

OEM-DES-M890/M891/M892-xxx
13.56 MHz OEM RFID Module
Hardware Description

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1 Introduction

1.1 Reference Documents

Command Protocol and API Description: OEM-DES devices Communication Protocol_x.yy_EN.pdf
 Manual of Test/Demo Software: OEM-DES devices Test Software Manual_x.y_EN.pdf

1.2 Key Features

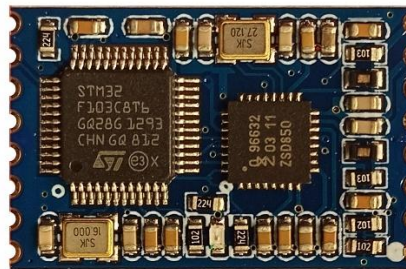
- Adopts ARM MCU solution
- Tiny size, single-face laying components with stamp-hole
- Compliant with ISO14443A/B, ISO15693, ISO18092 Standard
- 5 V power supply, various interface options

1.3 MCU Versions, Core Module Identification

Due to procurement problems on the world market, there are 3 versions of MCU used in the core module:

- STM32F103C6T8 (ST Microelectronics), order code character y = 0
- APM32F103CBT6 (Geehy Semiconductor), order code character y = 1
- GD32F350CBT6 (GigaDevice), order code character y = 2

Core Module with MCU STM32F103C6T8



Core Module with MCU APM32F103CBT6



Core Module with MCU GD32F350CBT6

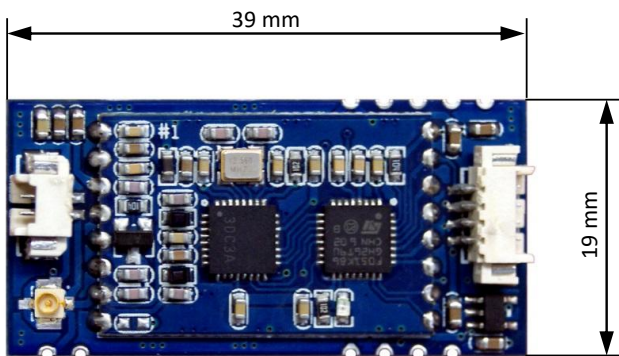


1.4 Versions

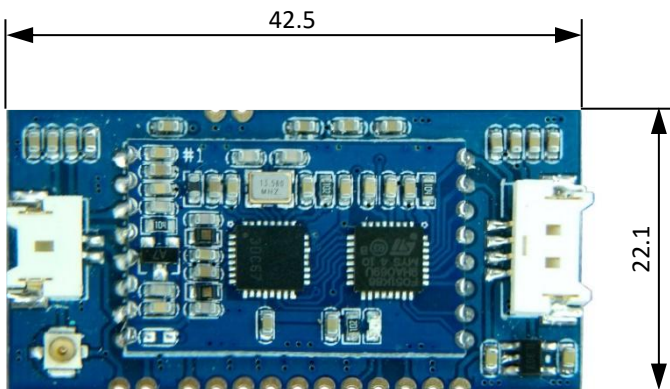
- OEM-DES-M89y-TTL with Pico Blade Connectors
- OEM-DES-M89y-TTL with Panel Mate Connectors
- OEM-DES-M89y-TTL-3V3 with Pico Blade Connectors
- OEM-DES-M89y-TTL-3V3 without connectors, dimensions as with Pico Blade connectors
- OEM-DES-M89y-232 with Panel Mate Connectors
- OEM-DES-M89y-USB with Panel Mate Connectors
- OEM-DES-M89y-USB-HID with Panel Mate Connectors

2 Mechanical Installation

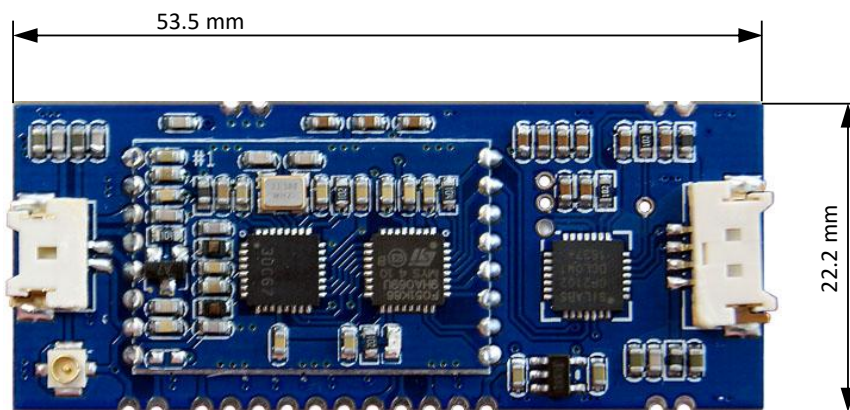
2.1 Dimensions OEM-DES-M89y-TTL with Pico Blade Connectors



