2	4	0XXX	
MNC2	4	0XXX	
LAC2	4		
Cell ID2	4		
RX Level2	2	0-63	
Reserved	0		
MCC3	4	0XXX	
MNC3	4	0XXX	
LAC3	4		
Cell ID3	4		
RX Level3	2	0-63	
Reserved	0		
MCC4	4	0XXX	
MNC4	4	0XXX	
LAC4	4		
Cell ID4	4		
RX Level4	2	0-63	
Reserved	0		
MCC5	4	0XXX	
MNC5	4	0XXX	
LAC5	4		
Cell ID5	4		
RX Level5	2	0-63	
Reserved	0		
MCC6	4	0XXX	
MNC6	4	0XXX	
LAC6	4		
Cell ID6	4		

RX Level6	2	0-63	
Reserved	0		
MCC	4	0XXX	
MNC	4	0XXX	
LAC	4		
Cell ID	4		
RX Level	2	0-63	
Reserved	0		
CSQ RSSI (Optional)	<=2	0 – 31 99	
CSQ BER (Optional)	<=2	0 – 7 99	
Number of Satellites (Optional)	<=2		
Report Count (Optional)	<=5	0-65535	
Max Count (Optional)	<=5	1-65535	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

✧ *<Trigger Type>*: The type of the message which is changed to **+RESP:GTLBS** when *<GPS Enable>* is disabled:

- 0: **+RESP:GTSTR**
- 1: **+RESP:GTCTN**
- 2: **+RESP:GTLSA**
- 3: **+RESP:GTBPL**
- 4: **+RESP:GTDOG**
- 6: **+RESP:GTNMR**

✧ *<Report Type>*: The type of the report **+RESP:GTLSA** and **+RESP:GTDOG**. For other messages, it is reserved.

- For **+RESP:GTDOG**
 - 0: Reboot message for time based working mode
 - 4: Reboot message for GSM watchdog
 - 5: Reboot message for send failure watchdog
- For **+RESP:GTLSA**
 - 1: The light intensity detected is higher than predefined sensitivity threshold.
 - 2: The light intensity detected is lower than predefined sensitivity threshold.
- For **+RESP:GTNMR**
 - 0: The state of the device changes from motion to rest.
 - 1: The state of the device changes from rest to motion.

✧ *<Movement Status>*: The movement status of the terminal.

- 0: Rest
- 1: Motion
- 2: Sensor disabled

- ✧ <MCC (i)>: MCC of the neighbor cell *i* (*i* is the index of the neighbor cell).
- ✧ <MNC (i)>: MNC of the neighbor cell *i*.
- ✧ <LAC (i)>: LAC (in hex format) of the neighbor cell *i*.
- ✧ <Cell ID (i)>: Cell ID (in hex format) of the neighbor cell *i*.
- ✧ <RX Level (i)>: The signal strength of the neighbor cell *i*. This parameter is a 6-bit value coded in 1 dB steps:
 - 0: -110 dBm
 - 1 to 62: -109 to -48 dBm
 - 63: -47 dBm
- ✧ <MCC>: MCC of the 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 only several neighbor cells (or even no neighbor cell). If there is no neighbor cell, all the fields of the neighbor cell will be empty.
2. "ffff" in the fields of <LAC(i)> and <Cell ID(i)> means the device doesn't know the value.
3. This message cannot be sent via SMS.

3.3.4. Buffer Report

If the BUFFER function is enabled, the device will save the message into the BUFFER in the following circumstances.

- ✧ No GSM signal.
- ✧ Failed to activate GPRS context for the TCP or UDP connection.
- ✧ Failed to establish the TCP connection with the backend server.

These messages will be sent to the backend server when the connection between the terminal and the backend server allows it. The device can save up to 1000 messages at most.

- ✧ Only **+RESP** messages except **+RESP:GTPDP** and **+RESP:GTALL** can be buffered.
- ✧ In the buffer report, the original header string "**+RESP**" is replaced by "**+BUFF**" while keeps the other content untouched including the original sending time and Count Number.
- ✧ Buffered messages will be sent only via GPRS by TCP or UDP protocol. They cannot be sent via SMS. If the current report mode is forced SMS mode, the buffered messages will not be sent until the report mode is changed to TCP or UDP.
- ✧ The buffered messages will be sent after normal messages if <Buffer Mode> in **AT+GTSRI** is set to 1

Example:

The following is an example of the buffered message:

```
+BUFF:GTCTN,440100,135790246811220,GL520,0,0,,,81,,,0,0.1,0,0.3,121.390875,31.164600,20130312183936,0460,0000,1877,0873,,,,,20130312190551,0304$
```

3.4. Heartbeat

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

➤ **+ACK:GTHBD,**

Example:			
+ACK:GTHBD,440100,135790246811220,,20100214093254,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

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

➤ **+SACK:GTHBD,**

Example:			
+SACK:GTHBD,440100,11F0\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

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

3.5. Sever Acknowledgement

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

➤ **+SACK:**

Example:			
----------	--	--	--

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

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

3.6. Debug Report

If the device running problems occur, the device will send the debug report **+RESP:GTLOG** to the backend server. Please send this message to our technical support.

➤ **+RESP:GTLOG,**

Example:			
+RESP:GTLOG,440100,868487002013753,GL520,Read_RTC_Time:20140719023250,READ_RTC_alarm_time:week:0,month:0,day:0,hour:2,minute:40,second:0,,BB_LOG_INFO:[2]:98,[3]:45,[4]:01,[5]:02,[6]:82,[7]:00,,20140719023319,002A\$			
Parameter	Length (byte)	Range/Format	Default
Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
Unique ID	15	IMEI	
Device Name	<=10		
Log Data	<=450	'0' – '9', 'a' – 'z', 'A' – 'Z'	
Send Time	14	YYYYMMDDHHMMSS	
Count Number	4	0000 – FFFF	
Tail Character	1	\$	\$

Appendix: Message Index

✧ Command and ACK

AT+GTQSS

+ACK:GTQSS

AT+GTBSI

+ACK:GTBSI

AT+GTSRI

+ACK:GTSRI

AT+GTGBC

+ACK:GTGBC

AT+GTTMA

+ACK:GTTMA

AT+GTGEO

+ACK:GTGEO

AT+GTRTO

+ACK:GTRTO

AT+GTPIN

+ACK:GTPIN

AT+GTLSA

+ACK:GTLSA

AT+GTDOG

+ACK:GTDOG

AT+GTPDS

+ACK:GTPDS

AT+GTNMD

+ACK:GTNMD

AT+GTONE

+ACK:GTONE

AT+GTABC

+ACK:GTABC

✧ Position Related Report

+RESP:GTSTR

+RESP:GTGEO

+RESP:GTRTL

+RESP:GTCTN

+RESP:GTLSA

+RESP:GTDOG

+RESP:GTNMR

✧ Report for Querying

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+RESP:GTCID
+RESP:GTCSQ
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✧ **Event Report**

+RESP:GTPNA
+RESP:GTBPL
+RESP:GTLBS
+RESP:GTPDP
+RESP:GTGSM

✧ **Heartbeat**

+ACK:GTHBD
+SACK:GTHBD

✧ **Server Acknowledgement**

+SACK

✧ **Debug Report**

+RESP:GTLOG

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