

# **LTE Standard**

# **GNSS Application Note**

**LTE Standard Module Series**

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# About the Document

## History

Revision	Date	Author	Description
1.0	2016-09-02	Sundy WANG	Initial
1.1	2017-02-13	Sundy WANG	<ol style="list-style-type: none"> <li>Added the introduction, AT commands and an operation procedure example of gpsOneXTRA Assistance function (Chapter 1.3, 2.7, 2.8, 2.9 and 3.3)</li> <li>Modified the parameter description of AT+QGPSCFG="outport"[,&lt;outport&gt;] (Chapter 2.1.1)</li> <li>Modified the parameter description of AT+QGPSDEL (Chapter 2.2)</li> </ol>
1.2	2019-10-23	Tery SHI	<ol style="list-style-type: none"> <li>Added applicable modules of this document (Chapter 1).</li> <li>Added following commands (Chapter 2.1)            AT+QGPSCFG="odpcontrol"            AT+QGPSCFG="dpoenable"            AT+QGPSCFG="plane"            AT+QGPSCFG="autogps"            AT+QGPSCFG="suplver"            AT+QGPSCFG="agpsposmode"            AT+QGPSCFG="agnssprotocol"            AT+QGPSCFG="fixfreq"</li> <li>Added command AT+QGPSSUPLURL(Chapter 2.6) and AT+QGPSSUPLCA (Chapter 2.7)</li> </ol>

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# 1 Introduction

Quectel LTE standard modules integrate a GNSS engine which supports GPS, BeiDou, Galileo and GLONASS systems and also gpsOneXTRA Assistance technology. The high-performance GNSS engine is suitable for various applications where the lowest-cost and accurate positioning is needed, and it supports position tracking without any network assistance. The GNSS makes LTE standard modules popular in application fields such as turn-by-turn navigation, asset tracking, personnel tracking, location-aware games, as well as home and fleet management.

This document is applied to the following LTE Standard modules:

- EC2x: EC21, EC25, EC20 R2.0 and EC20 R2.1
- EG2x-G: EG25-G and EG21-G
- EG9x: EG91 and EG95
- EM05

## 1.1. GNSS Turning on/off Procedures

The GNSS of LTE standard modules supports location calculation without any assistance from the network. GNSS turning on/off procedures are shown below:

**Step 1:** Configure GNSS parameters via **AT+QGPSCFG**.

**Step 2:** Turn on GNSS via **AT+QGPS**.

**Step 3:** After GNSS is turned on and position is fixed successfully, the positioning information can be obtained in either of the following three ways:

- 1) NMEA sentences are outputted to "usbntmea" port by default. NMEA sentences can be obtained by reading the port.
- 2) **AT+QGPSLOC** can be used to obtain positioning information directly, such as latitude, longitude, height, GNSS positioning mode, time, number of satellites, and so on.
- 3) After enabling **<nmeasrc>** via **AT+QGPSCFG="nmeasrc",1**, the specified NMEA sentence can be acquired via **AT+QGPSGNMEA**. If **<nmeasrc>** is disabled, this command cannot be used.

**Step 4:** Turn off GNSS via **AT+QGPSEND**.

## 1.2. NMEA Sentence Types

The NMEA sentences are compatible with NMEA-0183 protocol, and four kinds of prefixes are available to differentiate NMEA sentences of different satellite systems, as illustrated below.

For GPS NMEA sentences, the prefix is "GP", as below:

- GPGGA - Global positioning system fix data, such as time, position, etc.
- GPRMC - Recommended minimum specific GNSS data
- GPGSV - GNSS satellites in view, such as number of satellites in view, satellite ID numbers, etc.
- GPGSA - GNSS DOP and active satellites
- GPVTG - Course over ground and ground speed

For GLONASS NMEA sentences, the prefixes are "GL" and "GN", as below:

- GLGSV - GNSS satellites in view, such as number of satellites in view, satellite ID numbers, etc.
- GNGSA - GNSS DOP and active satellites
- GNGNS - GNSS fix data

For Galileo NMEA sentences, the prefixes are "GA", as below:

- GAGGA - Global positioning system fix data, such as time, position, etc.
- GARMC - Recommended minimum specific GNSS data
- GAGSV - GNSS satellites in view, such as number of satellites in view, satellite ID numbers, etc.
- GAGSA - GNSS DOP and active satellites
- GAVTG - Course over ground and ground speed

For BeiDou NMEA sentences, the prefixes are "PQ", as below:

- PQGSV - GNSS satellites in view, such as number of satellites in view, satellite ID numbers, etc.
- PQGSA - GNSS DOP and active satellites

## 1.3. Introduction of gpsOneXTRA Assistance

gpsOneXTRA Assistance technology enhances the performance of GNSS and provides simplified GNSS assistance delivery, including ephemeris, almanac, ionosphere, UTC, health and coarse time assistance for GNSS engine. After activating gpsOneXTRA Assistance, the TTFF (Time to First Fix) can be reduced by 18s~30s (or more in harsh environments with weak signals). The assistance data which is obtained from one of the gpsOneXTRA Assistance web servers needs to be updated once a day (or every couple of days).

Before using this function, please make sure the valid gpsOneXTRA assistance data is available first. It is necessary to download a new gpsOneXTRA binary file which contains the data from one of the gpsOneXTRA Assistance web servers via URLs listed below.



- The files named with suffix "xtra2.bin" are for GPS+GLONASS.

<http://xtrapath1.izatcloud.net/xtra2.bin>

<http://xtrapath2.izatcloud.net/xtra2.bin>

<http://xtrapath3.izatcloud.net/xtra2.bin>

- The files named with suffix "xtra3grc.bin" are for GPS+GLONASS+BeiDou.

<http://xtrapath1.izatcloud.net/xtra3grc.bin>

<http://xtrapath2.izatcloud.net/xtra3grc.bin>

<http://xtrapath3.izatcloud.net/xtra3grc.bin>

- The files named with suffix "xtra3grcej.bin" are for GPS+GLONASS+BeiDou+Galileo.

<http://xtrapath1.izatcloud.net/xtra3grcej.bin>

<http://xtrapath2.izatcloud.net/xtra3grcej.bin>

<http://xtrapath3.izatcloud.net/xtra3grcej.bin>

gpsOneXTRA assistance data needs to be updated regularly. The status of gpsOneXTRA data files can be queried via **AT+QGPSXTRADATA?** before updating.

