

# EG800Q&EG91xQ Series

## USB Descriptor Introduction

**LTE Standard Module Series**

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# About the Document

## Revision History

Version	Date	Author	Description
-	2024-07-12	Felix LIN	Creation of the document
1.0	2024-08-12	Felix LIN	First official release

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# 1 Introduction

This document introduces the USB descriptors of Quectel EG800Q series and EG91xQ family (EG915Q series and EG916Q-GL) modules. Host identifies USB devices (modules) through descriptors, including device descriptor, configuration descriptor, interface descriptor, endpoint descriptor, and string descriptor (optional).



## 2 Overview

The overview of the USB descriptors is as follows.

**Table 1: USB Descriptor Overview**

USB Descriptors	Functions	Remarks
Device descriptor	Describes the general information of the USB device, including all device configurations, such as the USB protocol version number used by the USB device, device type, and other device parameter information.	A device has only one device descriptor.
Configuration descriptor	Describes the configuration information of a specific USB device, such as the number of supported interfaces, power supply method, etc.	A device can have multiple configuration descriptors. The number of interfaces supported by a configuration is determined by the <i>bNumInterface</i> of the configuration descriptor.
Interface descriptor	Describes a specific interface of one specific configuration	When a configuration supports multiple interfaces, all endpoint descriptors of that interface are often returned as a part of a configuration descriptor. The interface descriptor cannot be accessed directly using <i>GetDescriptor()</i> or <i>SetDescriptor()</i> .
Endpoint descriptor	Describes the general information of USB endpoints	Each endpoint in the USB device has its own endpoint descriptor, whose number is determined by the <i>bNumEndpoints</i> of the interface descriptor.
String descriptor (optional)	Saves some text information such as supplier name and product serial number	<ul style="list-style-type: none"> <li>The string descriptor consists of three fields in a fixed order. The total length of the descriptor is not fixed, and varies with the number of strings and the length of the information.</li> <li>Optional. If a string descriptor is not supported, all string descriptor indexes in the device, configuration, and</li> </ul>

interface descriptors must be 0.

The following tables show the USB interfaces of EG800Q series and EG91xQ family modules:

**Table 2: Module USB Interface Description (ECM Network Card Mode)**

Interface No.	Interface Name	Description
0	DIAG interface	Log output
1	NMEA interface	NMEA sentence output/CDC data transmission
2	AT interface	AT command transmission/CDC data transmission
3	MODEM interface	AT command transmission/PPP connection/CDC data transmission
4	ECM interface	ECM configuration management
5	ECM interface	ECM data communication

**Table 3: Module USB Interface Description (RNDIS Network Card Mode)**

Interface No.	Interface Name	Description
0	RNDIS interface	RNDIS configuration management
1	RNDIS interface	RNDIS data communication
2	DIAG interface	Log output
3	NMEA interface	NMEA sentence output/CDC data transmission
4	AT interface	AT command transmission/CDC data transmission
5	MODEM interface	AT command transmission/PPP connection/CDC data transmission

#### NOTE

1. If the network card dialing method is configured to ECM, Linux can read the descriptors automatically, but the ECM driver needs to be installed under Windows to automatically read the descriptors.
2. If the network card dialing method is configured to RNDIS, Linux and Windows can both read the descriptors automatically.

For the interface descriptor of USB interfaces, see **Chapter 3.1.3** & **Chapter 3.2.3**.

# 3 USB Descriptors

Quectel EG800Q series and EG91xQ family modules are USB composite communication devices. After the module's USB driver is installed in the Windows or Linux operating system, the operating system automatically reads the device descriptor and configuration descriptor of the module, and at the same time creates a specified interface based on the interface descriptor of the configuration descriptor.

This chapter introduces the device descriptor, configuration descriptor, interface descriptor and endpoint descriptor of EG800Q series and EG91xQ family modules (the string descriptor does not need to be used).

## 3.1. ECM Network Card Mode

### 3.1.1. Device Descriptor

This chapter introduces the USB device descriptor of modules.

