

EG060V-EA USBnet Call Application Note

LTE-A Module Series

Version: 1.0

Date: 2021-12-29

Status: Released



At Quectel, our aim is to provide timely and comprehensive services to our customers. If you require any assistance, please contact our headquarters:

Quectel Wireless Solutions Co., Ltd.

Building 5, Shanghai Business Park Phase III (Area B), No.1016 Tianlin Road, Minhang District, Shanghai 200233, China

Tel: +86 21 5108 6236

Email: info@quectel.com

Or our local offices. For more information, please visit:

<http://www.quectel.com/support/sales.htm>.

For technical support, or to report documentation errors, please visit:

<http://www.quectel.com/support/technical.htm>.

Or email us at: support@quectel.com.

Legal Notices

We offer information as a service to you. The provided information is based on your requirements and we make every effort to ensure its quality. You agree that you are responsible for using independent analysis and evaluation in designing intended products, and we provide reference designs for illustrative purposes only. Before using any hardware, software or service guided by this document, please read this notice carefully. Even though we employ commercially reasonable efforts to provide the best possible experience, you hereby acknowledge and agree that this document and related services hereunder are provided to you on an “as available” basis. We may revise or restate this document from time to time at our sole discretion without any prior notice to you.

Use and Disclosure Restrictions

License Agreements

Documents and information provided by us shall be kept confidential, unless specific permission is granted. They shall not be accessed or used for any purpose except as expressly provided herein.

Copyright

Our and third-party products hereunder may contain copyrighted material. Such copyrighted material shall not be copied, reproduced, distributed, merged, published, translated, or modified without prior written consent. We and the third party have exclusive rights over copyrighted material. No license shall be granted or conveyed under any patents, copyrights, trademarks, or service mark rights. To avoid ambiguities, purchasing in any form cannot be deemed as granting a license other than the normal non-exclusive, royalty-free license to use the material. We reserve the right to take legal action for noncompliance with abovementioned requirements, unauthorized use, or other illegal or malicious use of the material.

Trademarks

Except as otherwise set forth herein, nothing in this document shall be construed as conferring any rights to use any trademark, trade name or name, abbreviation, or counterfeit product thereof owned by Quectel or any third party in advertising, publicity, or other aspects.

Third-Party Rights

This document may refer to hardware, software and/or documentation owned by one or more third parties (“third-party materials”). Use of such third-party materials shall be governed by all restrictions and obligations applicable thereto.

We make no warranty or representation, either express or implied, regarding the third-party materials, including but not limited to any implied or statutory, warranties of merchantability or fitness for a particular purpose, quiet enjoyment, system integration, information accuracy, and non-infringement of any third-party intellectual property rights with regard to the licensed technology or use thereof. Nothing herein constitutes a representation or warranty by us to either develop, enhance, modify, distribute, market, sell, offer for sale, or otherwise maintain production of any our products or any other hardware, software, device, tool, information, or product. We moreover disclaim any and all warranties arising from the course of dealing or usage of trade.

Privacy Policy

To implement module functionality, certain device data are uploaded to Quectel’s or third-party’s servers, including carriers, chipset suppliers or customer-designated servers. Quectel, strictly abiding by the relevant laws and regulations, shall retain, use, disclose or otherwise process relevant data for the purpose of performing the service only or as permitted by applicable laws. Before data interaction with third parties, please be informed of their privacy and data security policy.

Disclaimer

- a) We acknowledge no liability for any injury or damage arising from the reliance upon the information.
- b) We shall bear no liability resulting from any inaccuracies or omissions, or from the use of the information contained herein.
- c) While we have made every effort to ensure that the functions and features under development are free from errors, it is possible that they could contain errors, inaccuracies, and omissions. Unless otherwise provided by valid agreement, we make no warranties of any kind, either implied or express, and exclude all liability for any loss or damage suffered in connection with the use of features and functions under development, to the maximum extent permitted by law, regardless of whether such loss or damage may have been foreseeable.
- d) We are not responsible for the accessibility, safety, accuracy, availability, legality, or completeness of information, advertising, commercial offers, products, services, and materials on third-party websites and third-party resources.

Copyright © Quectel Wireless Solutions Co., Ltd. 2021. All rights reserved.

