

# **BG96 GNSS AGPS**

# **AT Commands Manual**

**LTE Module Series**

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# About the Document

## History

Revision	Date	Author	Description
1.0	2018-05-14	Matt YE	Initial

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# 1 Description of AT Commands

The following commands are used to configure various GNSS and AGPS configurations.

## 1.1. AT+QGPSCFG GNSS Configurations

The command is used to query and configure various GNSS settings.

AT+QGPSCFG Configure GNSS	
Test command <b>AT+QGPSCFG=?</b>	Response <b>+QGPSCFG: "plane",(0-2)"</b> <b>+QGPSCFG: "suplver",(1,2)"</b> <b>+QGPSCFG: "agpsposmode",(0-4294967295)</b> <b>+QGPSCFG: "lbsapn",(0-31),(0-4),&lt;apn&gt;</b> <b>+QGPSCFG: "agnssprotocol",(0-255),(0-65535)</b> <b>+QGPSCFG: "gpsweek",(0-65535)</b> <b>+QGPSCFG: "appidname",&lt;id&gt;,&lt;pwd&gt;</b> <b>+QGPSCFG: "ecidconfig",(0,1)</b>  <b>OK</b>
Write Command Configure AGPS plane type as user plane or control plane <b>AT+QGPSCFG="plane"[,&lt;plane&gt;]</b>	Response When there are two parameters: <b>OK</b> or <b>+CME ERROR: &lt;errcode&gt;</b>  When the second parameter is omitted, query the current setting: <b>+QGPSCFG: "plane",&lt;plane&gt;</b>  <b>OK</b>
Write Command Configure AGPS SUPL protocol version <b>AT+QGPSCFG="suplver"[,&lt;suplversion&gt;]</b>	Response When there are two parameters: <b>OK</b> or <b>+CME ERROR: &lt;errcode&gt;</b>

	<p>When the second parameter is omitted, query the current setting: <b>+QGPSCFG: "suplver",&lt;suplversion&gt;</b></p> <p><b>OK</b></p>
<p>Write Command Configure AGPS positioning mode supported <b>AT+QGPSCFG="agpsposmode"[,&lt;agpsposmode&gt;]</b></p>	<p>Response When there are two parameters: <b>OK</b> or <b>+CME ERROR: &lt;errcode&gt;</b></p> <p>When the second parameter is omitted, query the current setting: <b>+QGPSCFG: "agpsposmode",&lt;agpsposmode&gt;</b></p> <p><b>OK</b></p>
<p>Write Command Configure LBS APN <b>AT+QGPSCFG="lbsapn"[,&lt;sys&gt;,&lt;type&gt;,&lt;apn&gt;]</b></p>	<p>Response When there are four parameters: <b>OK</b> or <b>+CME ERROR: &lt;errcode&gt;</b></p> <p>When the parameters after the first one are omitted, query the current setting: <b>+QGPSCFG: "lbsapn",&lt;sys&gt;,&lt;type&gt;,&lt;apn&gt;</b></p> <p><b>OK</b></p>
<p>Write Command Select Assisted-GPS and GLONASS positioning protocol <b>AT+QGPSCFG="agnssprotocol"[,&lt;GPSLPP&gt;,&lt;GLONASSLPP&gt;]</b></p>	<p>Response When there are three parameters: <b>OK</b> or <b>+CME ERROR: &lt;errcode&gt;</b></p> <p>When the parameters after the first one are omitted, query the current setting: <b>+QGPSCFG: "agnssprotocol",&lt;GPSLPP&gt;,&lt;GLONASSLPP&gt;</b></p> <p><b>OK</b></p>
<p>Write Command Configure the minimum GPS week number <b>AT+QGPSCFG="gpsweek"[,&lt;gpsweek&gt;]</b></p>	<p>Response When there are two parameters: <b>OK</b> or <b>+CME ERROR: &lt;errcode&gt;</b></p>