**Table 4: USB Device Descriptor**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	18	0x12	18 bytes
<i>bDescriptorType</i>	Descriptor type	1	0x01	Device descriptor
<i>bcdUSB</i>	Version number of the USB specification that the device is compliant with	512	0x0200	USB version 2.0
<i>bDeviceClass</i>	Device class code	239	0xEF	Hybrid device
<i>bDeviceSubClass</i>	Device subclass code	2	0x02	2
<i>bDeviceProtocol</i>	Protocol code	1	0x01	IAD - Interface Association Descriptor

<i>bMaxPacketSize0</i>	Maximum packet size allowed for endpoint zero (0). Unit: byte.	64	0x40	64 bytes
<i>idVendor</i>	Vendor identifier	11388	0x2C7C	Quectel Wireless Solutions Co., Ltd.
<i>idProduct</i>	Product identifier	24583	0x6007	EG
<i>bcdDevice</i>	Device factory number	512	0x0200	512
<i>iManufacturer</i>	Index of the string descriptor describing the manufacturer	1	0x01	1
<i>iProduct</i>	Index of the string descriptor describing the product	2	0x02	2
<i>iSerialNumber</i>	Index of the string descriptor containing device's serial number	3	0x03	3
<i>bNumConfigurations</i>	Number of device configuration descriptors	1	0x01	1

### 3.1.2. Configuration Descriptor

This chapter introduces USB configuration descriptors of the module in ECM network card mode.

**Table 5: USB Configuration Descriptor (ECM Network Card Mode)**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	2	0x02	Configuration descriptor
<i>wTotalLength</i>	Total length of data returned for this configuration. Unit: byte.	258	0x0102	258 bytes
<i>bNumInterface</i>	Number of interfaces supported by this configuration	6	0x06	6 interfaces
<i>bConfigurationValue</i>	Configuration value. Only used when the system software of a USB device driver needs it.	1	0x01	Configuration 1

<i>iConfiguration</i>	Index of the string descriptor describing this configuration	0	0x00	0
<i>bmAttributes</i>	USB device characteristics	160	0xA0	160
<i>bmAttributes.Reserved D7</i>	The 7th bit of <i>bmAttributes</i> is reserved	1	0x01	1
<i>bmAttributes.SelfPowered D6</i>	Whether to power the USB device through USB_VBUS	0	0x00	NO
<i>bmAttributes.RemoteWakeup D5</i>	Whether remote wakeup is supported	1	0x01	YES
<i>bmAttributes.Reserved D4..0</i>	The 4th bit of <i>bmAttributes</i> is reserved	0	0x00	0
<i>bMaxPower</i>	Amount of power required in this configuration when the USB device is fully operational, expressed in units of 2 mA.	100	0x64	200 mA

#### NOTE

When the number of interfaces varies, the values of *wTotalLength* and *bNumInterface* are also different. After the users who uses QuecOpen solution add or remove interfaces from their code, the *wTotalLength* and *bNumInterface* of the configuration descriptor also change.

### 3.1.3. Interface Descriptor

This chapter introduces USB interface descriptors of the module in ECM network card mode.

#### 3.1.3.1. Interface 0 (DIAG Interface)

Table 6: Interface Descriptor of Interface 0

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	4	0x04	Interface descriptor
<i>bInterfaceNumber</i>	Interface number	0	0x00	0

<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by this interface	2	0x02	2 endpoints
<i>bInterfaceClass</i>	Interface class code	255	0xFF	255
<i>bInterfaceSubClass</i>	Interface subclass code	0	0x00	0
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	0
<i>iInterface</i>	Index of the string descriptor describing this interface	6	0x06	String descriptor 6

### 3.1.3.1.1. Endpoint Descriptor 1

**Table 7: Endpoint Descriptor 1 of Interface 0**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	1	0x01	Direction = OUT EndpointID = 1
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0	0

### 3.1.3.1.2. Endpoint Descriptor 2

Table 8: Endpoint Descriptor 2 of Interface 0

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	129	0x81	Direction = IN EndpointID = 1
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.1.3.2. Interface 1 (NMEA Interface)

