

EC2x&EG2x&EG9x&EM05 Series

GNSS Application Note

LTE Standard Module Series

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About the Document

Revision History

Version	Date	Author	Description
-	2016-09-02	Sundy WANG	Creation of the document
1.0	2016-09-02	Sundy WANG	First official release
1.1	2017-02-13	Sundy WANG	<ol style="list-style-type: none"> 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). Modified the parameter description of AT+QGPSCFG="outport"[,<outport>] (Chapter 2.1.1). Modified the parameter description of AT+QGPSDEL (Chapter 2.2).
1.2	2019-10-23	Tery SHI	<ol style="list-style-type: none"> Added applicable modules of this document (Chapter 1). Added following commands (Chapter 2.1). <ul style="list-style-type: none"> AT+QGPSCFG="odpcontrol" AT+QGPSCFG="dpoenable" AT+QGPSCFG="plane" AT+QGPSCFG="autogps" AT+QGPSCFG="suplver" AT+QGPSCFG="agpsposmode" AT+QGPSCFG="agnssprotocol" AT+QGPSCFG="fixfreq" Added command AT+QGPSSUPLURL (Chapter 2.6) and AT+QGPSSUPLCA (Chapter 2.7).
1.3	2020-09-04	Tery SHI	<ol style="list-style-type: none"> Updated downloading URL of gpsOneXTRA binary files (Chapter 1.4). Modified AT+QGPSCFG="dpoenable" to take effective immediately without saving to NVRAM, the configurations will be restored to default values after rebooting (Chapter 2.2.9). Updated the description of parameter <AGPS_posmode>

			<p>for AT+QGPSCFG="agpsposmode" (Chapter 2.2.14).</p> <p>4. Updated the description of AT+QGPS (Chapter 2.4).</p> <p>5. Updated the description of AT+QGPSTNMEA (Chapter 2.9).</p>
1.4	2023-05-08	Don XU	<p>1. Updated the following applicable modules:</p> <ul style="list-style-type: none"> Added the applicable modules: EG21-GL and EG25-GL. Updated the applicable module EC20 R2.1 to EC20-CE. <p>2. Added the maximum response time of commands (Chapters 2.2–2.12).</p> <p>3. Updated the parameter description of <DPO_enable> in AT+QGPSCFG="dpoenable" (Chapter 2.2.9).</p> <p>4. Updated the parameter range and default value of <AGPS_posmode> in AT+QGPSCFG="agpsposmode" (Chapter 2.2.14).</p> <p>5. Added the following commands:</p> <ul style="list-style-type: none"> AT+QGPSCFG="lbsapn" (Chapter 2.2.15) AT+QGPSPPI (Chapter 2.13) <p>6. Added a note on NMEA output frequency (Chapter 2.2.17).</p> <p>7. Added a note on the precautions for powering off and then restarting the module (Chapter 3.3).</p> <p>8. Added error codes 509, 510 and 511 (Chapter 4).</p>

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1 Introduction

Quectel LTE Standard EC2x family, EG2x family, EG9x family and EM05 series modules integrate the multi-GNSS engine which supports GPS, BDS, Galileo and GLONASS systems, with the gpsOneXTRA Assistance. The high-performance GNSS engine is suitable for various applications where the accurate positioning at the lowest cost is needed, and it supports position tracking without network assistance. This enables the modules to be widely used in application fields such as turn-by-turn navigation, asset tracking, personnel tracking, location-aware games, as well as home and fleet management.

1.1. Applicable Modules

Table 1: Applicable Modules

Module Family	Module
EC2x	EC20-CE
	EC21 Series
	EC25 Series
EG2x	EG21-G
	EG21-GL
	EG25-G
	EG25-GL
EG9x	EG91 Series
	EG95 Series
-	EM05 Series

1.2. GNSS Turning on/off Procedures

The GNSS of the modules supports location calculation without any network assistance. 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: Obtain the positioning information in either of the following three ways after turning on GNSS and fixing position successfully:

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

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

1.3. Supported NMEA Sentence Types

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

GPS NMEA sentences have the prefix "GP":

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

GLONASS NMEA sentences have the prefixes "GL" and "GN":

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

Galileo NMEA sentences have the prefix "GA":

- GAGSV - GNSS satellites in view, such as number of satellites in view and satellite ID numbers

BDS NMEA sentences have the prefix "PQ":

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

1.4. gpsOneXTRA Assistance Introduction

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 18–30 s (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 before expired.

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://xtrapath4.izatcloud.net/xtra2.bin>

<http://xtrapath5.izatcloud.net/xtra2.bin>

<http://xtrapath6.izatcloud.net/xtra2.bin>

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

<http://xtrapath4.izatcloud.net/xtra3grc.bin>

<http://xtrapath5.izatcloud.net/xtra3grc.bin>

<http://xtrapath6.izatcloud.net/xtra3grc.bin>

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

<http://xtrapath4.izatcloud.net/xtra3grcej.bin>

<http://xtrapath5.izatcloud.net/xtra3grcej.bin>

<http://xtrapath6.izatcloud.net/xtra3grcej.bin>

NOTE

Not all applicable modules of this document support GPS + GLONASS + BDS + Galileo system data files with the suffix "xtra3grcej.bin". Please contact Quectel Technical Support for details.