About the Document

Revision History

Version	Date	Author	Description
-	2021-11-15	Paddy LI	Creation of the document
1.0	2021-12-29	Paddy LI	First official release

Contents

About the Document.....	3
Contents.....	4
Table Index.....	5
Figure Index.....	6
1 Introduction	7
2 USBnet Call Process	8
3 USBnet Call Description.....	10
3.1. Configure USBnet.....	10
3.1.1. Configure Call Method	10
3.1.1.1. Configure Call Method in Windows.....	10
3.1.1.2. Configure Call Method in Linux.....	10
3.1.2. Configure Call Mode	10
3.2. Make Call	11
3.3. Call Result.....	11
3.3.1. Call Result in Windows	11
3.3.2. Call Result in Linux	13
4 AT Command.....	14
4.1. AT Command Introduction	14
4.1.1. Definitions.....	14
4.1.2. AT Command Syntax	14
4.2. Declaration of AT Command Examples	15
4.3. AT Command Description	15
4.3.1. AT+QCFG Extended Configuration.....	15
4.3.1.1. AT+QCFG="usbnet" Configure Call Method	15
4.3.1.2. AT+QCFG="nat" Configure Call Mode	16
4.3.2. AT+QICSGP Configure PDP Context.....	17
4.3.3. AT+QNETDEVCTL Make/Disconnect PDP Call	18
4.3.4. AT+QNETDEVSTATUS Query PDP Context ID Relevant Information.....	19
5 Appendix References	21

Table Index

Table 1: Types of AT Commands	14
Table 2: Related Document.....	21
Table 3: Terms and Abbreviations	21

Figure Index

Figure 1: USBnet Call Flowchart.....	8
Figure 2: RNDIS USBnet in Windows.....	11
Figure 3: USBnet Call Status in Windows.....	12
Figure 4: View IP Address of USBnet in Linux.....	13

1 Introduction

This document introduces how to use Quectel EG060V-EA module to make a USBnet call on a Windows host or a Linux host, including USBnet call methods, call procedures, call results, call status query and related AT commands.