Table 9: Interface Descriptor of Interface 1

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	4	0x04	Interface descriptor
<i>bInterfaceNumber</i>	Interface number	1	0x01	1
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by this interface	3	0x03	3 endpoints
<i>bInterfaceClass</i>	Interface class code	255	0xFF	255



<i>bInterfaceSubClass</i>	Interface subclass code	0	0x00	0
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	0
<i>iInterface</i>	Index of the string descriptor describing this interface	7	0x07	String descriptor 7

### 3.1.3.2.1. Endpoint Descriptor 1

**Table 10: Endpoint Descriptor 1 of Interface 1**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	130	0x82	Direction = IN EndpointID = 2
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	3	0x03	TransferType = Interrupt
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	16	0x0010	16 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms

### 3.1.3.2.2. Endpoint Descriptor 2

**Table 11: Endpoint Descriptor 2 of Interface 1**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor

<i>bEndpointAddress</i>	Address of the endpoint	131	0x83	Direction = IN EndpointID = 3
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.1.3.2.3. Endpoint Descriptor 3

**Table 12: Endpoint Descriptor 3 of Interface 1**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	2	0x02	Direction = OUT EndpointID = 2
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.1.3.3. Interface 2 (AT Interface)

**Table 13: Interface Descriptor of Interface 2**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	4	0x04	Interface descriptor
<i>bInterfaceNumber</i>	Interface number	2	0x02	2
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by this interface	3	0x03	3 endpoints
<i>bInterfaceClass</i>	Interface class code	255	0xFF	Vendor specific
<i>bInterfaceSubClass</i>	Interface subclass code	0	0x00	/
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	/
<i>iInterface</i>	Index of the string descriptor describing this interface	8	0x08	String descriptor 8

#### 3.1.3.3.1. Endpoint Descriptor 1

**Table 14: Endpoint Descriptor 1 of Interface 2**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	132	0x84	Direction = IN EndpointID = 4
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	3	0x03	TransferType = Interrupt

<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	16	0x0010	16 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms

### 3.1.3.3.2. Endpoint Descriptor 2

Table 15: Endpoint Descriptor 2 of Interface 2

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	133	0x85	Direction = IN EndpointID = 5
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.1.3.3.3. Endpoint Descriptor 3

Table 16: Endpoint Descriptor 3 of Interface 2

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes

<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	3	0x03	Direction = OUT EndpointID = 3
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.1.3.4. Interface 3 (MODEM Interface)

**Table 17: Interface Descriptor of Interface 3**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	4	0x04	Interface descriptor
<i>bInterfaceNumber</i>	Interface number	3	0x03	3
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by this interface	3	0x03	3 endpoints
<i>bInterfaceClass</i>	Interface class code	255	0xFF	Vendor specific
<i>bInterfaceSubClass</i>	Interface subclass code	0x00	0	0x00
<i>bInterfaceProtocol</i>	Interface protocol code	0x00	0	0x00
<i>iInterface</i>	Index of the string descriptor describing this interface	9	0x09	String descriptor 9

### 3.1.3.4.1. Endpoint Descriptor 1

Table 18: Endpoint Descriptor 1 of Interface 3

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	134	0x86	Direction = IN EndpointID = 6
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	3	0x03	TransferType = Interrupt
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	16	0x0010	16 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms

### 3.1.3.4.2. Endpoint Descriptor 2

Table 19: Endpoint Descriptor 2 of Interface 3

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	135	0x87	Direction = IN EndpointID = 7
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes

<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0
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### 3.1.3.4.3. Endpoint Descriptor 3

**Table 20: Endpoint Descriptor 3 of Interface 3**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	4	0x04	Direction = OUT EndpointID = 4
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.1.3.5. Interface 4 (ECM Interface)

**Table 21: Interface Descriptor of Interface 4**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	4	0x04	Interface descriptor
<i>bInterfaceNumber</i>	Interface's number	4	0x04	4

<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by this interface	1	0x01	1 endpoint
<i>bInterfaceClass</i>	Interface class code	2	0x02	Communication and CDC control
<i>bInterfaceSubClass</i>	Interface subclass code	6	0x06	Ethernet control model
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	Classless specific protocol
<i>iInterface</i>	Index of the string descriptor describing this interface	11	0x0B	String descriptor 11