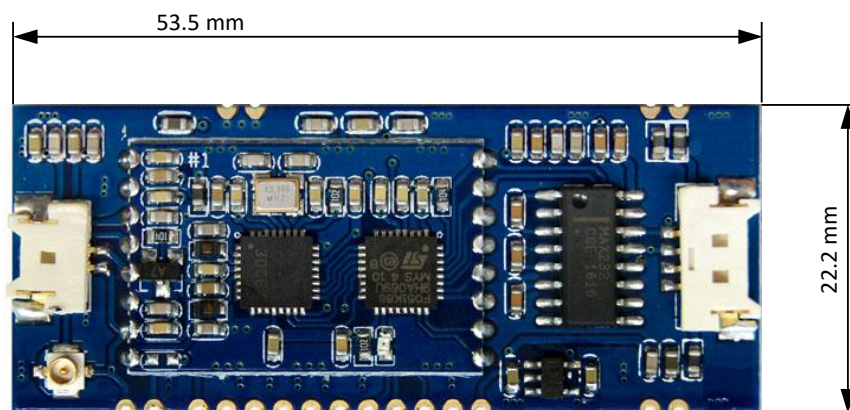
2.2 Dimensions OEM-DES-M89y-TTL with Panel Mate Connectors



2.3 Dimensions OEM-DES-M89y-USB with Panel Mate Connectors

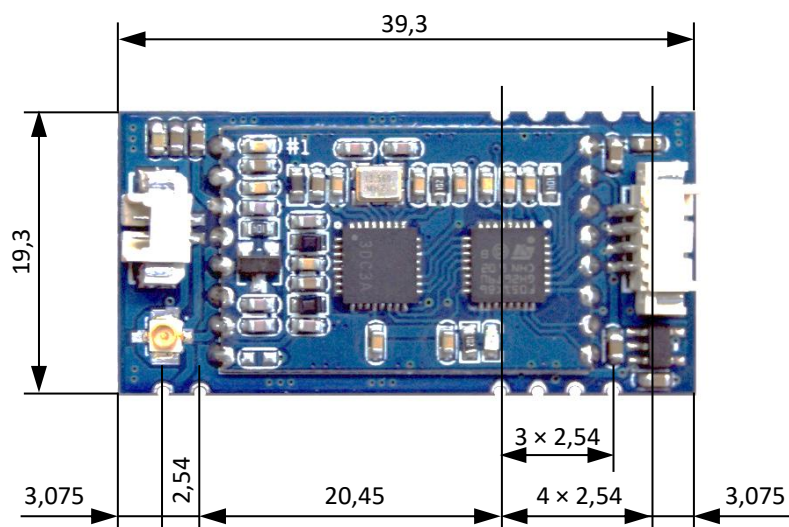


2.4 Dimensions OEM-DES-M89y-232 with Panel Mate Connectors

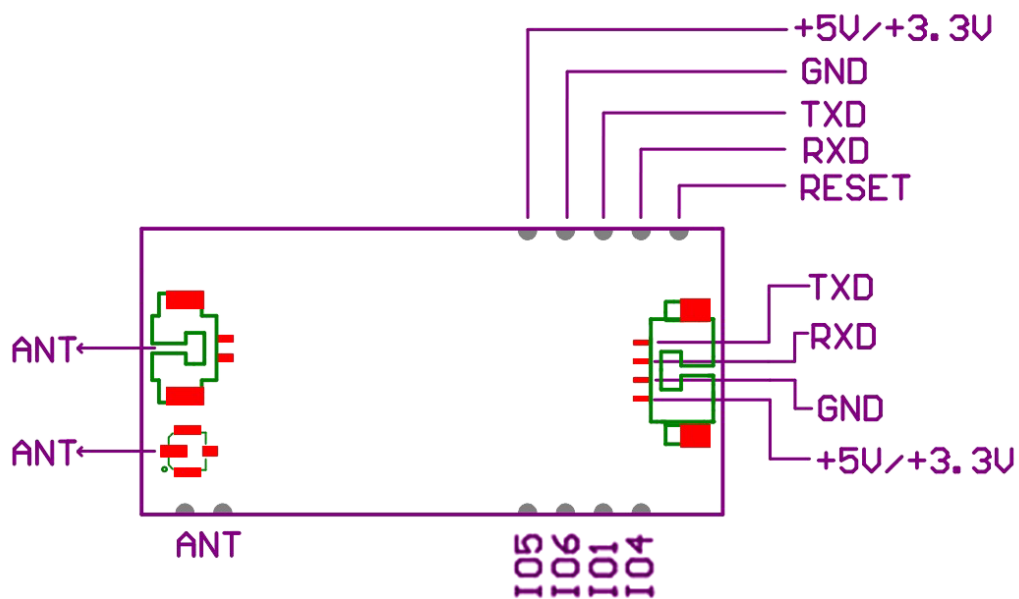


3 Electrical Installation

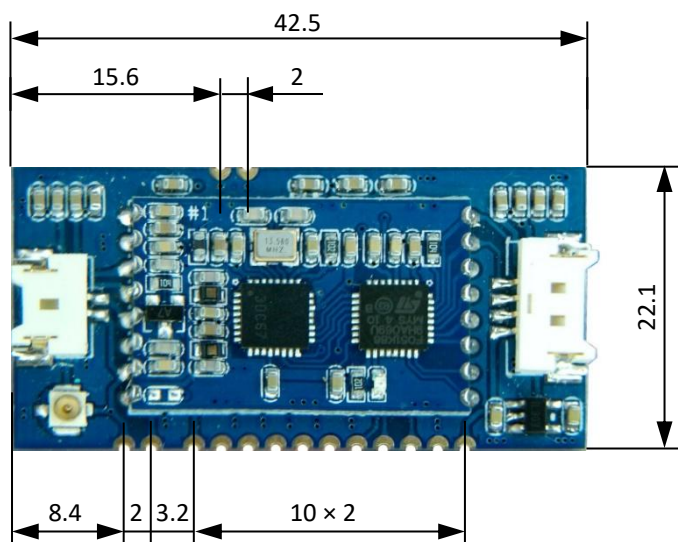
