



# ZK Series @Track Air Interface Protocol

LTE Cat-M1/LTE Cat-NB/UMTS/GPRS/GNSS Tracker

QSZTRACZKAN803D

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## 0. Revision History

Version	Date	Author	Description of Change
80.00 to 80.29	2018-05-18 to 2019-12-16	Kerwin Shen	First release up to version 80.29: The change descriptions were removed to reduce the size of the document.
80.2A	2019-12-27	Kerwin Shen	<ol style="list-style-type: none"> <li>1. Added AT+GTHLM command.</li> <li>2. Modify +RESP:GTCVR report.</li> <li>3. Added Sub-command 21 into AT+GTRTO.</li> <li>4. Added +RESP:GTHLM report.</li> </ol>
80.2B	2020-01-13	Kerwin Shen	<ol style="list-style-type: none"> <li>1. Modify AT+GTHLM command.</li> <li>2. Added Sub-command 22 into AT+GTRTO.</li> <li>3. Modify +RESP:GTQSN report.</li> </ol>
80.2C	2020-03-02	Kerwin Shen	<ol style="list-style-type: none"> <li>1. Added AT+GTNAL command.</li> <li>2. The &lt;Parameter 1&gt; in AT+GTRTO command is used for Sub-command C (Query).</li> <li>3. Corrected some of the descriptions.</li> </ol>
80.2D	2020-03-20	Kerwin Shen	<ol style="list-style-type: none"> <li>1. Defined the &lt;Helmet Box Status Mask&gt; field in +RESP:GTCVR report.</li> <li>2. Defined the &lt;Brake Force&gt; field in AT+GTECC command for ES300/ES400.</li> <li>3. Modify AT+GTMEL command.</li> </ol>
80.2E	2020-05-20	Kerwin Shen	<ol style="list-style-type: none"> <li>1. Added AT+GTBND command.</li> <li>2. Added +RESP:GTBND report.</li> <li>3. Defined the &lt;Helmet ID Recognition&gt; field in +RESP:GTCVR report.</li> <li>4. Defined the &lt;Use GPS Raw Data&gt; field in AT+GTFRI command.</li> <li>5. Modified the value range of &lt;Motion Data Collection Duration&gt; parameter in the AT+GTDCC command.</li> </ol>
80.2F	2020-05-20	Kerwin Shen	<ol style="list-style-type: none"> <li>1. Defined &lt;Rear Lamp Working Mode&gt; field in AT+GTECC command.</li> <li>2. Corrected descriptions.</li> </ol>
80.30	2020-08-11	Dean Zhu	<ol style="list-style-type: none"> <li>1. Add Battery Lock B (CAN) in AT+GTVAD.</li> </ol>
80.31	2020-08-17	Dean Zhu	<ol style="list-style-type: none"> <li>1. Changed Battery Lock C (CAN) to Battery Lock A (CAN) in AT+GTVAD.</li> <li>2. Added +RESP:GTBMI to report battery special information.</li> <li>3. Added &lt;Boost Level&gt; and &lt;Lock Level&gt; in AT+GTECC.</li> <li>4. Added AT+GTCAT command.</li> <li>5. Added new error code "0200000000000000" for</li> </ol>

			the result of the torque pedal is not in position.
80.32	2020-08-17	Dean Zhu	1. Modified the description of <Rear Lamp Working Mode> in AT+GTECC.
80.33	2020-09-18	Dean Zhu	1. Added Helmet Box Lock B (CAN) in AT+GTMEL. 2. Modified the range of <Unlock Send Interval> to 3 – 86400 sec in AT+GTFRI
80.34	2020-10-30	Dean Zhu	1. Change the minimum value of <Heartbeat Interval> in AT+GTQSS.
80.35	2020-11-03	Dean Zhu	1. Added +RESP: GTNFC report.
80.36	2020-11-05	Dean Zhu	1. Added <Sensor Wake Up> in AT+GTCFG. 2. Added <RGB Setting> in AT+GTLED. 3. Added new modes (2, 3) in <LED Work Mode> in AT+GTLED.
80.37	2020-11-16	Dean Zhu	1. Added AT+GTBTS command. 2. Added <Status Light Mode> in AT+GTLED. 3. Added new type in <Parameter1> in AT+GTRTO.
80.38	2020-12-01	Dean Zhu	1. Added AT+GTRMD command.
80.39	2020-12-28	Dean Zhu	1. Added new lock type 4 in +RESP:GTMLS. 2. Added <Rear Lamp Working Mode> 3 in AT+GTECC.
80.3A	2021-01-25	Dean Zhu	1. Added AT+GTCIC command. 2. Added <Multiple Mechanical Lock Enable Mask> in AT+GTMEL. 3. Added the description of AT+GTXWM in +RESP:GTALC.
80.3B	2021-02-22	Dean Zhu	1. Added region Korea in <b>AT+GTQSS</b> command.
80.3C	2021-03-28	Dean Zhu	1. Added <Offline RGB Setting> in <b>AT+GTHLM</b> command. 2. Added <Push Mode> in <b>AT+GTCIC</b> command.
80.3D	2021-04-22	Dean Zhu	1. Added <b>AT+GTBMI</b> command.

## 1. Overview

### 1.1. Scope

The @Track Air Interface Protocol, a digital communication interface based on printable ASCII characters over network, is used for all communication between the backend server and the terminal. The backend server sends a command to the terminal and then the terminal confirms with an Acknowledgement message. If necessary, the terminal also sends messages to the backend server.

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

### 1.2. Terms and Abbreviations

Abbreviation	Description
APN	Access Point Name
ASCII	American National Standard Code for Information Interchange
BLE	Bluetooth Low Energy
ECU	Electronic Control Unit
GPRS	General Packet Radio Service
GSM	Global System for Mobile Communication
HDOP	Horizontal Dilution of Precision
ICCID	Integrated Circuit Card Identity
IoT	Internet of Things
IP	Internet Protocol
LTE	Long Term Evolution
TCP	Transmission Control Protocol
UMTS	Universal Mobile Telecommunications System
UTC	Coordinated Universal Time

## 2. System Architecture

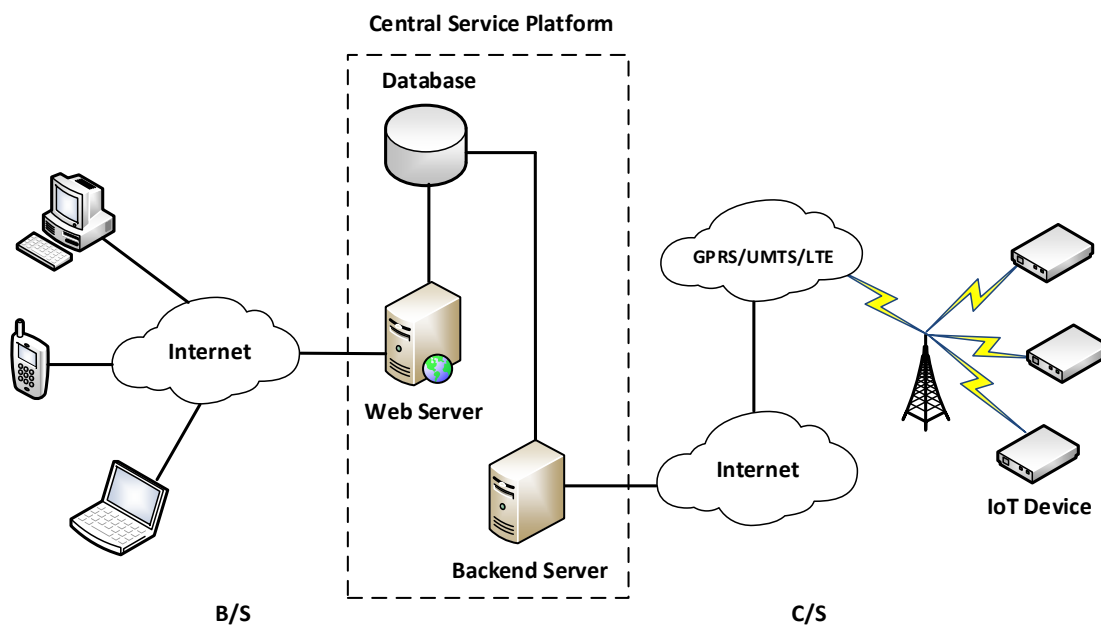


Figure 1 System Architecture

The backend server can be accessed by multiple terminals and should have the following abilities:

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

### 3. Message Description

#### 3.1. Message Format

All of the @Track Air Interface Protocol messages are composed of printable ASCII characters. Each message has the following format:

Message Format	Message Type
AT+GTXXX=<parameter1>, <parameter2>, ... \$	Command
+ACK:GTXXX, <parameter1>, <parameter2>, ... \$	Acknowledgment
+RESP:GTXXX,<parameter1>,<parameter2>,...\$	Report

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

The characters 'XXX' identify different message.

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

Detailed descriptions of each message format are located in the specific message sections.

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

The device can send other Reports to the server by configuring related parameters. Please see the following figure:

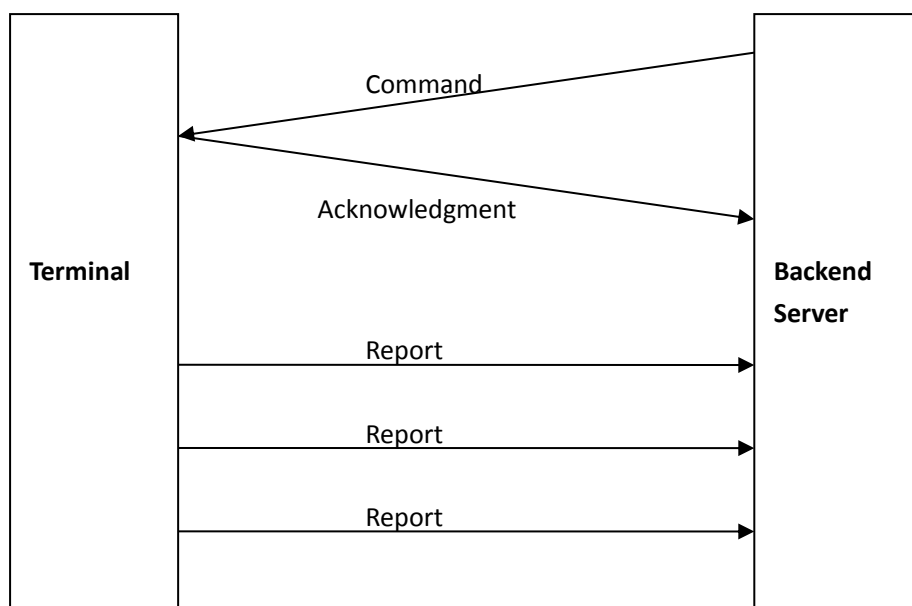


Figure 2 @Track Protocol Message Flow

When the device receives Commands over the air, it supports several Commands in one network packet without separating symbol between the Commands.

```

AT+GTFRI=zK102,1,0,300,600,,,,,FFFF$
AT+GTD0G=zK102,0,,30,0200,,1,0,60,60,,,,,FFFF$
AT+GTTMA=zK102,+,0,0,0,,,,,FFFF$
    
```

There are three Commands (**AT+GTFRI**, **AT+GTD0G** and **AT+GTTMA**) in the above message. And

the terminal will handle the three Commands one by one after it receives the message and it will report the following three Acknowledgement messages to the backend server one by one.

```
+ACK:GTFRI,EF8001,352948070088053,ZK102,,0007,20170120113143,0285$
+ACK:GTD0G,EF8001,352948070088053,ZK102,,0008,20170120113143,0286$
+ACK:GTTMA,EF8001,352948070088053,ZK102,,0009,20170120113143,0287$
```

### 3.2. Acknowledgement

When the device receives an 'AT+GTXXX' command, it will respond the message '+ACK:GTXXX'. The characters 'XXX' allow the identification of different messages. For example, when command 'AT+GTFRI' is received, message '+ACK:GTFRI' will be responded.

**Note:**

- (1) If the backend server received the acknowledgement after sending the command to device, it means that the command has been received successfully. If the command received by the device is not in correct format or if the parameter is incorrect, the command would not be executed and the acknowledgement would not be sent.
- (2) Specially, the **+ACK:GTHBD** is used for heartbeat function. Please refer to the chapter 'Heartbeat'.

The acknowledgement format for most commands is shown below:

➤ **+ACK:GTXXX,**

Example:				
+ACK:GTFRI,EF8001,352948070088053,ZK105,,0223,20170120114229,028E\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 - XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','_'	
4	Reserved	0		
5	Serial Number	4	0000 – FFFF	
6	Generated Time	14	YYYYMMDDHHMMSS	
7	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

Specially, the acknowledgement format for **AT+GTRTO** command is shown below:

➤ **+ACK:GTRTO,**

Example:				
+ACK:GTRTO,EF8001,352948070088053,ZK105,,VER,0227,20170120114610,0293\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 - XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','_'	
4	Reserved	0		
5	Sub Command	<=6	Sub command string	
6	Serial Number	4	0000 – FFFF	

7	Generated Time	14	YYYYMMDDHHMMSS	
8	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Sub Command>: Indicates the <Sub Command> of **AT+GTRTO**. (Please refer to description of **AT+GTRTO** command).
- ✧ <Serial Number>: A serial number which is the same as the <Serial Number> in the corresponding command. It is used to distinguish which command the ACK message is for.
- ✧ <Generated Time>: The local time to indicate when the message is generated.
- ✧ <Count Number>: A self-increasing count number in each acknowledgement message and other messages. It begins from “0000” and increases by 1 for each message. It rolls back after “FFFF”. And when the device reboots, the <Count Number> will restart from “0000”.
- ✧ <Tail Character>: A character to indicate the end of the command. It must be ‘\$’.

### 3.3. Heartbeat

Heartbeat is used to maintain the connection between the device and the backend server if the communication is via network. The heartbeat package is sent to the backend server at the interval specified by <Heartbeat Interval> in **AT+GTQSS** command.

#### 3.3.1. +ACK:GTHBD - Heartbeat Report

➤ **+ACK:GTHBD,**

<b>Example:</b> <b>+ACK:GTHBD,EF801C,862061041674804,ZK105,jFf;Xt3BXt(BjVzJQA%Q,20190816020036,0035\$</b>				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 - XXFFFF, X ∈ {'A'-'Z', '0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9', 'a'-'z', 'A'-'Z', '-', '_'	
4	BLE Command Password	<=20		
5	Generated Time	14	YYYYMMDDHHMMSS	
6	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <BLE Command Password>: The device will generate the random password. This password will report to the server by the '+ACK:GTHBD' report. So that the user can unlock the scooter by the unlock command with this password via the Bluetooth. Once the password has been used, the device will generate a new password. And the old password will become invalid when the server already got the new one.

#### 3.3.2. +SACK:GTHBD - Server Acknowledgement for Heartbeat

Whenever the backend server receives a heartbeat package, it will reply an Acknowledgement to the device.

➤ **+SACK:GTHBD,**

<b>Example:</b> <b>+SACK:GTHBD,EF8001,02A1\$</b>				
---	--	--	--	--

SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 - XXFFFF, X ∈ {'A'-'Z', '0'-'9'}	
2	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's Acknowledgement to the heartbeat.

### 3.4. Server Acknowledgement

If server Acknowledgement is enabled by **AT+GTQSS** command, the backend server will reply to the device whenever it receives a message from the device.

#### 3.4.1. +SACK - Server Acknowledgement for Report

##### ➤ +SACK:

Example: +SACK:11F0\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	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's Acknowledgment.

### 3.5. Time Zone

#### 3.5.1. AT+GTTMA: Time Adjustment

The command **AT+GTTMA** is used to adjust local time.