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 which is disabled by default 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 **Steps 3 to 6**; if the data is valid, turn on GNSS engine according to the procedures described in **Chapter 1.2** 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 1.2**.

NOTE

Before **Step 1**, ensure that the GNSS engine has been turned off.

For more detailed information of the AT commands mentioned above, see **Chapters 2.10, 2.11** and **2.12**.

2 Description of GNSS AT Commands

2.1. AT Command Introduction

2.1.1. Definitions

- **<CR>** Carriage return character.
- **<LF>** Line feed character.
- **<...>** Parameter name. Angle brackets do not appear on command line.
- **[...]** Optional parameter of a command or an optional part of TA information response. Square brackets do not appear on command line. When an optional parameter is omitted, the new value equals its previous value or its default setting, unless otherwise specified.
- **Underline** Default setting of a parameter.

2.1.2. AT Command Syntax

All command lines must start with **AT** or **at** and end with **<CR>**. Information responses and result codes always start and end with a carriage return character and a line feed character: **<CR><LF><response><CR><LF>**. In tables presenting commands and responses throughout this document, only the commands and responses are presented, and **<CR>** and **<LF>** are deliberately omitted.

Table 2: Type of AT Commands

Command Type	Syntax	Description
Test Command	AT+<cmd>=?	Test the existence of corresponding command and return information about the type, value, or range of its parameter.
Read Command	AT+<cmd>?	Check the current parameter value of the corresponding command.
Write Command	AT+<cmd>=<p1>[,<p2>[,<p3>[...]]]	Set user-definable parameter value.
Execution Command	AT+<cmd>	Return a specific information parameter or perform a specific action.

2.1.3. Declaration of AT Command Examples

The AT command examples in this document are provided to help you familiarize with AT commands and learn how to use them. The examples, however, should not be taken as Quectel's recommendation or suggestions about how you should design a program flow or what status you should set the module into. Sometimes multiple examples may be provided for one AT command. However, this does not mean that there exists a correlation among these examples and that they should be executed in a given sequence.

2.2. AT+QGPSCFG Configure GNSS

This command queries and configures various GNSS settings, including the output port and output types of NMEA sentences.

AT+QGPSCFG Configure GNSS

Test Command

AT+QGPSCFG=?

Response

+QGPSCFG: "outport",(list of supported <out_port>s)
+QGPSCFG: "nmeasrc",(list of supported <NMEA_src>s)
+QGPSCFG: "gpsnmeatype",(range of supported <GPS_NMEA_type>s)
+QGPSCFG: "glonassnmeatype",(range of supported <GLONASS_NMEA_type>s)
+QGPSCFG: "galileonmeatype",(list of supported <Galileo_NMEA_type>s)
+QGPSCFG: "beidoumeatype",(range of supported <BeiDou_NMEA_type>s)
+QGPSCFG: "gnssconfig",(range of supported <GNSS_config>s)
+QGPSCFG: "odpcontrol",(range of supported <ODP_control>s)
+QGPSCFG: "dpoenable",(list of supported <DPO_enable>s)
+QGPSCFG: "gsvextnmeatype",(list of supported <gsvext_NMEA_type>s)
+QGPSCFG: "plane",(range of supported <plane>s)
+QGPSCFG: "autogps",(list of supported <autoGPS>s)
+QGPSCFG: "suplver",(list of supported <SUPL_version>s)
+QGPSCFG: "agpsposmode",(range of supported <AGPS_posmode>s)
+QGPSCFG: "lbsapn",(range of supported <system_type>s),(range of supported <PDP_type>s),(range of supported <APN>)
+QGPSCFG: "agnssprotocol",(range of supported <AGPS_ip>s),(range of supported <AGLONASS_ip>s)
+QGPSCFG: "fixfreq",(list of supported <freq>s)

OK

2.2.1. AT+QGPSCFG="outport" Configure Output Port of NMEA Sentences

This command configures the output port of NMEA sentences.

AT+QGPSCFG="outport" Configure Output Port of NMEA Sentences	
Write Command AT+QGPSCFG="outport"[,<out_port>]]	Response If the optional parameter is omitted, query the current configuration: +QGPSCFG: "outport",<out_port> OK If the optional parameter is specified, configure the output port of NMEA sentences: OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved to NVRAM automatically.

Parameter

<out_port>	String type. Configure the output port of NMEA sentences.
	"none" Close NMEA sentence output
	"usbntmea" Output via USB NMEA port
	"uartdebug" Output via debug UART port
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

2.2.2. AT+QGPSCFG="nmeasrc" Enable/Disable Acquisition of NMEA Sentences via AT+QGPSTNMEA

This command enables/disables acquisition of NMEA sentences via **AT+QGPSTNMEA**.

AT+QGPSCFG="nmeasrc" Enable/Disable Acquisition of NMEA Sentences via AT+QGPSTNMEA	
Write Command AT+QGPSCFG="nmeasrc"[,<NMEA_src>]	Response If the optional parameter is omitted, query the current configuration:

	+QGPSCFG: "nmeasrc",<NMEA_src> OK If the optional parameter is specified, configure whether to enable acquisition of NMEA sentences via AT+QGPSCNMEA : OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved to NVRAM automatically.