The operation procedures of gpsOneXTRA Assistance function are shown as follows:

**Step 1:** gpsOneXTRA Assistance function is disabled by default, and can be enabled via **AT+QGPSXTRA=1**.

**Step 2:** Query and confirm the current validity of gpsOneXTRA data file via **AT+QGPSXTRADATA?**. If the data is invalid, perform **Step 3~6** then; if the data is valid, turn on GNSS engine according to the procedures described in **Chapter 1.1** directly.

**Step 3:** Download files with suffix "xtra2.bin" or "xtra3grc.bin" to the module via URLs listed above.

**Step 4:** Inject the correct gpsOneXTRA time to GNSS engine via **AT+QGPSXTRATIME**.

**Step 5:** Inject the valid gpsOneXTRA data file to GNSS engine via **AT+QGPSXTRADATA**.

**Step 6:** Turn on GNSS engine according to the procedures described in **Chapter 1.1**.

#### NOTE

Before **Step 1**, it is necessary to ensure that the GNSS engine has been turned off.

For more detailed information of the AT commands mentioned above, please refer to **Chapter 2.9, 2.10** and **2.11**.

## 2 Description of GNSS AT Commands

### 2.1. AT+QGPSCFG Configure GNSS

The command is used to query and configure various GNSS settings, including NMEA sentences output port, output type, etc.

AT+QGPSCFG Configure GNSS	
Test Command	Response
AT+QGPSCFG=?	+QGPSCFG: "outport",("none","usbntmea","uartdebug") +QGPSCFG: "nmeasrc",(0,1) +QGPSCFG: "gpsnmeatype",(0-31) +QGPSCFG: "glonassnmeatype",(0-7) +QGPSCFG: "galileonmeatype",(0-1) +QGPSCFG: "beidoumeatype",(0-3) +QGPSCFG: "gnssconfig",(0-6) +QGPSCFG: "odpcontrol",(0-2) +QGPSCFG: "dpoenable",(0,1) +QGPSCFG: "gsvextnmeatype",(0,1) +QGPSCFG: "plane",(0-2) +QGPSCFG: "autogps",(0,1) +QGPSCFG: "suplver",(1,2) +QGPSCFG: "agpsposmode",(0-4294967295) +QGPSCFG: "agnssprotocol",(0-255),(0-65535) +QGPSCDF: "fixfreq",(1,2,5,10)
	OK
Reference	

### 2.1.1. AT+QGPSCFG="outport" Configure NMEA Sentences Output Port

This command is used to configure the NMEA sentences output port. It will take effect immediately.

#### AT+QGPSCFG="outport" Configure NMEA Sentences Output Port

Write Command	Response
<b>AT+QGPSCFG="outport" [&lt;out_port&gt; ]</b>	When two parameters are specified, configure the output port of NMEA sentences: <b>OK</b> Or <b>ERROR</b>
Reference	When the second parameter is not specified, query the current setting: <b>+QGPSCFG: "outport", &lt;out_port&gt;</b>  <b>OK</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>

#### Parameter

<b>&lt;out_port&gt;</b>	String type. Configure the output port of NMEA sentences, and the parameter configuration will be automatically saved to NVRAM. "none" Close NMEA sentence output "usbnmea" Output via USB NMEA port "uartdebug" Output via debug UART port
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

### 2.1.2. AT+QGPSCFG="nmeasrc" Enable/Disable Acquisition of NMEA Sentences via AT+QGPSGNMEA

This command is used to enable/disable acquisition of NMEA sentences via **AT+QGPSGNMEA**. It will take effect immediately.

#### AT+QGPSCFG="nmeasrc" Enable/Disable Acquisition of NMEA Sentences via AT+QGPSGNMEA

Write Command	Response
<b>AT+QGPSCFG="nmeasrc" [&lt;NMEA_src&gt;]</b>	When two parameters are specified, configure whether to enable acquisition of NMEA sentences via

	<p><b>AT+QGPSGNMEA:</b> <b>OK</b> Or <b>ERROR</b></p> <p>When the second parameter is not specified, query the current setting: <b>+QGPSCFG: "nmeasrc",&lt;NMEA_src&gt;</b></p> <p><b>OK</b></p> <p>If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b></p>
Reference	

## Parameter

<b>&lt;NMEA_src&gt;</b>	<p>Integer type. If enabled, original NMEA sentences can be acquired via <b>AT+QGPSGNMEA</b>, and the parameter configuration will be automatically saved to NVRAM. Meanwhile, sentences are outputted via the same NMEA ports as before.</p> <p>0        Disable 1        Enable</p>
<b>&lt;errcode&gt;</b>	<p>Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.</p>

### 2.1.3. AT+QGPSCFG="gpsnmeatype" Configure Output Type of GPS NMEA

#### Sentences

This command is used to configure the type of GPS NMEA sentences that will be outputted. It will take effect after the module is rebooted.

#### AT+QGPSCFG="gpsnmeatype" Configure Output Type of GPS NMEA Sentences

<p>Write Command <b>AT+QGPSCFG="gpsnmeatype" [&lt;GPS_NMEA_type&gt;]</b></p>	<p>Response</p> <p>When two parameters are specified, configure the output type of GPS NMEA sentences: <b>OK</b> Or <b>ERROR</b></p> <p>When the second parameter is not specified, query the current setting: <b>+QGPSCFG: "gpsnmeatype",&lt;GPS_NMEA_type&gt;</b></p>
--	---

	<p><b>OK</b></p> <p>If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b></p>
Reference	

## Parameter

<b>&lt;GPS_NMEA_type&gt;</b>	Integer type. Output type of GPS NMEA sentences, and the parameter configuration will be automatically saved to NVRAM. The default value is 31 which means that all the five types of sentences will be outputted.
0	Disable
1	GPGGA
2	GPRMC
4	GPGSV
8	GPGSA
16	GPVTG
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

### 2.1.4. AT+QGPSCFG="glonassnmeatype" Configure Output Type of GLONASS

#### NMEA Sentences

This command is used to configure the type of the GLONASS NMEA sentence that will be outputted. It will take effect after the module is rebooted.