3.1 OEM-DES-M89y-TTL Position of Solder Joints with Pico Blade Connectors



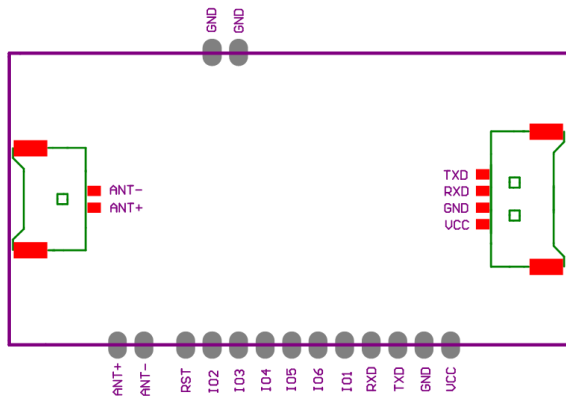
3.2 OEM-DES-M89y-TTL Pinout with Pico Blade Connectors



3.3 OEM-DES-M89y-TTL Position of Solder Joints with Panel Mate Connectors



3.4 OEM-DES-M89y-TTL Pinout with Panel Mate Connectors



Connector J1 (left)

PIN	Name	Description
1	Ant–	
2	Ant+	

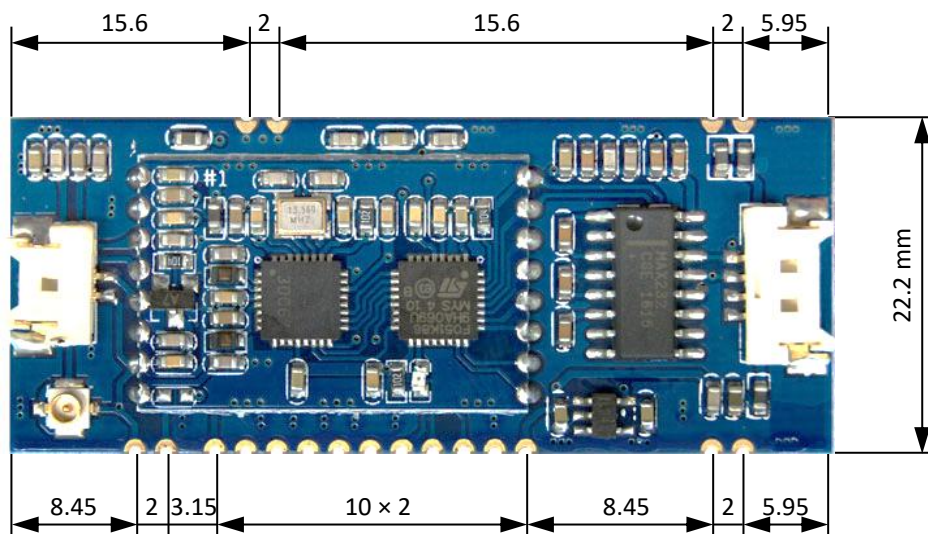
Connector J2 (right)