Parameter

<NMEA_src>	Integer type. If enabled, original NMEA sentences can be acquired via AT+QGPSCNMEA . Meanwhile, sentences are outputted via the AT port as a return value. 0 Disable 1 Enable
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

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

This command configures the type of GPS NMEA sentences that will be outputted.

AT+QGPSCFG="gpsnmeatype" Configure Output Type of GPS NMEA Sentences	
Write Command AT+QGPSCFG="gpsnmeatype",<GPS_NMEA_type>	Response If the optional parameter is omitted, query the current configuration: +QGPSCFG: "gpsnmeatype",<GPS_NMEA_type> OK If the optional parameter is specified, configure the output type of GPS NMEA sentences: OK Or

	ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved to NVRAM automatically.

Parameter

<GPS_NMEA_type>	Integer type. Output type of GPS NMEA sentences in XOR format. 0 Disable 1 GPGGA 2 GPRMC 4 GPGSV 8 GPGSA 16 GPVTG <u>31</u> All the five types of sentences
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

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

This command configures the type of the GLONASS NMEA sentence that will be outputted.

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

Write Command AT+QGPSCFG="glonassnmeatype", <GLONASS_NMEA_type>]	Response If the optional parameter is omitted, query the current configuration: +QGPSCFG: "glonassnmeatype",<GLONASS_NMEA_type> OK If the optional parameter is specified, configure the output type of GLONASS NMEA sentences: OK Or ERROR If there is any error related to ME functionality:
---	---

	+CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved to NVRAM automatically.

Parameter

<GLONASS_NMEA_type>	Integer type. Configure output type of GLONASS NMEA sentences in XOR format. <div> <u>0</u> Disable 1 GLGSV 2 GNGSA 4 GNGNS </div>
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

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

This command configures the type of Galileo NMEA sentence that will be outputted.

AT+QGPSCFG="galileonmeatype" Configure Output Type of Galileo NMEA Sentences	
Write Command AT+QGPSCFG="galileonmeatype"[,<Galileo_NMEA_type>]	Response If the optional parameter is omitted, query the current configuration: +QGPSCFG: "galileonmeatype",<Galileo_NMEA_type> OK If the optional parameter is specified, configure the output type of Galileo NMEA sentences: OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved to NVRAM automatically.

Parameter

<Galileo_NMEA_type>	Integer type. Configure output type of Galileo NMEA sentences in XOR format. 0 Disable 1 GAGSV
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

2.2.6. AT+QGPSCFG="beidoumeatype" Configure Output Type of BDS NMEA Sentences

This command configures the type of BDS NMEA sentence that will be outputted.

AT+QGPSCFG="beidoumeatype" Configure BDS NMEA Sentence Output Type	
Write Command AT+QGPSCFG="beidoumeatype",<BeiDou_NMEA_type>	Response If the optional parameter is omitted, query the current configuration: +QGPSCFG: "beidoumeatype",<BeiDou_NMEA_type> OK If the optional parameter is specified, configure the output type of BDS NMEA sentences: OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved to NVRAM automatically.

Parameter

<BeiDou_NMEA_type>	Integer type. Configure output type of BDS NMEA sentences in XOR format. 0 Disable 1 PQGSA 2 PQGSV
<errcode>	Integer type. The error code of operation. See Chapter 4 for details

2.2.7. AT+QGPSCFG="gnssconfig" Configure Supported GNSS Constellations

This command configures the supported GNSS constellations of the module.

AT+QGPSCFG="gnssconfig" Configure Supported GNSS Constellations	
Write Command AT+QGPSCFG="gnssconfig"[,<GNSS_config>]	<p>Response</p> <p>If the optional parameter is omitted, query the current configuration: +QGPSCFG: "gnssconfig",<GNSS_config></p> <p>OK</p> <p>If the optional parameter is specified, configure the supported GNSS constellations: OK Or ERROR</p> <p>If there is any error related to ME functionality: +CME ERROR: <errcode></p>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved to NVRAM automatically.

Parameter

<GNSS_config>	Integer type. Supported GNSS constellations. GPS is always ON. 0 GLONASS OFF/BDS OFF/Galileo OFF 1 GLONASS ON/BDS ON/Galileo ON 2 GLONASS ON/BDS ON/Galileo OFF 3 GLONASS ON/BDS OFF/Galileo ON 4 GLONASS ON/BDS OFF/Galileo OFF 5 GLONASS OFF/BDS ON/Galileo ON 6 GLONASS OFF/BDS OFF/Galileo ON 7 GLONASS OFF/BDS ON/Galileo OFF
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

2.2.8. AT+QGPSCFG="odpcontrol" Configure ODP Mode

This command configures the ODP mode.

AT+QGPSCFG="odpcontrol" Configure ODP Mode	
Write Command AT+QGPSCFG="odpcontrol",<ODP_control>]	Response If the optional parameter is omitted, query the current configuraion: +QGPSCFG: "odpcontrol",<ODP_control> OK If the optional parameter is specified, configure ODP mode: OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved to NVRAM automatically.

Parameter

<ODP_control>	Integer type. Set ODP mode. <u>0</u> Disable ODP 1 Low power mode 2 Ready mode
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

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

This command enables/disables the DPO mode for GNSS.