### 3.1.3.5.1. Endpoint Descriptor 1

**Table 22: Endpoint Descriptor 1 of Interface 4**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	136	0x88	Direction = IN EndpointID = 8
<i>bmAttributes</i>	Endpoint transfer type	3	0x3	TransferType = Interrupt
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	32	0x0020	32 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms



### 3.1.3.6. Interface 5 (ECM Interface)

**Table 23: Interface Descriptor of Interface 5**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	4	0x04	Interface descriptor
<i>bInterfaceNumber</i>	Interface's number	5	0x05	5
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	1	0x01	1
<i>bNumEndpoints</i>	Number of endpoints used by this interface	2	0x02	2 endpoints
<i>bInterfaceClass</i>	Interface class code	10	0x0A	CDC - data
<i>bInterfaceSubClass</i>	Interface subclass code	0	0x00	0
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	0
<i>iInterface</i>	Index of the string descriptor describing this interface	0	0x00	0

#### 3.1.3.6.1. Endpoint Descriptor 1

**Table 24: Endpoint Descriptor 1 of Interface 5**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	5	0x05	Direction = OUT EndpointID = 5
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that	512	0x0200	512 bytes

	this endpoint can send or receive. Unit: byte.			
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.1.3.6.2. Endpoint Descriptor 2

**Table 25: Endpoint Descriptor 2 of Interface 5**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	137	0x89	Direction = IN EndpointID = 9
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

## 3.2. RNDIS Network Card Mode

### 3.2.1. Device Descriptor

This chapter introduces the USB device descriptor of modules.

**Table 26: USB Device Descriptor**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	18	0x12	18 bytes
<i>bDescriptorType</i>	Descriptor type	1	0x01	Device descriptor
<i>bcdUSB</i>	Version number of the USB specification that the device is compliant with	512	0x0200	USB version 2.0
<i>bDeviceClass</i>	Device class code	239	0xEF	Hybrid device
<i>bDeviceSubClass</i>	Device subclass code	2	0x02	2
<i>bDeviceProtocol</i>	Protocol code	1	0x01	IAD - Interface Association Descriptor
<i>bMaxPacketSize0</i>	Maximum packet size allowed for endpoint zero (0). Unit: byte.	64	0x40	64 bytes
<i>idVendor</i>	Vendor identifier	11388	0x2C7C	Quectel Wireless Solutions Co., Ltd.
<i>idProduct</i>	Product identifier	24583	0x6007	EG
<i>bcdDevice</i>	Device factory number	512	0x0200	512
<i>iManufacturer</i>	Index of the string descriptor describing the manufacturer	1	0x01	1
<i>iProduct</i>	Index of the string descriptor describing the product	2	0x02	2
<i>iSerialNumber</i>	Index of the string descriptor containing device's serial number	3	0x03	3
<i>bNumConfigurations</i>	Number of device configuration descriptors	1	0x01	1

### 3.2.2. Configuration Descriptor

This chapter introduces USB configuration descriptors of the module in RNDIS network card mode.

**Table 27: USB Configuration Descriptor (RNDIS Network Card Mode)**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	2	0x02	Configuration descriptor
<i>wTotalLength</i>	Total length of data returned for this configuration. Unit: byte.	245	0x00F5	245 bytes
<i>bNumInterface</i>	Number of interfaces supported by this configuration	6	0x06	6 interfaces
<i>bConfigurationValue</i>	Configuration value. Only used when the system software of a USB device driver needs it.	1	0x01	Configuration 1
<i>iConfiguration</i>	Index of the string descriptor describing this configuration	0	0x00	0
<i>bmAttributes</i>	USB device characteristics	160	0xA0	160
<i>bmAttributes.Reserved D7</i>	The 7th bit of <i>bmAttributes</i> is reserved	1	0x01	1
<i>bmAttributes.SelfPowered D6</i>	Whether to power the USB device through USB_VBUS	0	0x00	NO
<i>bmAttributes.RemoteWakeup D5</i>	Whether remote wakeup is supported	1	0x01	YES
<i>bmAttributes.Reserved D4..0</i>	The 4th bit of <i>bmAttributes</i> is reserved	0	0x00	0
<i>bMaxPower</i>	Amount of power required in this configuration when the USB device is fully operational, expressed in units of 2 mA.	100	0x64	200 mA

