

RG50xQ&RM5xxQ Series

USB Descriptor Introduction

5G Module Series

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About the Document

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1 Introduction

This document introduces the USB descriptors of Quectel 5G RG50xQ and RM5xxQ series modules. Host identifies USB devices (modules) through descriptors, including device descriptor, configuration descriptor, interface descriptor, endpoint descriptor, and string descriptor (optional).

1.1. Applicable Modules

Table 1: Applicable Modules

Module Series	Model
RG50xQ	RG500Q Series
	RG501Q-EU
	RG502Q Series
RM5xxQ	RM500Q Series
	RM502Q-AE
	RM510Q-GL
	RM505Q-AE

2 Overview

The overview of the USB descriptors is as follows:

Table 2: USB Descriptor Overview

USB Descriptors	Functions	Remarks
Device Descriptor	Describes the general information about 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, method of power supply etc.	A device can have multiple configuration descriptors. The number of interfaces supported by a configuration is determined by the <i>bNumInterfaces</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>bNumEndpoint</i> of the interface descriptor.
String Descriptor (optional)	Saves some text information such as supplier name and product serial number	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.

- Optional. If a string descriptor is not supported, all string descriptor indexes in the device, configuration, and interface descriptors must be 0.

When the Host is connected to the RG50xQ and RM5xxQ series modules, the module defaults to display 8 ports. All supported USB ports have different functions, see the table below for details.

Table 3: Module USB Interface Description

Interface No.	Interface Name	Description
0	DM interface	Diagnostic port.
1	NMEA interface	For GPS NMEA sentence outputting.
2	AT interface	For AT command transmission.
3	Modem interface	For PPP connection.
4 (for applicable modules excluding RM505Q-AE)	RmNet interface	RmNet interface.
4, 5 (for RM505Q-AE)	MBIM interface	Mobile broadband interface model.
6	ADB interface	Android debug bridge.
7, 8, 9	UAC interface	USB audio class.

For the interface descriptors of USB interfaces, see **Chapter 3.3**.

NOTE

ADB and UAC interfaces are not enabled by default, and you can enable them with **AT+QCFG="usbcfg"**. See **document [1]** for details.

3 USB Descriptors

RG50xQ and RM5xxQ series 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 the RG50xQ and RM5xxQ series modules (the string descriptor does not need to be used).

3.1. Device Descriptor

This chapter introduces the USB device descriptor of the module.

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	800	0x0320	USB version 3.0 or 3.1
<i>bDeviceClass</i>	Device class code	0	0x0	0
<i>bDeviceSubClass</i>	Device subclass code. Assigned by device class code.	0	0x0	0
<i>bDeviceProtocol</i>	Protocol code	0	0x0	0
<i>bMaxPacketSize0</i>	Maximum packet size allowed for endpoint zero (0); Unit: byte.	9	0x09	9 bytes

<i>idVendor</i>	Vendor identifier	11388	0x2C7C	Quectel Wireless Solutions Co., Ltd.
<i>idProduct</i>	Product identifier	2048	0x0800	RG50xQ&RM5xxQ
<i>bcdDevice</i>	Device factory number	1044	0x0414	1044
<i>iManufacturer</i>	Index of the string descriptor describing the manufacturer	1	0x01	"Quectel"
<i>iProduct</i>	Index of the string descriptor describing the product	2	0x02	"RG50xQ&RM5xxQ"
<i>iSerialNumber</i>	Index of the string descriptor containing device's serial number	3	0x03	random string
<i>bNumConfigurations</i>	Number of device configuration descriptors	1	0x01	1

3.2. Configuration Descriptor

This chapter introduces the USB configuration descriptor of the module.