AT+QGPSCFG="dpoenable" Enable/Disable DPO Mode	
Write Command AT+QGPSCFG="dpoenable",<DPO_enable>]	Response If the optional parameter is omitted, query the current configuration: +QGPSCFG: "dpoenable",<DPO_enable>

	<p>OK</p> <p>If the optional parameter is specified, enable/disable the DPO mode:</p> <p>OK</p> <p>Or</p> <p>ERROR</p> <p>If there is any error related to ME functionality:</p> <p>+CME ERROR: <errcode></p>
Maximum Response Time	300 ms
Characteristics	<p>The command takes effect immediately.</p> <p>The configuration is not saved.</p>

Parameter

<DPO_enable>	<p>Integer type. Enable/Disable DPO.</p> <p>0 Disable DPO</p> <p>1 Enable the DPO with dynamic duty cycle</p> <p><u>2</u> Enable the DPO when the module is not connected to an external power supply and is running on battery only</p>
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

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

This command enables/disables GNSS extended GGSV.

AT+QGPSCFG="gsvextnmeatype" Enable/Disable GNSS Extended GGSV	
<p>Write Command</p> <p>AT+QGPSCFG="gsvextnmeatype",<gsvext_NMEA_type></p>	<p>Response</p> <p>If the optional parameter is omitted, query the current configuration:</p> <p>+QGPSCFG: "gsvextnmeatype",<gsvext_NMEA_type></p> <p>OK</p> <p>If the optional parameter is specified, configure the GNSS extended GGSV:</p> <p>OK</p> <p>Or</p> <p>ERROR</p> <p>If there is any error related to ME functionality:</p>

	+CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved to NVRAM automatically.

Parameter

<gsvext_NMEA_type>	Integer type. Enable/disable extended GGSV 0 Disable extended GGSV 1 Enable extended GGSV
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

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

This command configures the plane mode (control plane or user plane) to be used by the Mobile-Originated (MO) AGPS session.

AT+QGPSCFG="plane" Configure Plane Mode Used by MO AGPS Session	
Write Command AT+QGPSCFG="plane"[,<plane>]	Response If the optional parameter is omitted, query the current configuration: +QGPSCFG: "plane",<plane> OK If the optional parameter is specified, configure the plane mode used by MO GPS session: OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved to NVRAM automatically.

Parameter

<plane>	Integer type. The plane mode used by MO AGPS session. 0 User plane without SSL
----------------------	---

	1	User plane with SSL
	2	Control plane
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.	

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

This command configures whether to enable GNSS when the module restarts.

AT+QGPSCFG="autogps" Enable/Disable GNSS to Run Automatically	
Write Command AT+QGPSCFG="autogps"[,<autoGPS>]	Response If the optional parameter is omitted, query the current configuration: +QGPSCFG: "autogps",<autoGPS> OK If the optional parameter is specified, configure whether to enable GNSS to run automatically: OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved to NVRAM automatically.

Parameter

<autoGPS>	Integer type. Enable/disable GNSS to run automatically after the module is powered on. 0 Disable GNSS to run automatically 1 Enable GNSS to run automatically
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

2.2.13. AT+QGPSCFG="suplver" Configure SUPL Protocol Version

This command configures the SUPL version in an SI session, and the most likely used SUPL major version in a NI session.

AT+QGPSCFG="suplver" Configure SUPL Protocol Version	
Write Command AT+QGPSCFG="suplver"[,<SUPL_version>]	Response If the optional parameter is omitted, query the current configuration: +QGPSCFG: "suplver",<SUPL_version> OK If the optional parameter is specified, configure the SUPL protocol version: OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved to NVRAM automatically.

Parameter

<SUPL_version>	Integer type. SUPL protocol version. 1 SUPL version 1.0 2 SUPL version 2.0
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

2.2.14. AT+QGPSCFG="agpsposmode" Configure AGPS Positioning Mode

This command configures the AGPS positioning mode.

AT+QGPSCFG="agpsposmode" Configure AGPS Positioning Mode	
Write Command AT+QGPSCFG="agpsposmode"[,<AGPS_posmode>]	Response If the optional parameter is omitted, query the current configuration: +QGPSCFG: "agpsposmode",<AGPS_posmode>

	<p>OK</p> <p>If the optional parameter is specified, configure the AGPS mode:</p> <p>OK</p> <p>Or</p> <p>ERROR</p> <p>If there is any error related to ME functionality:</p> <p>+CME ERROR: <errcode></p>
Maximum Response Time	300 ms
Characteristics	<p>The command takes effect after the module is rebooted.</p> <p>The configuration is saved to NVRAM automatically.</p>

Parameter

<AGPS_posmode> Integer type. AGPS positioning mode. Each bit indicates a specified mode and see following figure for details. Setting bit to 1 can enable the corresponding mode. Range: 0–4294967295. Default value: 33488767 or 775.