##### ➤ AT+GTTMA=

Example: AT+GTTMA=zk105,+,0,0,0,,,,,0125\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Sign	1	+ -	+
3	Hour Offset	<=2	0 - 12	00
4	Minute Offset	<=2	0 - 59	00
5	Daylight Saving	1	0 1	0
6	UTC Time	14	YYYYMMDDHHMMSS	
7	Reserved			
8	Reserved	0		
9	Reserved	0		
10	Reserved	0		
11	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.
  - 1: Enable daylight saving.
- ✧ <UTC Time>: It is used to adjust the local time. The range is from 19700101000000 to 20341231235959.

### 3.6. Network

#### 3.6.1. AT+GTQSS: Network Configuration

➤ AT+GTQSS=

Example: AT+GTQSS=zk105,APN,,,3,1,1,218.17.46.11,77,0,0,,0,0,0,ZK105,0001\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	APN	< 40	'0'–'9','a'–'z','A'–'Z','-',','	
3	APN User Name	<=30		
4	APN Password	<=30		
5	Report Mode	1	0 3	0
6	Network Mode	1	0 1 2 3	0
7	Enable Buffer	1	0 1 2	0
8	Main Server IP/Domain Name	<=60		
9	Main Server Port	<=5	0 – 65535	0
10	LTE Mode	1	0-3	2
11	Region	<=1	0 1 2 3 4 5 6	0
12	Reserved	0		
13	Heartbeat Interval	<=3	0 1 – 360min	5
14	Enable SACK	1	0 1 2	0
15	Enable BLE Unlock	1	0 1	0
16	BLE Broadcast Name	<=9	'0'–'9','a'–'z','A'–'Z','-',','_'	ZK10*
17	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Password>: The valid characters of password are 0–9, a–z, and A–Z. The default value zk10\* means one of zk100/zk102/zk105.
- ✧ <APN>: Access point name. If this field is empty, the APN will be cleared.  
**Note:** The last character cannot be a dot.
- ✧ <APN User Name>: The network APN user name. If the parameter field is empty, the current value of this parameter will be cleared.
- ✧ <APN Password>: The network APN password. If the parameter field is empty, the current value of this parameter will be cleared.
- ✧ <Report Mode>: 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 by using the heartbeat data. Please note that in this mode the backend server should respond to the heartbeat data from the terminals.
- ✧ <Network Mode>: Mobile network modes of the device.
- 0: Auto.
  - 1: GSM only.
  - 2: LTE only. Only valid for the modem module which has 4G network function.
  - 3: 3G only. Only valid for the modem module which has 3G network function.
- ✧ <Enable Buffer>: Enable or disable BUFFER function.
- 0: Disable the BUFFER function.
  - 1: Enable the BUFFER function.
  - 2: High priority. The buffer report function is enabled and the device will send all the buffered reports before sending real-time reports except high priority message (for example: **+RESP:GTUPD**).
- ✧ <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.
- ✧ <LTE Mode>: Select LTE network mode.
- 0: Cat-M1 & Cat-NB. (Cat-M1 First)
  - 1: Cat-NB & Cat-M1. (Cat-NB First)
  - 2: Cat-M1.
  - 3: Cat-NB.

**Note:** The <LTE Mode> is only valid for the modem module with LTE CAT-M1 and/or CAT-NB. And only when the <Network Mode> is 0 or 2, <LTE Mode> is valid.

- ✧ <Region>: Select the region where the device is located.
- 0: Global.
  - 1: America.
  - 2: Europe.
  - 3: Brazil.
  - 4: China.
  - 5: Australia.
  - 6: Korea.

**Note:**

By selecting the appropriate region for the device, the speed of connecting to the server will increase.

- ✧ <Heartbeat Interval>: The interval for the terminal to send heartbeat package message to the backend server. If it is set to 0, no heartbeat package message will be sent.
- ✧ <Enable SACK>: 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 will reply with a SACK message after receiving a message from the device.

- 2: the backend server replies with a SACK message after receiving a message from the terminal, but the terminal does not check the serial number of the SACK message.
- ✧ <Enable BLE Unlock>: To indicate whether the device supports 'unlock the scooter via Bluetooth'.
  - 0: Disable Bluetooth Unlock Scooter.
  - 1: Enable Bluetooth Unlock Scooter.
- ✧ <BLE Broadcast Name>: Specify the Bluetooth broadcast name. The default value ZK10\* means one of ZK100/ZK102/ZK105.
- ✧ <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 "\$".

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

- No network signal.
- Failed to activate network context for the TCP connection.
- Failed to establish the TCP connection with the backend server.

These messages will be sent to the backend server after the message can be sent to the backend server. The buffer reports are saved to the built-in non-volatile memory in case the device is reset.

**Note:**

- Only +RESP messages can be buffered.
- In the buffer report, the original header string "+RESP" is replaced by "+BUFF". Other contents such as the original sending time and count number will be kept the same.

**Example:**

The following is an example of the buffered message:

```
+BUFF:GTFRI,EF801C,862061041674804,ZK105,,,,,0,0000000000000000,1,0.0,0,475.8,114.01639
5,22.537519,20190816014556,,0460,0000,27BD,0DFC,27&99,1,41,0,36138,4172,100,0,0,1,,0.0&
0.0&0.0&0.0&0&0&0&000000&000000&0&0&00000000000000000000&2,0,20190816014615,0
021$
```

**3.6.2. AT+GTIPN - Firmware Upgrade Server Switch**

The command **AT+GTIPN** is used to specify whether it is needed to switch server after firmware upgrade via OTA.

➤ **AT+GTIPN=**

Example:				
AT+GTIPN=zk105,1,218.17.46.60,985,,,,,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Switch Enable	1	0 1	0
3	Main Server IP/Domain Name	<=60		
4	Main Server Port	<=5	0 – 65535	0
5	Reserved	0		
6	Reserved	0		

7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
10	Reserved	0		
11	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Switch Enable>: Enable/disable switching server after firmware upgrade via OTA.
  - 0: Disable.
  - 1: Enable.

### 3.6.3. AT+GTRMD - Roaming Detection Configuration

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

#### ➤ AT+GTRMD=

Example: AT+GTRMD=zk105,1,,1,3,46000,46002,46003,,,,,0002\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Mode	1	0 1	0
3	Reserved	0		
4	Blacklist Operator Start	1	1-20	
5	Blacklist Operator End	1	1-20	
6	Black List Operator	<=6*20		
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
10	Reserved	0		
11	Reserved	0		
12	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Mode>: The working mode of the roaming detection function.
  - 0: Disable this function.
  - 1: Enable this function.
- ✧ <Blacklist Operator Start>: A numeral which indicates the first index of the blacklist operator numbers to be input. For example, if the value is 1, the device will update the black list of operators from the 1st one. If the parameter is empty, there should be no black list number following the empty value.
- ✧ <Blacklist Operator End>: A numeral which indicates the last index of the blacklist operator numbers to be input. For example, if the value is 2, the device will update the black list of operators until the 2nd one. If the parameter is empty, there should be no black list number following the empty value.

- ✧ <Black List Operator>: A blacklist of PLMN operator numbers. The numbers are composed of MCC and MNC, both of which consist of 3 digits. The last digit of MNC can be omitted (e.g., both '46001F' and '46001' are the PLMN of CHINA MOBILE). Two adjacent operator numbers are separated with ','. The number of the operators in the list is determined by the parameters <Blacklist Operator Start> and <Blacklist Operator End>. For example, if <Blacklist Operator Start> is 1 and <Blacklist Operator End> is 2, the operator list should include 2 operator numbers (empty value acceptable) and the two numbers are separated with ','.

**Note:** If more operators are needed, please adjust <Black Operator Start> and <Black 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.

### 3.6.4. +RESP:GTNCN - New Connection to Backend Server

Please refer to the chapter 'General Event Report'.

## 3.7. Watchdog

### 3.7.1. AT+GTDOG: Software Watchdog Setting

The **AT+GTDOG** command is used to reboot the device in a time based manner. This prevents the device from working in an abnormal status for a long time.

#### ➤ AT+GTDOG=

Example:				
AT+GTDOG=zk105,0,,30,0800,,1,0,480,480,480,,,,,0124\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Mode	1	0 1	1
3	Reserved	0		
4	Interval	<=2	1-30	7
5	Time	4	HHMM	0200
6	Reserved	0		
7	Report Before Reboot	1	0 1	1
8	Unit	1	0 1	0
9	No Network Interval	4	0 5-1440min	480min
10	No Activation Interval	4	0 5-1440min	480min
11	Send fail timeout	4	0 5-1440min	480min
12	Reserved	0		
13	Reserved	0		
14	Reserved	0		
15	Reserved	0		
16	Reserved	0		
17	Serial Number	4	0000 – FFFF	

	Tail Character	1	\$	\$
--	----------------	---	----	----

- ✧ <Mode>: Working mode.
  - 0: Disable this function.
  - 1: Reboot periodically according to the <Interval> and <Time> settings.
- ✧ <Interval>: The interval to reboot the device.
- ✧ <Time>: The time to perform the reboot operation when <Interval> condition is met.
- ✧ <Report Before Reboot>: Whether to report the **+RESP:GTD0G** message before reboot. 0 means "Do no report", and 1 means "Report". If this is enabled, the device will obtain a real-time location and send it to the server before reboot.
- ✧ <Unit>: Unit.
  - 0: Unit is day.
  - 1: Unit is hour.
- ✧ <No Network Interval>: The interval to reboot the device when it is in no network signal situation. 0 means "Do not reboot the device".
- ✧ <No Activation Interval>: The interval to reboot the device when PDP is unable to register or the interaction of messages fails (e.g., no TCP ACK or Server ACK). 0 means "Do not reboot the device".
- ✧ <Send Fail Timeout>: The device will reboot automatically if report sending time is greater than <Send Failure Timeout>. 0 means no rebooting the device.

### 3.7.2. +RESP:GTD0G - Device Reboot for Watchdog

Please refer to the chapter 'General Event Report'.

## 3.8. Positioning

### 3.8.1. AT+GTFRI: Fixed Report Information

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

➤ **AT+GTFRI=**

Example: AT+GTFRI=zK105,1,0,240,10,240,,,,,0223\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Mode	1	0 1	1
3	Discard No Fix	1	0 1	0
4	Lock Send Interval	<=5	5 – 86400 sec	300
5	Unlock Send Interval	<=5	3 – 86400 sec (Only ZK105C Series)   5 – 86400 sec	30
6	Backup Send Interval	<= 4	0 1 – 1440 min	240
7	Use GPS Raw Data	<=1	0 1	0
8	Reserved	0		
9	Reserved	0		
10	Reserved	0		
11	Serial Number	4	0000 – FFFF	

	Tail Character	1	\$	\$
--	----------------	---	----	----

- ✧ <Mode>: The working mode of the fixed report.
  - 0: Disable fixed report function.
  - 1: Enable the fixed time report.
- ✧ <Discard No Fix>: 0 means “Report last known GPS position if there is no GPS fix”, and 1 means “Do not send position information if there is no GPS fix”.
- ✧ <Lock Send Interval>: The period to send the position information when the device is locked. The value range is 5-86400 and the unit is second.
- ✧ <Unlock Send Interval>: The time interval to send the position information when the device is unlocked. The value range is 5-86400 and the unit is second.
- ✧ <Backup Send Interval>: The time interval to send the position information when only backup battery supply is used by the device. The unit is minute. 0 means no need to send the report in this situation. (Note: Only suitable for the devices that support backup battery)
- ✧ <Use GPS Raw Data>: Specify whether use the GPS raw data in the +RESP:GTFRI report. Setting this to empty is equivalent to setting it to 0.
  - 0: Use the optimized data.
  - 1: Use the raw data.

### 3.8.2. +RESP:GTFRI - Fix Time Report

➤ +RESP:GTFRI,

<b>Example:</b>				
+RESP:GTFRI,EF801C,862061041674804,ZK105,,,,,0,0000000000000000,1,0.0,0,475.8,114.01 6395,22.537519,20190816014556,,0460,0000,27BD,0DFC,27&99,1,41,0,36138,4172,100,0,0, 1,,0.0&0.0&0.0&0.0&0&0&0&000000&000000&0&0&00000000000000000000&2,0,201908 16014615,0021\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 – XXXFFF,X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z',' ','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z',' ','_'	
6	Reserved	0		
7	Reserved	0		
8	Report Type	1	0	
9	ECU Error Code	<=50	Please refer to the Chapter 'ECU Information'	
10	GPS Accuracy	<=2	0 1 – 50	
11	Speed	<=5	0.0 – 999.9km/h	
12	Azimuth	<=3	0 – 359	
13	Altitude	<=8	(-)xxxxx.x m	

14	Longitude	<=11	(-)xxx.xxxxxx	
15	Latitude	<=10	(-)xx.xxxxxx	
16	GPS UTC Time	14	YYYYMMDDHHMMSS	
17	Reserved	0		
18	MCC	0 4	0XXX	
19	MNC	0 4	0XXX	
20	LAC	0 4	0XXX	
21	Cell ID	<=8	XXXX XXXXXXXX	
22	CSQ	<=5	CSQ RSSI&CSQ BER	
23	Network Type	1	0-3	
24	State	2	41 42	
25	Power Supply	1	0 1	
26	Main Power Voltage	<=5	00000 – 45000mV	
27	Backup Battery Voltage	<=4	00000 – 4500mV	
28	Backup Battery Percentage	<=3	0-100	
29	ECU Error Type	1	0 1-2	
30	Alive	1	0 1	
31	ECU Lock State	1	0 1	
32	Task Id	<=40		
33	ECU Info	<= 100	Please refer to the Chapter ' <b>ECU Information</b> '	
34	Scooter Battery Percentage	<=5	0 – 100.0	
35	Generated Time	14	YYYYMMDDHHMMSS	
36	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Protocol Version>: The protocol version that the terminal conforms to. The first two characters XX indicate the device type. 'EF' means ZK102. The middle two characters represent the major version number and the last two characters represent the minor version number. And both the major version and the minor version are hex digits. For example, 0101 means version 1.01.
- ✧ <Report Type> Used to indicate the report type.  
0: Fixed interval report.
- ✧ <ECU Error Code>: The ECU's fault mask and it is in hexadecimal big-end format. Each bit indicates a fault, and if a fault occurs, the corresponding bit is set to 1. Otherwise, the field will be empty. Please refer to the Chapter '**ECU Information**'.
- ✧ <GPS Accuracy>: The HDOP defined in NMEA0183. The range of the value is 1 – 50. The smaller the value is, the higher the precision will be. Note that one thing different from NMEA0183 is that 0 means no fix here. For GPS accuracy value between 0 and 1, it is set to 1.
- ✧ <Speed>: The speed read 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.xxxxxx” and the

value range is from “-180.000000” to “180.000000”. The unit is degree. West longitude is represented as negative starting with “-” and east longitude is represented as positive without “+”.

- ✧ <Latitude>: The latitude of the current position. The format is “(-)xx.xxxxxx” and the value range is from “-90.000000” to “90.000000”. The unit is degree. South latitude is represented as negative starting with “-” and north latitude is represented as positive without “+”.
- ✧ <GPS UTC Time>: UTC time from GPS.
- ✧ <MCC>: Mobile country code. It is 3-digit in length and ranges from 000 to 999. If Bit 3 is not set to 1 in field <Report Composition Mask> within AT+GTCTFG, the length of this field is 0 in ASCII format message.
- ✧ <MNC>: Mobile network code. It is 3-digit in length and ranges from 000-999. If Bit 3 is not set to 1 in field <Report Composition Mask> within AT+GTCTFG, the length of this field is 0 in ASCII format message.
- ✧ <LAC>: Location Area Code in hex format.
- ✧ <Cell ID>: Cell ID in hex format.
- ✧ <Network Type>: The current registered network type.
  - 0: Not registered
  - 1: GSM.
  - 2: LTE.
  - 3: 3G.
- ✧ <State>: The current device state.
  - 41: Device stationary.
  - 42: Device motion.
- ✧ <Power Supply>: The current device power supply state.
  - 0: Main power supply.
  - 1: Backup battery supply.
- ✧ <Main Power Voltage>: Main power supply voltage.
- ✧ <Backup Battery Voltage>: Backup battery voltage.
- ✧ <Backup Battery Percentage>: Backup battery percentage.
- ✧ <ECU Error Type>: The ECU error type.
  - 0: Normal status.
  - 1: ECU no response.
  - 2: ECU error report.
- ✧ <Alive>: Device alive state.
  - 0: Disable riding.
  - 1: Enable riding.
- ✧ <ECU Lock State>: The state of ECU lock.
  - 0: ECU Lock is unlocked.
  - 1: ECU Lock is locked.
- ✧ <Task ID>: From the backend server through RTO command.
- ✧ <ECU Info>: The information of the ECU. Please refer to the Chapter ‘**ECU Information**’.
- ✧ <Scooter Battery Percentage>: The battery voltage percentage of scooter.