#### AT+QGPSCFG="glonassnmeatype" Configure Output Type of GLONASS NMEA Sentences

Write Command	Response
<b>AT+QGPSCFG="glonassnmeatype"[, &lt;GLONASS_NMEA_type&gt;]</b>	<p>When two parameters are specified, configure the output type of GLONASS NMEA sentences:</p> <p><b>OK</b></p> <p>Or</p> <p><b>ERROR</b></p> <p>When the second parameter is not specified, query the current setting:</p> <p><b>+QGPSCFG:</b> <b>"glonassnmeatype",&lt;GLONASS_NMEA_type&gt;</b></p> <p><b>OK</b></p>

	If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

## Parameter

<b>&lt;GLONASS_NMEA_type&gt;</b>	Integer type. Configure output type of GLONASS NMEA sentences, and the parameter configuration will be automatically saved to NVRAM. The default value is 0.  <table border="0"> <tr><td>0</td><td>Disable</td></tr> <tr><td>1</td><td>GLGSV</td></tr> <tr><td>2</td><td>GNGSA</td></tr> <tr><td>4</td><td>GNGNS</td></tr> </table>	0	Disable	1	GLGSV	2	GNGSA	4	GNGNS
0	Disable								
1	GLGSV								
2	GNGSA								
4	GNGNS								
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.								

### 2.1.5. AT+QGPSCFG="galileonmeatype" Configure Output Type of Galileo NMEA Sentences

This command is used to configure the type of Galileo NMEA sentence that will be outputted. It will take effect after the module is rebooted.

#### AT+QGPSCFG="galileonmeatype" Configure Output Type of Galileo NMEA Sentences

Write Command <b>AT+QGPSCFG="galileonmeatype" [&lt;Galileo_NMEA_type&gt;]</b>	Response When two parameters are specified, configure the output type of Galileo NMEA sentences: <b>OK</b> Or <b>ERROR</b>  When the second parameter is not specified, query the current setting: <b>+QGPSCFG: "galileonmeatype",&lt;Galileo_NMEA_type&gt;</b>  <b>OK</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

## Parameter

<b>&lt;Galileo_NMEA_type&gt;</b>	Integer type. Configure output type of Galileo NMEA sentences, and the parameter configuration will be automatically saved to NVRAM. The default value is 0. <u>0</u> Disable 1      GAGSV
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

### 2.1.6. AT+QGPSCFG="beidoumeatype" Configure Output Type of BeiDou NMEA Sentences

This command is used to configure the type of BeiDou NMEA sentence that will be outputted. It will take effect after the module is rebooted.

#### AT+QGPSCFG="beidoumeatype" Configure Output Type of BeiDou NMEA Sentences

Write Command <b>AT+QGPSCFG="beidoumeatype" [&lt;BeiDou_NMEA_type&gt;]</b>	Response When two parameters are specified, configure the output type of BeiDou NMEA sentences: <b>OK</b> Or <b>ERROR</b>  When the second parameter is not specified, query the current setting: <b>+QGPSCFG: "beidoumeatype", &lt;BeiDou_NMEA_type&gt;</b>  <b>OK</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

## Parameter

<b>&lt;BeiDou_NMEA_type&gt;</b>	Integer type. Configure output type of BeiDou NMEA sentences, and the parameter configuration will be automatically saved to NVRAM. The default value is 0. <u>0</u> Disable 1      PQGSA
---------------------------------	---

	2	PQGSV
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details	

### 2.1.7. AT+QGPSCFG="gnssconfig" Configure Supported GNSS Constellations

This command is used to configure the supported GNSS constellations of the module. It will take effect after the module is rebooted.

AT+QGPSCFG="gnssconfig" Configure Supported GNSS Constellations	
Write Command <b>AT+QGPSCFG="gnssconfig"[,&lt;GNSS_config&gt;]</b>	<p>Response</p> <p>When two parameters are specified, configure the supported GNSS constellations: <b>OK</b> Or <b>ERROR</b></p> <p>When the second parameter is not specified, query the current setting: <b>+QGPSCFG: "gnssconfig",&lt;GNSS_config&gt;</b>  <b>OK</b></p> <p>If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b></p>
Reference	

#### Parameter

<b>&lt;GNSS_config&gt;</b>	Integer type. Supported GNSS constellations GPS is always ON
0	GLONASS OFF/BeiDou OFF/Galileo OFF
1	GLONASS ON/BeiDou ON/Galileo ON
2	GLONASS ON/BeiDou ON/Galileo OFF
3	GLONASS ON/BeiDou OFF/Galileo ON
4	GLONASS ON/BeiDou OFF/Galileo OFF
5	GLONASS OFF/BeiDou ON/Galileo ON
6	GLONASS OFF/BeiDou OFF/Galileo ON
7	GLONASS OFF/BeiDou ON/Galileo OFF
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.



### 2.1.8. AT+QGPSCFG="odpcontrol" Configure ODP Mode

This command is used to configure the OPD mode. This command will take effect after the module is rebooted.

#### AT+QGPSCFG="odpcontrol" Configure ODP Mode

Write Command <b>AT+QGPSCFG="odpcontrol"[,&lt;ODP_control&gt;]</b>	Response When two parameters are specified, ODP mode can be configured: <b>OK</b> Or <b>ERROR</b>  When the second parameter is not specified, the current setting can be queried: <b>+QGPSCFG: "odpcontrol",&lt;ODP_control&gt;</b>  <b>OK</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
---	--

Reference

#### Parameter

<b>&lt;ODP_control&gt;</b>	Integer type. Set ODP mode. The setting will be automatically saved to NVRAM. 0      Disable ODP 1      Low power mode 2      Ready mode
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

### 2.1.9. AT+QGPSCFG="dpoenable" Enable/Disable DPO Mode

This command is used to enable/disable the DPO mode for GNSS. It will take effect after the module is rebooted.

#### AT+QGPSCFG="dpoenable" Enable/Disable DPO Mode

Write Command <b>AT+QGPSCFG="dpoenable"[,&lt;DPO_enable&gt;]</b>	Response When two parameters are specified, enable/disable the DPO mode: <b>OK</b> Or
---	--

	<p><b>ERROR</b></p> <p>When the second parameter is not specified, query the current setting: <b>+QGPSCFG: "dpoenable",&lt;DPO_enable&gt;</b></p> <p><b>OK</b></p> <p>If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b></p>
Reference	

### Parameter

<b>&lt;DPO_enable&gt;</b>	<p>Integer type. Enable/Disable DPO. The setting will be automatically saved to NVRAM.</p> <p>0      Disable DPO</p> <p>1      Enable the DPO with dynamic duty cycle</p> <p>2      Enable the DPO only if the phone is not connected to an external power supply (not running on battery)</p>
<b>&lt;errcode&gt;</b>	<p>Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.</p>

### 2.1.10. AT+QGPSCFG="gsvextnmeatype" Enable/Disable GNSS Extended GGSV

This command is used to enable/disable GNSS extended GGSV. It will take effect after the module is rebooted.