	<p>When the second parameter is omitted, query the current setting: <b>+QGPSCFG: "gpsweek",&lt;gpsweek&gt;</b></p> <p><b>OK</b></p>
<p>Write Command Configure application ID and password <b>AT+QGPSCFG="appidname" [&lt;id&gt;,&lt;pwd&gt;]</b></p>	<p>Response When there are three parameters: <b>OK</b> or <b>+CME ERROR: &lt;errcode&gt;</b></p> <p>When the parameters behind the first one are omitted, query the current setting: <b>+QGPSCFG: "appidname",&lt;id&gt;,&lt;pwd&gt;</b></p> <p><b>OK</b></p>
<p>Write Command Enable or disable the ECID <b>AT+QGPSCFG="ecidconfig" [&lt;ecid&gt;]</b></p>	<p>Response When there are two parameters: <b>OK</b> or <b>+CME ERROR: &lt;errcode&gt;</b></p> <p>When the second parameter is omitted, query the current setting: <b>+QGPSCFG: "ecidconfig",&lt;ecid&gt;</b></p> <p><b>OK</b></p>
Reference	

## Parameter

<b>&lt;plane&gt;</b>	Set AGPS user and control plane mode.
0	User plane without SSL
1	User plane with SSL
2	Control plane
<b>&lt;suplversion&gt;</b>	AGPS SUPL protocol version.
1	SUPL v1.0
2	SUPL v2.0
<b>&lt;agpsposmode&gt;</b>	Configure AGPS positioning mode. The default value is 65407. Unit: Decimal.
0	Not supported
1	Supported
Bit 0	Standalone



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	Bit 1	UP MS-based
	Bit 2	UP MS-assisted
	Bit 3	CP MS-based (2G)
	Bit 4	CP MS-assisted (2G)
	Bit 8	UP MS-based (4G)
	Bit 9	UP MS-assisted (4G)
	Bit 10	CP MS-based (4G)
	Bit 11	CP MS-assisted (4G)
	Bit 21	A-GLONASS UP MS-based for 4G
	Bit 22	A-GLONASS UP MS-assisted for 4G
	Bit 23	A-GLONASS CP MS-based for 4G
	Bit 24	A-GLONASS CP MS-assisted for 4G
	Other Bits	Reserved
<b>&lt;sys&gt;</b>		Configure serving system type.
	1	CMDA (Not effective for BG96)
	2	HDR (Not effective for BG96)
	4	GSM
	8	WCDMA (Not effective for BG96)
	16	LTE
<b>&lt;type&gt;</b>		Configure PDN type.
	1	IPV4
	2	IPV6
	4	IPV4V6
	8	PPP
<b>&lt;apn&gt;</b>		Configure APN.
<b>&lt;GPSLPP &gt;</b>		Assisted GPS LPP positioning protocol selection. Unit: Decimal.
	0	Disabled
	1	Enabled
	Bit 0	UP LPP
	Bit 1	CP LPP
<b>&lt;GLONASSLPP&gt;</b>		Assisted GLONASS positioning protocol selection.
	0	Disabled
	1	Enabled
	Bit 0	CP RRLP
	Bit 1	CP RRC
	Bit 2	CP LPP
	Bit 8	UP RRLP
	Bit 10	UP LPP
	Other Bits	Reserved
<b>&lt;gpsweek&gt;</b>		Configure the minimum GPS week number.
		Recommend values:
	<u>1738</u>	For live GPS environment (default)
	1054	For simulated GPS environment. That is Spirent PLTS and ULTS, etc.
<b>&lt;id&gt;</b>		Application ID.

---

<pwd>	Application password.
<ecid>	Enable or disable ECID function. 0      Disable 1      Enable
<errcode>	Integer type. The error code of the operation. If it is not 0, it is the type of error. Please refer to <b>Appendix B</b> for details.

**NOTE**

**AT+QGPSCFG="appidname",<id>,<pwd>]** command is used for Verizon Wireless SUPL test only. The application ID and password should be got from Verizon Wireless.

## 1.2. AT+QGPS Turn on GNSS

The command is used to turn on GNSS function. When <fixcount> is 0, GNSS will fix position continuously. GNSS can be turned off by **AT+QGPSEND**. When <fixcount> is not 0, and the actual positioning times reach the specified value, GNSS will be turned off automatically.