Table 5: USB Configuration Descriptor

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.	349	0x15D	349 bytes
<i>bNumInterface</i>	Number of interfaces supported by this configuration	5	0x05	5 interfaces (for applicable modules excluding RM505Q-AE)
		6	0x06	6 interfaces (for RM505Q-AE)
<i>bConfigurationValue</i>	Configuration value. Only	1	0x01	1

	used when the system software of a USB device driver needs it.			
<i>iConfiguration</i>	Index of the string descriptor describing this configuration	4	0x04	"DIAG_SER_RM NET_AUDIO"
<i>bmAttributes</i>	USB device characteristics	224	0xA0	224
<i>bmAttributes.Reserved D7</i>	7th byte 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	0
<i>bmAttributes.RemoteWakeup D5</i>	Remote wakeup mode	1	0x01	1
<i>bmAttributes.Reserved D4..0</i>	4th byte 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.	112	0x70	896 mA

3.3. Interface Descriptors

This chapter introduces the USB interface descriptors of the module.

3.3.1. Interface 0 (DM 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 the interface	2	0x02	2 endpoints
<i>bInterfaceClass</i>	Interface class code	255	0xFF	255
<i>bInterfaceSubClass</i>	Interface subclass code	255	0xFF	255
<i>bInterfaceProtocol</i>	Interface protocol code	48	0x30	48
<i>iInterface</i>	Index of the string descriptor describing the interface	0	0x00	0

3.3.1.1. Endpoint Descriptor 0

Table 7: Endpoint Descriptor 0 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>	Endpoint address	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.	1024	0x0400	1024 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.1.2. Endpoint Descriptor 1

Table 8: 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>	Endpoint address	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.	1024	0x0400	1024 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.2. 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 the 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 the interface	0	0x00	0

3.3.2.1. Endpoint Descriptor 0

Table 10: Endpoint Descriptor 0 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>	Endpoint address	131	0x83	Direction = IN EndpointID = 3
<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.	10	0x0A	10 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms

3.3.2.2. Endpoint Descriptor 1

Table 11: 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>	Endpoint address	130	0x82	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.	1024	0x0400	1024 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.2.3. Endpoint Descriptor 2

Table 12: 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>	Endpoint address	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.	1024	0x0400	1024 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.3. 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 the 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 the interface	0	0x00	0

3.3.3.1. Endpoint Descriptor 0

Table 14: Endpoint Descriptor 0 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>	Endpoint address	133	0x85	Direction = IN EndpointID = 5
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	3	0x03	TransferType = Interrupt
<i>wMaxPacketSize</i>	The maximum packet size that	10	0x0A	10 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

3.3.3.2. Endpoint Descriptor 1

Table 15: 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>	Endpoint address	132	0x84	Direction = IN 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.	1024	0x0400	1024 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.3.3. Endpoint Descriptor 2

Table 16: 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>	Endpoint address	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.	1024	0x0400	1024 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.4. 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's 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 the 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 the interface	0	0x00	0

3.3.4.1. Endpoint Descriptor 0

Table 18: Endpoint Descriptor 0 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>	Endpoint address	135	0x87	Direction = IN EndpointID = 7
<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.	10	0x0A	10 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms

3.3.4.2. Endpoint Descriptor 1

Table 19: 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>	Endpoint address	134	0x86	Direction = IN EndpointID = 6
<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.	1024	0x0400	1024 bytes

<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0
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3.3.4.3. Endpoint Descriptor 2

Table 20: 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>	Endpoint address	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.	1024	0x0400	1024 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

NOTE

Applicable modules excluding RM505Q-AE support interface 4 (RmNet interface).

3.3.5. Interface 4 (RmNet 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 the interface	3	0x03	3 endpoints
<i>bInterfaceClass</i>	Interface class code	255	0xFF	255
<i>bInterfaceSubClass</i>	Interface subclass code	255	0xFF	255
<i>bInterfaceProtocol</i>	Interface protocol code	255	0xFF	255
<i>iInterface</i>	Index of the string descriptor describing the interface	7	0x07	"RmNet"

3.3.5.1. Endpoint Descriptor 0

Table 22: Endpoint Descriptor 0 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>	Endpoint address	136	0x88	Direction = IN EndpointID = 9
<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.	9	0x09	9 ms

3.3.5.2. Endpoint Descriptor 1

Table 23: 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>	Endpoint address	142	0x8E	Direction = IN EndpointID = 8
<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.	1024	0x0400	1024 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.5.3. Endpoint Descriptor 2