#### AT+QGPSCFG="gsvextnmeatype" Enable/Disable GNSS Extended GGSV

<p>Write Command</p> <p><b>AT+QGPSCFG="gsvextnmeatype" [&lt;gsvext_NMEA_type&gt;]</b></p>	<p>Response</p> <p>When two parameters are specified, configure the GNSS extended GGSV:</p> <p><b>OK</b></p> <p>Or</p> <p><b>ERROR</b></p> <p>When the second parameter is not specified, query the current setting: <b>+QGPSCFG: "gsvextnmeatype",&lt;gsvext_NMEA_type&gt;</b></p> <p><b>OK</b></p> <p>If there is any error related to ME functionality:</p>
---	--

	<b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

### Parameter

<b>&lt;gsvext_NMEA_type&gt;</b>	Enable/disable extended GGSV <u>0</u> Disable extended GGSV 1      Enable extended GGSV
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

### 2.1.11. AT+QGPSCFG="plane" Configure Plane Mode Used by MO AGPS Session

This command is used to configure the plane mode (control plane or user plane) to be used by the Mobile-Originated (MO) AGPS session. This command will take effect after the module is rebooted.

#### AT+QGPSCFG="plane" Configure AGPS Plane Mode

Write Command <b>AT+QGPSCFG="plane" [,&lt;plane&gt;]</b>	Response When two parameters are specified, configure the plane mode used by MO GPS session: <b>OK</b> Or <b>ERROR</b>  When the second parameter is not specified, query the current setting: <b>+QGPSCFG: "plane",&lt;plane&gt;</b>  <b>OK</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

### Parameter

<b>&lt;plane&gt;</b>	Integer type. The plane mode used by MO AGPS session. 0    User plane without SSL <u>1</u> User plane with SSL 2    Control plane
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

### 2.1.12. AT+QGPSCFG="autogps" Enable/Disable GNSS to Run Automatically

This command is used to configure whether to enable GNSS when the module restarts. It will take effect after the module is rebooted.

#### AT+QGPSCFG="autogps" Enable/Disable GNSS to Run Automatically

Write Command <b>AT+QGPSCFG="autogps"[,&lt;autoGPS&gt;]</b>	Response When two parameters are specified, configure whether to enable GNSS to run automatically: <b>OK</b> Or <b>ERROR</b>  When the second parameter is not specified, query the current setting: <b>+QGPSCFG: "autogps",&lt;autoGPS&gt;</b>  <b>OK</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
--	---

Reference

#### Parameter

<b>&lt;autoGPS&gt;</b>	Integer type. Enable/disable GNSS to run automatically after the module is powered on, and the parameter configuration will be automatically saved to NVRAM. <u>0</u> Disable GNSS to run automatically 1 Enable GNSS to run automatically
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

### 2.1.13. AT+QGPSCFG="suplver" Configure SUPL Protocol Version

This command is used to configure the SUPL version in an SI session, and the most likely used SUPL major version in a NI session. This command will take effect after the module is rebooted.

#### AT+QGPSCFG="suplver" Configure SUPL Protocol Version

Write Command <b>AT+QGPSCFG="suplver"[,&lt;SUPL_version&gt;]</b>	Response When two parameters are specified, configure the SUPL protocol version: <b>OK</b>
---	--

	<p>Or <b>ERROR</b></p> <p>When the second parameter is not specified, query the current setting: <b>+QGPSCFG: "suplver",&lt;SUPL_version&gt;</b></p> <p><b>OK</b></p> <p>If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b></p>
Reference	

### Parameter

<b>&lt;SUPL_version&gt;</b>	<p>Integer type. SUPL protocol version.</p> <p>1 SUPL version 1.0</p> <p><u>2</u> SUPL version 2.0</p>
<b>&lt;errcode&gt;</b>	<p>Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.</p>

### 2.1.14. AT+QGPSCFG="agpsposmode" Configure AGPS Positioning Mode

This command is used to configure the AGPS positioning mode. It will take effect after the module is rebooted.

AT+QGPSCFG="agpsposmode" Configure the AGPS mode	
<p>Write Command</p> <p><b>AT+QGPSCFG="agpsposmode" [&lt;AGPS_posmode&gt;]</b></p>	<p>Response</p> <p>When two parameters are specified, configure the AGPS mode: <b>OK</b></p> <p>Or <b>ERROR</b></p> <p>When the second parameter is not specified, query the current setting: <b>+QGPSCFG: "agpsposmode",&lt;AGPS_posmode&gt;</b></p> <p><b>OK</b></p> <p>If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b></p>
Reference	

## Parameter

<b>&lt;AGPS_posmode&gt;</b>	Integer type. AGPS positioning mode configuration. The range is 0-4294967295. The default value of each LTE Standard modules are different.
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

### 2.1.15. AT+QGPSCFG="agnssprotocol" Configure A-GNSS Positioning Protocols

This command is used to configure A-GPS LPP positioning protocol and A-GLONASS positioning protocol. This command will take effect after rebooting the module.

#### AT+QGPSCFG="agnssprotocol" Configure A-GNSS Positioning Protocols

Write Command	Response
<b>AT+QGPSCFG="agnssprotocol"[,&lt;AGPS Ip&gt;,&lt;AGLONASS Ip&gt;]</b>	When two parameters are specified, configure the LPP protocol: <b>OK</b> Or <b>ERROR</b>
	When the second and third parameters are not specified, query the current setting: <b>+QGPSCFG:</b> <b>"agnssprotocol",&lt;AGPS Ip&gt;,&lt;AGLONASS Ip&gt;</b>
	<b>OK</b>
	If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

## Parameter

<b>&lt;AGPS_Ip&gt;</b>	Integer type. A-GPS LPP positioning protocol. 1 User plane LPP 2 Control plane LPP
<b>&lt;AGLONASS_Ip&gt;</b>	Integer type. A-GLONASS positioning protocol. 1 Control plane RRLP 2 Control plane RRC 4 Control plane LPP 256 User plane RRLP 1024 User plane LPP
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

### 2.1.16. AT+QGPSCFG="fixfreq" Configure NMEA Output Frequency

This command is used to configure the NMEA sentence output frequency. It can only be executed when the GNSS engine is turned off and takes effect immediately. When the output frequency of NMEA is set higher than 1Hz, the output of GGA, RMC, VTG and GSA sentences will be outputted at the set frequency, and the output of GSV sentence will always be 1Hz.