AT+QGPS Turn on GNSS	
Test Command <b>AT+QGPS=?</b>	Response <b>+QGPS: (1-4),(1-255),(1-1000),(0-1000),(1-65535)</b>  <b>OK</b>
Read Command <b>AT+QGPS?</b>	Response <b>+QGPS: &lt;gnssstate&gt;</b>  <b>OK</b>
Write Command <b>AT+QGPS=&lt;gnssmode&gt;[,&lt;fixmaxtime&gt;[,&lt;fixmaxdist&gt;[,&lt;fixcount&gt;[,&lt;fixrate&gt;]]]]</b>	Response <b>OK</b> or <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

### Parameter

<gnssstate>	GNSS state. 0    GNSS OFF 1    GNSS ON
<gnssmode>	GNSS working mode. 1    Stand-alone

	2 MS-based
	3 MS-Assisted
	4 Low Accuracy MSA(cell id)
<b>&lt;fixmaxtime&gt;</b>	The maximum positioning time (unit: s). which indicate the response time of GNSS receiver while measuring the GNSS pseudo range, and the upper time limit of GNSS satellite searching. It also includes the time for demodulating the ephemeris data and calculating the position. 1-30-255 Maximum positioning time
<b>&lt;fixmaxdist&gt;</b>	Accuracy threshold of positioning. Unit: m. 1-50-1000
<b>&lt;fixcount&gt;</b>	Number of attempts for positioning. 0-1000 0 indicates continuous positioning. Non-zero values indicate the actual number of attempts for positioning.
<b>&lt;fixrate&gt;</b>	The interval time between the first and second time positioning. Unit: s. 1-65535
<b>&lt;errcode&gt;</b>	Integer type. The error code of the operation. If it is not 0, it is the type of error. Please refer to <b>Appendix B</b> for details.

### 1.3. AT+QGPSSUPLURL Set SUPL Server Address URL

This command can be used to configure the SUPL server URL. The setting will be saved in NVRAM automatically.

<b>AT+QGPSSUPLURL Set SUPL Server URL</b>	
Test command <b>AT+QGPSSUPLURL=?</b>	Response <b>+QGPSSUPLURL: &lt;suplurl&gt;</b>  <b>OK</b>
Read Command <b>AT+QGPSSUPLURL?</b>	Response <b>+QGPSSUPLURL: &lt;suplurl&gt;</b>  <b>OK</b>
Write Command <b>AT+QGPSSUPLURL=&lt;suplurl&gt;</b>	Response <b>OK</b> or <b>ERROR</b> or <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

## Parameter

<b>&lt;suplurl&gt;</b>	SUPL server address. The format is <URL>[:<port_number>]. Such as “supl.server.com”, “123.123.123.123”, “supl.server.com:7275”. The default port is 7275.
<b>&lt;errcode&gt;</b>	Integer type. The error code of the operation. If it is not 0, it is the type of error. Please refer to <b>Appendix B</b> for details.

## 1.4. AT+QGPSSUPLCA Import SUPL CA Certificate

This command is used to import SUPL CA root certificate. The certificate file should be input into file system */UFS* catalogue by **AT+QFUPL** command. For more details about the command, please refer to **document [2]**. The certificate should be obtained from the operator or the server provider.

<b>AT+QGPSSUPLCA Import SUPL CA Certificate</b>	
Test command <b>AT+QGPSSUPLCA=?</b>	Response <b>+QGPSSUPLCA: &lt;cafilename&gt;</b>  <b>OK</b>
Read Command <b>AT+QGPSSUPLCA?</b>	Response <b>OK</b>
Write Command <b>AT+QGPSSUPLCA=&lt;cafilename&gt;</b>	Response <b>OK</b> or <b>ERROR</b> or <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

## Parameter

<b>&lt;cafilename&gt;</b>	Certificate file name. The file should be in <i>/UFS</i> catalogue in the file system.
<b>&lt;errcode&gt;</b>	Integer type. The error code of the operation. If it is not 0, it is the type of error. Please refer to <b>Appendix B</b> for details.

## 1.5. AT+QGPSLOCK Enable/Disable GNSS Lock

This command is used to set the GNSS lock in AGPS mode.

AT+QGPSLOCK Enable/Disable GNSS Lock	
Test command <b>AT+QGPSLOCK=?</b>	Response <b>+QGPSLOCK: (0-3)</b>  <b>OK</b>
Read Command <b>AT+QGPSLOCK?</b>	Response <b>+QGPSLOCK: &lt;permission&gt;</b>  <b>OK</b>
Write Command <b>AT+QGPSLOCK=&lt;permission&gt;</b>	Response <b>OK</b> or <b>ERROR</b> or <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

### Parameter

<b>&lt;permission&gt;</b>	Specifies whether GNSS should be permitted under Mobile-Initiated (MI) or Mobile-Terminated (MT) conditions. <ul style="list-style-type: none"> <li><u>0</u> Enabled under both MI and MT.</li> <li>1 Disabled under MI and enabled under MT.</li> <li>2 Enabled under MI and disabled under MT.</li> <li>3 Disabled under both MI and MT.</li> </ul>
<b>&lt;errcode&gt;</b>	Integer type. The error code of the operation. If it is not 0, it is the type of error. Please refer to <b>Appendix B</b> for details.

