HUAWEI Module

USB Interface Descriptor Guide

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About This Document

Revision History

Document Version	Date	Chapter	Descriptions
01	2014-12-27		Creation
02	2014-09-09	1	Added the description of MU709s-6, ME909s-120 and ME909s-821.
		3.4	Uppdated USB interface descriptors of MU709s series module.
		3.7	Added USB interface descriptors of ME909s series module
03	2018-10-11	Scope 1 3.7	Added the description of ME909s- 821a.

Scope

MU509-b

MU509-g

MU509-c

MC509-a

MC509

MU609

MU709s-2

MU709s-6

ME909u-521

ME909u-523

ME909s-120

ME909s-821

ME909s-821a

Contents

1 Introduction

This document provides the Huawei module USB interface descriptors, which is intended to provide references for customers to develop the USB driver. If the customer wants to integrate the module USB driver in Linux or Android system kernel codes, we recommend the customer can directly refer to *Guide to Kernel Driver Integration in Linux for Huawei Modules*.

Huawei module and the related firmware in the table below support USB interface descriptors.

Huawei Module	Firmware Version	Remarks
MU509-b	12.815.03.01.00 or later 13.815.07.00.00 or later	-
MU509-g	12.815.03.01.00 or later 13.815.07.00.00 or later	-
MU509-c	11.815.00.78.00 or later	-
MC509-a	11.106.22.00.00 or later	Mini PCIe and LGA module have the same USB interface descriptors.
MC509	11.106.19.03.322 or later	Mini PCIe and LGA module have the same USB interface descriptors.
MU609	12.105.29.00.00 or later	Mini PCIe and LGA module have the same USB interface descriptors.
MU709s-2	11.651.63.00.00 or later	Mini PCIe and LGA module have the same USB interface descriptors.
MU709s-6	11.651.63.00.00 or later	Mini PCIe and LGA module have the same USB interface descriptors.

Huawei Module	Firmware Version	Remarks
ME909u-521	12.631.07.00.00 or later	Mini PCIe and LGA module have the same USB interface descriptors.
ME909u-523	11.430.63.00.00 or later	Mini PCIe and LGA module have the same USB interface descriptors.
ME909s-120	11.617.01.00.00 or later	Mini PCIe and LGA module have the same USB interface descriptors.
ME909s-821	11.617.01.00.00 or later	Mini PCIe and LGA module have the same USB interface descriptors.
ME909s-821a	11.617.08.00.00 or later	Mini PCIe and LGA module have the same USB interface descriptors.

NOTE

- Customers can send AT command "ATI" or "AT+GMR" to the module and get the firmware version number.
- bConfigurationValue is the index to configure descriptors, and the value starts from 1.
- The ME909u-521 firmware versions before 12.631.07.00.00 do not support bConfigurationValue=3, and some firmware versions does not have the GPS port.
- The MU709s-2 and MU709s-6 firmware versions before 11.651.63.00.00 do not support bConfigurationValue=3.

2 Interface Overview

This chapter describes the Huawei module interface types and the USB descriptor specifications.

2.1 Interface Specifications

Interface Name	Type	Value or Descriptions
MODEM	MODEM serial port	General serial port
NDIS/ECM/NCM	Ethernet port	Modules must have NDIS as Ethernet port on Windows XP/7, and have ECM or NCM as Ethernet port in Linux or Android.
PCUI	General serial port	The host application can use this port do AT commands communication.
DIAG	General serial port	Used for debugging.
MBIM	Ethernet port	Modules must support Windows 8.0 or later and support MBIM port.
GPS	Serial port	Read-only serial port

2.2 USB Descriptors Specifications

2.2.1 Device Descriptors

Field	Size (Byte)	Value or Descriptions
bLength	1	Length of the device descriptor
bDescriptorType	1	Indicates it is a device descriptor type

Field	Size (Byte)	Value or Descriptions
bcdUSB	2	This field identifies the release of the USB specification with which the device and its descriptors are compliant
bDeviceClass	1	-
bDeviceSubClass	1	-
bDeviceProtocol	1	-
bMaxPacketSize0	1	-
idVendor	2	Vendor ID
idProduct	2	Product ID
bcdDevice	2	-
iManufacture	1	-
iProduct	1	-
iSerialNumber	1	-
bNumConfigurations	1	-

2.2.2 Configuration Descriptors

Field	Size (Byte)	Value or Descriptions
bLength	1	Length of the configuration descriptor
bDescriptorType	1	Indicates it is a configuration descriptor type.
wTotalLength	2	Total length of the configuration descriptor
bNumInterfaces	1	Number of interfaces supported by the configuration
bConfigurationValue	1	The index of the configuration, the host will use this index in the USB interface configuration, starting from one.
iConfiguration	1	-
bmAttributes	1	-
MaxPower	1	-

2.2.3 Interface Descriptors

Field	Size (Byte)	Value or Descriptions
bLength	1	Length of the interface descriptor
bDescriptorType	1	Indicates it is an interface descriptor type.
bInterfaceNumber	1	Index of the interface, accumulated from 0
bAlternateSetting	1	-
bNumEndpoints	1	Endpoint number. • For MODEM interfaces, the value is 0x03. That is, three endpoints (Interrupt, Bulk In and Bulk Out) are required. • For general serial interfaces, the value is 0x02 or 0x03. That is, the Interrupt endpoint is optional.
bInterfaceClass	1	-
bInterfaceSubClass	1	-
bInterfaceProtocol	1	-
iInterface	1	-

2.2.4 Endpoint Descriptors

Field	Size(Byte)	Value or Descriptions
bLength	1	Length of the endpoint descriptor
bDescriptorType	1	Indicates it is an endpoint descriptor type.
bEndpointAddress	1	Endpoint address
bmAttributes	1	Endpoint attributes under the configuration selected by using the bConfigurationValue
wMaxPacketSize	2	Maximum packet size that this endpoint can send or receive.
bInterval	1	Interval for polling endpoint for data transfers

2.3 VID and PID

This section describes how to find out Huawei module's VID and PID information.