2 USBnet Call Process

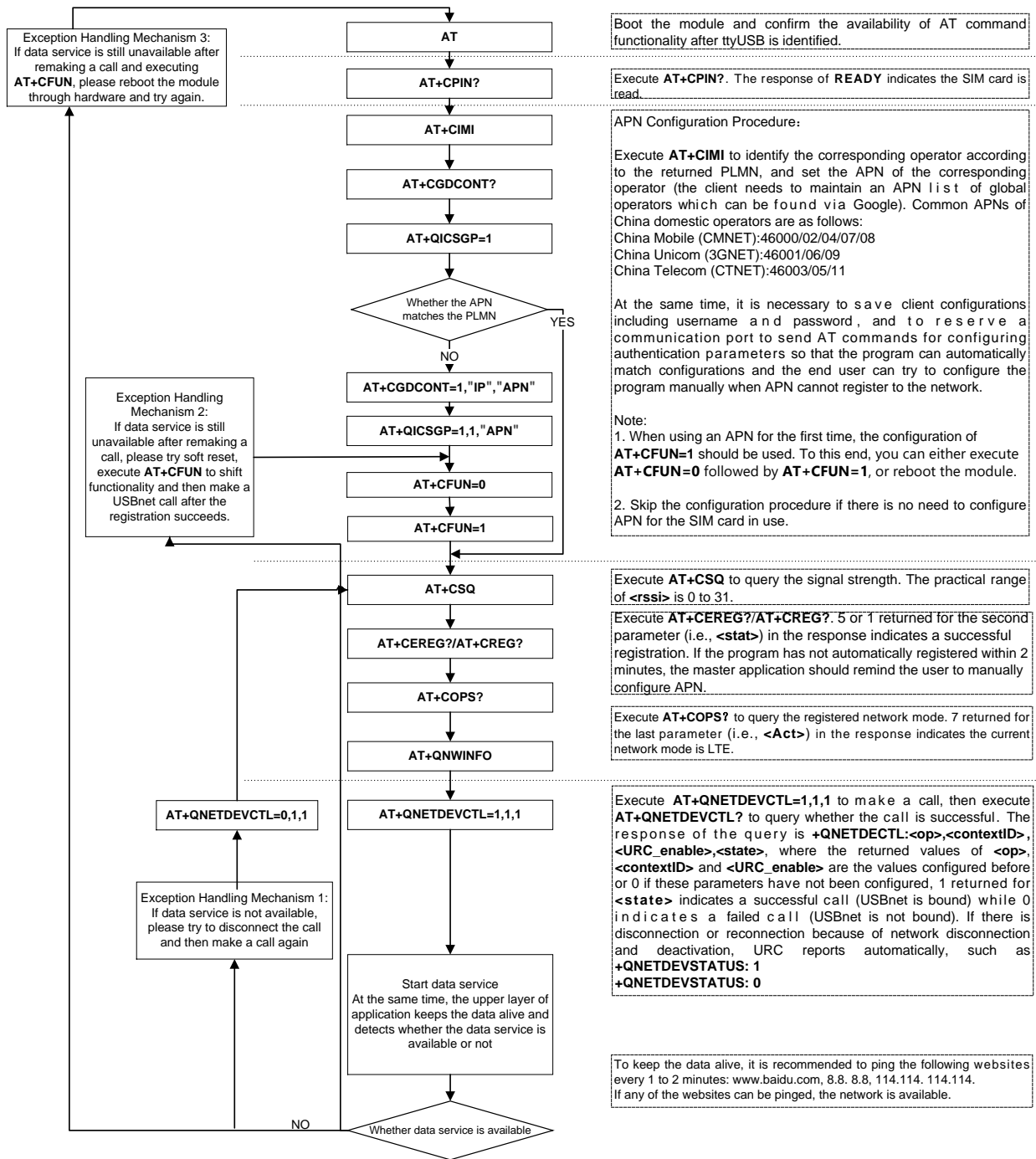


Figure 1: USBnet Call Flowchart

NOTE

For details about the AT commands given in the figure above, see **document [1]**.

3 USBnet Call Description

This chapter introduces the specific procedures of making a USBnet call according to the USBnet call process of **Chapter 2**.

You can configure the USBnet call method by executing **AT+QCFG** and make a call by executing **AT+QNETDEVCTL**. If the call is made successfully, you can view the USBnet call result by executing **AT+QNETDEVSTATUS**. See **Chapter 4.3** for details of the above AT commands.

3.1. Configure USBnet

3.1.1. Configure Call Method

3.1.1.1. Configure Call Method in Windows

Execute **AT+QCFG="usbnet",3** to configure the call method as RNDIS.

3.1.1.2. Configure Call Method in Linux

Execute **AT+QCFG="usbnet",4** to configure the call method as NCM; or
Execute **AT+QCFG="usbnet",1** to configure the call method as ECM; or
Execute **AT+QCFG="usbnet",3** to configure the call method as RNDIS.

3.1.2. Configure Call Mode

Execute **AT+QCFG="nat",0** to configure the call mode as router mode; or
Execute **AT+QCFG="nat",1** to configure the call mode as bridge mode.

NOTE

The configurations of the above commands take effect after the module is rebooted. It is recommended to query the current call mode by executing **AT+QCFG="nat"** after startup. If the current configuration is different from your expectation, you can configure the module as described above and then reboot the module.

3.2. Make Call

Execute **AT+QNETDEVCTL** to make a USBnet call. For example, execute **AT+QNETDEVCTL=2,1,1**, which means a USBnet call is made with **<contextID>=1**, and the module is enabled to automatically reconnect to network after disconnecting from network; and the URC that reports the call status is enabled. If the call is made successfully, you can check the call result. For details about the call result, see **Chapter 3.3**.

3.3. Call Result

If the call is made successfully, the host computer creates a corresponding USBnet connection. You can check the call result by viewing the USBnet status.

3.3.1. Call Result in Windows

Windows 10 is taken as an example. Open the "Control Panel" window, click "Network and Internet", then select the created RNDIS USBnet, double click the USBnet icon and then click "Details" to view the USBnet call status.