PIN	Name	Description
1	TxD	UART TxD (yellow)
2	RxD	UART RxD (green)
3	GND	Power supply GND (black)
4	+5V/+3.3V	Power supply +5 or + 3.3 Vdc (red)

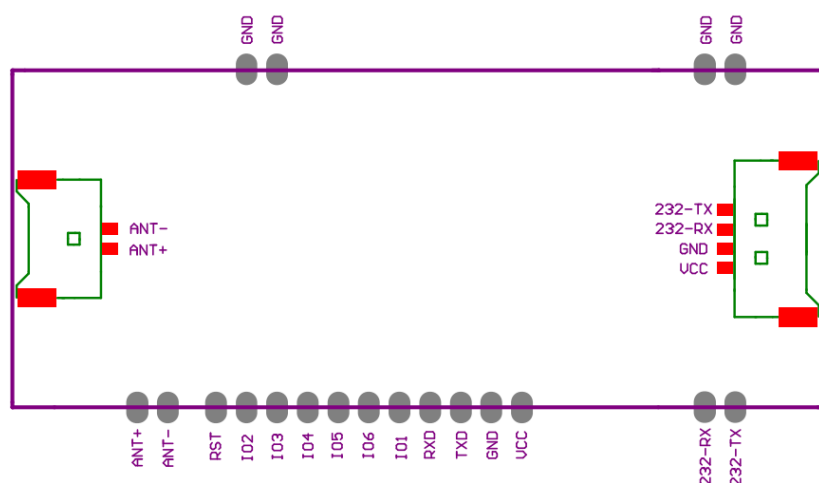
Solder Joints

PIN	Name	Description
1	Antenna+	
2	Antenna–	
3	RST	Low-Power Reset
4	IO2	Output Group for RGB Light Control
5	IO3	Output Group for RGB Light Control
6	IO4	Output Group for RGB Light Control
7	IO5	External LED
8	IO6	External LED
9	IO1	External Buzzer
10	RXD	Internal TTL interface, only for listening
11	TXD	Internal TTL interface, only for listening
12	GND	Power Supply –
13	VCC	Power Supply +

3.5 OEM-DES-M89y- 232 Position of Solder Joints with Panel Mate Connectors



3.6 OEM-DES-M89y- 232 Pinout



Connector J1

PIN	Name	Description
1	Ant-	
2	Ant+	

Connector J2

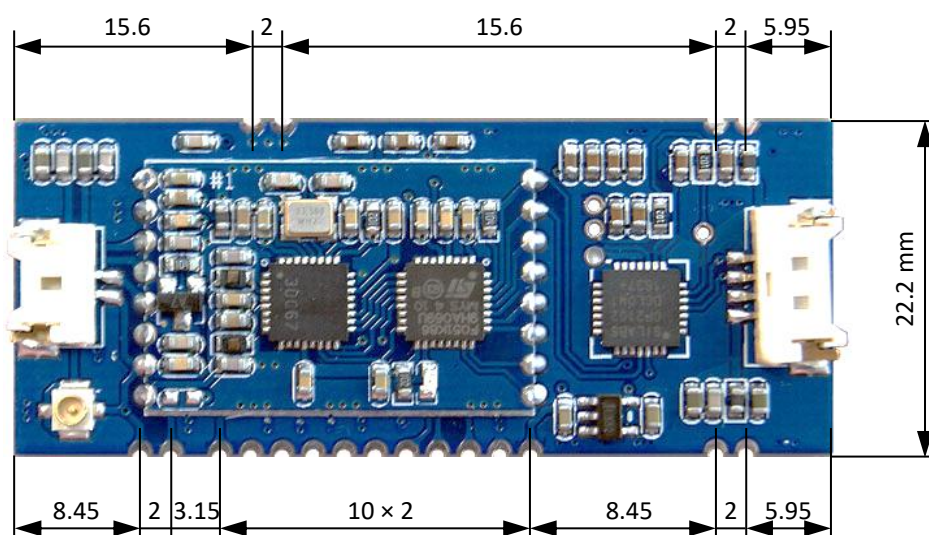
PIN	Name	Description
1	232-TX	UART TxD to RS232 Pin 3
2	232-RX	UART RxD to RS232 Pin 2
3	GND	Power supply GND
4	VCC	Power supply +5 Vdc