NOTE

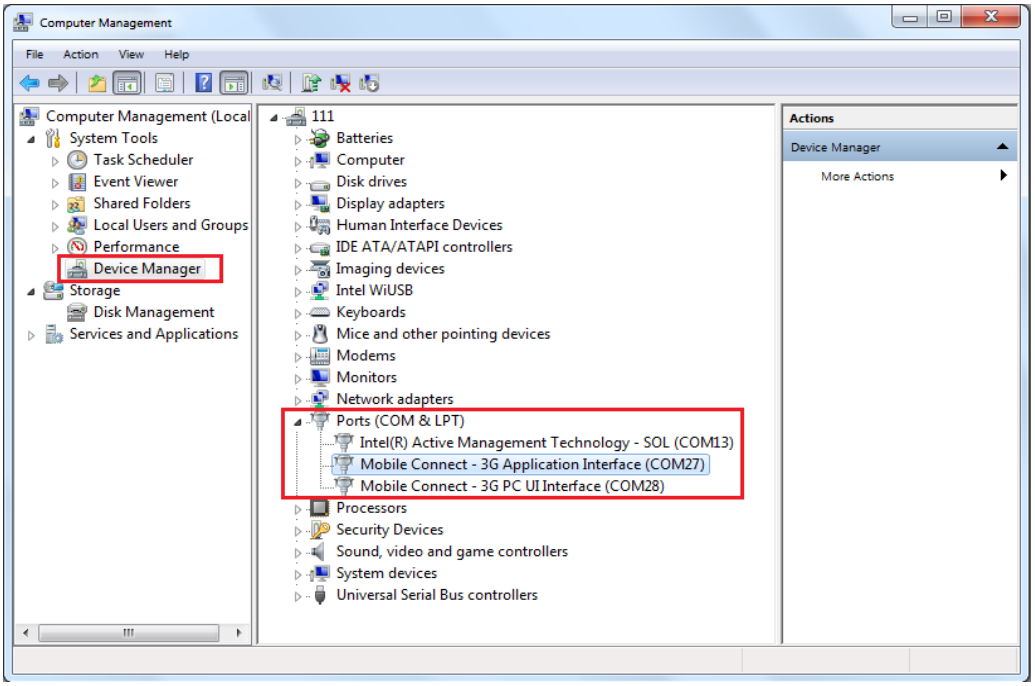
- If customers take the computer with Windows operating system to do the test, please get the Huawei module Windows driver from technical support engineers.
- If customers take the computer with Linux or Android operating system to do the test, please refer to *Guide to Kernel Driver Integration in Linux for Huawei Modules* to review and modify the kernel code, so that the module driver can be loaded in normal way.
- This section takes MU509-b module as an example for reference.

2.3.1 Finding out VID and PID on Windows Operating System

The detailed steps are shown as following.

Step 1 Connect the module and the computer with Windows operating system by the USB cable.

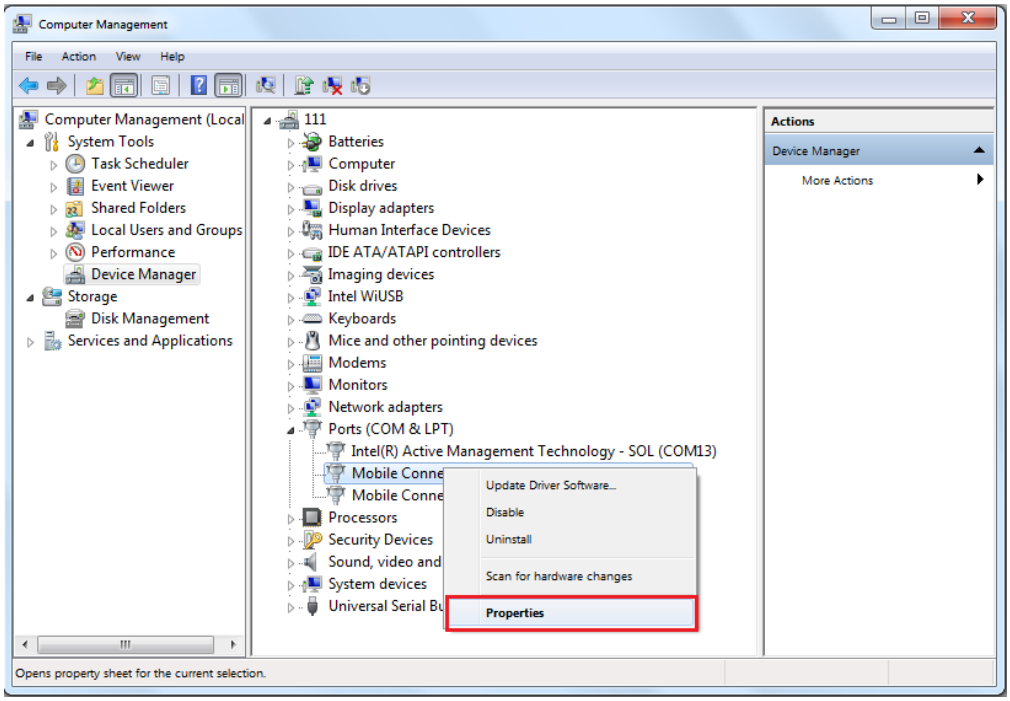
Step 2 Enter **Start** > **Computer**. Right click **Computer** and select **Manage**. Then **Computer Management** window will be displayed. Please refer to the red marks in the image below. Select **Device Manage** and expand **Ports (COM & LPT)** node to find out Huawei module serial ports.