#### AT+QGPSCFG="fixfreq" Configure NMEA Output Frequency

Write Command <b>AT+QGPSCFG="fixfreq",&lt;freq&gt;</b>	<p>Response</p> <p>When two parameters are specified, configure the NMEA output frequency: <b>OK</b></p> <p>Or <b>ERROR</b></p> <p>When the second parameter is not specified, query the current setting: <b>+QGPSCFG: "fixfreq",&lt;freq&gt;</b></p> <p><b>OK</b></p> <p>If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b></p>
Reference	

#### Parameter

<b>&lt;freq&gt;</b>	Integer type. NMEA output frequency. The default value is 1Hz. <ul style="list-style-type: none"> <li><u>1</u> 1Hz</li> <li>2 2Hz</li> <li>5 5Hz</li> <li>10 10Hz</li> </ul>
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

#### NOTE

Not all modules and software baselines support this function. Please consult Quectel Technical Support Team for specific supported model and software baselines.

## 2.2. AT+QGPSDEL Delete Assistance Data

The command is used to delete assistance data so as to operate cold start, hot start and warm start of GNSS. The command can only be executed when GNSS is turned off. After deleting the assistance data via this command, the cold start of GNSS can be enforced via **AT+QGPS**. Hot/warm start can also be performed if the corresponding conditions are satisfied. This command takes effect immediately.

### AT+QGPSDEL Delete Assistance Data

Test Command <b>AT+QGPSDEL=?</b>	Response <b>+QGPSDEL: (0-3)</b>  <b>OK</b>
Write Command <b>AT+QGPSDEL=&lt;delete_type&gt;</b>	Response <b>OK</b> Or <b>ERROR</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

### Parameter

<b>&lt;delete_type&gt;</b>	Integer type. The type of GNSS assistance data to be deleted. 0 Delete all assistance data. Enforce cold start after starting GNSS. 1 Do not delete any data. Perform hot start if the conditions are permitted after starting GNSS. 2 Delete some related data. Perform warm start if the conditions are permitted after starting GNSS. 3 Delete the gpsOneXTRA assistance data injected into GNSS engine.
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.



## 2.3. AT+QGPS Turn on GNSS

This command is used to turn on GNSS function. When **<fix\_count>** is 0, GNSS can be turned off via **AT+QGPSEND**. When **<fix\_count>** is non-zero and reaches the value specified by customers, GNSS will be turned off automatically. This command takes effect immediately.

### AT+QGPS Turn on GNSS

Test Command <b>AT+QGPS=?</b>	Response <b>+QGPS: (1-4),(1-255),(0-1000),(0-1000),(1-65535)</b>  <b>OK</b>
Read Command Read current GNSS state <b>AT+QGPS?</b>	Response <b>+QGPS: &lt;GNSS_state&gt;</b>  <b>OK</b>
Write Command <b>AT+QGPS=&lt;GNSS_mode&gt;[,&lt;fix_maxtime&gt;[,&lt;fix_maxdist&gt;[,&lt;fix_count&gt;[,&lt;fix_rate&gt;]]]]</b>	Response <b>OK</b> Or <b>ERROR</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

### Parameter

<b>&lt;GNSS_state&gt;</b>	Integer type. GNSS state 0 GNSS OFF 1 GNSS ON
<b>&lt;GNSS_mode&gt;</b>	Integer type. GNSS working mode 1 Stand-alone 2 MS-based 3 MS-assisted 4 Speed-optimal
<b>&lt;fix_maxtime&gt;</b>	Integer type. The maximum positioning time (unit: s), which indicates 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;fix_maxdist&gt;</b>	Integer type. Accuracy threshold of positioning. Unit: m. 0-50-1000
<b>&lt;fix_count&gt;</b>	Integer type. Positioning times.

	0-1000
	0 Continuous positioning. Other values Actual positioning times.
<fix_rate>	Integer type. The interval between the first and the second positioning. Unit: s. 1-65535
<errcode>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

## 2.4. AT+QGPSEND Turn off GNSS

When GNSS is turned on and <fix\_count> is 0, GNSS fixes position continuously and can be turned off via **AT+QGPSEND**. When <fix\_count> is non-zero and reaches the value specified by customers, GNSS will be turned off automatically. This command takes effect immediately.

### AT+QGPSEND Turn off GNSS

Test Command <b>AT+QGPSEND=?</b>	Response  <b>OK</b> Or <b>ERROR</b>
Read command <b>AT+QGPSEND?</b>	Response  <b>OK</b> Or <b>ERROR</b>
Execution Command Turn off GNSS <b>AT+QGPSEND</b>	Response <b>OK</b> Or <b>ERROR</b>  If error is related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

### Parameter

<errcode>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.
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## 2.5. AT+QGPSLOC Acquire Positioning Information

This command is used to acquire positioning information. Before executing the command, GNSS must be turned on via **AT+QGPS**. If GNSS fails in position fix, **+CME ERROR: <errcode>** will be returned to indicate the corresponding situation. This command takes effect immediately.