Bit value	Description
Bit 0	Standalone
Bit 1	UP MS-based
Bit 2	UP MS-assisted
Bit 3	CP MS-based (2G)
Bit 4	CP MS-assisted (2G)
Bit 5	CP UE-based (3G)
Bit 6	CP UE-assisted (3G)
Bit 7	UP network measurement report (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 16	Enabling of autonomous fallback for SUPL-MSB
Bit 17	A-GLONASS UP MS-based for 3G
Bit 18	A-GLONASS UP MS-assisted for 3G
Bit 19	A-GLONASS CP MS-based for 3G
Bit 20	A-GLONASS CP MS-assisted for 3G
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

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

NOTE

When a China Unicom/China Telecom/China Mobile (U)SIM card is inserted, the default value of **<AGPS_posmode>** is 775. When another kind of (U)SIM card is inserted, the default value of **<AGPS_posmode>** is 33488767.

2.2.15. AT+QGPSCFG="lbsapn" Configure AGNSS Positioning APN

This command configures AGNSS positioning APN.

AT+QGPSCFG="lbsapn" Configure AGNSS Positioning APN	
Write Command AT+QGPSCFG="lbsapn"[,<system_type>,<PDP_type>,<APN>]	<p>Response</p> <p>If the optional parameters are omitted, query the current configuration: +QGPSCFG: "lbsapn",<system_type>,<PDP_type>,<APN></p> <p>OK</p> <p>If the optional parameters are specified, configure the AGNSS positioning APN: OK Or ERROR</p> <p>If there is any error related to ME functionality: +CME ERROR: <errcode></p>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved to NVRAM automatically.

Parameter

<system_type>	Integer type. Service system type in XOR format. Range: 0–31.
0	Disable
1	CDMA
2	HDR
4	GSM
8	WCDMA
16	LTE
<PDP_type>	Integer type. PDP type in XOR format.
0	Disable

	1	IPv4
	2	IPv6
	3	IPv4v6
	4	PPP
<APN>	String type. Configure the APN name. Default value: NULL. For example: "CMNET", "CTNET".	
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.	

2.2.16. AT+QGPSCFG="agnssprotocol" Configure AGNSS Positioning Protocols

This command configures AGPS LPP positioning protocol and AGLONASS positioning protocol.

AT+QGPSCFG="agnssprotocol" Configure AGNSS Positioning Protocols	
Write Command AT+QGPSCFG="agnssprotocol"[,<AGPS_Ip>,<AGLONASS_Ip>]	Response If the optional parameters are omitted, query the current configuration: +QGPSCFG: "agnssprotocol",<AGPS_Ip>,<AGLONASS_Ip> OK If the optional parameters are specified, configure the LPP protocol: OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved to NVRAM automatically.

Parameter

<AGPS_Ip>	Integer type. AGPS LPP positioning protocol in XOR format. Default value: 3. 1 User plane LPP 2 Control plane LPP
<AGLONASS_Ip>	Integer type. AGLONASS positioning protocol in XOR format. Default value: 1287. 1 Control plane RRLP 2 Control plane RRC 4 Control plane LPP

	256	User plane RRLP
	1024	User plane LPP
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.	

2.2.17. AT+QGPSCFG="fixfreq" Configure NMEA Output Frequency

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

AT+QGPSCFG="fixfreq" Configure NMEA Output Frequency	
Write Command AT+QGPSCFG="fixfreq",<freq>	Response If the optional parameter is omitted, query the current configuration: +QGPSCFG: "fixfreq",<freq> OK If the optional parameter is specified, configure the NMEA output frequency: OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration is saved to NVRAM automatically.

Parameter

<freq>	Integer type. NMEA sentence output frequency. 1 1 Hz 2 2 Hz 5 5 Hz 10 10 Hz
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

NOTE

1. Not all modules and software baselines support this function. For more details, contact Quectel Technical Support.
2. For firmware versions with "R06", such as EC25JLFAR06A01M4, the NMEA sentence output frequency is set to 5 Hz, while the frequency that takes effect is 4 Hz.

2.3. AT+QGPSDEL Delete Assistance Data

The command deletes 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 the assistance data is deleted 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.

AT+QGPSDEL Delete Assistance Data	
Test Command AT+QGPSDEL=?	Response +QGPSDEL: (range of supported <delete_type>s) OK
Write Command AT+QGPSDEL=<delete_type>	Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

Parameter

<delete_type>	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.
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

2.4. AT+QGPS Turn on GNSS

This command turns on GNSS function. When **<fix_count>** is 0, GNSS engine continues to locate and can be turned off via **AT+QGPSEND**. When **<fix_count>** is non-zero and reaches the value specified by customers, GNSS turns off automatically.

AT+QGPS Turn on GNSS	
Test Command AT+QGPS=?	Response +QGPS: (range of supported <GNSS_mode> s),(range of supported <fix_maxtime> s),(range of supported <fix_maxdist> s),(range of supported <fix_count> s),(range of supported <fix_rate> s) OK
Read Command Read current GNSS state AT+QGPS?	Response +QGPS: <GNSS_state> OK
Write Command AT+QGPS=<GNSS_mode>[,<fix_maxtime>[,<fix_maxdist>[,<fix_count>[,<fix_rate>]]]]	Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<GNSS_state>	Integer type. GNSS state. 0 GNSS OFF 1 GNSS ON
<GNSS_mode>	Integer type. GNSS working mode. 1 Stand-alone 2 MS-based 3 MS-assisted 4 Speed-optimal
<fix_maxtime>	Integer type. The maximum positioning time, 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. Range: 1–255. Default value: 255. Unit: second.
<fix_maxdist>	Integer type. Accuracy threshold of positioning. Range: 0–1000. Default value: 50. Unit: meter.
<fix_count>	Integer type. Positioning times. Range: 0–1000. Default value: 0 0 Continuous positioning Other values Actual positioning times
<fix_rate>	Integer type. The interval between the first and the second positioning. Range: 1–65535. Default value: 1. Unit: second.
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

2.5. 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, GNSS is turned off automatically.