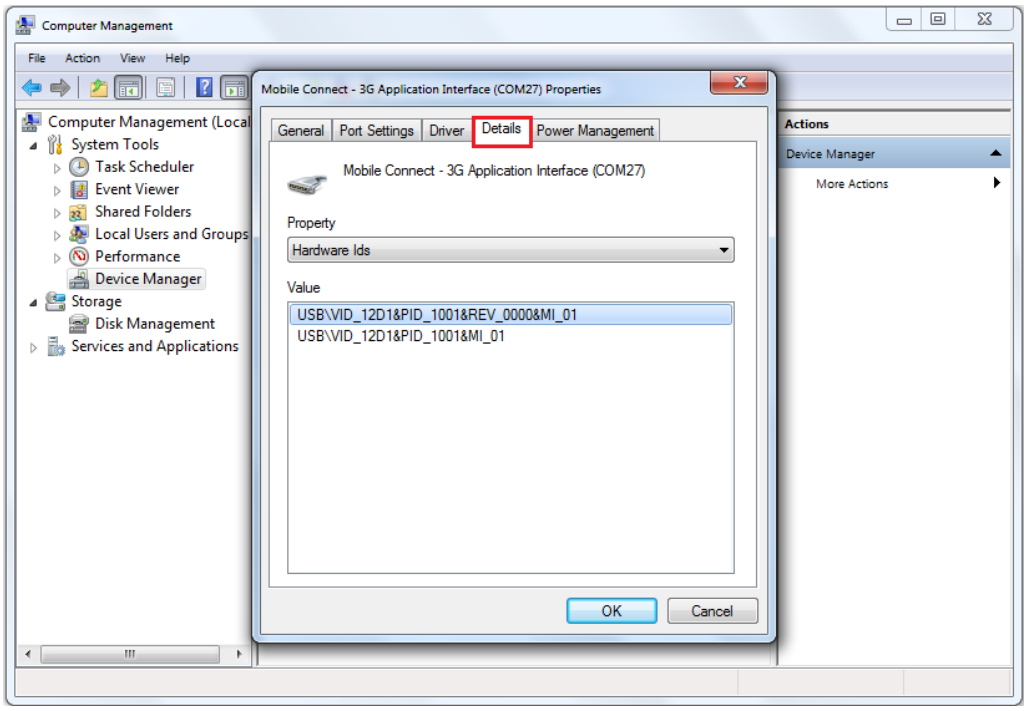
NOTE

The ports in the figure are provided only for your reference. The actual module may be different.

Step 3 Select anyone of the Huawei module USB serial ports. Right click it and select **Properties** to open the port's properties menu. This section takes **Mobile Connect – 3G Application Interface (COM27)** port as an example.



Step 4 Select **Details** and **Properties** as **Hardware Ids**. Then customers will get the MU509-b module's VID=0x12D1, PID=0x1001 from the **Value** list.



2.3.2 Finding out VID and PID on Linux or Android Operating System

The detailed steps are shown as following.

Step 1 Connect the module and the computer with Linux or Android operating system by the USB cable.

Step 2 Open the command window and run the command **lsusb**. Then all the devices mounted on the USB bus will be listed. Customers can find out the Huawei module's VID (VID=0x12D1) and PID value

Step 3 Run the command **lsusb –vd 12D1:PID** (this **PID** should be the value got from the Step 2), and then all the descriptors information of **12D1:PID** will be listed.

3 USB Interface Descriptors Information

This chapter describes the USB interface descriptors information of Huawei module on different operation systems. Customers can refer to that information for the module USB driver integration development.

NOTE

- This document will be updated along with the new module product releasing or the module USB interface descriptors information updating. Please make sure to get the latest release version.
- Please get the operation systems supportable information from modules' datasheet or the modules' specification.
- Customers need to have a certain understanding about how the host operating system selects the module's USB configuration, which will make it easier and more correct to use the module USB interface information.

3.1 USB Interface Descriptors of MU509 Series Module

This section introduces the USB interface descriptors information of MU509 series (MU509-b, MU509-c and MC509-g) module on different operation systems.

3.1.1 On Windows XP/7

The configuration of MU509 series module on Windows XP/7 is bConfigurationValue=1, and the USB serials sequence is MODEM, DIAG and PCUI.