### 3.9. Movement Detection

#### 3.9.1. AT+GTNMD: Movement Detection Configuration

The **AT+GTNMD** command is used to configure the parameters for movement detection.

➤ **AT+GTNMD=**

Example:				
AT+GTNMD=zk105,2,3,5,,,,,0126\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Non-movement Duration	<=3	1 – 255 (×14sec)	2
3	Movement Duration	<=2	1 – 50 (×128ms)	3
4	Sensitivity Level	1	2 – 19	5
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
10	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Non-movement Duration>: A time parameter to determine whether the device enters non-movement status. If the motion sensor detects that the device stays in non-movement status for the period of time specified by <Non-movement Duration>, the device will be considered to be in non-movement status.
- ✧ <Movement Duration>: A time parameter to determine whether the device enters movement status. If the motion sensor detects that the device stays in movement for the period of time specified by <Movement Duration>, the device will be considered to be in movement status.
- ✧ <Sensitivity Level>: The threshold for the motion sensor to determine whether the device is in movement. The smaller the value is, the easier for the device to be considered to enter the state of movement. The range is 2~19 and 2 means most sensitive.

#### 3.9.2. AT+GTALM: Continuous Vibration Alarm

The **AT+GTALM** command is used to configure the parameters for anti-theft detection.

➤ **AT+GTALM=**

Example:				
AT+GTALM=ZK105,20,1800,,,,,0210\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Continuous Vibration Alarm	<=3	0-300 (s)	10
3	Alarm Interval	<=4	5-3600 (s)	10
4	Reserved	0		
5	Reserved	0		
6	Reserved	0		

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

- ✧ <Continuous Vibration Alarm>: When the device is locking and detects it is in a state of continuous vibration and the duration is greater than the value set by <Continuous Vibration Alarm>, **+RESP: GTALM** will be reported. 0 means to turn off this function.
- ✧ <Alarm Interval>: The interval for the device sound and light alarm when the device detects the scooter is being illegally unlocked or in vibration state.

### 3.9.3. +RESP:GTSTT - Device Motion State Change

Please refer to the chapter 'General Event Report'.

### 3.9.4. +RESP:GTALM - Continuous Vibration Alarm

Please refer to the chapter 'General Event Report'.

### 3.9.5. +RESP:GTBOV - Scooter Overturned

Please refer to the chapter 'General Event Report'.

### 3.9.6. +RESP:GTBRN - Scooter Recovered from Overturn

Please refer to the chapter 'General Event Report'.

## 3.10. ECU

### 3.10.1. AT+GTECC: ECU Parameters Configuration (OKAI ES100)

The **AT+GTECC** command is used to configure the parameters of OKAI ES100.

➤ **AT+GTECC=**

Example:				
AT+GTECC=zk102,,0,0,0,,,,,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Reserved	0		
3	Maximum Speed Limit	<=2	0 - 7	0
4	Speed Up Mode	<=1	0-1	0
5	Display Unit	1	0 1	0
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
10	Reserved	0		
11	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Maximum Speed Limit>: The degree of the scooter's maximum speed level.
  - 0: No speed limit.
  - 1: The max speed is 1 MPH
  - 2: The max speed is 2 MPH
  - 3: The max speed is 3 MPH

- 4: The max speed is 4 MPH
- 5: The max speed is 5 MPH
- 6: The max speed is 6 MPH
- 7: The max speed is 7 MPH
- ✧ <Speed Up Mode>: The speed-up mode of scooter.
  - 0: Soft mode.
  - 1: Motion mode.
- ✧ <Display Unit>: The unit of meter display.
  - 0: YD.
  - 1: KM.

### 3.10.2. AT+GTECC: ECU Parameters Configuration (OKAI ES200/ES300/ES400)

The AT+GTECC command is used to configure the parameters of OKAI ES200/ES300/ES400.

➤ **AT+GTECC=**

Example: AT+GTECC=zk105,,63,0,0,,,,,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Reserved	0		
3	Maximum Speed Limit	<=2	0 - 63 Km/h	63
4	Speed Up Mode	<=1	0-1	0
5	Display Unit	<=1	0 1	0
6	Reserved	0		
7	Brake Force	<=2	0 - 10	5
8	Rear Lamp Working Mode	<=1	0 1 2 3	0
9	Reserved	0		
10	Reserved	0		
11	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Maximum Speed Limit>: Specify the scooter's maximum speed.
- ✧ <Speed Up Mode>: The speed up mode of scooter.
  - 0: Soft mode.
  - 1: Motion mode.
- ✧ <Display Unit>: The unit of meter display.
  - 0: YD.
  - 1: KM.
- ✧ <Brake Force>: For adjusting brake force. 0 means the minimum braking force.
- ✧ <Rear Lamp Working Mode>: Specifies the working mode when the rear lamp is on.
  - 0:
    - No Brake: Low brightness.
    - Brake: Low brightness.
  - 1:
    - No Brake: High brightness.

- Brake: High brightness (No change).
- 2:
  - No Brake: Low brightness.
  - Brake: High and low brightness switching alternatively.
- 3:
  - No Brake: Low brightness.
  - Brake: High brightness.

### 3.10.3. AT+GTECC: ECU Parameters Configuration (OKAI EB100/EB200)

The AT+GTECC command is used to configure the parameters of OKAI EB100/EB200.

➤ **AT+GTECC=**

Example: AT+GTECC=zk105,,63,0,0,,,,,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Reserved	0		
3	Maximum Speed Limit	<=2	0 - 63 Km/h	63
4	Speed Up Mode	<=1	0-1	0
5	Display Unit	<=1	0 1	0
6	Boost Level	1	1 - 5	2
7	Brake Force	<=2	0 - 10	5
8	Rear Lamp Working Mode	<=1	0 1 2 3	0
9	Lock Force Level	1	0 – 5	0
10	Reserved	0		
11	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Maximum Speed Limit>: Specify the scooter's maximum speed.
- ✧ <Speed Up Mode>: The speed up mode of scooter.
  - 0: Soft mode.
  - 1: Motion mode.
- ✧ <Display Unit>: The unit of meter display.
  - 0: YD.
  - 1: KM.
- ✧ <Boost Level>: The boost level of speed.
- ✧ <Brake Force>: For adjusting brake force. 0 means the minimum braking force.
- ✧ <Rear Lamp Working Mode>: Specifies the working mode when the rear lamp is on.
  - 0:
    - No Brake: Low brightness.
    - Brake: High brightness.
  - 1:
    - No Brake: High brightness.
    - Brake: High brightness (No changed).
  - 2:
    - No Brake: Low brightness.

- Brake: High and low brightness switching alternatively.
- 3:
  - No Brake: Low brightness.
  - Brake: High brightness.
- ✧ <Lock Force Level>: The level of lock scooter. 0 means no lock scooter.

### 3.10.4. AT+GTCIC: Scooter initialization Configuration

The command **AT+GTCIC** is used to configure the parameters for scooter initialization state.

➤ **AT+GTCIC=**

Example: AT+GTCIC=zk105,1,0,,,,,,0002\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9' 'a' – 'z' 'A' – 'Z'	zk10*
2	ECU Throttle Enable	1	0 1	1
3	Wireless Charge Enable	1	0 1	0
4	Push Mode	1	0 1	0
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
11	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <ECU Throttle Enable>: The working mode of the ECU Throttle. It is associated with <Maximum Speed Limit> in **AT+GTECC**. If <ECU Throttle Enable> is set to 0, the <Maximum Speed Limit> will not work.
  - 0: Disable this function.
  - 1: Enable this function.
- ✧ <Wireless Charge Enable>: It is used to indicate whether to enable wireless charging.
  - 0: Disable this function.
  - 1: Enable this function.
- ✧ <Push Mode>: It is used to indicate whether to enable push mode.
  - 0: Disable this function.
  - 1: Enable this function.

### 3.10.5. AT+GTBMI: Battery Manager Information

The **AT+GTBMI** command is used to report battery manager information.

➤ **AT+GTBMI=**

Example: AT+GTBMI= zk105,1,60,30,,,,,,0223\$				
SN	Parameter	Length	Range/Format	Default

		(Byte)		
1.	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2.	Mode	1	0 1	0
3.	Lock Send Interval	<=5	10 – 86400 sec	300
4.	Unlock Send Interval	<=5	10 – 86400 sec	30
5.	Reserved	0		
6.	Reserved	0		
7.	Reserved	0		
8.	Reserved	0		
9.	Reserved	0		
10.	Reserved	0		
11.	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Mode>: The working mode of the battery manager information.
  - 0: Disable report function.
  - 1: Enable report function.
- ✧ <Lock Send Interval>: The period to send the battery manager information when the device is locked. The value range is 10-86400 and the unit is second.
- ✧ <Unlock Send Interval>: The time interval to send the battery manager information when the device is unlocked. The value range is 10-86400 and the unit is second.

### 3.10.6. +RESP:GTBMI - Battery Manager Information

The report of the battery manager specific information.

➤ +RESP:GTBMI,

SN	Parameter	Length (Byte)	Range/Format	Default
1.	Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z', '0'-'9'}	
2.	Unique ID	15	IMEI	
3.	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-', '_'	
4.	VIN	<=17	'0'-'9','A'-'Z'	
5.	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-', '_'	
6.	Reserved	0		
7.	Series Number	<=2	0 - 99	
8.	Parallel Number	<=2	0 - 99	
9.	Rated Capacity	5	0 – 99000mAh	
10.	Actual Capacity	5	0 - 99000mAh	
11.	Circular Information(4601)	16	0000000000000000	-

			FFFFFFFFFFFFFFFF	
12.	Single Information 1(4602)	16	0000000000000000 FFFFFFFFFFFFFFFF	-
13.	Single Information 2(4603)	16	0000000000000000 FFFFFFFFFFFFFFFF	-
14.	Single Information 3(4604)	16	0000000000000000 FFFFFFFFFFFFFFFF	-
15.	Single Information 4(4605)	16	0000000000000000 FFFFFFFFFFFFFFFF	-
16.	Core Temperature (4606)	16	0000000000000000 FFFFFFFFFFFFFFFF	-
17.	Other Temperatures (4607)	16	0000000000000000 FFFFFFFFFFFFFFFF	-
18.	Running State (4609)	16	0000000000000000 FFFFFFFFFFFFFFFF	-
19.	Voltage And Current(4610)	16	0000000000000000 FFFFFFFFFFFFFFFF	-
20.	Capacity And Health(4611)	16	0000000000000000 FFFFFFFFFFFFFFFF	-
21.	Reserved	0		
22.	Reserved	0		
23.	Reserved	0		
24.	Reserved	0		
25.	Reserved	0		
26.	Generated Time	14	YYMMDDHHMMSS	
27.	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Series Number>: Number of batteries in series.
- ✧ <Parallel Number>: Number of batteries in parallel.
- ✧ <Rated Capacity>: The rated capacity of the battery.
- ✧ <Actual Capacity>: The actual capacity of the battery.

**3.10.7. +RESP:GTLOR - ECU Lock Locking Request**

Please refer to the chapter ‘General Event Report’.

**3.10.8. +RESP:GTLOC - ECU Lock Locking Successful**

Please refer to the chapter ‘General Event Report’.

**3.10.9. +RESP:GTLOF - ECU Lock Locking Failed**

Please refer to the chapter ‘General Event Report’.

**3.10.10. +RESP:GTULS - ECU Lock Unlocking Successful**

Please refer to the chapter ‘General Event Report’.

**3.10.11. +RESP:GTULF - ECU Lock Unlocking Failed**

Please refer to the chapter 'General Event Report'.

**3.10.12. +RESP:GTCSD - ECU Abnormal Shutdown**

Please refer to the chapter 'General Event Report'.

**3.10.13. +RESP:GTCFL - ECU Firmware Lost**

Please refer to the chapter 'General Event Report'.

**3.10.14. +RESP:GTCFU - ECU Error Code Update**

Please refer to the chapter 'General Event Report'.

**3.11. Global Configuration****3.11.1. AT+GTCFG: Global Configuration**

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

➤ **AT+GTCFG=**

Example: AT+GTCFG=zk105,,ZK105,1,5,1,,00FF,00FF,,,0,0,1,7,7,0122\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	New Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	
3	Device Name	<=20	'0' – '9', 'a' – 'z', 'A' – 'Z', '-', '_'	ZK10*
4	GPS On Need	1	0 1	1
5	Filtrate the GPS Data Time	2	5 – 60sec	5
6	AGPS Mode	1	0 1	0
7	Reserved	0		
8	Report Item Mask	<=4	0000 – 00FF	00FF
9	Event Mask	4	0000-00FF	0083
10	Sensor Wake Up	1	0 1	0
11	Reserved	0		
12	Backup Voice Play Enable	1	0 1	0
13	Power off Enable	1	0 1	0
14	Voice Play Enable	1	0 1	1
15	Volume	1	0-7	7
16	Alarm Volume	1	0-7	7
17	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <New Password>: Used to change the current password.
- ✧ <Device Name>: The name of the device, which appears in every message. The default value means one of ZK100/ZK102/ZK105.
- ✧ <GPS On Need>: Whether to turn off GPS chip after retrieving GPS position information.

- 0: Never turn off GPS chip.
- 1: Turn off GPS chip after retrieving GPS information every time.
- ✧ <Filtrate the GPS Data Time>: It is the waiting time after successful GPS fix. The device will wait for a period of time (specified by <Filtrate the GPS Data Time>) and then get the result of GPS fixing because the position obtained immediately after the GPS fix may not be accurate. (e.g. If <Filtrate the GPS Data Time> is set to 7, the device will wait 7 seconds after the GPS fix and then get the fix result). The range of the parameter is 5 – 60, and the default value is 5. Unit: second.
- ✧ <AGPS Mode>: A numeral to indicate whether to enable AGPS. AGPS increases the chance of getting GPS position successfully and reduces the time needed to get GPS position.
  - 0: Disable the AGPS function.
  - 1: Enable the AGPS function.
- ✧ <Report Item Mask>: Bitwise report mask to configure the composition of all the messages. Each bit represents a field in the message. If a bit is set to 1, the corresponding field will be filled if it is included in the message. Otherwise, the field will be empty.
  - Bit 0 (0001): <Speed>
  - Bit 1 (0002): <Azimuth>
  - Bit 2 (0004): <Altitude>
  - Bit 3 (0008): Cell information, including <MCC>, <MNC>, <LAC>, <Cell ID>
  - Bit 4 (0010): <Send Time>
  - Bit 5 (0020): <Device Name>
  - Bit 6 (0040): <VIN>
  - Bit 7 (0080): <QR Code>
- ✧ <Event Mask>: A Hex value to configure which event report will be sent to the backend server. Each bit corresponds to a message. And if the bit is set to 1, the corresponding message will be sent to the backend server. Otherwise, it will not be sent to the backend server. Following is the matching between each bit and the message.
  - Bit 0 (0001): **+RESP: GTPNA**
  - Bit 1 (0002): **+RESP: GTPFA**
  - Bit 2 (0004): **+RESP: GTBPL**
  - Bit 3 (0008): **+RESP: GTBTC/+RESP: GTSTC**
  - Bit 4 (0010): **+RESP: GTSCE/+RESP: GTPCE**
  - Bit 5 (0020): **+RESP: GTSTT**
  - Bit 6 (0040): **+RESP: GTEPN/+RESP: GTEPF**
  - Bit 7 (0080): **+RESP: GTPNL**
  - Bit 8 ~Bit 15: **Reserved**
- ✧ <Sensor Wake Up>:
  - 0: Allow the device to wake up through the sensor when using the backup battery.
  - 1: Do not allow the device to wake up through the sensor when using the backup battery.
- ✧ <Power off Enable>:
  - 0: Disable power off the device.
  - 1: Enable power off the device.
- ✧ <Voice Play Enable>: Specify whether to enable the voice play.
  - 0: Disable the voice play.