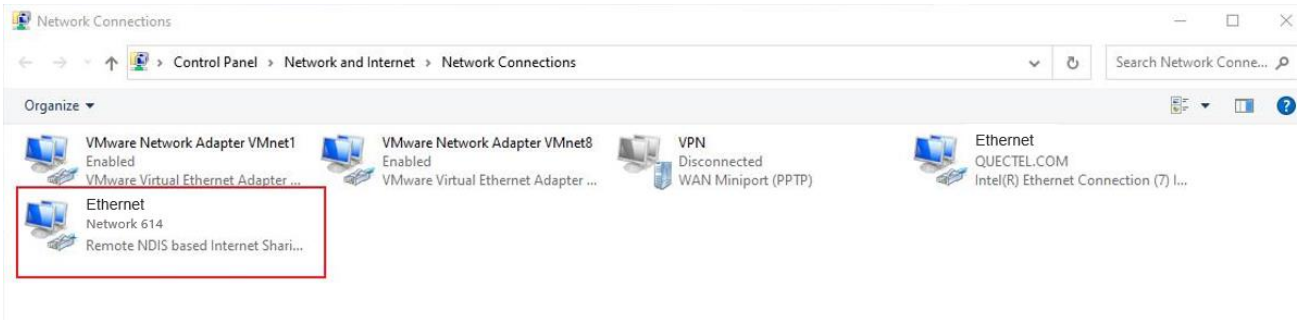


Figure 2: RNDIS USBnet in Windows

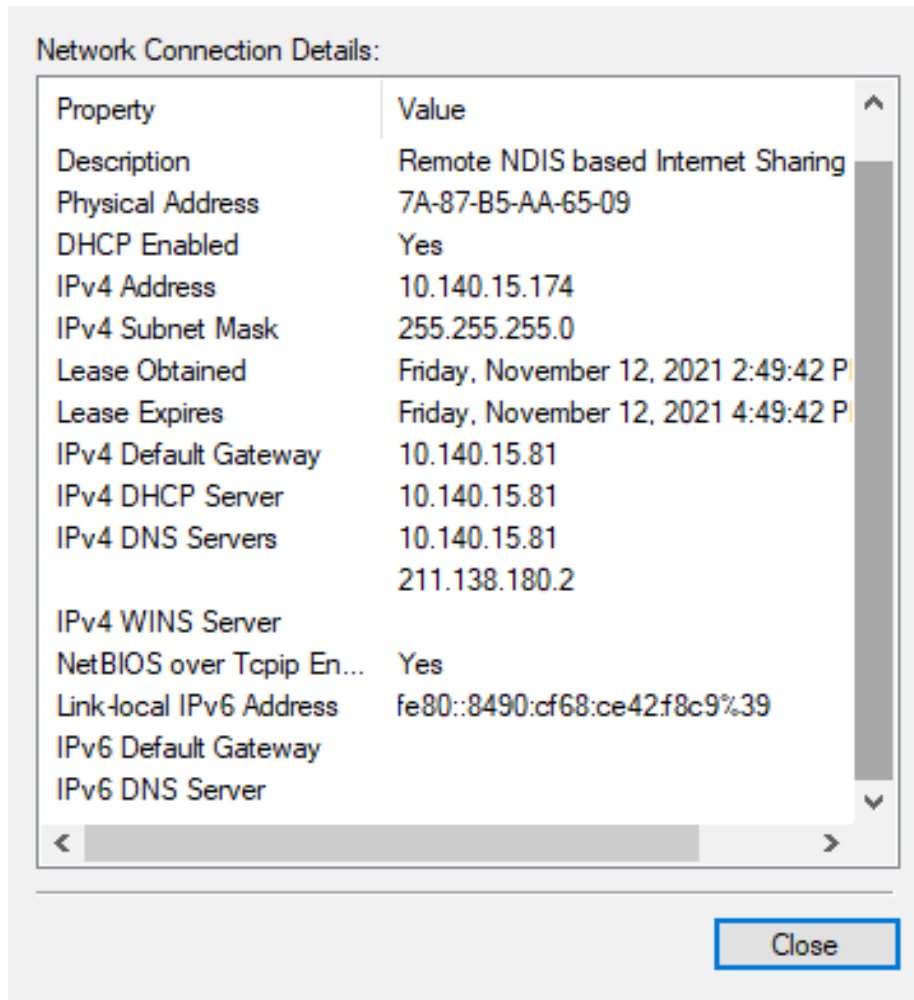


Figure 3: USBnet Call Status in Windows

3.3.2. Call Result in Linux

Execute **ifconfig** on the host computer to view IP address of the current USBnet, as shown in the following figure:

```

root@ubuntu:~#
root@ubuntu:~# ifconfig
lo          Link encap:Local Loopback
           inet addr:127.0.0.1  Mask:255.0.0.0
           inet6 addr: ::1/128 Scope:Host
           UP LOOPBACK RUNNING  MTU:65536  Metric:1
           RX packets:556 errors:0 dropped:0 overruns:0 frame:0
           TX packets:556 errors:0 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:1000
           RX bytes:40899 (40.8 KB)  TX bytes:40899 (40.8 KB)

usb0       Link encap:Ethernet  HWaddr 46:d7:50:81:f9:96
           inet addr:192.168.1.228 Bcast:192.168.1.255  Mask:255.255.255.0
           inet6 addr: fe80::d46e:932d:8366:22ec/64 Scope:Link
           UP BROADCAST RUNNING MULTICAST  MTU:1500  Metric:1
           RX packets:23 errors:0 dropped:0 overruns:0 frame:0
           TX packets:66 errors:0 dropped:0 overruns:0 carrier:0
           collisions:0 txqueuelen:1000
           RX bytes:2682 (2.6 KB)  TX bytes:11058 (11.0 KB)

root@ubuntu:~#
root@ubuntu:~#
root@ubuntu:~# ping baidu.com -c 4
PING baidu.com (220.181.38.148) 56(84) bytes of data.
64 bytes from 220.181.38.148: icmp_seq=1 ttl=47 time=153 ms
64 bytes from 220.181.38.148: icmp_seq=2 ttl=47 time=38.2 ms
64 bytes from 220.181.38.148: icmp_seq=3 ttl=47 time=73.1 ms
64 bytes from 220.181.38.148: icmp_seq=4 ttl=47 time=39.8 ms

--- baidu.com ping statistics ---
4 packets transmitted, 4 received, 0% packet loss, time 3005ms
rtt min/avg/max/mdev = 38.269/76.275/153.828/46.891 ms
root@ubuntu:~#

```

Figure 4: View IP Address of USBnet in Linux

4 AT Command

4.1. AT Command Introduction

4.1.1. Definitions

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

4.1.2. 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 1: Types of AT Commands

Command Type	Syntax	Description
Test Command	AT+<cmd>=?	Test the existence of corresponding Write Command and return information about the type, value, or range of its parameter.
Read Command	AT+<cmd>?	Check the current parameter value of a corresponding Write 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.

4.2. Declaration of AT Command Examples

The AT command examples in this document are provided to help you learn about the use of the AT commands introduced herein. 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, or that they should be executed in a given sequence.

4.3. AT Command Description