### NOTE

When the number of interfaces varies, the values of *wTotalLength* and *bNumInterface* are also different. After the users who uses QuecOpen solution add or remove interfaces from their code, the *wTotalLength* and *bNumInterface* of the configuration descriptor also change.

## 3.2.3. Interface Descriptor

This chapter introduces USB interface descriptors of the module in RNDIS network card mode.

### 3.2.3.1. Interface 0 (RNDIS Interface)

**Table 28: Interface Descriptor of Interface 0**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	4	0x04	Interface descriptor
<i>bInterfaceNumber</i>	Interface number	0	0x00	0
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by this interface	1	0x01	1 endpoint
<i>bInterfaceClass</i>	Interface class code	224	0xE0	Wireless control
<i>bInterfaceSubClass</i>	Interface subclass code	1	0x01	1
<i>bInterfaceProtocol</i>	Interface protocol code	3	0x03	Remote NDIS
<i>iInterface</i>	Index of the string descriptor describing this interface	6	0x06	String descriptor 6

### 3.2.3.1.1. Endpoint Descriptor 1

**Table 29: Endpoint Descriptor 1 of Interface 0**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	1	0x81	Direction = IN EndpointID = 1
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	3	0x03	TransferType = Interrupt
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	8	0x0008	8 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	14	0x0E	14 ms

### 3.2.3.2. Interface 1 (RNDIS Interface)

**Table 30: Interface Descriptor of Interface 1**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	4	0x04	Interface descriptor
<i>bInterfaceNumber</i>	Interface number	1	0x01	1
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by this interface	2	0x02	2 endpoints
<i>bInterfaceClass</i>	Interface class code	10	0x0A	CDC - data

<i>bInterfaceSubClass</i>	Interface subclass code	0	0x00	0
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	0
<i>iInterface</i>	Index of the string descriptor describing this interface	0	0x00	0

### 3.2.3.2.1. Endpoint Descriptor 1

**Table 31: Endpoint Descriptor 1 of Interface 1**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	1	0x01	Direction = OUT EndpointID = 1
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.2.3.2.2. Endpoint Descriptor 2

**Table 32: Endpoint Descriptor 2 of Interface 1**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor

<i>bEndpointAddress</i>	Address of the endpoint	130	0x82	Direction = IN EndpointID = 2
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.2.3.3. Interface 2 (DIAG Interface)

**Table 33: Interface Descriptor of Interface 2**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	4	0x04	Interface descriptor
<i>bInterfaceNumber</i>	Interface number	2	0x02	2
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by this interface	2	0x02	2 endpoints
<i>bInterfaceClass</i>	Interface class code	255	0xFF	255
<i>bInterfaceSubClass</i>	Interface subclass code	0	0x00	0
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	0
<i>iInterface</i>	Index of the string descriptor describing this interface	7	0x07	String descriptor 7



### 3.2.3.3.1. Endpoint Descriptor 1

**Table 34: Endpoint Descriptor 1 of Interface 2**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	2	0x02	Direction = OUT EndpointID = 2
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.2.3.3.2. Endpoint Descriptor 2

**Table 35: Endpoint Descriptor 2 of Interface 2**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	131	0x83	Direction = IN EndpointID = 3
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes

<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0
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### 3.2.3.4. Interface 3 (NMEA Interface)

**Table 36: Interface Descriptor of Interface 3**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	4	0x04	Interface descriptor
<i>bInterfaceNumber</i>	Interface number	3	0x03	3
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by this interface	3	0x03	3 endpoints
<i>bInterfaceClass</i>	Interface class code	255	0xFF	Vendor specific
<i>bInterfaceSubClass</i>	Interface subclass code	0	0x00	/
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	/
<i>iInterface</i>	Index of the string descriptor describing this interface	8	0x08	String descriptor 8