- 1: Enable the voice play.
- ✧ <Backup Voice Play Enable>: Specify whether to enable the voice play when only backup battery supply is used. (Note: Only suitable for the devices that support backup battery)
  - 0: Disable the voice play when only backup battery supply is used.
  - 1: Enable the voice play when only backup battery supply is used.
- ✧ <Volume>: Normal alarm volume. 0 is the smallest volume and 7 is largest volume.
- ✧ <Alarm Volume>: Abnormal alarm volume.

**Note:**

For AGPS function, it is unavoidable that AGPS file will be downloaded from the specified URL. At present, about 5 KB data is for the AGPS function each day.

**3.11.2. +RESP:GTPNA - Power on**

Please refer to the chapter 'General Event Report'.

**3.11.3. +RESP:GTPFA - Power off**

Please refer to the chapter 'General Event Report'.

**3.11.4. +RESP:GTPNL - Power on Fixed Report**

Please refer to the chapter 'General Event Report'.

**3.11.5. +RESP:GTSCE - Scooter Battery Starts Charging**

Please refer to the chapter 'General Event Report'.

**3.11.6. +RESP:GTPCE - Scooter Battery Stops Charging**

Please refer to the chapter 'General Event Report'.

**3.11.7. +RESP:GTBTC - Backup Battery Starts Charging**

Please refer to the chapter 'General Event Report'.

**3.11.8. +RESP:GTSTC - Backup Battery Stops Charging**

Please refer to the chapter 'General Event Report'.

**3.11.9. +RESP:GTBPL - Backup Battery Low**

Please refer to the chapter 'General Event Report'.

**3.11.10. +RESP:GTEPN - Main Power Supply**

Please refer to the chapter 'General Event Report'.

**3.11.11. +RESP:GTEPF - Backup Power Supply**

Please refer to the chapter 'General Event Report'.

**3.12. LED Configuration**

**3.12.1. AT+GTLED: LED Setting**

The AT+GTLED command is used to configure the parameters of LED.

➤ AT+GTLED=

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

AT+GTLED=zk102,1,0,50,,,,,,0211\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Green LED to Indicate the Status Enable	1	0 1	1
3	Led Work Mode	1	0 3	0
4	Led Blink Frequency	<=3	20-100	50
5	RGB Setting	6	000000 - FFFFFFFF	000000
6	Status Light Mode	0	0 1	0
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
10	Reserved	0Z		
11	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Green LED to Indicate the Status Enable>: Whether to use the LED to indicate the status of the scooter. 0 means the LED is not used to indicate the status and always off.
- ✧ <LED Work Mode>: The working mode of LED to indicate the status of the scooter.
  - 0: LED constant on to indicate the status.
  - 1: LED flashes to indicate the status.
  - 2: LED off to indicate the status.
  - 3: LED breathing to indicate the status.
- ✧ <LED Blink Frequency>: Blink frequency of LED.
- ✧ <RGB Setting>: The color setting of red, green and blue, for example, FF0102 means red color is FF, green color is 01, and blue color is 02.
- ✧ <Status Light Mode>: The working mode of status light.
  - 0: Turn off the status light.
  - 1: Turn on the status light.

**Note:**

The ZK100/ZK102 devices only support two modes in <LED Work Mode>: 0 and 1, and do not support <RGB Setting>, and effective only when the device works in the NORMAL mode. The ZK105 device does not support <Green LED to Indicate the Status Enable> and <LED Blink Frequency>.

### 3.13. Value-added Service

#### 3.13.1. AT+GTVAD: Configuration

The command **AT+GTVAD** is used to configure the value-added service.

➤ **AT+GTVAD=**

Example:				
AT+GTVAD=zk105,0,0,0,0,0,0,0,0215\$				
SN	Parameter	Length	Range/Format	Default

		(Byte)		
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Battery Lock Enable	1	0 1	0
3	Electronic Bell Enable	1	0 1	0
4	Request to Stop Service Enable	1	0 1	0
5	NFC Work Mode	1	0 1	0
6	Scooter Battery Heating	1	0 1	0
7	Battery Lock Type	<=1	0 1 2 3 4	0
8	Battery Lock Playing Alarm Times	<=2	0 - 10	0
9	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Battery Lock Enable>: Enable/Disable Battery-Lock function.
  - 0: Disable.
  - 1: Enable.
- ✧ <Electronic Bell Enable>: Enable/Disable electronic bell function.
  - 0: Disable.
  - 1: Enable.
- ✧ <Request to Stop Service Enable>: Enable/Disable 'Request to Stop Service' function. If this field is set to 0, the **+RESP:GTRSS** event will not occur.
  - 0: Disable.
  - 1: Enable.
- ✧ <NFC Work Mode>: Specify the NFC working mode.
  - 0: Disable NFC.
  - 1: Enable NFC.
- ✧ <Scooter Battery Heating>: Enable/Disable the scooter battery heating function.
  - 0: Disable.
  - 1: Enable.
- ✧ <Battery Lock Type>: The type of Battery-Lock.
  - 0: Battery Lock A (UART).
  - 1: Battery Lock B (UART).
  - 2: Battery Lock C (CAN).
  - 3: Battery Lock D (UART).
  - 4: Battery Lock B (CAN).
- ✧ <Battery Lock Playing Alarm Times>: The number of times an alarm audio is played when a Battery-Lock is illegally unlocked.

**Note:**

- (1) The AT+GTVAD command is only valid for the ZK105/ZK106 devices.
- (2) The ZK105 devices are without 'Request to Stop Service' function, it means that the field <Request to Stop Service Enable> is invalid for ZK105 devices.
- (3) The ZK106 devices are without NFC function, it means that the field <NFC Work Mode> is invalid for ZK106 devices.
- (4) The Mechanical Lock includes: Battery-Lock, Pile-Lock, Helmet Box-Lock, Spare-Lock, etc. Please refer to the **AT+GTMEL** command to see more configuration.

### 3.13.2. AT+GTNFC: NFC Tag ID Setting

The command **AT+GTNFC** is used to configure the NFC tag ID.

➤ **AT+GTNFC=**

Example: AT+GTNFC=zk105,,1,ZK105,,,,0225\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Reserved	0		
3	Tag ID Selection	1	0 1	0
4	Tag ID String	<=120	ASCII visible characters, exclude these three characters: ',' '\$' '+'	
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		
8	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Tag ID Selection>: Specify the NFC tag ID source.
  - 0: QR code.
  - 1: <Tag ID String>.
- ✧ <Tag ID String>: If the <Tag ID Selection> is set to 1, this string will be used as NFC tag ID.

### 3.13.3. AT+GTBCP: BLE Command Password Setting

The command **AT+GTBCP** is used to configure the BLE command password for BLE and NFC.

➤ **AT+GTBCP=**

Example: AT+GTBCP=zk105,,1,ZK105_BLE,,,,0226\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Reserved	0		
3	Password Type Selection	1	0 1	0
4	Static Password String	<=20	'0'–'9','a'–'z','A'–'Z','-',','_'	
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		
8	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Password Type Selection>: Specify the password type.
  - 0: Dynamic password.
  - 1: Static password.
- ✧ <Static Password String>: If the <Password Type Selection> is set to 1, this string will be used as BLE command password. Password length must be at least 4 bytes to be valid.

### 3.13.4. AT+GTMEL: Additional Lock Configuration

The command **AT+GTMEL** is used to configure the Mechanical-Lock (except Battery-Lock).

➤ **AT+GTMEL=**

Example: AT+GTMEL=zk105,0,0,0,0,0,,,0299\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' - '9', 'a' - 'z', 'A' - 'Z'	zk10*
2	Pile Lock Selection	0	0 1	0
3	Helmet Box Lock Selection	1	0 - 2	0
4	Spare Lock Selection	1	0 1	0
5	Pile Lock Playing Alarm Times	<=2	0 - 10	0
6	Helmet Box Lock Playing Alarm Times	<=2	0 - 10	0
7	Multiple Mechanical Lock Enable Mask	16	0000000000000000 - FFFFFFFFFFFFFFFF	0
8	Reserved	0		
9	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Pile Lock Selection>: Specify the type of Pile-Lock.
  - 0: Not Supported.
  - 1: Pile Lock A (CAN).
- ✧ <Helmet Box Lock Selection>: Specify the type of Helmet Box-Lock.
  - 0: Not Supported.
  - 1: Helmet Box Lock A (CAN).
  - 2: Helmet Box Lock B (CAN).
- ✧ <Spare Lock Selection>: Specify the type of Spare-Lock.
  - 0: Not Supported.
  - 1: Spare Lock A (CAN).
- ✧ <Pile Lock Playing Alarm Times>: The number of times an alarm audio is played when a Pile-Lock is illegally unlocked.
- ✧ <Helmet Box Lock Playing Alarm Times>: The number of times an alarm audio is played when a 'Helmet Box Lock' is illegally unlocked.
- ✧ <Multiple Mechanical Lock Enable Mask>: It is a hexadecimal value composed of 8 bytes. Each byte is represented by two characters and each byte represents a type of lock. Each bit of a byte means to enable a lock or disable a lock. The following table describes the mechanical lock represented by each bit and the reserved bit means that it has no controllable mechanical lock.

**Mechanical Lock Enable Mask Table:**

Mask Bit	Item
Bit 63 - 1	Reserved

Bit 0	Hub lock A (CAN)
-------	------------------

**3.13.5. +RESP:GTMLS - Mechanical Lock Status Change**

**3.13.6. +RESP:GTRSS - Request to Stop Service**

- +RESP:GTMLS,
- +RESP:GTRSS,

SN	Parameter	Length (Byte)	Range/Format	Default
<b>Example:</b>				
+RESP:GTMLS,EF801C,862061041674804,ZK105,,,,,30,0,36138,4172,100,1,2,,,20190816015225,0030\$				
+RESP:GTRSS,EF801C,862061041674804,ZK105,,,,,0,0,36258,4180,100,1,2,,,20190816015245,0033\$				
1	Protocol Version	6	XX0000 - XXFFFF, X ∈ {'A'-'Z', '0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9', 'a'-'z', 'A'-'Z', '-', '_', ''	
4	VIN	<=17	'0'-'9', 'A'-'Z'	
5	QR Code	<=36	'0'-'9', 'a'-'z', 'A'-'Z', '-', '_', ''	
6	Reserved	0		
7	Reserved	0		
8	Report Type	<=2	0 - 99	
9	Power Supply	1	0 1	
10	Main Power Voltage	<=5	00000 – 45000mV	
11	Backup Battery Voltage	<=4	00000 – 4500mV	
12	Backup Battery Percentage	<=3	0-100	
13	ECU Lock State	1	0 1	
14	Mechanical Lock State	1	0 1 2	
15	Mechanical Lock Type	1	0 1 2 3 4	
16	Reserved	0		
17	Generated Time	14	YYYYMMDDHHMMSS	
18	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Report Type>: Indicates the event type.
  - For +RESP:GTMLS
    - 0: Mechanical-Lock initial status.
    - 10: Mechanical-Lock locking successfully.
    - 11: Mechanical-Lock locking failed.
    - 20: Mechanical-Lock unlocking successfully.
    - 21: Mechanical-Lock unlocking failed.
    - 30: Mechanical-Lock fault.
    - 40: Mechanical-Lock door opened.

- 41: Mechanical-Lock door closed.
- 99: Mechanical-Lock abnormal use alarm.

- For other reports
- For other reports this field is always set to 0.

✧ <Mechanical Lock State>: The state of mechanical lock which indicated by <Mechanical Lock Type>.

- 0: Unlocked.
- 1: Locked.
- 2: Unknown.

✧ <Mechanical Lock Type>: The type of mechanical lock.

- 0: Battery Lock.
- 1: Pile Lock.
- 2: Helmet Box Lock.
- 3: Spare Lock.
- 4: Hub lock

### 3.13.7. +RESP:GTNFC: NFC Information Report

➤ +RESP:GTNFC,

Example:				
+RESP:GTNFC,EF8028,862061041674804,ZK105,SA1234567890NK,,,,,11223344,,,,,,20191129173525,0032\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1.	Protocol Version	6	XX0000 - XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
2.	Unique ID	15	IMEI	
3.	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','_'	
4.	VIN	<=17	'0'-'9','A'-'Z'	
5.	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',','_'	
6.	Reserved	0		
7.	Reserved	0		
8.	Reserved	0		
9.	UID	8	00000000 - FFFFFFFF	
10.	Reserved	0		
11.	Reserved	0		
12.	Reserved	0		
13.	Reserved	0		
14.	Reserved	0		
15.	Reserved	0		
16.	Generated Time	14	YYYYMMDDHHMMSS	
17.	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

### 3.14. Real Time Operation

#### 3.14.1. AT+GTRTO: Real Time Operation

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

##### ➤ AT+GTRTO=

Example: AT+GTRTO=zk105,8,,0,,,,,0227\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Sub Command	<=2	0 – 23	
3	Reserved	0		
4	Parameter1	1	0 1 2 3	
5	Task Id	<=40		
6	Configuration command	0 3		
7	Sending UTC Time	0 14	YYYYMMDDHHMMSS	
8	Expire time	<=5	0-86400s	
9	Reserved	0		
10	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

✧ <Sub Command>: A numeral to indicate the sub command to be executed.

0: **(RESERVED)**

1: **(RTL)**: Get the current GPS fix information via message **+RESP:GTRTL**.

2: **(READ)**: Request the device to report its entire configuration.

3: **(REBOOT)**: Reboot the device remotely.

4: **(RESERVED)**

5: **(PWROFF)**: Power off the device remotely.

6: **(CID)**: Request the device to report the ICCID of the installed SIM card.

7: **(RESERVED)**

8: **(VER)**: Request the device to report version information including the device type, the firmware version, and the hardware version.

9: **(HLON)**: Turn on the head lamp.

A: **(HLOFF)**: Turn off the head lamp.

B: **(WARN)**: Illegal use of scooter warning.

C: **(QUERY)**: Query the device via message **+RESP:GTQRY**.

D: **(INF)**: Request the device information via message **+RESP:GTINF**.

E: **(ALIVE)**: Set alive state. **+RESP:GTALI**

F: **(UNLOCK)**: Unlock the ECU Lock.

10: **(LOCK)**: Lock the ECU Lock.

11: **(RLON)**: Turn on the rear lamp.

12: **(RLOFF)**: Turn off the rear lamp.

13: **(MEULK)**: Unlock the Battery-Lock. Related to message **+RESP:GTMLS**.

14: **(MELOC)**: Lock the Battery-Lock. Related to message **+RESP:GTMLS**.

15: **(EUNLK)**: Enhanced unlock command. Unlock the ECU Lock and turn on or off

headlamp automatically according to scooter speed.