NOTE

MU509 series module can be used only for demo test on Windows XP/7.

- MODEM serial port is used for the low-speed PS data service, including three endpoints.

MODEM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0xFF	-

MODEM Serial Port		
Field	**Value**	**Description**
bInterfaceProtocol	0xFF	-
bNumEndpoints	3	0x81: INTERRUPT IN
		0x82: BULK IN
		0x01: BULK OUT

- DIAG serial port is used to debug and capture trace logs, including two endpoints.

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	1	The second interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0xFF	-
bInterfaceProtocol	0xFF	-
bNumEndpoints	2	0x83: BULK IN
		0x02: BULK OUT

- PCUI serial port is used to do AT command communication with the host application, including two endpoints.

PCUI Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	2	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0xFF	-
bInterfaceProtocol	0xFF	-
bNumEndpoints	2	0x84: BULK IN
		0x03: BULK OUT

3.1.2 On Windows 8.0 or Later

MU509 series module does not support Windows 8.0 or later.

3.1.3 On Linux/Android

MU509 series module only supports bConfigurationValue=1 configuration. Please check the USB interface descriptors details information on the Windows XP/7.

3.1.4 On Other Operating Systems

MU509 series module only supports bConfigurationValue=1 configuration. Please check the USB interface descriptors details information on the Windows XP/7.

3.2 USB Interface Descriptors of MC509 Series Module

This section introduces the USB interface descriptors information of MC509 series module (MC509 and MC509-a module) on different operation systems.

3.2.1 On Windows XP/7

The configuration of MC509 series module on Windows XP/7 is bConfigurationValue=1, and the USB serials sequence is MODEM, DIAG, PCUI and GPS.

NOTE
MC509 series module can be used only for demo test on Windows XP/7.

- MODEM serial port is used for the low-speed PS data service, including three endpoints.

MODEM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0xFF	-
bInterfaceProtocol	0xFF	-
bNumEndpoints	3	0x81: INTERRUPT IN
		0x82: BULK IN
		0x02: BULK OUT

- DIAG serial port is used to debug and capture trace logs, including two endpoints.

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	1	The second interface
bInterfaceClass	0xFF	-

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceSubClass	0xFF	-
bInterfaceProtocol	0xFF	-
bNumEndpoints	2	0x84: BULK IN
		0x04: BULK OUT

- PCUI serial port is used to do AT command communication with the host application, including two endpoints.

PCUI Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	2	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0xFF	-
bInterfaceProtocol	0xFF	-
bNumEndpoints	2	0x86: BULK IN
		0x06: BULK OUT

- GPS serial port is used for GPS service and GPS data transfer, which has two separate ports, including one data port with two endpoints, and one control port with two endpoints.

GPS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	3	The fourth interface, GPS data interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0xFF	-
bInterfaceProtocol	0xFF	-
bNumEndpoints	2	0x88: BULK IN
		0x07: BULK OUT
bInterfaceNumber	4	The fifth interface, GPS control interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0xFF	-

GPS Serial Port		
Field	**Value**	**Description**
bInterfaceProtocol	0xFF	-
bNumEndpoints	2	0x89: BULK IN
		0x09: BULK OUT

3.2.2 On Windows 8.0 or Later

MC509 series module does not support Windows 8.0 or later.

3.2.3 On Linux/Android

MC509 series module only supports bConfigurationValue=1 configuration. Please check the USB interface descriptors details information on the Windows XP/7.

3.2.4 On Other Operating Systems

MC509 series module only supports bConfigurationValue=1 configuration. Please check the USB interface descriptors details information on the Windows XP/7.

3.3 USB Interface Descriptors of MU609 Module

3.3.1 On Windows XP/7

The configuration of MU609 module on Windows XP/7 is bConfigurationValue=1, and the USB serials sequence is MODEM, DIAG, PCUI, GPS and NDIS.

NOTE
MU609 module can be used only for demo test on Windows XP/7.

- MODEM serial port is used for the low-speed PS data service, including three endpoints.

MODEM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x01	-
bNumEndpoints	3	0x81: INTERRUPT IN
		0x82: BULK IN
		0x01: BULK OUT

- DIAG serial port is used to debug and capture trace logs, including two endpoints.

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	1	The second interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x03	-
bNumEndpoints	2	0x83: BULK IN
		0x02: BULK OUT

- PCUI serial port is used to do AT command communication with the host application, including two endpoints.

PCUI Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	2	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x02	-
bNumEndpoints	2	0x84: BULK IN
		0x03: BULK OUT

- GPS serial port is used for GPS service and GPS data transfer, which has two separate ports, including one data port with two endpoints, and one control port with two endpoints.

GPS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	3	The fourth interface, GPS data interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x05	-
bNumEndpoints	2	0x85: BULK IN
		0x04: BULK OUT

GPS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	4	The fifth interface, GPS control interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x06	-
bNumEndpoints	2	0x86: BULK IN
		0x05: BULK OUT

- NDIS serial port is used for PS data service, including three endpoints.

NDIS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	5	The sixth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x07	
bNumEndpoints	3	0x87: INTERRUPT IN
		0x88: BULK IN
		0x06: BULK OUT

3.3.2 On Windows 8.0 or Later

MU609 module does not support Windows 8.0 or later.