Solder Joints

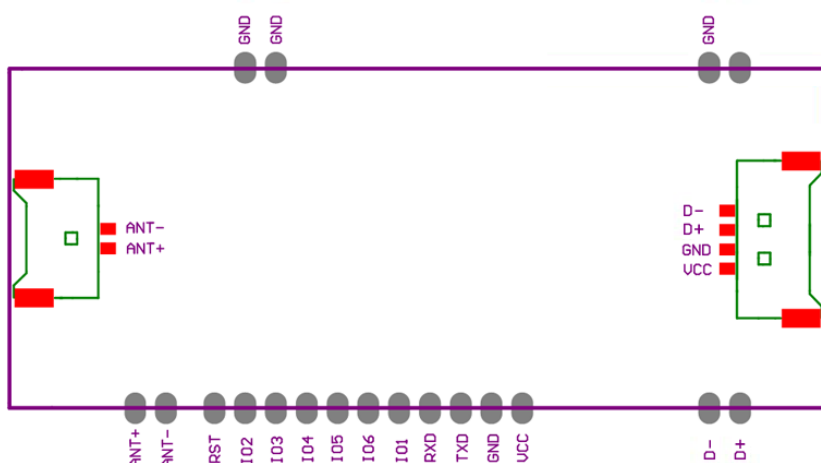
PIN	Name	Description
1	Antenna+	
2	Antenna-	

3	RST	Low-Power Reset
4	IO2	Output Group for RGB Light Control
5	IO3	Output Group for RGB Light Control
6	IO4	Output Group for RGB Light Control
7	IO5	External LED
8	IO6	External LED
9	IO1	External Buzzer
10	RXD	Internal TTL interface, only for listening
11	TXD	Internal TTL interface, only for listening
12	GND	Power Supply –
13	VCC	Power Supply +
14	232-RX	RS232 Receive Data, Input
15	232-TX	RS232 Transmit Data, Output

3.7 OEM-DES-M89y-USB Position of Solder Joints with Panel Mate Connectors



3.8 OEM-DES-M89y-USB Pinout



Connector J1

PIN	Name	Description
1	Ant–	
2	Ant+	

Connector J2

PIN	Name	Description
1	D–	USB Data – (White)
2	D+	USB Data + (Green)
3	GND	Power Supply – (Black)
4	VCC	Power Supply + (Red)

Solder Joints

PIN	Name	Description
1	Antenna+	
2	Antenna–	
3	RST	Low-Power Reset
4	IO2	Output Group for RGB Light Control
5	IO3	Output Group for RGB Light Control
6	IO4	Output Group for RGB Light Control
7	IO5	External LED
8	IO6	External LED
9	IO1	External Buzzer
10	RXD	Internal TTL interface, only for listening
11	TXD	Internal TTL interface, only for listening
12	GND	Power Supply –
13	VCC	Power Supply +
14	D–	USB Data – (White)
15	D+	USB Data + (Green)

4 Notes on Mainboard Integration

4.1 RF Connection

It is recommended to use the U.FL connector on the carrier board.

In case you need another connector

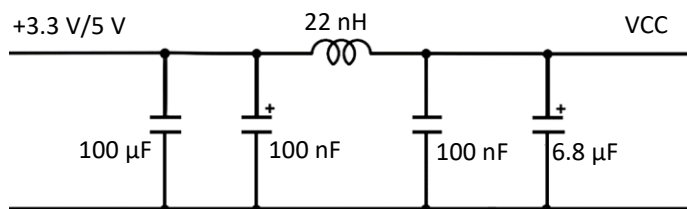
Keep the traces to an RF connection as short as possible.

Do not intermix the supply GND with RF GND. Use the two antenna connectors from the OEM Module.