4.3.1. AT+QCFG Extended Configuration

AT+QCFG Extended Configuration

Test Command AT+QCFG=?	Response +QCFG: "usbnet",(list of supported <net>s) +QCFG: "nat",(list of supported <nat>s) ... OK
Maximum Response Time	300 ms

4.3.1.1. AT+QCFG="usbnet" Configure Call Method

This command queries or configures the call method of USBnet.

AT+QCFG="usbnet" Configure Call Method

Write Command AT+QCFG="usbnet"[,<net>]	Response If the optional parameter is omitted, query the current setting. +QCFG: "usbnet",<net> OK If the optional parameter is specified, configure the call method. OK Or ERROR
Maximum Response Time	300 ms

Characteristics	The command takes effect after the module is rebooted. The configuration will be saved automatically.
-----------------	--

Parameter

<net>	Integer type. Call method of USBnet.
	1 ECM
	3 RNDIS
	<u>4</u> NCM

Example

```
AT+QCFG="usbnet",4 //Configure the call method as NCM.
OK
```

4.3.1.2. AT+QCFG="nat" Configure Call Mode

This command queries or configures the call mode of USBnet.

AT+QCFG="nat" Configure Call Mode	
Write Command AT+QCFG="nat"[,<nat>]	Response If the optional parameter is omitted, query the current setting. +QCFG: "nat",<nat> OK If the optional parameter is specified, configure the call mode. OK Or ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect after the module is rebooted. The configuration will be saved automatically.

Parameter

<nat>	Integer type. Call mode.
	<u>0</u> Router mode
	1 Bridge mode

NOTE

In router mode, the address obtained by the host is a private network address; while in bridge mode, the address obtained by the host is a public network address.

Example

```
AT+QCFG="nat",1 //Configure the call mode as bridge mode.
OK
```

4.3.2. AT+QICSGP Configure PDP Context

This command queries or configures relevant parameters for a specified PDP context.

AT+QICSGP Configure PDP Context	
Test Command AT+QICSGP=?	Response +QICSGP: (range of supported <contextID>s),(range of supported <context_type>s),<APN>,<username>,<password>,(range of supported <authentication>s) OK
Read Command AT+QICSGP?	Response +QICSGP: <contextID>,<context_type>,<APN>,<username>,<password>,<authentication> OK
Write Command AT+QICSGP=<contextID>[,<context_type>,<APN>[,<username>,<password>,<authentication>]]	Response If the optional parameters are omitted, query the configuration of the specified PDP context. +QICSGP: <context_type>,<APN>,<username>,<password>,<authentication> OK If any of the optional parameters is specified, configure the specified PDP context. OK Or ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be saved automatically.