3.3.3 On Linux/Android

The configuration of MU609 module on Linux/Android is bConfigurationValue=2, and the USB serials sequence is ECM, MODEM, DIAG, PCUI and GPS.

- ECM serial port is used for PS data service, which has one control interface including one endpoint, and one data interface including two endpoints.

ECM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface, control interface
bInterfaceClass	0x02	Communication interface class

ECM Serial Port		
Field	**Value**	**Description**
bInterfaceSubClass	0x06	Ethernet control model
bInterfaceProtocol	0x00	-
bNumEndpoints	1	0x81: INTERRUPT IN
bInterfaceNumber	1	The second interface, data interface
bInterfaceClass	0x0A	Data interface class
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x00	-
bNumEndpoints	2	0x82: BULK IN
		0x01: BULK OUT

- MODEM serial port is used for the low-speed PS data service, including three endpoints.

MODEM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	2	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x01	-
bNumEndpoints	3	0x83: INTERRUPT IN
		0x84: BULK IN
		0x02: BULK OUT

- DIAG serial port is used to debug and capture trace logs, including two endpoints.

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	3	The fourth interface-
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x03	-

DIAG Serial Port		
Field	**Value**	**Description**
bNumEndpoints	2	0x85: BULK IN
		0x03: BULK OUT

- PCUI serial port is used to do AT command communication with the host application, including two endpoints.

PCUI Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	4	The fifth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x02	-
bNumEndpoints	2	0x86: BULK IN
		0x04: BULK OUT

- GPS serial port is used for GPS service and GPS data transfer, which has two separate ports, including one data port with two endpoints, and one control port with two endpoints.

GPS Port		
Field	**Value**	**Description**
bInterfaceNumber	5	The sixth interface, GPS data interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x05	-
bNumEndpoints	2	0x87: BULK IN
		0x05: BULK OUT
bInterfaceNumber	6	The seventh interface, GPS control interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x06	-
bNumEndpoints	2	0x88: BULK IN

GPS Port		
Field	**Value**	**Description**
		0x06: BULK OUT

3.3.4 On Other Operating Systems

Customers need to select the correct module USB interface configuration referring to that configuration model supported by the host system. If the host system does not select one configuration of MU609 module actively, then the MU609 module will enumerate the serials ports as that on Windows XP/7, which means the bConfigurationValue=1.

3.4 USB Interface Descriptors of MU709s Series Module

This section introduces the USB interface descriptors information of MU709s series (MU709s-2 and MU709s-6) module on different operation systems.

3.4.1 On Windows XP/7

The configuration of MU709s series module on Windows XP/7 is bConfigurationValue=1, and the USB serials sequence is MODEM, DIAG, PCUI and NDIS.

NOTE
MU709s series module can be used only for demo test on Windows XP/7.

- MODEM serial port is used for the low-speed PS data service, including three endpoints.

MODEM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x03	-
bInterfaceProtocol	0x01	-
bNumEndpoints	3	0x82: INTERRUPT IN
		0x81: BULK IN
		0x01: BULK OUT

- DIAG serial port is used to debug and capture trace logs, including two endpoints.

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	1	The second interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x03	-
bInterfaceProtocol	0x03	-
bNumEndpoints	2	0x83: BULK IN
		0x02: BULK OUT

- PCUI serial port is used to do AT command communication with the host application, including two endpoints.

PCUI Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	2	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x03	-
bInterfaceProtocol	0x02	-
bNumEndpoints	2	0x84: BULK IN
		0x03: BULK OUT

- NDIS serial port is used for PS data service, including three endpoints.

NDIS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	3	The fourth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x03	-
bInterfaceProtocol	0x16	-
bNumEndpoints	3	0x86: INTERRUPT IN
		0x85: BULK IN
		0x04: BULK OUT

3.4.2 On Windows 8.0 or Later

The configuration of MU709s series module on Windows 8.0 or later is bConfigurationValue=3, and the USB serial configuration is MBIM.

NOTE
MU709s series module can be used only for demo test on Windows 8.0 or later.

MBIM serial port is used for PS data service on Windows 8.0 or later, which has one control interface including one endpoint, and one data interface including two endpoints.

MBIM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface, control interface
bInterfaceClass	0x02	Communication interface class
bInterfaceSubClass	0x0E	MBIM Port
bInterfaceProtocol	0x00	-
bNumEndpoints	1	0x82: INTERRUPT IN
bInterfaceNumber	1	The second interface, data interface
bInterfaceClass	0x0A	Data interface class
bInterfaceSubClass	0x00	-
bInterfaceProtocol	0x02	-
bNumEndpoints	2	0x81: BULK IN
		0x01: BULK OUT

3.4.3 On Linux/Android

The configuration of MU709s series module on Linux/Android is bConfigurationValue=2, and the USB serials sequence is ECM, MODEM, DIAG and PCUI.

- ECM serial port is used for PS data service, which has one control interface including one endpoint, and one data interface including two endpoints.

ECM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface, control interface
bInterfaceClass	0x02	Communication interface class
bInterfaceSubClass	0x06	Ethernet control model
bInterfaceProtocol	0x00	-

ECM Serial Port		
Field	**Value**	**Description**
bNumEndpoints	1	0x82: INTERRUPT IN
bInterfaceNumber	1	The second interface, data interface
bInterfaceClass	0x0A	Data interface class
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x00	-
bNumEndpoints	2	0x81: BULK IN
		0x01: BULK OUT

- MODEM serial port is used for the low-speed PS data service, including three endpoints.