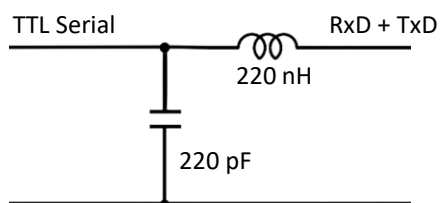
In case you have to fulfil strict EMC regulations, try these filters:

4.2 Power Supply

In addition to the capacitors on the module, you can filter the power supply with an additional C-L-C filter:

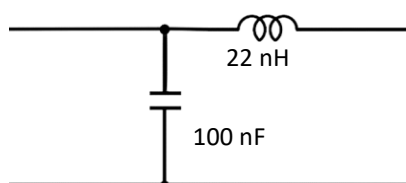


4.3 Serial Interfaces



-3 dB point @ 7 MHz

4.4 Other IOs (LED, Buzzer, Reset, etc.)



-3 dB Point @ 4.4 MHz

4.5 Reset Pin

Pull up the reset pin with a resistor of app. 10 kOhms to positive power supply voltage.

5 Technical Data

Other functions and details to be continued and upgraded.

Electrical Specifications	
Power Supply	5 Vdc (3.3 Vdc on request)
Power Consumption	< 100 mA, standby current < 1 mA (low power mode)
Operating Frequency	13.56 MHz
Baudrate	9600...115200 bit/s
Antenna	external, U.FL, Molex connector and solder joints
Reader IC	NXP CLRC 663
RF TX Speed	up to 848 kBd
Interfaces	UART (TTL or RS232), USB VCP, HID* The TTL is not 5 V tolerant!
Connectors	Please use the photos in chapters 2 + 3 to determine the type of connectors you need: Molex PicoBlade Series, 53261 PCB connector, 51021 cable connector Molex PanelMate Series, 53780 PCB connector, 51146 cable connector

Mechanical Specifications OEM-DES-M890-TTL with Pico Blade Connector	
Dimensions	39 × 19 × 4,5 mm
Weight	5 g
Material	FR4, blue

Mechanical Specifications OEM-DES-M890-TTL with Panel Mate Connector	
Dimensions	42,5 × 22.1 × 3.7 mm
Weight	5 g
Material	FR4, blue

Mechanical Specifications OEM-DES-M890-USB; -232 with Panel Mate Connector	
Dimensions	53,5 × 22.2 × 5 mm
Weight	7 g
Material	FR4, blue

Environmental Conditions	
Operating Temperature	-20 °C ... +80 °C
Storage Temperature	-40 °C ... +85 °C
Humidity	up to 95 %, non-condensing
MTBF	200'000 h

Supported Standards / Tags	
ISO 14443 A and compatible	Read/write: MIFARE® Classic Mini / 1K /4K, MIFARE Ultralight®, MIFARE Ultralight® C, MIFARE® DESFire® EV1, MIFARE® Smart MX, MIFARE® Plus S / X, MIFARE® Pro X, NTAG 21x Read UID only: Read UID only of all other ISO14443A RFID tags
ISO 14443 B and compatible	SRI4K, SR1X4K, AT88RF020, 66CL160S, SR176
ISO 15693 and compatible	EM4135, EM4043, EM4x33, EM4x35, I-Code SLI / SLIX, M24LR16/64, TI Tag-it HF-I, SRF55Vxx (my-d vicinity)

Applicable Standards	
EMC	EN 301489-1:2012-04 (v1.9.21)
	EN 301489-3:2013-12 (V1.6.1)
Radio Regulation	EN 300330-1:2015-08 (V1.8.1)
	EN 300330-2:2015-08 (V1.6.1)
Safety	EN 60950-1:2014-08
	EN 62369-1:2010-03
	EN 50364:2010-11
RoHS 2	EC Guideline 2011/65/EU and amendment 2015/863
	EN 50581:2012 (valid until 2024-07-07)
	EN 63000:2018
REACH	EU Guideline 1907/2006, updated by 2018/2005/EU
Certificates	FCC, CE

SDK Information	
Supported OS by Silabs USB VCP Driver	Windows 7/8/8.1/10 (v6.7.3)
	Windows XP/Server 2003/Vista/7/8/8.1 (v6.7)
	Windows 2K (v6.3a)
	WinCE (5.0, 6.0)
	Macintosh OSX (v4)
	Linux (3.x.x., 2.6.x)
	Android 4.2
Supported OS	Windows XP, Vista, 7, 8, 8.1, 10
Supported Languages	Binary command protocol, VS2005 C++
Demo Software	Windows

* Human Interface Device