AT+QGPSEND Turn off GNSS	
Test Command AT+QGPSEND=?	Response OK Or ERROR
Read command AT+QGPSEND?	Response OK Or ERROR
Execution Command AT+QGPSEND	Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

Parameter

<errcode>	Integer type. The error code of operation. See Chapter 4 for details.
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2.6. AT+QGPSLOC Acquire Positioning Information

This command acquires positioning information. Before executing the command, turn on GNSS via **AT+QGPS**. If GNSS fails in position fix, **+CME ERROR: <errcode>** is returned to indicate the corresponding situation.

AT+QGPSLOC Acquire Positioning Information	
Test Command AT+QGPSLOC=?	Response +QGPSLOC: <UTC>,<latitude>,<longitude>,<HDOP>,<altitude>,<fix>,<COG>,<spkm>,<spkn>,<date>,<nsat> OK
Write Command AT+QGPSLOC=<mode>	Response +QGPSLOC: <UTC>,<latitude>,<longitude>,<HDOP>,<altitude>,<fix>,<COG>,<spkm>,<spkn>,<date>,<nsat> OK If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are not saved.

Parameter

<mode>	Integer type. Latitude and longitude display format. 0 <latitude>,<longitude> format: ddmm.mmmmmN/S,dddmm.mmmmmE/W 1 <latitude>,<longitude> format: ddmm.mmmmmm,N/S,dddmm.mmmmmm,E/W 2 <latitude>,<longitude> format: (-)dd.ddd,(-)ddd.ddd
<UTC>	String type. UTC time. Format: hhmmss.sss (Quoted from GPGL sentence).
<latitude>	String type. Latitude. If <mode> is 0: Format: ddmm.mmmmmN/S (Quoted from GPGL sentence) dd Degree. Range: 00–89 mm.mmm Minute. Range: 00.0000–59.9999 N/S North/South If <mode> is 1: Format: ddmm.mmmmmm,N/S (Quoted from GPGL sentence) dd Degree. Range: 00–89 mm.mmmmmm Minute. Range: 00.000000–59.999999

	N/S	North/South
	<p>If <mode> is 2:</p> <p>Format: (-)dd.ddddd (Quoted from GPGL sentence)</p> <p>dd.ddddd Degree. Range: -89.9999–89.9999</p> <p>- South</p>	
<longitude>	<p>String type. Longitude.</p> <p>If <mode> is 0:</p> <p>Format: dddmm.mmmmmE/W (Quoted from GPGL sentence)</p> <p>ddd Degree. Range: 000–179</p> <p>mm.mmmmm Minute. Range: 00.0000–59.9999</p> <p>E/W East/West</p> <p>If <mode> is 1:</p> <p>Format: dddmm.mmmmmmm,E/W (Quoted from GPGL sentence)</p> <p>Ddd Degree. Range: 000–179</p> <p>mm.mmmmmmm Minute. Range: 00.000000–59.999999</p> <p>E/W East/West</p> <p>If <mode> is 2:</p> <p>Format: (-)dd.ddddd (Quoted from GPGL sentence)</p> <p>dd.ddddd Degree. Range: -179.99999–179.99999</p> <p>- West</p>	
<HDOP>	Horizontal precision. Range: 0.5–99.9 (Quoted from GPGL sentence).	
<altitude>	The altitude of the antenna away from the sea level, and is rounded to one decimal place. Unit: meter (Quoted from GPGL sentence).	
<fix>	Integer type. GNSS positioning mode (Quoted from GAGSA/GPGSA sentence).	
	2	2D positioning
	3	3D positioning
<COG>	<p>String type. Course Over Ground based on true north.</p> <p>Format: ddd.mm (Quoted from GPVTG sentence).</p> <p>ddd Degree. Range: 000–359</p> <p>mm Minute. Range: 00–59</p>	
<spkm>	Speed over ground. Format: xxxx.x. Unit: km/h. Round the value to one decimal place (Quoted from GPVTG sentence).	
<spkn>	Speed over ground. Format: xxxx.x. Unit: knots. Round the value to one decimal place (Quoted from GPVTG sentence).	
<date>	UTC time when fixing position. Format: ddmmyy (Quoted from GPRMC sentence).	
	dd	Day
	mm	Month
	yy	Year
<nsat>	Number of satellites. Range: 00–12 (the first 0 should be retained) (Quoted from GPGL sentence).	

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

2.7. AT+QGPSSUPLURL Configure SUPL Server URL

This command configures the SUPL server URL.