### AT+QGPSLOC Acquire Positioning Information

Test Command <b>AT+QGPSLOC=?</b>	Response <b>+QGPSLOC: &lt;UTC&gt;,&lt;latitude&gt;,&lt;longitude&gt;,&lt;HDOP&gt;,&lt;altitude&gt;,&lt;fix&gt;,&lt;COG&gt;,&lt;spkm&gt;,&lt;spkn&gt;,&lt;date&gt;,&lt;nsat&gt;</b>  <b>OK</b>
Write Command <b>AT+QGPSLOC=&lt;mode&gt;</b>	Response <b>+QGPSLOC: &lt;UTC&gt;,&lt;latitude&gt;,&lt;longitude&gt;,&lt;HDOP&gt;,&lt;altitude&gt;,&lt;fix&gt;,&lt;COG&gt;,&lt;spkm&gt;,&lt;spkn&gt;,&lt;date&gt;,&lt;nsat&gt;</b>  <b>OK</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

### Parameter

<b>&lt;mode&gt;</b>	Integer type. Latitude and longitude display format. 0 <b>&lt;latitude&gt;,&lt;longitude&gt;</b> format: ddmm.mmmm N/S,dddmm.mmmm E/W 1 <b>&lt;latitude&gt;,&lt;longitude&gt;</b> format: ddmm.mmmmmm N/S,dddmm.mmmmmm E/W 2 <b>&lt;latitude&gt;,&lt;longitude&gt;</b> format: (-)dd.dddd,(-)ddd.dddd
<b>&lt;UTC&gt;</b>	UTC time. Format: hhmmss.sss (Quoted from GPGLL sentence).
<b>&lt;latitude&gt;</b>	Latitude.  If <b>&lt;mode&gt;</b> is 0: Format: ddmm.mmmm N/S (Quoted from GPGLL sentence) dd                    00-89 (degree) mm.mmm            00.0000-59.9999 (minute) N/S                 North latitude/South latitude  If <b>&lt;mode&gt;</b> is 1: Format: ddmm.mmmmmm N/S (Quoted from GPGLL sentence) dd                    00-89 (degree) mm.mmmmmm       00.000000-59.999999 (minute)

---

	N/S	North latitude/South latitude
	If <b>&lt;mode&gt;</b> is 2:	
	Format: (-)dd.ddddd (Quoted from GPGGA sentence)	
	dd.ddddd	-89.99999-89.99999 (degree)
	-	South latitude
<b>&lt;longitude&gt;</b>	Longitude	
	If <b>&lt;mode&gt;</b> is 0:	
	Format: dddmm.mmmm E/W (Quoted from GPGGA sentence)	
	Ddd	000-179 (degree)
	mm.mmmm	00.0000-59.9999 (minute)
	E/W	East longitude/West longitude
	If <b>&lt;mode&gt;</b> is 1:	
	Format: dddmm.mmmmmm E/W (Quoted from GPGGA sentence)	
	Ddd	000-179 (degree)
	mm.mmmmmm	00.000000-59.999999 (minute)
	E/W	East longitude/West longitude
	If <b>&lt;mode&gt;</b> is 2:	
	Format: (-)dd.ddddd (Quoted from GPGGA sentence)	
	dd.ddddd	-179.99999-179.99999 (degree)
	-	West longitude
<b>&lt;HDOP&gt;</b>	Horizontal precision: 0.5-99.9 (Quoted from GPGGA sentence).	
<b>&lt;altitude&gt;</b>	The altitude of the antenna away from the sea level (unit: m), and is accurate to one decimal place (Quoted from GPGGA sentence).	
<b>&lt;fix&gt;</b>	GNSS positioning mode (Quoted from GAGSA/GPGSA sentence).	
	2	2D positioning
	3	3D positioning
<b>&lt;COG&gt;</b>	Course Over Ground based on true north.	
	Format: ddd.mm (Quoted from GPVTG sentence).	
	ddd	000-359 (degree)
	mm	00-59 (minute)
<b>&lt;spkm&gt;</b>	Speed over ground.	
	Format: xxxx.x. Unit: km/h. Accurate to one decimal place (Quoted from GPVTG sentence).	
<b>&lt;spkn&gt;</b>	Speed over ground.	
	Format: xxxx.x. Unit: knots. Accurate to one decimal place (Quoted from GPVTG sentence).	
<b>&lt;date&gt;</b>	UTC time when fixing position.	
	Format: ddmmyy (Quoted from GPRMC sentence).	
<b>&lt;nsat&gt;</b>	Number of satellites, from 00 (the first 0 should be retained) to 12 (Quoted from GPGGA sentence).	

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**<errcode>** Integer type. The error code of operation. Please refer to **Chapter 4** for details.

## 2.6. AT+QGPSSUPLURL Configure SUPL Server URL

This command is used to configure the SUPL server URL. The parameter configuration will be saved to NVRAM automatically. This command takes effect immediately.

### AT+QGPSSUPLURL Configure SUPL Server URL

Test command <b>AT+QGPSSUPLURL=?</b>	Response <b>+QGPSSUPLURL: &lt;SUPL_URL&gt;</b>  <b>OK</b>
Read Command <b>AT+QGPSSUPLURL?</b>	Response <b>+QGPSSUPLURL: &lt;SUPL_URL&gt;</b>  <b>OK</b>
Write Command Configure SUPL server URL <b>AT+QGPSSUPLURL=&lt;SUPL_URL&gt;</b>	Response <b>OK</b> Or <b>ERROR</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

#### Parameter

**<SUPL\_URL>** String type. SUPL server address. The address format is "URL:port\_number" where the "port\_number" can be omitted, for example "supl.server.com", "123.123.123.123", and "supl.server.com:7275". When the "port number" is omitted, the default value (7275) will be used.

**<errcode>** Integer type. The error code of operation. Please refer to **Chapter 4** for details.

## 2.7. AT+QGPSSUPLCA Inject SUPL Certificate

This command is used to inject SUPL certificate. The certificate file should be inputted into the file system via **AT+QFUPL**, details of which are provided in *Quectel\_LTE\_Standard\_FILE\_Application\_Note*. The certificate should be obtained from the operator or the server provider. This command takes effect immediately.

### AT+QGPSSUPLCA Inject SUPL Certificate

Test command <b>AT+QGPSSUPLCA=?</b>	Response <b>+QGPSSUPLCA: &lt;CA_file_name&gt;</b>  <b>OK</b>
Read Command <b>AT+QGPSSUPLCA?</b>	Response  <b>OK</b> Or <b>ERROR</b>
Write Command <b>AT+QGPSSUPLCA=&lt;CA_file_name&gt;</b>	Response <b>OK</b> Or <b>ERROR</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

#### Parameter

**<CA\_file\_name>** String type. SUPL certificate name.

**<errcode>** Integer type. The error code of operation. Please refer to **Chapter 4** for details.

## 2.8. AT+QGPSGNMEA Acquire NMEA Sentences

This command is used to acquire NMEA sentences. Before using this command, GNSS must be turned on via **AT+QGPS**, and set **<NMEA\_src>** into 1 to enable acquisition of NMEA sentences via **AT+QGPSGNMEA**.