Parameter

<contextID>	Integer type. PDP context ID. Range: 1–15.
<context_type>	Integer type. Protocol type. 1 IPv4 2 IPv6 3 IPv4v6
<APN>	String type. Access point name.
<username>	String type. Username. Maximum length: 50 bytes.
<password>	String type. Password. Maximum length: 50 bytes.
<authentication>	Integer type. Authentication method. 0 NONE 1 PAP 2 CHAP

Example

```
AT+QICSGP=2,1,"","quectel","123456",1 //Configure <contextID>=2.
OK
```

4.3.3. AT+QNETDEVCTL Make/Disconnect PDP Call

This command makes or disconnects a PDP call.

AT+QNETDEVCTL Perform/Disconnect PDP Call	
Test Command AT+QNETDEVCTL=?	Response +QNETDEVCTL: (range of supported <op>s),(range of supported <contextID>),(list of supported <URC_enable>s),(list of supported <state>s) OK
Read Command AT+QNETDEVCTL?	Response +QNETDEVCTL: <op>,<contextID>,<URC_enable>,<state> OK
Write Command Make a call through a specified PDP context AT+QNETDEVCTL=<op>,<contextID>[,<URC_enable>]	Response OK Or ERROR
Maximum Response Time	300 ms
Characteristics	The command takes effect immediately. The configuration will be saved automatically.

Parameter

<op>	Integer type. Make or disconnect a call. 0 Disconnect a call 1 Make a call 2 Make a call and automatically remake a call after disconnecting from the network 3 Make a call and automatically remake a call after disconnecting from the network, and automatically make a call after startup
<contextID>	Integer type. PDP context ID. Range: 1–15.
<URC_enable>	Integer type. Whether to enable URC that reports the call status. 0 Disable 1 Enable
<state>	Integer type. Call status. 0 Failed 1 Successful

NOTE

You can configure **<op>** as 0/1/2 to disable automatically making a call after startup as needed.

Example

```
AT+QNETDEVCTL=2,1,1 //Configure <contextID>=1 to make a call.
OK
```

4.3.4. AT+QNETDEVSTATUS Query PDP Context ID Relevant Information

This command queries relevant information of the specified PDP context ID.

AT+QNETDEVSTATUS Query PDP Context ID Relevant Information

Test Command AT+QNETDEVSTATUS=?	Response +QNETDEVSTATUS: (list of activated <contextID>s) OK
Write Command AT+QNETDEVSTATUS=<contextID>	Response +QNETDEVSTATUS: <contextID>,<clip>,<netmask>,<gate>,<DHCP>,<pDNS>,<sDNS> OK Or ERROR

Maximum Response Time	300 ms
Characteristics	/

Parameter

<contextID>	Integer type. PDP context ID. Range: 1–15.
<clip>	String type. Host IP address. Range: 0x0000_0000–0xFFFF_FFFF.
<netmask>	String type. Subnet mask. Range: 0x0000_00FF–0xFCFF_FFFF.
<gate>	String type. Default gateway address. Range: 0x0000_0000–0xFFFF_FFFF.
<DHCP>	String type. DHCP server address. Range: 0x0000_0000–0xFFFF_FFFF.
<pDNS>	String type. Primary DNS address. Range: 0x0000_0000–0xFFFF_FFFF.
<sDNS>	String type. Secondary DNS address. Range: 0x0000_0000–0xFFFF_FFFF.

Example

```

AT+QNETDEVSTATUS=2 //Query the information of <contextID>=2.
+QNETDEVSTATUS: 2,"10.175.91.166","","","211.138.180.2","211.138.180.3"

OK
    
```

5 Appendix References

Table 2: Related Document

Document Name
[1] Quectel_EG060V-EA_AT_Commands_Manual

Table 3: Terms and Abbreviations

Abbreviation	Description
APN	Access Point Name
CHAP	Challenge Handshake Authentication Protocol
DHCP	Dynamic Host Configuration Protocol
DNS	Domain Name System
ECM	Ethernet Control Model
ID	Identifier
IP	Internet Protocol
IPv4	Internet Protocol Version 4
IPv6	Internet Protocol Version 6
NCM	Network Control Model
PAP	Password Authentication Protocol
PDP	Packet Data Protocol
RNDIS	Remote Network Driver Interface Specification
URC	Unsolicited Result Code
USB	Universal Serial Bus