#### 3.2.3.4.1. Endpoint Descriptor 1

**Table 37: Endpoint Descriptor 1 of Interface 3**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes

<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	132	0x84	Direction = IN EndpointID = 4
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	3	0x03	TransferType = Interrupt
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	16	0x0010	16 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms

### 3.2.3.4.2. Endpoint Descriptor 2

Table 38: Endpoint Descriptor 2 of Interface 3

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	133	0x85	Direction = IN EndpointID = 5
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.2.3.4.3. Endpoint Descriptor 3

**Table 39: Endpoint Descriptor 3 of Interface 3**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	3	0x03	Direction = OUT EndpointID = 3
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.2.3.5. Interface 4 (AT Interface)

**Table 40: Interface Descriptor of Interface 4**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	4	0x04	Interface descriptor
<i>bInterfaceNumber</i>	Interface's number	4	0x04	4
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by this interface	3	0x03	3 endpoints
<i>bInterfaceClass</i>	Interface class code	255	0xFF	Vendor specific

<i>bInterfaceSubClass</i>	Interface subclass code	0x00	0	0x00
<i>bInterfaceProtocol</i>	Interface protocol code	0x00	0	0x00
<i>iInterface</i>	Index of the string descriptor describing this interface	9	0x09	String descriptor 9

### 3.2.3.5.1. Endpoint Descriptor 1

Table 41: Endpoint Descriptor 1 of Interface 4

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	134	0x86	Direction = IN EndpointID = 6
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	3	0x03	TransferType = Interrupt
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	16	0x0010	16 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms

### 3.2.3.5.2. Endpoint Descriptor 2

Table 42: Endpoint Descriptor 2 of Interface 4

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor

<i>bEndpointAddress</i>	Address of the endpoint	135	0x87	Direction = IN EndpointID = 7
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.2.3.5.3. Endpoint Descriptor 3

**Table 43: Endpoint Descriptor 3 of Interface 4**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	4	0x04	Direction = OUT EndpointID = 4
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.2.3.6. Interface 5 (MODEM Interface)

**Table 44: Interface Descriptor of Interface 5**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	4	0x04	Interface descriptor
<i>bInterfaceNumber</i>	Interface's number	5	0x05	5
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by this interface	3	0x03	3 endpoints
<i>bInterfaceClass</i>	Interface class code	255	0xFF	Vendor specific
<i>bInterfaceSubClass</i>	Interface subclass code	0	0x00	0
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	0
<i>iInterface</i>	Index of the string descriptor describing this interface	10	0x0A	String descriptor 10

#### 3.2.3.6.1. Endpoint Descriptor 1

**Table 45: Endpoint Descriptor 1 of Interface 5**

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	136	0x88	Direction = IN EndpointID = 8
<i>bmAttributes</i>	Endpoint transfer type	3	0x3	TransferType = Interrupt
<i>wMaxPacketSize</i>	The maximum packet size that	16	0x0010	16 bytes

	this endpoint can send or receive. Unit: byte.			
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms

### 3.2.3.6.2. Endpoint Descriptor 2

Table 46: Endpoint Descriptor 2 of Interface 5

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Address of the endpoint	137	0x89	Direction = IN EndpointID = 9
<i>bmAttributes</i>	Endpoint transfer type	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

### 3.2.3.6.3. Endpoint Descriptor 3

Table 47: Endpoint Descriptor 3 of Interface 5

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	7	0x07	7 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor



<i>bEndpointAddress</i>	Address of the endpoint	5	0x05	Direction = OUT EndpointID = 5
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	2	0x02	TransferType = Bulk
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	512	0x0200	512 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

# 4 Appendix References

**Table 48: Terms and Abbreviations**

Abbreviation	Description
CDC	Communications Device Class
ECM	Ethernet Networking Control Model
IAD	Interface Association Descriptor
ID	Identifier
NMEA	National Marine Electronics Association
PPP	Point to Point Protocol
RNDIS	Remote Network Driver Interface Specification
USB	Universal Serial Bus