- 16: (**WLCON**): Wireless charging enabled. Related to message **+RESP:GTWLC**.
- 17: (**WLCOFF**): Wireless charging disabled. Related to message **+RESP:GTWLC**.
- 18: (**SPDON**): Turn on the throttle.
- 19: (**SPDOFF**): Turn off the throttle.
- 1A: (**SPDSTA**): Request the throttle status via message **+RESP:GTSPD**.
- 1B: (**RLONEN**): Turn on the rear lamp (even if the ECU-Lock is locked).
- 1C: (**QSN**): Query the SN number of BMS. Related to message **+RESP:GTQSN**.
- 1D: (**CLRTML**): Clear the total mileage.
- 1E: (**ULKMEC**): Unlock the mechanical lock. Related to message **+RESP:GTMLS**.
- 1F: (**LOCMEC**): Lock the mechanical lock. Related to message **+RESP:GTMLS**.
- 20: (**CANVER**): Request the version of CAN interface peripheral, such as mechanical locks of CAN type. Related to message **+RESP:GTCVR**.
- 21: (**HLMUNB**): Unbind the helmet. Related to message **+RESP:GTHLM**.
- 22: (**EBELL**): Playing the electronic bell audio.
- 23: (**BMI**): The battery manager specific information.

(**Note**: The sub commands 13, 14, 1E and 1F are only effective for the devices that support mechanical lock function.)

- ✧ <Parameter1>: This parameter is used for part of the sub commands. This field is not allowed to be empty, and a 0 is recommended for sub-commands other than those listed below.

For the sub command ALIVE (E):

- 0: Disable riding.
- 1: Enable riding.

For the sub command ULKMEC (1E) and LOCMEC (1F), indicates Mechanical-Lock type:

- 0: Battery Lock.
- 1: Pile Lock.
- 2: Helmet Box Lock.
- 3: Spare Lock.

For the sub command QUERY (C):

- 0: With playing the audio.
- 1: Without playing the audio.

For the sub command CANVER (20):

- 0: Query all information in real time.
- 1: Only query the helmet box ID in real time.

- ✧ <Task ID>: The string is used to prevent the device from executing commands repeatedly. When the device continuously receives two identical sub-commands and the <Task ID> in the command is the same (but not empty), the second command will be ignored.

- ✧ <Configuration command>:

➤ When <Sub Command> is set to 2 (**READ**):

- If <Configuration command> is empty, the device will report all the configurations via **+RESP: GTALC**.
- If <Configuration command> is set to one of options:  
**QSS/CFG/TMA/FRI/DOG/NMD/ALM/ECC/LED/IPN/VAD/NFC/BCP/MEL/DCC/HLM/**



5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',','_'	
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		
9	ECU Error Code	<=50	Please refer to the Chapter <b>'ECU Information'</b>	
10	GPS Accuracy	<=2	0 1 – 50	
11	Speed	<=5	0.0 – 999.9km/h	
12	Azimuth	<=3	0 – 359	
13	Altitude	<=8	(-)xxxxx.x m	
14	Longitude	<=11	(-)xxx.xxxxxx	
15	Latitude	<=10	(-)xx.xxxxxx	
16	GPS UTC Time	14	YYYYMMDDHHMMSS	
17	Reserved	0		
18	MCC	0 4	0XXX	
19	MNC	0 4	0XXX	
20	LAC	0 4	0XXX	
21	Cell ID	<=8	XXXX XXXXXXXX	
22	CSQ	<=5	CSQ RSSI&CSQ BER	
23	Network Type	1	0-3	
24	State	2	41 42	
25	Power Supply	1	0 1	
26	Main Power Voltage	<=5	00000 – 45000mV	
27	Backup Battery Voltage	<=4	00000 – 4500mV	
28	Backup Battery Percentage	<=3	0-100	
29	ECU Error Type	1	0 1-2	
30	Alive	1	0 1	
31	ECU Lock State	1	0 1	
32	Task Id	<=40		
33	ECU Info	<= 100	Please refer to the Chapter <b>'ECU Information'</b>	
34	Scooter Battery Percentage	<=5	0 – 100.0	
35	Generated Time	14	YYYYMMDDHHMMSS	
36	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

**3.14.5. +RESP:GTALS - RTO.READ**

The report for READ (e.g. FRI) a configuration.

➤ **+RESP:GTALS,**

<b>Example:</b>				
<b>+RESP:GTALS,EF801F,862061041625020,ZK105,,,,,FRI,1,0,30,10,5,,,,,20190909093917,31D0\$</b>				
<b>SN</b>	<b>Parameter</b>	<b>Length</b>	<b>Range/Format</b>	<b>Default</b>

		(Byte)		
1	Protocol Version	6	XX0000–XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',',','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',',','_'	
6	Reserved	0		
7	Task Id	<=40		
8	FRI	3	FRI	FRI
·	Mode	1	0 1	1
	Discard No Fix	1	0 1	0
	Lock Send Interval	<=5	5 – 86400sec	900
	Unlock Send Interval	<=5	5 – 86400sec	60
	Backup Send Interval	<= 4	0 1 – 1440 min	240
	Reserved	0		
	Reserved	0		
N	Reserved	0		
N+1	Generated Time	14	YYYYMMDDHHMMSS	
N+2	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

### 3.14.6. +RESP:GTALC - RTO.READ

The report for READ all configuration.

➤ +RESP:GTALC,

**Example:**  
+RESP:GTALC,EF8029,862061041625020,ZK105,,,,,FFFFFFFFFFFFFFFF,QSS,,,,,3,0,1,218.17.46.  
11,77,3,0,,0,0,0,ZK105BLE,CFG,zk105,zk105MGC,1,5,1,,00FF,00FF,,,1,1,1,7,7,TMA,+8,0,0,,,,,  
FRI,1,0,30,10,5,,,,,DOG,1,,3,1200,,1,0,60,60,60,,,,,NMD,2,50,19,,,,,ALM,20,1800,,,,,ECC,,10,0  
,1,0,,,,,LED,1,0,50,,,,,IPN,0,,0,,,,,VAD,0,0,0,0,0,0,0,NFC,,0,,,,,BCP,,1,ZK105\_BLE,,,,,MEL,1,1,1  
,0,0,,DCC,1,0,1,7,,,,,HLM,0,0,255,255,255,255,255,255,,,,,NAL,0,60,,,,,20191231081207,0BC  
8\$

SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000–XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',',','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',',','_'	
6	Reserved	0		
7	Task Id	<=40		

8	Configuration Mask	16	0000000000000000 – FFFFFFFFFFFFFFFF	
9	QSS	3	QSS	QSS
10	APN	< 40		
11	APN User Name	<=30		
12	APN Password	<=30		
13	Report Mode	1	0 3	0
14	Network Mode	1	0 1 2 3	0
15	Enable Buffer	1	0 1	0
16	Main Server IP/Domain Name	<=60		
17	Main Server Port	<=5	0 – 65535	0
18	LTE Mode	1	0-3	2
19	Region	<=1	0 1 2 3 4 5	0
20	Reserved	0		
21	Heartbeat Interval	<=3	0 5 – 360min	5
22	Enable SACK	1	0 1 2	0
23	Enable BLE Unlock	1	0 1	0
24	BLE Broadcast Name	<=9	'0'-'9','a'-'z','A'-'Z','-',','_'	
25	CFG	3	CFG	CFG
26	New Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	
27	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','_'	
28	GPS On Need	1	0-2	1
29	Filtrate the GPS Data Time	<=2	5 – 60sec	5
30	AGPS Mode	1	0 1	0
31	Reserved	0		
32	Report Item Mask	<=4	0000 - 00FF	00FF
33	Event Mask	4	0000 - 00FF	0083
34	Sensor Wake Up	1	0 1	0
35	Reserved	0		
36	Backup Voice Play Enable	1	0 1	0
37	Power off Enable	1	0 1	0
38	Voice Play Enable	1	0 1	1
39	Volume	1	0-7	7
40	Alarm Volume	1	0-7	7
41	TMA	3	TMA	TMA
42	Sign	1	+ -	+
43	Hour Offset	<=2	0 - 12	00
44	Minute Offset	<=2	0 - 59	00
45	Daylight Saving	1	0 1	0
46	UTC Time	0		
47	Reserved	0		
48	Reserved	0		

49	Reserved	0		
50	Reserved	0		
51	FRI	3	FRI	FRI
52	Mode	1	0 1	1
53	Discard No Fix	1	0 1	0
54	Lock Send Interval	<=5	5 – 86400sec	900
55	Unlock Send Interval	<=5	5 – 86400sec	60
56	Backup Send Interval	<= 4	0 1 – 1440 min	240
57	Use GPS Raw Data	<=1	0 1	0
58	Reserved	0		
59	Reserved	0		
60	Reserved	0		
61	DOG	3	DOG	DOG
62	Mode	1	0 1	1
63	Reserved	0		
64	Interval	<=2	1-30 days	7
65	Time	4	HHMM	0200
66	Reserved	0		
67	Report Before Reboot	1	0 1	1
68	Unit	1	0 1	0
69	No Network Interval	4	0 5-1440 min	480
70	No Activation Interval	4	0 5-1440 min	480
71	Send Fail Timeout	4	0 5-1440 min	480
72	Reserved	0		
73	Reserved	0		
74	Reserved	0		
75	Reserved	0		
76	Reserved	0		
77	NMD	3	NMD	NMD
78	Non-movement Duration	<=3	1 – 255 (x14sec)	2
79	Movement Duration	<=2	1 – 50 (x128ms)	3
80	Sensitivity Level	1	2 – 19	5
81	Reserved	0		
82	Reserved	0		
83	Reserved	0		
84	Reserved	0		
85	Reserved	0		
86	ALM	3	ALM	ALM
87	Continuous vibration alarm	<=3	0-300 (s)	10
88	Alarm Interval	<=4	0 5-3600 (s)	10S
89	Reserved	0		
90	Reserved	0		

91	Reserved	0		
92	ECC	3	ECC	ECC
93	Reserved	0		
94	Maximum Speed Limit	<=2	Please refer to the Chapter 'ECU'	
95	Speed Up Mode	<=1	0-1	0
96	Display Unit	1	0 1	0
97	Boost Level	1	1 - 5	2
98	Brake Force	<=2	0 - 10	5
99	Rear Lamp Working Mode	<=1	0 1 2 3	0
100	Lock Force Level	1	0 - 5	0
101	Reserved	0		
102	LED	3	LED	LED
103	Green LED to Indicate the Status Enable	1	0 1	1
104	Led Work Mode	1	0 1	0
105	LED Blink Frequency	<=3	20-100	50
106	RGB Setting	6	000000 - FFFFFFFF	000000
107	Status Light Mode	0	0 1	0
108	Reserved	0		
109	Reserved	0		
110	Reserved	0		
111	Reserved	0		
112	IPN	3	IPN	IPN
113	Switch Enable	1	0 1	0
114	Main Server IP/Domain Name	<=60		
115	Main Server Port	<=5	0 - 65535	0
116	Reserved	0		
117	Reserved	0		
118	Reserved	0		
119	Reserved	0		
120	Reserved	0		
121	Reserved	0		
122	VAD	3	VAD	VAD
123	Battery Lock Enable	1	0 1	0
124	Electronic Bell Enable	1	0 1	0
125	Request to Stop Service Enable	1	0 1	0
126	NFC Work Mode	1	0 1	0
127	Scooter Battery Heating	<=1	0 1	0
128	Battery Lock Type	<=1	0 1 2 3	0
129	Battery Lock Playing Alarm Times	<=1	0 - 10	0
130	NFC	3	NFC	NFC

131	Reserved	0		
132	Tag ID Selection	1	0 1	0
133	Tag ID String	<=120	ASCII characters	
134	Reserved	0		
135	Reserved	0		
136	Reserved	0		
137	BCP	3	BCP	BCP
138	Reserved	0		
139	Password Type Selection	1	0 1	0
140	Static Password String	<=20	ASCII characters	
141	Reserved	0		
142	Reserved	0		
143	Reserved	0		
144	MEL	3	MEL	MEL
145	Pile Lock Selection	0	0 1	0
146	Helmet Box Lock Selection	1	0 1	0
147	Spare Lock Selection	1	0 1	0
148	Pile Lock Playing Alarm Times	<=2	0 - 10	0
149	Helmet Box Lock Playing Alarm Times	<=2	0 - 10	0
150	Multiple Mechanical Lock Enable Mask	16	0000000000000000- FFFFFFFFFFFFFFFF	0
151	Reserved	0		
152	DCC	3	DCC	DCC
153	Motion Data Collection	1	0 1	0
154	Motion Data Collection Duration	<=2	10 - 30 (s)	10
155	G-Sensor Hazard Detection	1	0 1	0
156	G-Sensor Hazard Sensitivity	<=2	1 - 99 (x0.1g)	7
157	Reserved	0		
158	Reserved	0		
159	Reserved	0		
160	Reserved	0		
161	HLM	3	HLM	HLM
162	Top Lamp Work Mode	1	0 1 2 3	0
163	Side Lamp Work Mode	1	0 1 2 3	0
164	Top Lamp Color R	<=3	0 - 255	255
165	Top Lamp Color G	<=3	0 - 255	255
166	Top Lamp Color B	<=3	0 - 255	255
167	Side Lamp Color R	<=3	0 - 255	255
168	Side Lamp Color G	<=3	0 - 255	255
169	Side Lamp Color B	<=3	0 - 255	255
170	Offline RGB Setting	<=16	0 – FFFFFFFFFFFFFFFF	0

171	Reserved	0		
172	Reserved	0		
173	Reserved	0		
174	NAL	3	NAL	NAL
175	Mode	1	0 1	0
176	Server Connection Lost Duration	<=3	1 - 999 min	60
177	Reserved	0		
178	Reserved	0		
179	Reserved	0		
180	Reserved	0		
181	RMD	3	RMD	RMD
182	Mode	1	0 1	0
183	Reserved	0		
184	Black Operator 1	<=6		
185	....			
186	Black Operator 20	<=6		
187	Reserved	0		
188	Reserved	0		
189	Reserved	0		
190	Reserved	0		
191	Reserved	0		
192	BTS	3	BTS	BTS
193	Reserved	0		
194	Reserved	0		
195	Reserved	0		
196	Reserved	0		
197	Discoverable Mode	1	0 - 1	0
198	Reserved	0		
199	Reserved	0		
200	Reserved	0		
201	Reserved	0		
202	Reserved	0		
203	Reserved	0		
204	Reserved	0		
205	Reserved	0		
206	Reserved	0		
207	Reserved	0		
208	Reserved	0		
209	Reserved	0		
210	Reserved	0		
211	Reserved	0		
212	Reserved	0		

213	Reserved	0		
214	CIC	3	CIC	CIC
215	ECU Throttle Enable	1	0 1	1
216	Wireless Charge Enable	1	0 1	0
217	Push Mode	1	0 1	0
218	Reserved	0		
219	Reserved	0		
220	Reserved	0		
221	Reserved	0		
222	Reserved	0		
223	XWM	3	XWM	XWM
224	Work Mode	1	1 2 3 4	
225	Normal Report Direction	2	00 - FF	01
226	Test Report Direction	2	00 - FF	00
227	Reserved	0		
228	Reserved	0		
229	Reserved	0		
230	BMI	3	BMI	BMI
231	Mode	1	0 1	0
232	Lock Send Interval	<=5	10 – 86400 sec	300
233	Unlock Send Interval	<=5	10 – 86400 sec	30
234	Reserved	0		
235	Reserved	0		
236	Reserved	0		
237	Reserved	0		
238	Reserved	0		
239	Reserved	0		
240	Generated Time	14	YYYYMMDDHHMMSS	
241	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

**AT+GTXWM:**

- ✧ <Work Mode>: Set current mode.
  - 1: Normal Mode.
  - 2: Inactive Mode.
  - 3: Test Mode.
  - 4: Transport Mode.
- ✧ <Normal Report Direction >: Indicates the report direction in 'Normal Mode'. Setting the related bit to 1 means to enable and 0 means to disable.
  - Bit 0 – Report to server
  - Bit 1 – Report to serial port.
  - Bit 2 – Report to Bluetooth.
- ✧ <Test Report Direction >: Indicates the report direction in 'Test mode'. Setting the related bit

to 1 means to enable and 0 means to disable.