Table 24: 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>	Endpoint address	15	0x0F	Direction = OUT EndpointID = 15
<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.	1024	0x0400	1024 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.6. Interface 4 and 5 (MBIM Interface)

3.3.6.1. Interface 4 (MBIM Interface)

Table 25: 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 the interface	1	0x01	1 endpoint
<i>bInterfaceClass</i>	Interface class code	2	0x02	2
<i>bInterfaceSubClass</i>	Interface subclass code	14	0x0E	14
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	0
<i>iInterface</i>	Index of the string descriptor describing the interface	7	0x07	"RM505Q-AE"

3.3.6.1.1. Endpoint Descriptor 0

Table 26: Endpoint Descriptor 0 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>	Endpoint address	136	0x88	Direction = IN EndpointID = 8
<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.	64	0x0040	64 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	9	0x09	9 ms

3.3.6.2. Interface 5 (MBIM Interface)

Table 27: Interface Descriptor of Interface 5 (Alternate Setting 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'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 the interface	0	0x00	0

<i>bInterfaceClass</i>	Interface class code	10	0x0A	10
<i>bInterfaceSubClass</i>	Interface subclass code	0	0x00	0
<i>bInterfaceProtocol</i>	Interface protocol code	2	0x02	2
<i>iInterface</i>	Index of the string descriptor describing the interface	0	0x00	0

Table 28: Interface Descriptor of Interface 5 (Alternate Setting 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'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 the interface	2	0x02	2 endpoints
<i>bInterfaceClass</i>	Interface class code	10	0x0A	10
<i>bInterfaceSubClass</i>	Interface subclass code	0	0x00	0
<i>bInterfaceProtocol</i>	Interface protocol code	2	0x02	2
<i>iInterface</i>	Index of the string descriptor describing the interface	8	0x08	"MBIM Data"

3.3.6.2.1. Endpoint Descriptor 0

Table 29: Endpoint Descriptor 0 of Interface 5 (Alternate Setting 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>	Endpoint address	142	0x8E	Direction = IN EndpointID = 14
<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.	1024	0x0400	1024 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.6.2.2. Endpoint Descriptor 1

Table 30: Endpoint Descriptor 1 of Interface 5 (Alternate Setting 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>	Endpoint address	15	0x0F	Direction = OUT EndpointID = 15
<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.	1024	0x0400	1024 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

NOTE

Only RM505Q-AE supports interface 4 and 5 (MBIM interface).

3.3.7. Interface 6 (ADB Interface)

Table 31: Interface Descriptor of Interface 6

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	6	0x06	6
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by the interface	2	0x02	2 endpoints
<i>bInterfaceClass</i>	Interface class code	255	0xFF	255
<i>bInterfaceSubClass</i>	Interface subclass code	66	0x42	66
<i>bInterfaceProtocol</i>	Interface protocol code	1	0x01	1
<i>iInterface</i>	Index of the string descriptor describing the interface	8	0x08	"ADB Interface"

3.3.7.1. Endpoint Descriptor 0

Table 32: Endpoint Descriptor 0 of Interface 6

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>	Endpoint address	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.	1024	0x0400	1024 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.7.2. Endpoint Descriptor 1

Table 33: Endpoint Descriptor 1 of Interface 6

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>	Endpoint address	138	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.	1024	0x0400	1024 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	0	0x00	0

3.3.8. Interface 7, 8 and 9 (UAC Interface)

3.3.8.1. Interface 7 (UAC Interface)

Table 34: Interface Descriptor of Interface 7

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	7	0x07	7
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by the interface	0	0x00	0
<i>bInterfaceClass</i>	Interface class code	1	0x01	1
<i>bInterfaceSubClass</i>	Interface subclass code	1	0x01	2
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	0
<i>iInterface</i>	Index of the string descriptor describing the interface	9	0x09	"AC Interface"

3.3.8.2. Interface 8 (UAC Interface)

Table 35: Interface Descriptor of Interface 8 (Alternate Setting 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's number	8	0x08	8