AT+QGPSSUPLURL Configure SUPL Server URL	
Test command AT+QGPSSUPLURL=?	Response +QGPSSUPLURL: <SUPL_URL> OK
Read Command AT+QGPSSUPLURL?	Response +QGPSSUPLURL: <SUPL_URL> OK
Write Command Configure SUPL server URL AT+QGPSSUPLURL=<SUPL_URL>	Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is saved to NVRAM automatically.

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. See Chapter 4 for details.

2.8. AT+QGPSSUPLCA Inject SUPL Certificate

This command injects SUPL certificate. The certificate file should be inputted into the file system via **AT+QFUPL** (See **document [1]** for details). The certificate should be obtained from the operator or the

server provider.

AT+QGPSSUPLCA Inject SUPL Certificate	
Test command AT+QGPSSUPLCA=?	Response +QGPSSUPLCA: <CA_file_name> OK
Read Command AT+QGPSSUPLCA?	Response OK Or ERROR
Write Command AT+QGPSSUPLCA=<CA_file_name>	Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

Parameter

<CA_file_name>	String type. SUPL certificate name.
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

2.9. AT+QGPSTNMEA Acquire NMEA Sentences

This command acquires NMEA sentences. Before using this command, turn on GNSS via **AT+QGPS**, and set **<NMEA_src>** to 1 to enable acquisition of NMEA sentences via **AT+QGPSTNMEA**.

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

AT+QGPSGNMEA Acquire NMEA Sentences	
Test Command AT+QGPSGNMEA=?	Response +QGPSGNMEA: (list of supported <NMEA_type>s) OK
Write Command Query GGA sentence AT+QGPSGNMEA="GGA"	Response [+QGPSGNMEA: GGA sentence] [...] OK If there is any error related to ME functionality: +CME ERROR: <errcode>
Write Command Query RMC sentence AT+QGPSGNMEA="RMC"	Response [+QGPSGNMEA: RMC sentence] [...] OK If there is any error related to ME functionality: +CME ERROR: <errcode>
Write Command Query GSV information AT+QGPSGNMEA="GSV"	Response [+QGPSGNMEA: GSV sentence] [...] OK If there is any error related to ME functionality: +CME ERROR: <errcode>
Write Command Query GSA sentence AT+QGPSGNMEA="GSA"	Response [+QGPSGNMEA: GSA sentence] [...] OK If there is any error related to ME functionality: +CME ERROR: <errcode>
Write Command Query VTG sentence AT+QGPSGNMEA="VTG"	Response [+QGPSGNMEA: VTG sentence] [...] OK

	If there is any error related to ME functionality: +CME ERROR: <errcode>
Write Command Query GNS sentence AT+QGPSGNMEA="GNS"	Response [+QGPSGNMEA: GNS sentence] [...] OK If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

Parameter

<NMEA_type>	String type. NMEA sentence type. "GGA" GGA sentence "RMC" RMC sentence "GSV" GSV sentence "GSA" GSA sentence "VTG" VTG sentence "GNS" GNS sentence
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

2.10. AT+QGPSXTRA Enable/Disable gpsOneXTRA Assistance Function

This command enables/disables gpsOneXTRA Assistance function.

AT+QGPSXTRA Enable/Disable gpsOneXTRA Assistance Function	
Test Command AT+QGPSXTRA=?	Response +QGPSXTRA: (list of supported <XTRA_enable>s) OK
Read Command AT+QGPSXTRA?	Response +QGPSXTRA: <XTRA_enable> OK
Write Command AT+QGPSXTRA=<XTRA_enable>	Response OK Or

	ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configurations are saved to NVRAM automatically.

Parameter

<XTRA_enable>	Integer type. Enable/disable gpsOneXTRA Assistance function. 0 Disable gpsOneXTRA Assistance 1 Enable gpsOneXTRA Assistance
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

2.11. AT+QGPSXTRATIME Inject gpsOneXTRA Time

This command injects gpsOneXTRA time to GNSS engine. Before using this command, enable gpsOneXTRA Assistance function via **AT+QGPSXTRA=1**. After the function is activated, the GNSS engine asks for gpsOneXTRA time and assistance data file. Before injecting gpsOneXTRA data file, inject gpsOneXTRA time first via this command.

AT+QGPSXTRATIME Inject gpsOneXTRA Time	
Test Command AT+QGPSXTRATIME=?	Response +QGPSXTRATIME: 0,<xtratetime>,(list of supported <UTC>s),(list of supported <force>s),<uncrtn> OK
Write Command Inject gpsOneXTRA time AT+QGPSXTRATIME=<type>,<xtratime>,<UTC>,<force>,<uncrtn>	Response OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration is not saved.