Bit 0 – Report to server

Bit 1 – Report to serial port.

Bit 2 – Report to Bluetooth.

### 3.14.7. +RESP:GTCID - RTO.CID

The report for ICCID real time operation.

➤ +RESP:GTCID,

Example:				
+RESP:GTCID,EF8000,866425030732178,ZK102,,,,,8937201017040393098F,20180614125128,0F9D\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 – XXXFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',','_'	
6	Reserved	0		
7	Task Id	<=40		
8	ICCID	20		
9	Generated Time	14	YYYYMMDDHHMMSS	
10	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

### 3.14.8. +RESP:GTVR - RTO.VER

The report for VER real time operation.

➤ +RESP:GTVR,

Example:				
+RESP:GTVR,EF8000,866425030732178,ZK102,,,,ZK102,0103,0101,BG96,BG96MAR02A05M1G,0101,,,,,20180614130619,0FD2\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 – XXXFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',','_'	
6	Reserved	0		
7	Device Type	10	'0'-'9','a'-'z','A'-'Z'	

8	Firmware Version	4	0000 – FFFF	
9	Hardware Version	4	0000 – FFFF	
10	Modem Hardware Version	<=20		
11	Modem Software Version	<=50		
12	Bluetooth Firmware Version	4	0000 – FFFF	
13	Scooter Hardware Version	<=24	'0' – '9', 'a' – 'z', 'A' – 'Z'	
14	Scooter Firmware Version	<=24	'0' – '9', 'a' – 'z', 'A' – 'Z'	
15	Reserved	0		
16	Task Id	<=40		
17	Generated Time	14	YYYYMMDDHHMMSS	
18	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Device Type>: A string which represents the type of the device. The device type can be ZK100/ZK102/ZK102MP/ZK105M, etc.
- ✧ <Firmware Version>: The firmware version. The first two characters indicate the main version and the last two characters indicate the subsidiary version. For example, 0110 means the version 1.10.
- ✧ <Hardware Version>: The hardware version. The first two characters indicate the main version and the last two characters indicate the subsidiary version. For example, 0110 means the version 1.10.
- ✧ <QR Code>: The QR Code of the device.
- ✧ <Modem Hardware Version>: Describes the modem hardware information for this device.
- ✧ <Modem Software Version>: Describes the modem software version information for this device.

### 3.14.9. +RESP:GTALI - RTO.ALIVE

Please refer to the chapter 'General Event Report'.

### 3.14.10. +RESP:GTSPD - RTO.SPDSTA

The report for throttle status.

#### ➤ +RESP:GTSPD,

Example:				
+RESP:GTSPD,EF8000,866425030732178,ZK105,,,,,1,20191012125011,1012\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 – XXXFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',','_'	
6	Reserved	0		
7	Task Id	<=40		
8	Throttle Status	1	0 1	

9	Generated Time	14	YYYYMMDDHHMMSS	
10	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

✧ <Throttle Status>: The status of throttle.

- 0: Throttle off.
- 1: Throttle on.

### 3.14.11. +RESP:GTQSN - RTO.QSN

The report for scooter battery SN number.

➤ +RESP:GTQSN,

Example:				
+RESP:GTQSN,EF8000,866425030732178,ZK105,,,,,RP13S20A,20191023101250,1033\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',','_'	
6	Scooter Battery Percentage	<=3	0 - 100	
7	Task Id	<=40		
8	Scooter Battery SN	8	'0'-'9','a'-'z','A'-'Z'	
9	Generated Time	14	YYYYMMDDHHMMSS	
10	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

### 3.14.12. +RESP:GTCVR - RTO.CANVER

The report for the version of CAN interface peripheral.

➤ +RESP:GTCVR,

Example:				
+RESP:GTCVR,EF8029,866425030732178,ZK105,,,,,20190929,20191204,20190929,20191127,, ,,,,,,20180614130619,1024\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 – XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',','_'	
6	Reserved	0		
7	Battery-Lock Hardware Version	<=16	'0'-'9','a'-'z','A'-'Z',	

8	Battery-Lock Firmware Version	<=16	'0'-'9','a'-'z','A'-'Z',	
9	Pile-Lock Hardware Version	<=16	'0'-'9','a'-'z','A'-'Z',	
10	Pile-Lock Firmware Version	<=16	'0'-'9','a'-'z','A'-'Z',	
11	Helmet Box Lock Hardware Version	<=16	'0'-'9','a'-'z','A'-'Z',	
12	Helmet Box Lock Firmware Version	<=16	'0'-'9','a'-'z','A'-'Z',	
13	Spare-Lock Hardware Version	<=16	'0'-'9','a'-'z','A'-'Z',	
14	Spare-Lock Firmware Version	<=16	'0'-'9','a'-'z','A'-'Z',	
15	Helmet Exist	<=1	0 1 2	
16	Helmet ID	<=16	'0'-'9','a'-'f','A'-'F'	
17	Helmet Box Status Mask	<=3	000 - 122	
18	Helmet ID Recognition	<=1	0 1	
19	Task ID	<=40		
20	Generated Time	14	YYYYMMDDHHMMSS	
21	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Helmet Exist>: Indicates whether the helmet exists.
  - 0: Not exist.
  - 1: Exist.
  - 2: Not support or unknown.
- ✧ <Helmet ID>: The unique ID of helmet.
- ✧ <Helmet Box Status Mask>: Indicates the status of helmet box. There are 3 characters in this field.
  - The 1<sup>st</sup> character (Helmet Box Lock Status):
    - 0: Locked.
    - 1: Unlocked.
  - The 2<sup>nd</sup> character (Helmet Box Door Status):
    - 0: Closed.
    - 1: Opened.
    - 2: Not support or unknown
  - The 3<sup>rd</sup> character (Helmet Exist Status):
    - 0: Not exist.
    - 1: Exist.
    - 2: Not support or unknown
- ✧ <Helmet ID Recognition>: Indicates whether the helmet ID is the same as the binding ID.
  - 0: Not the same.
  - 1: The same.

**3.14.13. +RESP:GTHLM - RTO.HLMUNB**

The report for the helmet event.

➤ **+RESP:GTHLM,**

**Example:**

**+RESP:GTHLM,EF802A,866425030732178,ZK105,,,,1,,,20191231140622,1100\$**

SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 – XXXFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',','_'	
6	Reserved	0		
7	Report Type	1	0 1	
8	Reserved	0		
9	Task ID	<=40		
10	Generated Time	14	YYYYMMDDHHMMSS	
11	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

✧ <Report Type>: Indicates the event type.

- 0: Helmet unbinding failed.
- 1: Helmet unbinding successful.

### 3.15. Reservation Service

#### 3.15.1. AT+GTRES: Reservation Service Command

The **AT+GTRES** command is used to make a reservation for consumer. And **+RESP:GTRES** is the corresponding event report.

➤ **AT+GTRES=**

Example:				
AT+GTRES=zk105,1,30,,,,,0399\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Reservation Enable	1	0 1	
3	Reservation Time	<=3	10 - 480 min	
4	Reserved	0		
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		
8	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

✧ <Reservation Enable>: Make a reservation or cancel it.

- 0: Cancel the reservation.
- 1: Make a reservation.

✧ <Reservation Time>: Specify the keeping time of reservation. This field is valid only when <Reservation Enable> is set to 1.

### 3.15.2. +RESP:GTRES - Reservation Event Report

➤ +RESP:GTRES,

Example: +RESP:GTRES,EF801C,862061041674804,ZK105,,,,,30,0,36138,4172,100,1,2,,,201908160152 25,0030\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 - XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',',','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',',','_'	
6	Reserved	0		
7	Reserved	0		
8	Report Type	<=2	0 - 99	
9	Power Supply	1	0 1	
10	Main Power Voltage	<=5	00000 – 45000mV	
11	Backup Battery Voltage	<=4	00000 – 4500mV	
12	Backup Battery Percentage	<=3	0-100	
13	ECU Lock State	1	0 1	
14	Battery Lock State	1	0 1 2	
15	Reserved	0		
16	Reserved	0		
17	Generated Time	14	YYYYMMDDHHMMSS	
18	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

✧ <Report Type>: Indicates the event type.

- 0: Reservation successful.
- 1: Reservation time up.
- 2: Reservation canceled.
- 3: Reservation failed.

✧ <Battery Lock State>: The state of Battery-Lock.

- 0: Unlocked.
- 1: Locked.
- 2: Unknown.

### 3.15.3. +RESP:GTWLC - Wireless Charging Event Report

➤ +RESP:GTWLC,

Example: +RESP:GTWLC,EF801C,862061041674804,ZK105,,,,,10,0,36138,4172,100,1,2,,,201908300212 25,0032\$				
--	--	--	--	--

SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 - XXFFFF, X ∈ {'A'-'Z', '0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9', 'a'-'z', 'A'-'Z', '-', '_',	
4	VIN	<=17	'0'-'9', 'A'-'Z'	
5	QR Code	<=36	'0'-'9', 'a'-'z', 'A'-'Z', '-', '_',	
6	Reserved	0		
7	Reserved	0		
8	Report Type	<=2	0 - 99	
9	Power Supply	1	0 1	
10	Main Power Voltage	<=5	00000 – 45000mV	
11	Backup Battery Voltage	<=4	00000 – 4500mV	
12	Backup Battery Percentage	<=3	0-100	
13	ECU Lock State	1	0 1	
14	Battery Lock State	1	0 1 2	
15	Reserved	0		
16	Reserved	0		
17	Generated Time	14	YYYYMMDDHHMMSS	
18	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Report Type>: Indicates the event type.
- 10: Wireless charging enabled successful.
  - 11: Wireless charging enabled failed.
  - 20: Wireless charging disabled successful.
  - 21: Wireless charging disabled failed.

### 3.16. General Event Report

The following event reports are triggered when certain event occurs.

#### 3.16.1. Event Report

- **+RESP: GTPNA:** Power on report.
- **+RESP: GTPFA:** Power off report.
- **+RESP: GTPNL:** The device fixed successfully after power on
- **+RESP: GTSTT:** Device motion state indication
- **+RESP: GTNCN:** New connection to backend server
- **+RESP: GTDOG:** Device reboot for watchdog
- **+RESP: GTALM:** Abnormal alarm
- **+RESP: GTALI:** The report for set alive state
- **+RESP: GTLOR:** The report for requesting to lock device
- **+RESP: GTLOC:** The report for locking device successfully
- **+RESP: GTLOF:** The report for failed device locking

- **+RESP: GTULS:** The report for unlocking device successfully
- **+RESP: GTULF:** The report for failed device unlocking
- **+RESP: GTBOV:** The scooter overturned
- **+RESP: GTBRN:** The scooter recovered from overturn
- **+RESP: GTCSD:** ECU abnormal shutdown report
- **+RESP: GTCFL:** ECU firmware lost. Needing to update ECU firmware to work properly
- **+RESP: GTCFU:** ECU error code update
- **+RESP: GTSCE:** Scooter battery starts charging report
- **+RESP: GTPCE:** Scooter battery stops charging report
- **+RESP: GTBTC:** Backup battery starts charging report
- **+RESP: GTSTC:** Backup battery stops charging report
- **+RESP: GTBPL:** Backup battery low
- **+RESP: GTEPN:** Power switch from backup battery to main power report
- **+RESP: GTEPF:** Power switch from main power to backup battery report

(NOTE: The '+RESP: GTEPN', '+RESP: GTEPF', '+RESP: GTBTC', '+RESP: GTSTC' and '+RESP: GTBPL' reports is only suitable for the devices that support backup battery.)

Example:				
+RESP:GTPNL,EF801C,862061041674804,ZK105,,,,,0,0000000000000000,1,0.0,0,459.1,114.0 16118,22.538930,20190816015005,,0460,0000,27BD,0DFC,0&0,1,41,0,36113,4172,100,0,0,1 ,,0.0&0.0&0.0&0.0&0.0&0.0&0.000000&000000&0&0&00000000000000000000&2,0,2019081 6015003,002C\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 – XXXFFF,X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',','','_'	
6	Reserved	0		
7	Reserved	0		
8	Report Type	1	0 1 2 3	
9	ECU Error Code	<=50	Please refer to the Chapter 'ECU Information'	
10	GPS Accuracy	<=2	0 1 – 50	
11	Speed	<=5	0.0 – 999.9km/h	
12	Azimuth	<=3	0 – 359	
13	Altitude	<=8	(-)xxxxx.x m	
14	Longitude	<=11	(-)xxx.xxxxxx	
15	Latitude	<=10	(-)xx.xxxxxx	
16	GPS UTC Time	14	YYYYMMDDHHMMSS	
17	Reserved	0		
18	MCC	0 4	0XXX	

19	MNC	0 4	0XXX	
20	LAC	0 4	0XXX	
21	Cell ID	<=8	XXXX XXXXXXXX	
22	CSQ	<=5	CSQ RSSI&CSQ BER	
23	Network Type	1	0-3	
24	State	2	41 42	
25	Power Supply	1	0 1	
26	Main Power Voltage	<=5	00000 – 45000mV	
27	Backup Battery Voltage	<=4	00000 – 4500mV	
28	Backup Battery Percentage	<=3	0-100	
29	ECU Error Type	1	0 1-2	
30	Alive	1	0 1	
31	ECU Lock State	1	0 1	
32	Task Id	<=40		
33	ECU Info	<= 100	Please refer to the Chapter 'ECU Information'	
34	Scooter Battery Percentage	<=5	0 – 100.0	
35	Generated Time	14	YYYYMMDDHHMMSS	
36	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

✧ <Report Type>: This field is only valid for **+RESP: GTDOG**, **+RESP: GTULF**, **+RESP: GTALM**, **+RESP:GTALI** and **+RESP: GTCFL** reports. For other reports this field is always set to 0.

- For **+RESP:GTDOG**
  - 0: Based on <Interval>and <Time> to reboot
  - 1: PDP activate fail
  - 2: No network signal
  - 3: Send fail timeout
- For **+RESP: GTULF**
  - The reasons of unlock fail.
  - 1: Error or timeout occurred while unlocking.
  - 2: ECU type is unmatched.
- For **+RESP: GTLOF**
  - The reasons of locking failure.
  - 0: Error or timeout occurred while locking.
  - 1: Illegal operation during riding.
- For **+RESP: GTALM**
  - The reason of abnormal alarm
  - 0: Continuous vibration
- For **+RESP: GTALI**
  - The result of set alive state
  - 0: Set alive state success
  - 1: Set alive state fail
- For **+RESP: GTCFL**

The hardware version of the ECU

### 3.16.2. ECU Information

#### 3.16.2.1. For ES100

✧ <ECU Error Code>: The range is 0000000000000000 - FFFFFFFF. The Error Code is defined as follows:

- Bit 0(0001): Acceleration Handle Failure
- Bit 1(0002): Brake Handle Failure
- Bit 2 (0004): Software Failure
- Bit 3 (0008): ECU Communication Failure
- Bit 4 (0010): Central Control Communication Failure
- Bit 5 (0020): NC
- Bit 6 (0040): NC
- Bit 7 (0080): NC
- Bit 8 (0100): Over Current Protection
- Bit 9 (0200): Under Voltage Protection
- Bit 10 (0400): Over Voltage Protection
- Bit 11 (0800): Blockage Protection
- Bit 12(1000): Upper Bridge Failure
- Bit 13 (2000): Lower Bridge Failure
- Bit 14(4000): Motor Failure
- Bit 15(8000): Other Failures

✧ <ECU Info>: The information of the ECU. It includes multiple fields and each field is separated by '&'.