MODEM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	2	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x03	-
bInterfaceProtocol	0x01	-
bNumEndpoints	3	0x84: INTERRUPT IN
		0x83: BULK IN
		0x02: BULK OUT

- DIAG serial port is used to debug and capture trace logs, including two endpoints.

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	3	The fourth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x03	-
bInterfaceProtocol	0x03	-
bNumEndpoints	2	0x85: BULK IN
		0x03: BULK OUT

- PCUI serial port is used to do AT command communication with the host application, including two endpoints.

PCUI Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	4	The fifth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x03	-
bInterfaceProtocol	0x02	-
bNumEndpoints	2	0x86: BULK IN
		0x04: BULK OUT

3.4.4 On Other Operating Systems

Customers need to select the correct module USB interface configuration referring to that configuration model supported by the host system. If the host system does not select one configuration of MU709s series module actively, then the MU709s series module will enumerate the serials ports as that on Windows XP/7, which means the bConfigurationValue=1.

3.5 USB Interface Descriptors of ME909u-521 Module

3.5.1 On Windows XP/7

The configuration of ME909u-521 module on Windows XP/7 is bConfigurationValue=1, and the USB serials sequence is MODEM, DIAG, PCUI, NDIS and GPS.

NOTE
ME909u-521 module can be used only for demo test on Windows XP/7.

- MODEM serial port includes three endpoints. ME909u-521 module does not support MODEM serial port to be used for data service.

MODEM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x10	-
bNumEndpoints	3	0x82: INTERRUPT IN

MODEM Serial Port		
Field	**Value**	**Description**
		0x81: BULK IN
		0x01: BULK OUT

- DIAG serial port is used to debug and capture trace logs, including two endpoints.

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	1	The second interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x13	-
bNumEndpoints	2	0x83: BULK IN
		0x02: BULK OUT

- PCUI serial port is used to do AT command communication with the host application, including two endpoints.

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	1	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x13	-
bNumEndpoints	2	0x83: BULK IN
		0x02: BULK OUT

- NDIS serial port is used for PS data service, including three endpoints.

NDIS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	3	The fourth interface
bInterfaceClass	0xFF	-

NDIS Serial Port		
Field	**Value**	**Description**
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x11	-
bNumEndpoints	3	0x86: INTERRUPT IN
		0x85: BULK IN
		0x04: BULK OUT

- GPS serial port is used for GPS data service, including two endpoints.

GPS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	4	The fifth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x14	-
bNumEndpoints	2	0x87: BULK IN
		0x05: BULK OUT

3.5.2 On Windows 8.0 or Later

The configuration of ME909u-521 module on Windows 8.0 or later is bConfigurationValue=3, and the USB serial configuration is MBIM and GPS.

NOTE

ME909u-521 module can be used only for demo test on Windows 8.0 or later.

- MBIM serial port is used for PS data service on Windows 8.0 or later, which has one control interface including one endpoint, and one data interface including two endpoints.

MBIM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface, control interface
bInterfaceClass	0x02	Communication interface class
bInterfaceSubClass	0x0E	MBIM Port
bInterfaceProtocol	0x00	-
bNumEndpoints	1	0x82: INTERRUPT IN

MBIM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	1	The second interface, data interface
bInterfaceClass	0x0A	Data interface class
bInterfaceSubClass	0x00	-
bInterfaceProtocol	0x02	-
bNumEndpoints	2	0x81: BULK IN
		0x01: BULK OUT

- GPS serial port is used for GPS data service, including two endpoints.

GPS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	2	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x14	-
bNumEndpoints	2	0x83: BULK IN
		0x02: BULK OUT

3.5.3 On Linux/Android

The configuration of ME909u-521 module on Linux/Android is bConfigurationValue=2, and the USB serials sequence is ECM, MODEM, DIAG, PCUI and GPS.

- ECM serial port is used for PS data service, which has one control interface including one endpoint, and one data interface including two endpoints.

ECM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface, control interface
bInterfaceClass	0x02	Communication interface
bInterfaceSubClass	0x06	Ethernet control model
bInterfaceProtocol	0x00	-
bNumEndpoints	1	0x82: INTERRUPT IN
bInterfaceNumber	1	The second interface, data interface

ECM Serial Port		
Field	**Value**	**Description**
bInterfaceClass	0x0A	Data interface
bInterfaceSubClass	0x00	-
bInterfaceProtocol	0x00	-
bNumEndpoints	2	0x81: BULK IN
		0x01: ULK OUT

- MODEM serial port includes three endpoints. ME909u-521 module does not support MODEM serial port to be used for data service.

MODEM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	2	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x10	-
bNumEndpoints	3	0x84: INTERRUPT IN
		0x83: BULK IN
		0x02: BULK OUT

- DIAG serial port is used to debug and capture trace logs, including two endpoints.

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	3	The fourth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x13	-
bNumEndpoints	2	0x85: BULK IN
		0x03: BULK OUT

- PCUI serial port is used to do AT command communication with the host application, including two endpoints.

PCUI Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	4	The fifth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x12	-
bNumEndpoints	2	0x86: BULK IN
		0x04: BULK OUT

- GPS serial port is used for GPS data service, including two endpoints.