Parameter

<type>	Integer type. Type of injecting time. <u>0</u> Inject XTRA time manually
<xtratime>	String type. Current UTC time. Format: "yyyy/mm/dd, hh:mm:ss". e.g. "2019/01/05,08:30:30".
<UTC>	Integer type. UTC or GPS time that gpsOneXTRA time refers to. <u>0</u> GPS time <u>1</u> UTC time (Recommended)
<force>	Integer type. Whether to force GNSS to accept the data. <u>0</u> Not force GNSS to accept the data <u>1</u> Force acceptance of data (Recommended)
<uncrtn>	Integer type. Uncertainty of time. It indicates the time difference between sending a request to the SNTP server and receiving a response from the SNTP server. Default value: 3500. Unit: millisecond.
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

2.12. AT+QGPSXTRADATA Inject gpsOneXTRA Data File

This command injects a gpsOneXTRA assistance data file to the GNSS engine. Before operating this command, enable gpsOneXTRA first, store valid gpsOneXTRA data file into RAM or UFS (UFS is recommended) of the module and inject gpsOneXTRA time 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 AT+QGPSXTRADATA=?	Response +QGPSXTRADATA: <xtradatafilename> OK
Read Command Query the status of gpsOneXTRA data files AT+QGPSXTRADATA?	Response +QGPSXTRADATA: <xtra_data_durtime>,<injected_data_time> OK If there is any error related to ME functionality: +CME ERROR: <errcode>
Write Command Inject gpsOneXTRA data files AT+QGPSXTRADATA=<xtradatafilena	Response OK Or

me>	ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	1 s
Characteristics	The command takes effect immediately. The configuration is saved to NVRAM automatically.

Parameter

<xtradatafilename>	String type. Filename of the gpsOneXTRA data file, e.g. "RAM:xtra2.bin" or "RAM:xtra3grc.bin", in which, RAM indicates the actual file storage area.
<xtra_data_durtime>	Integer type. Valid time of injected gpsOneXTRA data file. Unit: minute. 0 No gpsOneXTRA file or the file is overdue 1–10080 Valid time of gpsOneXTRA file
<injected_data_time>	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".
<errcode>	Integer type. The error code of operation. See Chapter 4 for details.

2.13. AT+QGPSPPI Get GNSS Positioning Assistance Information

This command gets GNSS positioning assistance information. Before using this command, turn on GNSS through **AT+QGPS**, and wait for the positioning to be successful before you can get the GNSS positioning assistance information through **AT+QGPSPPI**.

AT+QGPSPPI Get GNSS Positioning Assistance Information	
Test Command AT+QGPSPPI=?	Response +QGPSPPI: (range of supported <index>s) OK
Write Command AT+QGPSPPI=<index>	Response +QGPSPPI: <value> OK Or ERROR If there is any error related to ME functionality: +CME ERROR: <errcode>
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately.

Parameter

<index>	Integer type. The type of positioning assistance data.
	1 Circular Horizontal Position Uncertainty. Unit: m.
	2 Vertical Uncertainty. Unit: m.
	3 Horizontal Confidence. Unit: Percentage.
<value>	Float type. The corresponding values are obtained according to <index>.
	Format: xxxx.xxxx. Round the value to three decimal places.
<errcode>	Integer type. The error code of operation. See Chapter 4 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+QGPSEND**.

```
AT+QGPS=1 //Turn on GNSS.
OK
//After turning on GNSS, NMEA sentences will be outputted from "usbntmea" port by default.
AT+QGPSLOC=0 //Obtain positioning information.
+QGPSLOC: 063416.400,3143.2951N,11713.0655E,0.6,224.9,2,162.57,17.6,9.5,110620,07
OK
AT+QGPSEND //Turn off GNSS.
OK
```

3.2. Application of GNSS <NMEA_src>

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

```
AT+QGPSCFG="nmeasrc",1 //Set <NMEA_src> to 1 to enable acquisition of NMEA
                           sentences via AT+QGPSTNMEA.
OK
AT+QGPSTNMEA="GGA" //Obtain GGA sentence.
+QGPSTNMEA: $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 <NMEA_src> to 0 to disable acquisition of NMEA
                           sentences via AT+QGPSTNMEA.
OK
AT+QGPSTNMEA="GGA"
+CME ERROR: 507 //Acquisition of NMEA sentences via AT+QGPSTNMEA
                  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
//Activate gpsOneXTRA Assistance function 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 1.4.
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, see documents [1] and [2]
                                                         respectively.

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

```

NOTE

When the module is powered off and restarted, it is necessary to re-inject time and files.

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 3: Summary of Error Codes

<errcode>	Meaning
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
509	XTRA not enabled
510	XTRA file opening 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
517	CMUX port is not opened

549Unknown error

5 Appendix References

Table 4: Related Documents

Document Name
[1] Quectel_LTE_Standard_FILE_Application_Note
[2] Quectel_QCOM_User_Guide

Table 5: Terms and Abbreviations

Abbreviation	Description
AGPS	Assisted GPS (Global Positioning System)
APN	Access Point Name
BDS	BeiDou Navigation Satellite System
CDMA	Code-Division Multiple Access
CRC	Cyclic Redundancy Check
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
GSM	Global System for Mobile Communications
GSV	GNSS Satellites in View
HDR	High Data Rate
LPP	LTE Positioning Protocol
MCU	Micro Control Unit
ME	Mobile Equipment
MS	Mobile Station
NI	Network Initiated
NMEA	NMEA (National Marine Electronics Association) 0183 Interface Standard
NVRAM	Non-Volatile Random Access Memory
ODP	On-Demand Positioning
PC	Personal Computer
PPP	Point-to-Point Protocol
RAM	Random Access Memory
RMC	Recommended Minimum Specific GNSS Data
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	Coordinated Universal Time
VTG	Course Over Ground and Ground Speed
WCDMA	Wideband Code Division Multiple Access