## 2 Examples

### 2.1. Example of MS-Assisted AT Process in Control Plane Mode

```
AT+QGPSCFG="plane",2 //Set AGPS control plane mode
OK
AT+QGPS=3 //Start AGPS MSA mode
OK
```

### 2.2. Example of MS-Based without SSL AT Process in User Plane Mode

```
AT+QGPSCFG="plane",0 //Set AGPS user plane mode without SSL
OK
AT+QGPSSUPLURL="supl.google.com:7276" //Set SUPL server URL
OK
AT+QGPSCFG="lbsapn",16,1,"vzwinternet" //Set LBS APN
OK
AT+QGPS=2 //Start AGPS MSB mode
OK
```

### 2.3. Example of MS Assisted without SSL AT Process in User Plane Mode

```
AT+QGPSCFG="plane",0 //Set AGPS user plane mode without SSL
OK
AT+QGPSSUPLURL="supl.google.com:7276" //Set SUPL server URL
OK
AT+QGPSCFG="lbsapn",16,1,"vzwinternet" //Set LBS APN
OK
AT+QGPS=3 //Start AGPS MSA mode
OK
```

## 2.4. Example of MS-Based with SSL AT Process in User Plane Mode

```
AT+QGPSCFG="plane",1 //Set AGPS user plane mode with SSL
OK
AT+QGPSSUPLURL="supl.google.com:7275" //Set SUPL server URL
OK
AT+QGPSSUPLCA="cert.cer" //Import the CA certificate
OK
AT+QGPSCFG="lbsapn",16,1,"vzwinternet" //Set LBS APN
OK
AT+QGPS=2 //Start AGPS MSB mode
OK
```

## 2.5. Example of MS-Assisted with SSL AT Process in User Plane Mode

```
AT+QGPSCFG="plane",1 //Set AGPS user plane mode with SSL
OK
AT+QGPSSUPLURL="supl.google.com:7275" //Set SUPL server URL
OK
AT+QGPSSUPLCA="cert.cer" //Import the CA certificate
OK
AT+QGPSCFG="lbsapn",16,1,"vzwinternet" //Set LBS APN
OK
AT+QGPS=3 //Start AGPS MSA mode
OK
```

# 3 Appendix A References

**Table 1: Related Document**

SN	Document Name	Remark
[1]	Quectel_BG96_AT_Commands_Manual	AT commands manual for BG96
[2]	Quectel_BG96_FILE_AT_Commands_Manual	Introduction about BG96 file AT commands

**Table 2: Terms and Abbreviations**

Abbreviation	Description
GNSS	Global Navigation Satellite Systems
GPS	Global Positioning System provides by USA
GLONASS	Global Navigation Satellite System provides by Russia
AGPS	Assisted GPS
MSA	Mobile Station Assisted
MSB	Mobile Station Based
SUPL	Secure User Plane Location
CP	Control Plane
UP	User Plane
ECID	Enhanced Cell ID
MI	Mobile Initiated
MT	Mobile Terminated



# 4 Appendix B Summary of Error Code

The error code **<errcode>** indicates an error related to GNSS operations. The detail about **<errcode>** is described in the following table.

**Table 3: Summary of Error Codes**

<b>&lt;errcode&gt;</b>	<b>Meaning</b>
501	Invalid parameter(s).
502	Operation not supported.
503	GNSS subsystem busy.
504	Session is ongoing.
505	Session not activity.
506	Operation timeout.
507	Function not enables.
508	Time information error.
509	XTRA not enable.
510	XTRA file open failed.
511	Bad CRC for XTRA data file.
512	Validity time is out of range.
513	Internal resource error.
514	GNSS locked.
515	End by E911.
516	Not fixed now.
549	Unknown error.

---

550 File open failed.

---

551 URL too long

---