GPS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	5	The sixth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x14	-
bNumEndpoints	2	0x87: BULK IN
		0x05: BULK OUT

3.5.4 On Other Operating Systems

Customers need to select the correct module USB interface configuration referring to that configuration model supported by the host system. If the host system does not select one configuration of ME909u-521 module actively, then the ME909u-521 module will enumerate the serials ports as that on Windows XP/7, which means the bConfigurationValue=1.

3.6 USB Interface Descriptors of ME909u-523 Module

3.6.1 On Windows XP/7

The configuration of ME909u-523 module on Windows XP/7 is bConfigurationValue=1, and the USB serials sequence is MODEM, DIAG, PCUI, NDIS and GPS.

NOTE
ME909u-523 module can be used only for demo test on Windows XP/7.

- MODEM serial port includes three endpoints. ME909u-523 module does not support MODEM serial port to be used for data service.

MODEM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x10	-
bNumEndpoints	3	0x82: INTERRUPT IN
		0x81: BULK IN
		0x01: BULK OUT

- DIAG serial port is used to debug and capture trace logs, including two endpoints.

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	1	The second interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x13	-
bNumEndpoints	2	0x83: BULK IN
		0x02: BULK OUT

- PCUI serial port is used to do AT command communication with the host application, including two endpoints.

PCUI Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	2	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x12	-
bNumEndpoints	2	0x84: BULK IN
		0x03: BULK OUT

- NDIS serial port is used for PS data service, including three endpoints.

NDIS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	3	The fourth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x11	-
bNumEndpoints	3	0x86: INTERRUPT IN
		0x85: BULK IN
		0x04: BULK OUT

- GPS serial port is used for GPS data service, including two endpoints.

GPS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	4	The fifth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x14	-
bNumEndpoints	2	0x87: BULK IN
		0x05: BULK OUT

3.6.2 On Windows 8.0 or Later

The configuration of ME909u-523 module on Windows 8.0 or later is bConfigurationValue=3, and the USB serial configuration is MBIM and GPS.

NOTE
ME909u-523 module can be used only for demo test on Windows 8.0 or later.

- MBIM serial port is used for PS data service on Windows 8.0 or later, which has one control interface including one endpoint, and one data interface including two endpoints.

MBIM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface, control interface
bInterfaceClass	0x02	Communication interface class

MBIM Serial Port		
Field	**Value**	**Description**
bInterfaceSubClass	0x0E	MBIM Port
bInterfaceProtocol	0x00	-
bNumEndpoints	1	0x82: INTERRUPT IN
bInterfaceNumber	1	The second interface, data interface
bInterfaceClass	0x0A	Data interface class
bInterfaceSubClass	0x00	-
bInterfaceProtocol	0x02	-
bNumEndpoints	2	0x81: BULK IN
		0x01: BULK OUT

- GPS serial port is used for GPS data service, including two endpoints.

GPS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	2	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x14	-
bNumEndpoints	2	0x83: BULK IN
		0x02: BULK OUT

3.6.3 On Linux/Android

The configuration of ME909u-523 module on Linux/Android is bConfigurationValue=2, and the USB serials sequence is ECM, MODEM, DIAG, PCUI and GPS.

- ECM serial port is used for PS data service, which has one control interface including one endpoint, and one data interface including two endpoints.

ECM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface, control interface
bInterfaceClass	0x02	Communication interface class
bInterfaceSubClass	0x06	Ethernet control model

ECM Serial Port		
Field	**Value**	**Description**
bInterfaceProtocol	0x00	-
bNumEndpoints	1	0x82: INTERRUPT IN
bInterfaceNumber	1	The second interface, data interface
bInterfaceClass	0x0A	Data interface class
bInterfaceSubClass	0x00	-
bInterfaceProtocol	0x00	-
bNumEndpoints	2	0x81: BULK IN
		0x01: BULK OUT

- MODEM serial port includes three endpoints. ME909u-523 module does not support MODEM serial port to be used for data service.

MODEM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	2	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x10	-
bNumEndpoints	3	0x84: INTERRUPT IN
		0x83: BULK IN
		0x02: BULK OUT

- DIAG serial port is used to debug and capture trace logs, including two endpoints.

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	3	The fourth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x13	-
bNumEndpoints	2	0x85: BULK IN

DIAG Serial Port		
Field	**Value**	**Description**
		0x03: BULK OUT

- PCUI serial port is used to do AT command communication with the host application, including two endpoints.

PCUI Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	4	The fifth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x12	-
bNumEndpoints	2	0x86: BULK IN
		0x04: BULK OUT

- GPS serial port is used for GPS data service, including two endpoints.

GPS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	5	The sixth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x01	-
bInterfaceProtocol	0x14	-
bNumEndpoints	2	0x87: BULK IN
		0x05: BULK OUT

3.6.4 On Other Operating Systems

Customers need to select the correct module USB interface configuration referring to that configuration model supported by the host system. If the host system does not select one configuration of ME909u-523 module actively, then the ME909u-523 module will enumerate the serials ports as that on Windows XP/7, which means the bConfigurationValue=1.

3.7 USB Interface Descriptors of ME909s Series Module

This section introduces the USB interface descriptors information of ME909s series (ME909s-120 、ME909s-821 and ME909s-821a) module on different operation systems.