The sentence output can be disabled via **AT+QGPSCFG="gpsnmeatype"**, **AT+QGPSCFG="glonassnmeatype"**, **AT+QGPSCFG="galileonmeatype"** or **AT+QGPSCFG="beidoumeatype",0**. If sentence output is disabled, **AT+QGPSGNMEA** can still be

used to acquire NMEA sentences on condition that the GNSS has already acquired sentences via this command after its activation. And the sentences acquired via the command will be the last ones that have ever been acquired. This command takes effect immediately.

### AT+QGPSGNMEA Acquire NMEA Sentences

<p>Test Command <b>AT+QGPSGNMEA=?</b></p>	<p>Response <b>+QGPSGNMEA: ("GGA","RMC","GSV","GSA","VTG","GNS")</b></p> <p><b>OK</b></p>
<p>Write Command Query GGA sentence <b>AT+QGPSGNMEA="GGA"</b></p>	<p>Response <b>+QGPSGNMEA: GGA sentence</b></p> <p><b>OK</b></p> <p>If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b></p>
<p>Write Command Query RMC sentence <b>AT+QGPSGNMEA="RMC"</b></p>	<p>Response <b>+QGPSGNMEA: RMC sentence</b></p> <p><b>OK</b></p> <p>If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b></p>
<p>Write Command Query GSV information <b>AT+QGPSGNMEA="GSV"</b></p>	<p>Response <b>+QGPSGNMEA: GSV sentence</b></p> <p><b>OK</b></p> <p>If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b></p>
<p>Write Command Query GSA sentence <b>AT+QGPSGNMEA="GSA"</b></p>	<p>Response <b>+QGPSGNMEA: GSA sentence</b></p> <p><b>OK</b></p> <p>If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b></p>
<p>Write Command Query VTG sentence <b>AT+QGPSGNMEA="VTG"</b></p>	<p>Response <b>+QGPSGNMEA: VTG sentence</b></p> <p><b>OK</b></p> <p>If there is any error related to ME functionality:</p>

	<b>+CME ERROR: &lt;errcode&gt;</b>
Write Command Query GNS sentence <b>AT+QGPSGNMEA="GNS"</b>	Response <b>+QGPSGNMEA: GNS sentence</b>  <b>OK</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

### Parameter

**<errcode>** Integer type. The error code of operation. Please refer to **Chapter 4** for details.

## 2.9. AT+QGPSXTRA Enable/Disable gpsOneXTRA Assistance Function

This command is used to enable/disable gpsOneXTRA Assistance function, and it will take effect immediately.

### AT+QGPSXTRA Enable/Disable gpsOneXTRA Assistance Function

Test Command <b>AT+QGPSXTRA=?</b>	Response <b>+QGPSXTRA: (0,1)</b>  <b>OK</b>
Read Command <b>AT+QGPSXTRA?</b>	Response <b>+QGPSXTRA: &lt;xtraenable&gt;</b>  <b>OK</b>
Write Command <b>AT+QGPSXTRA=&lt;xtraenable&gt;</b>	Response <b>OK</b> Or <b>ERROR</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	



## Parameter

<b>&lt;xtraenable&gt;</b>	Integer type. Enable/disable gpsOneXTRA Assistance function, and the parameter configuration will be automatically saved to NVRAM. <u>0</u> Disable gpsOneXTRA Assistance 1 Enable gpsOneXTRA Assistance
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

## 2.10. AT+QGPSXTRATIME Inject gpsOneXTRA Time

This command can be used to inject gpsOneXTRA time to GNSS engine. Before using it, gpsOneXTRA Assistance function must be enabled via **AT+QGPSXTRA=1** command. After activating the function, the GNSS engine will ask for gpsOneXTRA time and assistance data file. Before injecting gpsOneXTRA data file, gpsOneXTRA time must be injected first via this command. This command takes effect immediately.

### AT+QGPSXTRATIME Inject gpsOneXTRA Time

Test Command <b>AT+QGPSXTRATIME=?</b>	Response <b>+QGPSXTRATIME: 0,&lt;xtratime&gt;,(0,1),(0,1),&lt;uncrtn&gt;</b>  <b>OK</b>
Write Command Inject gpsOneXTRA time <b>AT+QGPSXTRATIME=&lt;type&gt;,&lt;xtratime&gt;,&lt;utc&gt;,&lt;force&gt;,&lt;uncrtn&gt;</b>	Response <b>OK</b> Or <b>ERROR</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

## Parameter

<b>&lt;type&gt;</b>	Type of injecting time. <u>0</u> Inject XTRA time manually 1 Inject time through SNTP once. This type is disabled currently.
<b>&lt;xtratime&gt;</b>	Current UTC time. Format: YYYY/MM/DD,hh:mm:ss. e.g. 2019/01/05,08:30:30.
<b>&lt;utc&gt;</b>	UTC or GPS time that gpsOneXTRA time refers to. <u>0</u> GPS time <u>1</u> UTC time. This value is recommended.
<b>&lt;force&gt;</b>	Whether to force GNSS to accept the data. <u>0</u> Not force GNSS to accept the data

	1 Force acceptance of data. This value is recommended.
<b>&lt;uncrtn&gt;</b>	Uncertainty of time. Unit: ms. Default value: 3500ms. It indicates the time difference between sending a request to the SNTP server and receiving a response from the SNTP server.
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

## 2.11. AT+QGPSXTRADATA Inject gpsOneXTRA Data File

This command is used to inject a gpsOneXTRA assistance data file to the GNSS engine. Before operating this command, gpsOneXTRA must be enabled, valid gpsOneXTRA data file must be stored into RAM or UFS (UFS is recommended) of the module and gpsOneXTRA time be injected to GNSS engine. After operating this command successfully, gpsOneXTRA data file can be deleted from RAM or UFS, and whether the gpsOneXTRA data is injected successfully can be queried via **AT+QGPSXTRADATA?**.