Example:		
0.0&0.0&0.0&0.0&0&0&0&0&19&185&0&0		
No.	Parameter	Remark
1	Speed	The current speed, unit: km/h.
2	Current mileage	The current mileage, unit: km.
3	Remaining mileage	The remaining mileage, unit: km.
4	Total mileage	The total mileage, unit: km.
5	Head light status	The head light status. 0: Head light off. 1: Head light on.
6	Rear light status	The rear light status. 0: Rear light off. 1: Rear light on.
7	Ride time	The total time of riding and the range is 0-36000 s.
8	Firmware version	The firmware version of ECU.
9	Hardware version	The hardware version of ECU.
10	Key status	The key status. 0: The key is not pressed.

		1: The key is pressed.
11	Charging	Indicate whether the scooter battery is being charged. 0: Not charging. 1: Charging.

**3.16.2.2. For ES200**

✧ <ECU Error Code>: The range is 0000000000000000 - FFFFFFFF. The Error Code is defined as follows:

- Bit 0 (0000000000000001): Over current second layer protection
- Bit 1 (0000000000000002): Over current third layer protection
- Bit 2 (0000000000000004): Over current fourth layer protection
- Bit 3 (0000000000000008): Discharging over heating
- Bit 4 (0000000000000010): Discharging under temperature
- Bit 5 (0000000000000020): MOS over heating
- Bit 6 (0000000000000040): Pre-discharge error
- Bit 7 (0000000000000080): NC
- Bit 8 (0000000000000100): Protection chip damage
- Bit 9 (0000000000000200): Charge MOS damage
- Bit 10 (0000000000000400): Discharge MOS damage
- Bit 11 (0000000000000800): Cell temperature sensor damage
- Bit 12 (0000000000001000): Cell drop
- Bit 13 (0000000000002000): Under voltage first layer protection
- Bit 14 (0000000000004000): Under voltage second layer protection
- Bit 15 (0000000000008000): Over current first layer protection
- Bit 16 (0000000000010000): Over legal charging temperature
- Bit 17 (0000000000020000): Discharging over heating
- Bit 18 (0000000000040000): Charging under temperature
- Bit 19 (0000000000080000): Discharging under temperature
- Bit 20 (0000000000100000): MOS over heating
- Bit 21 (0000000000200000): Other over heating
- Bit 22 (0000000000400000): Pre-discharge error
- Bit 23 (0000000000800000): Pre-charge error
- Bit 24 (0000000001000000): Under voltage first layer protection
- Bit 25 (0000000002000000): Under voltage second layer protection
- Bit 26 (0000000004000000): Over voltage first layer protection
- Bit 27 (0000000008000000): Over voltage second layer protection
- Bit 28 (0000000010000000): Over current first layer protection
- Bit 29 (0000000020000000): Over current second layer protection
- Bit 30 (0000000040000000): Over current third layer protection
- Bit 31 (0000000080000000): Over current fourth layer protection
- Bit 32 (0000000100000000): Cell temperature sensor damage**
- Bit 33 (0000000200000000): Large charging/discharging temperature difference**
- Bit 34 (0000000400000000): NC
- Bit 35 (0000000800000000): NC

- Bit 36 (0000001000000000): Cell imbalance
- Bit 37 (0000002000000000): Cell drop**
- Bit 38 (0000004000000000): NC
- Bit 39 (0000008000000000): Charging over current
- Bit 40 (0000010000000000): Failed to communicate with protection chip**
- Bit 41 (0000020000000000): Metering device damage
- Bit 42 (0000040000000000): Flash chip damaged
- Bit 43 (0000080000000000): Clock chip damage (Reserved)
- Bit 44 (0000100000000000): Charge MOS damage**
- Bit 45 (0000200000000000): Discharge MOS damage**
- Bit 46 (0000400000000000): MCU ROM damage**
- Bit 47 (0000800000000000): MCU RAM damage**
- Bit 48 (0001000000000000): Acceleration Handle Failure
- Bit 49 (0002000000000000): Brake Handle Failure
- Bit 50 (0004000000000000): Software Failure
- Bit 51 (0008000000000000): ECU Communication Failure**
- Bit 52 (0010000000000000): Central Control Communication**
- Bit 53 (0020000000000000): Motor over temperature protection
- Bit 54 (0040000000000000): Battery communication error**
- Bit 55 (0080000000000000): NC
- Bit 56 (0100000000000000): Over Current Protection
- Bit 57 (0200000000000000): Under voltage Protection
- Bit 58 (0400000000000000): Over voltage Protection
- Bit 59 (0800000000000000): Blockage Protection
- Bit 60 (1000000000000000): Upper Bridge Failure**
- Bit 61 (2000000000000000): Lower Bridge Failure**
- Bit 62 (4000000000000000): Motor Failure**
- Bit 63 (8000000000000000): Other Failures

**Note:** Bit 0 to Bit 15 are used to indicate history error codes.

✧ <ECU Info>: The information of the ECU. It includes multiple fields and each field is separated by '&'.

Example:		
0.0&0.0&126.0&6534.4&0&0&0&150102&D1D2D3&1&0&00000000000000000000&1		
No.	Parameter	Remark
1	Speed	The current speed, unit: km/h.
2	Current Mileage	The current mileage, unit: km. (Especially, for ZK102P the unit is m).
3	Remaining Mileage	The remaining mileage, unit: km.
4	Total Mileage	The total mileage, unit: km.
5	Head Light Status	The head light status. 0: Head light off. 1: Head light on.
6	Rear Light Status	The rear light status. 0: Rear light off.

		1: Rear light on.
7	Ride Time	The total time of riding and the range is 0-36000 s.
8	Firmware Version	The firmware version of ECU.
9	Hardware Version	The hardware version of ECU.
10	Bell Button Status	The bell button status. 0: The bell button is released. 1: The bell button is pressed.
11	Charging	Indicate whether the scooter battery is being charged. 0: Not charging. 1: Charging.
12	Battery Status	There are 20 ASCII characters in this field with 2 characters as a group. The 1st group: Bit 0 – Charging tube state (0: OFF, 1: ON) Bit 1 – Discharging tube state (0: OFF, 1: ON) Bit 2~7 – NC The 2nd group: Battery health status (Reserved). The 3rd group: Cell maximum temperature. The 4rd group: Cell minimum temperature. The 5rd group: MOS temperature. The 6rd group: Other temperature. The 7rd ~10rd group: Pack current. Unit: mA.
13	Battery-Lock State	The state of Battery-Lock (This parameter is only valid for ZK105) 0: Unlocked. 1: Locked. 2: Unknown.

**3.16.2.3. For ES300/ES400**

✧ <ECU Error Code>: It includes multiple fields and each field is separated by '&'. The Error Code is defined as follows:

Bit 0 (0000000000000001): Head lamp fault  
 Bit 1 (0000000000000002): Meter firmware lost  
 Bit 2 (0000000000000004): Turning handle fault  
 Bit 3 (0000000000000008): Turning handle not returned  
 Bit 4 (0000000000000010): Left brake crank fault  
 Bit 5 (0000000000000020): Right brake crank fault  
 Bit 6 (0000000000000040): Left brake crank not returned  
 Bit 7 (0000000000000080): Right brake crank not returned  
 Bit 8 (0000000000000100): ECU heartbeat error  
 Bit 9 (0000000000000200): BMS heartbeat error  
 Bit 10 (0000000000000400): Meter heartbeat error  
 Bit 11 (0000000000000800): NC  
 Bit 12 (0000000000001000): NC  
 Bit 13 (0000000000002000): NC  
 Bit 14 (0000000000004000): NC  
 Bit 15 (0000000000008000): NC  
 Bit 16 (0000000000010000): Over legal charging temperature  
 Bit 17 (0000000000020000): Discharging over heating  
 Bit 18 (0000000000040000): Charging under temperature  
 Bit 19 (0000000000080000): Discharging under temperature  
 Bit 20 (00000000000100000): MOS over heating  
 Bit 21 (00000000000200000): Other over heating  
 Bit 22 (00000000000400000): Pre-discharge error  
 Bit 23 (00000000000800000): Pre-charge error  
 Bit 24 (00000000001000000): Under voltage first layer protection  
 Bit 25 (00000000002000000): Under voltage second layer protection  
 Bit 26 (00000000004000000): Over voltage first layer protection  
 Bit 27 (00000000008000000): Over voltage second layer protection  
 Bit 28 (00000000100000000): Over current first layer protection  
 Bit 29 (00000000200000000): Over current second layer protection  
 Bit 30 (00000000400000000): Over current third layer protection  
 Bit 31 (00000000800000000): Over current fourth layer protection  
**Bit 32 (0000000100000000): Cell temperature sensor damage**  
**Bit 33 (0000000200000000): Large charging/discharging temperature difference**  
 Bit 34 (0000000400000000): Charging fuse broken  
 Bit 35 (0000000800000000): Discharging fuse broken  
 Bit 36 (0000001000000000): Cell imbalance  
**Bit 37 (0000002000000000): Cell drop**  
 Bit 38 (0000004000000000): NC  
 Bit 39 (0000008000000000): Charging over current  
**Bit 40 (0000010000000000): Failed to communicate with protection chip**

Bit 41 (0000020000000000): Metering device damage  
Bit 42 (0000040000000000): Flash chip damage  
Bit 43 (0000080000000000): NC  
**Bit 44 (0000100000000000): Charge MOS damage**  
**Bit 45 (0000200000000000): Discharge MOS damage**  
**Bit 46 (0000400000000000): MCU ROM damage**  
**Bit 47 (0000800000000000): MCU RAM damage**  
Bit 48 (0001000000000000): Controller under voltage  
Bit 49 (0002000000000000): Controller firmware lost  
Bit 50 (0004000000000000): ECU upper MOS damage  
Bit 51 (0008000000000000): ECU lower MOS damage  
Bit 52 (0010000000000000): Motor hall fault  
Bit 53 (0020000000000000): Motor phase line fault  
Bit 54 (0040000000000000): Motor temperature protection  
Bit 55 (0080000000000000): Motor stalling  
Bit 56 (0100000000000000): ECU MOS over temperature  
Bit 57 (0200000000000000): The torque pedal is not in position  
Bit 58 (0400000000000000): NC  
Bit 59 (0800000000000000): NC  
Bit 60 (1000000000000000): NC  
Bit 61 (2000000000000000): NC  
Bit 62 (4000000000000000): NC  
Bit 63 (8000000000000000): NC

**Note:** If the battery communication is normal, and the following error codes were read, which means both the two groups of discharge MOSFETs are damaged:

- \* Cell temperature sensor damage;
- \* Cell drop;
- \* Under voltage second layer protection;
- \* Over current first layer protection;
- \* Over current second layer protection;
- \* Over current third layer protection;
- \* Over current fourth layer protection;
- \* Discharging over heating;
- \* Discharging under temperature;
- \* MOS over heating;
- \* Pre-discharge error.

✧ <ECU Info>: The information of the ECU. It includes multiple fields and each field is separated by '&'.

Example:		
0.0&0.0&126.0&6534.4&0&0&0&150102&D1D2D3&1&0&00000000000000000000&1		
No.	Parameter	Remark
1	Speed	The current speed, unit: km/h.
2	Current Mileage	The current mileage, unit: km.
3	Remaining Mileage	The remaining mileage, unit: km.
4	Total Mileage	The total mileage, unit: km.
5	Head Light Status	The head light status. 0: Head light off. 1: Head light on.
6	Rear Light Status	The rear light status. 0: Rear light off. 1: Rear light on.
7	Ride Time	The total time of riding and the range is 0-36000 s.
8	Firmware Version	The firmware version of ECU.
9	Hardware Version	The hardware version of ECU.
10	Bell Button Status	The bell button status. 0: The bell button is released. 1: The bell button is pressed.
11	Charging	Indicate whether the scooter battery is being charged. 0: Not charging. 1: Charging.
12	Battery Status	There are 20 ASCII characters in this field with 2 characters as a group. The 1st group: Bit 0 – Charging MOS state (0: OFF, 1: ON) Bit 1 – Discharging MOS state (0: OFF, 1: ON) Bit 2~7 – NC The 2nd group: Battery health status. Unit: 1%. The 3rd group: Cell maximum temperature. The 4rd group: Cell minimum temperature. The 5rd group: MOS temperature. The 6rd group: Other temperature. The 7rd ~10rd group: Pack current. Unit: mA.
13	Battery-Lock State	The state of Battery-Lock. 0: Unlocked. 1: Locked. 2: Unknown.
14	Battery-Lock Door	The state of Battery-Lock door. 0: Opened. 1: Closed.

		2: Unknown.
15	Battery Heating Plate	<p>There are 14 ASCII characters in this field with 2 characters as a group.</p> <p>The 1st group: Temperature 1. Unit: °C.</p> <p>The 2nd group: Temperature 2. Unit: °C.</p> <p>The 3rd group: Temperature 3. Unit: °C.</p> <p>The 4rd group: Temperature 4. Unit: °C.</p> <p>The 5rd group: Temperature 5. Unit: °C.</p> <p>The 6rd group: Plate 1 status (0-OFF, 1-ON).</p> <p>The 7rd group: Plate 2 status (0-OFF, 1-ON).</p>

### 3.17. Auxiliary Data Collection

#### 3.17.1. AT+GTDCC: Data Collection Configuration

The **AT+GTDCC** command is used to configure how to collect auxiliary data.

➤ **AT+GTDCC=**

Example: AT+GTDCC=zk105,1,10,1,7,,,,,0399\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Motion Data Collection	1	0 1	0
3	Motion Data Collection Duration	<=2	5 - 30 (s)	10
4	G-Sensor Hazard Detection	1	0 1	0
5	G-Sensor Hazard Sensitivity	<=2	1 - 99 (x0.1g)	7
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		
9	Reserved	0		
10	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Motion Data Collection>: Enable/Disable motion data collection function.
  - 0: Disable.
  - 1: Enable.
- ✧ <Motion Data Collection Duration>: Specify the duration of motion data collection. It is the interval of sending +RESP:GTMDR report as well.
- ✧ <G-Sensor Hazard Detection>: Enable/Disable G-Sensor hazard event detection function.
  - 0: Disable.
  - 1: Enable.
- ✧ <G-Sensor Hazard Sensitivity>: G-Sensor sensitivity of detecting hazard event. The smaller the number is, the more sensitive this function would be. When the event is triggered, a +RESP:GTADR message will be sent immediately and another +RESP:GTADR message will

be sent 10 seconds later.

### 3.17.2. +RESP:GTMDR: Motion Data Report

When the scooter is unlocked, the motion data (GPS information, scooter speed, speed handle value, brake value, etc.) will be packed and reported to backend server.

➤ **+RESP:GTMDR,**

SN	Parameter	Length (Byte)	Range/Format	Default
<b>Example:</b>				
<b>+RESP:GTMDR,EF8028,862061041674804,ZK105,,,,,0,10,1,114.016118,22.538930,1.0,00C5,00CD,00C8,2,114.016118,22.538930,1.0,00C5,00CD,00C8,3,114.016118,22.538930,1.0,00C5,00CD,00C8,4,114.016118,22.538930,1.0,00C5,00CD,00C8,5,114.016118,22.538930,1.0,00C5,00CD,00C8,6,114.016118,22.538930,1.0,00C5,00CD,00C8,7,114.016118,22.538930,1.0,00C5,00CD,00C8,8,114.016118,22.538930,1.0,00C5,00CD,00C8,9,114.016118,22.538930,1.0,00C5,00CD,00C8,10,114.016118,22.538930,1.0,00C5,00CD,00C8,20191129173525,0032\$</b>				
1	Protocol Version	6	XX0000 - XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',','_'	
6	Reserved	0		
7	Reserved	0		
8	Report Type	1	0	
9	Total Sample Number	<=2	1 - 99	
10	Sample ID	<=2	1 - 99	
11	Longitude	<=11	(-)xxx.xxxxxx	
12	Latitude	<=10	(-)xx.xxxxxx	
13	Scooter Speed	<=4	0.0 - 99.9 km/h	
14	Left Brake Value	<=4	0 - FFFF	
15	Right Brake Value	<=4	0 - FFFF	
16	Speed Handle Value	<=4	0 - FFFF	
...	...			
N	Sample ID	<=2	1 - 99	
N+1	Longitude	<=11	(-)xxx.xxxxxx	
N+2	Latitude	<=10	(-)xx.xxxxxx	
N+3	Scooter Speed	<=4	0.0 - 99.9 km/h	
N+4	Left Brake Value	<=4	0 - 65535	
N+5	Right Brake Value	<=4	0 - 65535	
N+6	Speed Handle Value	<=4	0 - 65535	
N+7	Generated Time	14	YYYYMMDDHHMMSS	
N+8	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

✧ <Report Type>: Indicates whether the type of report.