3.7.1 On Windows XP/7

The configuration of ME909s series module on Windows XP/7 is bConfigurationValue=1, and the USB serials sequence is MODEM, DIAG, PCUI, NDIS Ctrl and Serial B.

- MODEM serial port includes three endpoints.

MODEM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x10	-
bNumEndpoints	3	0x82: INTERRUPT IN
		0x81: BULK IN
		0x01: BULK OUT

- DIAG serial port is used to debug and capture trace logs, including two endpoints.

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	1	The second interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x13	-
bNumEndpoints	2	0x83: BULK IN
		0x02: BULK OUT

- PCUI serial port is used to do AT command communication with the host application, including two endpoints.

PCUI Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	2	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x12	-
bNumEndpoints	2	0x84: BULK IN
		0x03: BULK OUT

- NDIS serial port is used for PS data service, including three endpoints.

NDIS Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	3	The fourth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x16	-
bNumEndpoints	3	0x86: INTERRUPT IN
		0x85: BULK IN
		0x04: BULK OUT

- Ctrl serial port is used for eCall service, including two endpoints.

NOTE

User should to send eCall AT commands through this Ctrl port, which will let those eCall AT commands are processed in higher priority.

Ctrl Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	4	The fifth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x06	-
bNumEndpoints	2	0x87: BULK IN
		0x05: BULK OUT

- Serial B serial port is used to capture module logs and always working together with Diag port, including two endpoints.

Serial B Port		
Field	**Value**	**Description**
bInterfaceNumber	5	The sixth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x1B	-
bNumEndpoints	2	0x88: BULK IN
		0x06: BULK OUT

3.7.2 On Windows 8.0 or Later

The configuration of ME909s series module on Windows 8.0 or later is bConfigurationValue=3, and the USB serial configuration is MBIM and GPS.

- MBIM serial port is used for PS data service on Windows 8.0 or later, which has one control interface including one endpoint, and one data interface including two endpoints.

MBIM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface, control interface
bInterfaceClass	0x02	Communication interface class
bInterfaceSubClass	0x0E	MBIM Port
bInterfaceProtocol	0x00	-
bNumEndpoints	1	0x82: INTERRUPT IN
bInterfaceNumber	1	The second interface, data interface
bInterfaceClass	0x0A	Data interface class
bInterfaceSubClass	0x00	-
bInterfaceProtocol	0x02	-
bNumEndpoints	2	0x81: BULK IN
		0x01: BULK OUT

3.7.3 On Linux/Android

The configuration of ME909s series module on Linux/Android is bConfigurationValue=2, and the USB serials sequence is NCM, MODEM, DIAG, PCUI, Ctrl and Serial B.

- ECM serial port is used for PS data service, which has one control interface including one endpoint, and one data interface including two endpoints.

NCM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	0	The first interface, control interface
bInterfaceClass	0x02	Communication interface class
bInterfaceSubClass	0x06	Ethernet control model
bInterfaceProtocol	0x10	-
bNumEndpoints	1	0x82: INTERRUPT IN
bInterfaceNumber	1	The second interface, data interface
bInterfaceClass	0x0A	Data interface class
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x11	-
bNumEndpoints	2	0x81: BULK IN
		0x01: BULK OUT

- MODEM serial port includes three endpoints.

MODEM Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	2	The third interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x10	-
bNumEndpoints	3	0x84: INTERRUPT IN
		0x83: BULK IN
		0x02: BULK OUT

- DIAG serial port is used to debug and capture trace logs, including two endpoints.

DIAG Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	3	The fourth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x13	-
bNumEndpoints	2	0x85: BULK IN
		0x03: BULK OUT

- PCUI serial port is used to do AT command communication with the host application, including two endpoints.

PCUI Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	4	The fifth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x12	-
bNumEndpoints	2	0x86: BULK IN
		0x04: BULK OUT

- Ctrl serial port is used for eCall service, including two endpoints.

NOTE
User should to send eCall AT commands through this Ctrl port, which will let those eCall AT commands are processed in higher priority.

Ctrl Serial Port		
Field	**Value**	**Description**
bInterfaceNumber	5	The sixth interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x06	-
bNumEndpoints	2	0x87: BULK IN
		0x05: BULK OUT

- Serial B serial port is used to capture module logs and always working together with Diag port, including two endpoints.

Serial B Port		
Field	**Value**	**Description**
bInterfaceNumber	6	The seventh interface
bInterfaceClass	0xFF	-
bInterfaceSubClass	0x06	-
bInterfaceProtocol	0x1B	-
bNumEndpoints	2	0x88: BULK IN
		0x06: BULK OUT

3.7.4 On Other Operating Systems

Customers need to select the correct module USB interface configuration referring to that configuration model supported by the host system. If the host system does not select one configuration of ME909s series module actively, then the ME909s series module will enumerate the serials ports as that on Windows XP/7, which means the bConfigurationValue=1.

4 Acronyms and Abbreviations

Acronym or Abbreviation	Expansion
ECM	Ethernet Control Model
GPS	Global Positioning System
MBIM	Mobile Broadband Interface Model
NDIS	Network Driver Interface Specification
PID	Product ID
PS	Packet Switched
USB	Universal Serial Bus
VID	Vendor ID