### AT+QGPSXTRADATA Inject gpsOneXTRA Data File

Test Command <b>AT+QGPSXTRADATA=?</b>	Response <b>+QGPSXTRADATA: &lt;xtradatafilename&gt;</b>  <b>OK</b>
Read Command Query the status of gpsOneXTRA data files <b>AT+QGPSXTRADATA?</b>	Response <b>+QGPSXTRADATA: &lt;xtradatadurtime&gt;,&lt;injecteddatatime&gt;</b>  <b>OK</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Write Command Inject gpsOneXTRA data files <b>AT+QGPSXTRADATA=&lt;xtradatafilename&gt;</b>	Response <b>OK</b> Or <b>ERROR</b>  If there is any error related to ME functionality: <b>+CME ERROR: &lt;errcode&gt;</b>
Reference	

## Parameter

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<b>&lt;xtradatafilename&gt;</b>	String type. Filename of the gpsOneXTRA data file, e.g. <i>xtra2.bin</i> or <i>xtra3grc.bin</i> .
<b>&lt;xtradataurtime&gt;</b>	Integer type. Valid time of injected gpsOneXTRA data file. Unit: min. 0 No gpsOneXTRA file or the file is overdue 1-10080 Valid time of gpsOneXTRA file
<b>&lt;injecteddatatime&gt;</b>	String type. Start time of the valid time of gpsOneXTRA data file. Format: YYYY/MM/DD, hh:mm:ss, e.g. 2016/01/03,15:34:50.
<b>&lt;errcode&gt;</b>	Integer type. The error code of operation. Please refer to <b>Chapter 4</b> for details.

---

# 3 Examples

## 3.1. Turn on/off the GNSS

Default parameters are used in this example to turn on GNSS. After turning on GNSS, NMEA sentences will be outputted from "usbntmea" port by default; and GNSS can be turned off via **AT+QGSEND**.

```

AT+QGPS=1 //Turn on GNSS.
OK
//After turning on GNSS, NMEA sentences will be outputted from "usbntmea" port by default.
AT+QGPSLOC? //Obtain positioning information.
+QGPSLOC: 061951.0,3150.7223N,11711.9293E,0.7,62.2,2,0.0,0.0,0.0,110513,09

OK
AT+QSEND //Turn off GNSS.
OK

```

## 3.2. Application of GNSS <nmeasrc>

When GNSS is turned on and <nmeasrc> is set to 1, NMEA sentences can be acquired directly via **AT+QGPSGNMEA**.

```

AT+QGPSCFG="nmeasrc",1 //Set <nmeasrc> to 1 to enable acquisition of NMEA
sentences via AT+QGPSGNMEA.
OK
AT+QGPSGNMEA="GGA" //Obtain GGA sentence.
+QGPSGNMEA: $GPGGA,103647.0,3150.721154,N,11711.925873,E,1,02,4.7,59.8,M,-2.0,M,,*77

OK
AT+QGPSCFG="nmeasrc",0 //Set <nmeasrc> to 0 to disable acquisition of NMEA
sentences via AT+QGPSGNMEA.
OK
AT+QGPSGNMEA="GGA"
+CME ERROR: 507 //Acquisition of NMEA sentences via AT+QGPSGNMEA
was disabled, and thus GGA sentences cannot be obtained.

```

### 3.3. Operation Procedures of gpsOneXTRA Assistance Function

This example shows the operation procedures of gpsOneXTRA Assistance function.

```

AT+QGPSXTRA=1 //If gpsOneXTRA Assistance is disabled,
enable it first and then perform the following
procedures.

OK
//The gpsOneXTRA Assistance function is activated immediately.
//If gpsOneXTRA data file is valid (query via AT+QGPSXTRADATA?), turn on GNSS engine directly.
//If gpsOneXTRA data file is invalid (query via AT+QGPSXTRADATA?), then perform the following
procedures.
//gpsOneXTRA data file can be downloaded to PC (or MCU) from URL
http://xtrapath1.izatcloud.net/xtra2.bin or other URLs listed in Chapter 1.3.
AT+QFUPL="RAM:xtra2.bin",59748,60 //Select a gpsOneXTRA file and upload it to
module via QCOM. For more details about this
command and QCOM tool usage and
configuration, please refer to document [1].

OK
AT+QGPSXTRATIME=0,"2019/01/05,08:30:30",1,1,3500 //Inject gpsOneXTRA time to GNSS engine.
OK
AT+QGPSXTRADATA="RAM:xtra2.bin"
OK //The gpsOneXTRA data file is injected to
GNSS engine successfully.
AT+QFDEL="RAM:xtra2.bin" //Delete gpsOneXTRA data file from UFS.
OK
AT+QGPS=1 //Turn on GNSS engine.
OK

```

## 4 Summary of Error Codes

The **<errcode>** indicates an error related to GNSS operation. The details about **<errcode>** are described in the following table.

**Table 1: 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 active
506	Operation timeout
507	Function not enabled
508	Time information error
512	Validity time is out of range
513	Internal resource error
514	GNSS locked
515	End by E911
516	Not fixed now
517	CMUX port is not opened
549	Unknown error

# 5 Appendix A References

**Table 2: Related Documents**

SN	Document Name	Remark
[1]	Quectel_LTE_Standard_FILE_AT_Commands_Manual	File AT Commands Manual for LTE Standard Modules

**Table 3: Terms and Abbreviations**

Abbreviation	Description
AGPS	Assisted Global Positioning System
APN	Access Point Name
BeiDou	BeiDou Navigation Satellite System
DOP	Dilution of Precision
DPO	Dynamic Power Optimization
Galileo	Galileo Satellite Navigation System
GGA	Global Positioning System Fix Data
GLONASS	Global Navigation Satellite System
GNS	Global Network Service
GNSS	Global Navigation Satellite System
GPS	Global Positioning System
gpsOneXTRA	An Auxiliary Positioning Technology Provided by Qualcomm
GSA	GPS DOP and Active Satellites
GSV	Satellites in View

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LPP	LTE Positioning Protocol
MCU	Micro Control Unit
ME	Mobile Equipment
MS	Mobile Station
NI	Network Initiated
NMEA	National Marine Electronics Association
NVRAM	Non-Volatile Random Access Memory
ODP	On-Demand Positioning
PC	Private Computer
RAM	Random Access Memory
RMC	Recommended Minimum Navigation Information
SI	SET Initiated
SNR	Signal Noise Ratio
SNTP	Simple Network Time Protocol
SSL	Secure Sockets Layer
SUPL	Secure User Plane Location
TTFF	Time to First Fix
UART	Universal Asynchronous Receiver & Transmitter
UFS	User File System
URL	Uniform Resource Locator
USB	Universal Serial Bus
UTC	Universal Time Code
VTG	Course Over Ground and Ground Speed

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