- 0: Fix time report.
- ✧ <Total Sample Number>: The total number of samples included in the report.
- ✧ <Sample ID>: The ID number of sample.
- ✧ <Longitude>: The longitude of the current position. The format is “(-)xxx.xxxxx” and the value range is from “-180.000000” to “180.000000”. The unit is degree. West longitude is represented as negative starting with “-” and east longitude is represented as positive without “+”.
- ✧ <Latitude>: The latitude of the current position. The format is “(-)xx.xxxxx” and the value range is from “-90.000000” to “90.000000”. The unit is degree. South latitude is represented as negative starting with “-” and north latitude is represented as positive without “+”.
- ✧ <Scooter Speed>: The current speed of scooter. Unit: km/h.
- ✧ <Left Brake Value>: The value of the left brake.
- ✧ <Right Brake Value>: The value of the right brake.
- ✧ <Speed Handle Value>: The value of the speed handle.

### 3.17.3. +RESP:GTADR: Acceleration Data Report

When the acceleration reaches the threshold, the 10s XYZ-axis acceleration data will be reported to backend server packed with one packet message. And the device will continue to record 10s XYZ-axis data and then report to backend server packed with another packet message.

➤ +RESP:GTADR,

**Example:**

```
+RESP:GTADR,EF8028,862061041624874,ZK105,,,,,2,,100,003CFFD50019015CFED3FF9DFF9
A001AFFF20056002C010FFECA006300030181FFA500570004FFAD0014009DFFE100270246F
F16FF72FFEA0000FFDD0069FFB10137FF500030FFC20059FFD800D8FF290038FFBC0106FFDF
00AAFFD6002400000044001A007400320015006C00050003007C0012000400830001000700
7EFFC800030077FFA400080055FFA400070059FFA600050065FFB800050068FFA800010072F
FBD00020064FFC000060067FFD1000A0071FFDB0008006FFFFA0001007EFFFE0002007EFFFD
0002007EFFFD0001007EFFFD0002007EFFFD0002007EFFFE0002007EFFFE0002007EFFFD0002
007EFFFD0002007EFFFD0001007EFFFE0002007EFFFD0002007FFFFD0002007EFFFD0002007F
FFFD0002007FFFFD0002007EFFFD0002007EFFFD0002007EFFFD0002007EFFFD0002007EFFFE
0002007EFFFD0002007CFFFE00020080FFFD0001007EFFFE0002007DFFFE0002007EFFFE0002
007EFFFD0001007EFFFE0002007EFFFD0002007EFFFE0001007EFFFE0002007EFFFD0001007E
FFFD0002007EFFFD0001007FFFFD0002007EFFFE0002007EFFFD0002007EFFFD0001007EFFFD
0001007EFFFE0001007EFFFD0002007EFFFE0002007EFFFD0001007EFFFD0002007EFFFD0002
007EFFFD0002007EFFFD0002007EFFFD0002007EFFFD0002007FFFFD0002007EFFFD0002007
EFFFE0002007FFFFE0002007FFFFD0002007EFFFD0002007FFFFE0002007EFFFE0002007EFF
D0002007EFFFD0002007EFFFD0002007EFFFE0002007EFFFE0002007EFFFD0002007EFFFD00
02007EFFFD0002007FFFFD0002007EFFFD0002007E,20191205101648,2518$
```

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

4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-', '_'	
6	Reserved	0		
7	Reserved	0		
8	Report Type	1	0	
9	Reserved	0		
10	Total Frames	<=3	0 - 100	
11	Data	<=1200	'0'-'9','A'-'F'	
12	Generated Time	14	YYYYMMDDHHMMSS	
13	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Report Type>: Indicates the type of the packet message when the event is triggered.
  - 0: First packet message.
  - 1: Period packet message.
  - 2: Last packet message.
- ✧ <Total Frames>: Total number of data frames contained in this packet message.
- ✧ <Data>: There are most 1200 ASCII characters in one packet message. 12 characters are a frame. The first 4 characters of the 12 characters represent X-axis acceleration data, the next 4 characters represent Y-axis and last 4 characters is Z-axis. The ASCII "0001" equals to **0x0001** in hex format, and the ASCII "AFFF" equals to **0xAFFF** in hex format.

Example:

**+RESP:GTADR,EF8028,862061041674804,ZK105,,,,,0,,,000100010055...,20191129173525,0032\$**

This is the oldest XYZ-axis acceleration data:

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

Equal to decimal format: X (axis acceleration data) = 1; Y = 1; Z = 85;

**+RESP:GTADR,EF8028,862061041674804,ZK105,,,,,0,,,,,FFFFFFF10052,20191129173525,0032\$**

This is the latest XYZ-axis acceleration data:

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

Equal to decimal format: X (axis acceleration data) = -1; Y = -15; Z = 82;

NOTE: Acceleration of gravity (+g) is 16 in decimal format and -g is -16. With the linear feature, the acceleration data 2047 represents +16g and -2048 represents -16g.

### 3.18. Helmet Box

#### 3.18.1. AT+GTHLM: Helmet Box Configuration

The **AT+GTHLM** command is used to configure the helmet box.

➤ **AT+GTHLM=**

**Example:**

**AT+GTHLM=zk105,0,0,255,255,255,255,255,,,,,0501\$**

SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Top Lamp Work Mode	1	0 1 2 3	0
3	Side Lamp Work Mode	1	0 1 2 3	0
4	Top Lamp Color R	<=3	0 - 255	255
5	Top Lamp Color G	<=3	0 - 255	255
6	Top Lamp Color B	<=3	0 - 255	255
7	Side Lamp Color R	<=3	0 - 255	255
8	Side Lamp Color G	<=3	0 - 255	255
9	Side Lamp Color B	<=3	0 - 255	255
10	Offline RGB Setting	<=16	0 – FFFFFFFFFFFFFFFF	0
11	Reserved	0		
12	Reserved	0		
13	Reserved	0		
14	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Top Lamp Work Mode>: Specify the working mode of top lamp.
  - 0: Off.
  - 1: Blinking.
  - 2: Breathing.
  - 3: Solid on.
- ✧ <Side Lamp Work Mode>: Specify the working mode of side lamp.
  - 0: Off.
  - 1: Blinking.
  - 2: Breathing.
  - 3: Solid on.
- ✧ <Top Lamp Color R>: Specify the R (Red) value of top lamp.
- ✧ <Top Lamp Color G>: Specify the G (Green) value of top lamp.
- ✧ <Top Lamp Color B>: Specify the B (Blue) value of top lamp.
- ✧ <Side Lamp Color R>: Specify the R (Red) value of side lamp.
- ✧ <Side Lamp Color G>: Specify the G (Green) value of side lamp.
- ✧ <Side Lamp Color B>: Specify the B (Blue) value of side lamp.
- ✧ <Offline RGB Setting>: It is used to configure how the helmet box light will behave when the device is disconnected from the server. It is a hexadecimal value composed of 8 bytes, each byte is represented by two characters, the following are the specific parsing rules:
  - The first two characters are used to indicate whether to enable the offline configuration RGB function. If its value is not 0, it means that the function is enabled, if it is 0, it means that the function is disabled.
  - The next two characters are used to indicate <Top Lamp Work Mode> and <Side Lamp Work Mode> in offline RGB setting. Its high four bits are used to represent the value of <Top Lamp Work Mode>, and its low four bits are used to represent the value of <Side Lamp Work Mode>.

- From the fifth character to the last character, every two characters represent a specific parameter, they are <Top Lamp Color R> <Top Lamp Color G> <Top Lamp Color B> <Side Lamp Color R> <Side Lamp Color G> and <Side Lamp Color B> from front to back.

**Example:**

- To disable <Offline RGB Setting>, set the highest character to 0 as 00FFFFFFFFFFFF, or set the <Offline RGB Setting> to 0.
- To enable <Offline RGB Setting>, set two bytes to non-0 values as 11FFFFFFFFFFFF. Please note that if <Offline RGB Setting> is set to 11, other characters will be automatically set to 0 as 000000000000000011, and due to the highest two characters are 0, <Offline RGB Setting> is disabled.
- If the <Offline RGB Setting> is set to: FF12AABBCCDDEEFF, according to above rule, it indicates to enable <Offline RGB Setting>, after the network is disconnected, the helmet box's top lamp will blink and the side lamp will in breathing status. And the top lamp color will set Red to 0xAA, set Green to 0xBB, set Blue to 0xCC, also the Side lamp color will set Red to 0xDD, set Green to 0xEE, set Blue to 0xFF.

### 3.19. Automatic Locking

#### 3.19.1. AT+GTNAL: Automatic Locking Configuration

When the device is unable to connect to the server for a long time, the automatic locking action is performed.

- **AT+GTNAL=**

Example: AT+GTNAL=zk105,0,60,,,,,0533\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Mode	1	0 1	0
3	Server Connection Lost Duration	<=3	1 - 999 min	60
4	Reserved	0		
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		
8	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Mode>: Enable/disable the automatic locking function.
  - 0: Disable.
  - 1: Enable.
- ✧ <Server Connection Lost Duration>: Specify the duration of the failure to connect to the server. When this condition is met, the automatic locking action will be performed.

## 3.20. Binding

### 3.20.1. AT+GTBND: Binding Command

The AT+GTBND command is used to bind the VIN and QR code into the device.

➤ **AT+GTBND=**

Example: AT+GTBND=zk105,1,SA1234567890NK,DD16-MZ80,,,,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Mode	1	0 1	
3	VIN	<=17		
4	QR Code	<=32		
5	Reserved	0		
6	Reserved	0		
7	Reserved	0		
8	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

- ✧ <Mode>: Binding or clear binding.
  - 0: Clear the binding information.
  - 1: Binding the information.
- ✧ <VIN>: The VIN code string.
- ✧ <QR Code>: The QR code string.

### 3.20.2. +RESP:GTBND: Binding Information Report

When the device successfully executes the AT+GTBND command, a +RESP:GTBND message will be sent.

➤ **+RESP:GTBND,**

Example: +RESP:GTBND,EF8028,862061041674804,ZK105,SA1234567890NK,DD16-MZ80,,,,20191129173525,0032\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 - XXXFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',','_'	
6	Reserved	0		
7	Reserved	0		
8	Reserved	0		
9	Generated Time	14	YYYYMMDDHHMMSS	
10	Count Number	4	0000 – FFFF	

	Tail Character	1	\$	\$
--	----------------	---	----	----

### 3.21. Bluetooth Setting

#### 3.21.1. AT+GTBTS - Bluetooth Setting

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

➤ **AT+GTBTS=**

Example: AT+GTBTS=zk105,,,,,0,,,,,,,,,,,,,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1.	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2.	Reserved	0		
3.	Reserved	0		
4.	Reserved	0		
5.	Reserved	0		
6.	Discoverable Mode	1	0 – 1	0
7.	Reserved	0		
8.	Reserved	0		
9.	Reserved	0		
10.	Reserved	0		
11.	Reserved	0		
12.	Reserved	0		
13.	Reserved	0		
14.	Reserved	0		
15.	Reserved	0		
16.	Reserved	0		
17.	Reserved	0		
18.	Reserved	0		
19.	Reserved	0		
20.	Reserved	0		
21.	Reserved	0		
22.	Reserved	0		
23.	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

✧ *<Discoverable Mode>*: The mode of configuring the Bluetooth to be discoverable or non-discoverable.

- 0: Discoverable.
- 1: Non-discoverable.

### 3.22. Other Commands

#### 3.22.1. AT+GTCAT: CAN Transparent Command

The AT+GTCAT command is used to send transparent command.

➤ **AT+GTCAT=**

Example: AT+GTCAT=zk105,D0D1D2D3D4D5D6D7,FFFF\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Password	4 – 20	'0' – '9', 'a' – 'z', 'A' – 'Z'	zk10*
2	Data	16	'0' – '9', 'A' – 'F'	
3	Serial Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

✧ <Data>: The data of CAN transparent information.

#### 3.22.2. +RESP:GTCAT – CAN Transparent Command Response

➤ **+RESP:GTCAT,**

Example: +RESP:GTCAT,EF801C,862061041674804,ZK105,,D0D1D2D3D4D5D6D7,20190816015225,0030\$				
SN	Parameter	Length (Byte)	Range/Format	Default
1	Protocol Version	6	XX0000 - XXFFFF, X ∈ {'A'-'Z','0'-'9'}	
2	Unique ID	15	IMEI	
3	Device Name	<=20	'0'-'9','a'-'z','A'-'Z','-',','_'	
4	VIN	<=17	'0'-'9','A'-'Z'	
5	QR Code	<=36	'0'-'9','a'-'z','A'-'Z','-',','_'	
6	Reserved	0		
7	Data	16	'0' – '9', 'A' – 'F'	
8	Generated Time	14	YYYYMMDDHHMMSS	
9	Count Number	4	0000 – FFFF	
	Tail Character	1	\$	\$

✧ <Data>: The data of CAN transparent response.

## 4. Appendix: Message Index

### ✧ Acknowledgement

+ACK:GTXXX

### ✧ Heartbeat

+ACK:GTHBD

+SACK:GTHBD

### ✧ Server Acknowledgment

+SACK

### ✧ Commands

AT+GTTMA

AT+GTQSS

AT+GTIPN

AT+GTDG

AT+GTFRI

AT+GTNMD

AT+GTALM

AT+GTECC

AT+GTCFG

AT+GTLED

AT+GTVAD

AT+GTNFC

AT+GTBCP

AT+GTMEL

AT+GTRTO

AT+GTRES

AT+GTDCC

AT+GTHLM

AT+GTNAL

AT+GTBND

AT+GTCAT

### ✧ Reports

+RESP:GTNCN

+RESP:GTDG

+RESP:GTFRI

+RESP:GTSTT

+RESP:GTALM

+RESP:GTBOV

+RESP:GTBRN

+RESP:GTLOR

+RESP:GTLOC  
+RESP:GTLOF  
+RESP:GTULS  
+RESP:GTULF  
+RESP:GTCSD  
+RESP:GTCFL  
+RESP:GTCFU  
+RESP:GTPNA  
+RESP:GTPFA  
+RESP:GTPNL  
+RESP:GTSCE  
+RESP:GTPCE  
+RESP:GTBTC  
+RESP:GTSTC  
+RESP:GTBPL  
+RESP:GTEPN  
+RESP:GTEPF  
+RESP:GTMLS  
+RESP:GTRSS  
+RESP:GTRES  
+RESP:GTWLC  
+RESP:GTMDR  
+RESP:GTADR  
+RESP:GTBND  
+RESP:GTCAT

◇ **Real Time Operation Reports**

+RESP:GTQRY  
+RESP:GTINF  
+RESP:GTRTL  
+RESP:GTALS  
+RESP:GTALC  
+RESP:GTCID  
+RESP:GTVER  
+RESP:GTALI  
+RESP:GTSPD  
+RESP:GTQSN  
+RESP:GTCVR  
+RESP:GTHLM