<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by the interface	0	0x00	0
<i>bInterfaceClass</i>	Interface class code	1	0x01	1
<i>bInterfaceSubClass</i>	Interface subclass code	2	0x02	2
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	0
<i>iInterface</i>	Index of the string descriptor describing the interface	9	0x09	"AC Interface"

Table 36: Interface Descriptor of Interface 8 (Alternate Setting 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's number	8	0x08	8
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	1	0x01	1
<i>bNumEndpoints</i>	Number of endpoints used by the interface	1	0x01	1 endpoint
<i>bInterfaceClass</i>	Interface class code	1	0x01	1
<i>bInterfaceSubClass</i>	Interface subclass code	2	0x02	2
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	0
<i>iInterface</i>	Index of the string descriptor describing the interface	0	0x00	0

3.3.8.2.1. Endpoint Descriptor 0

Table 37: Endpoint Descriptor 0 of Interface 8 (Alternate Setting 1)

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Endpoint address	138	0x8A	Direction = IN EndpointID = 10
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	5	0x05	TransferType = Isochronous
<i>wMaxPacketSize</i>	The maximum packet size that this endpoint can send or receive. Unit: byte.	32	0x20	32 bytes
<i>bInterval</i>	The interval between polling endpoints when a data transmission interruption occurs. Unit: milliseconds.	4	0x0004	4 ms
<i>bSyncAddress</i>	The endpoint address used to communicate synchronization information by this endpoint, if required. Reset to zero if no synchronization pipe is used.	0	0x00	0

3.3.8.3. Interface 9 (UAC Interface)

Table 38: Interface Descriptor of Interface 9 (Alternate Setting 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's number	9	0x09	9

<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	0	0x00	0
<i>bNumEndpoints</i>	Number of endpoints used by the interface	0	0x00	0
<i>bInterfaceClass</i>	Interface class code	1	0x01	1
<i>bInterfaceSubClass</i>	Interface subclass code	2	0x02	2
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	0
<i>iInterface</i>	Index of the string descriptor describing the interface	14	0x0E	"AS Interface"

Table 39: Interface Descriptor of Interface 9 (Alternate Setting 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's number	9	0x09	9
<i>bAlternateSetting</i>	Used to identify different interface descriptors of the same interface	1	0x01	1
<i>bNumEndpoints</i>	Number of endpoints used by the interface	1	0x01	1 endpoint
<i>bInterfaceClass</i>	Interface class code	1	0x01	1
<i>bInterfaceSubClass</i>	Interface subclass code	2	0x02	2
<i>bInterfaceProtocol</i>	Interface protocol code	0	0x00	0
<i>iInterface</i>	Index of the string descriptor describing the interface	15	0x0F	"AS Interface"

3.3.8.3.1. Endpoint Descriptor 0

Table 40: Endpoint Descriptor 0 of Interface 9 (Alternate Setting 1)

Parameter	Meaning	Value		
		Decimal	Hex	Description
<i>bLength</i>	Descriptor size. Unit: byte.	9	0x09	9 bytes
<i>bDescriptorType</i>	Descriptor type	5	0x05	Endpoint descriptor
<i>bEndpointAddress</i>	Endpoint address	6	0x06	Direction = OUT EndpointID = 6
<i>bmAttributes</i>	Endpoint transfer type expressed in 2 bitmaps	9	0x09	TransferType = Isochronous
<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.	4	0x04	4 ms
<i>bSyncAddress</i>	The endpoint address used to communicate synchronization information by this endpoint, if required. Reset to zero if no synchronization pipe is used.	0	0x00	0

4 Appendix References

Table 41: Related Documents

Document Name
[1] Quectel_RG50xQ&RM5xxQ_Series_AT_Commands_Manual

Table 42: Terms and Abbreviations

Abbreviation	Description
AC	Alternating Current
ADB	Android Debug Bridge
AS	Access Stratum
DM	Device Manager
GPS	Global Positioning System
ID	Identifier
MBIM	Mobile Broadband Interface Model
NMEA	NMEA (National Marine Electronics Association) 0183 Interface Standard
PPP	Point to Point Protocol
UAC	USB Audio Class
USB	Universal Serial Bus