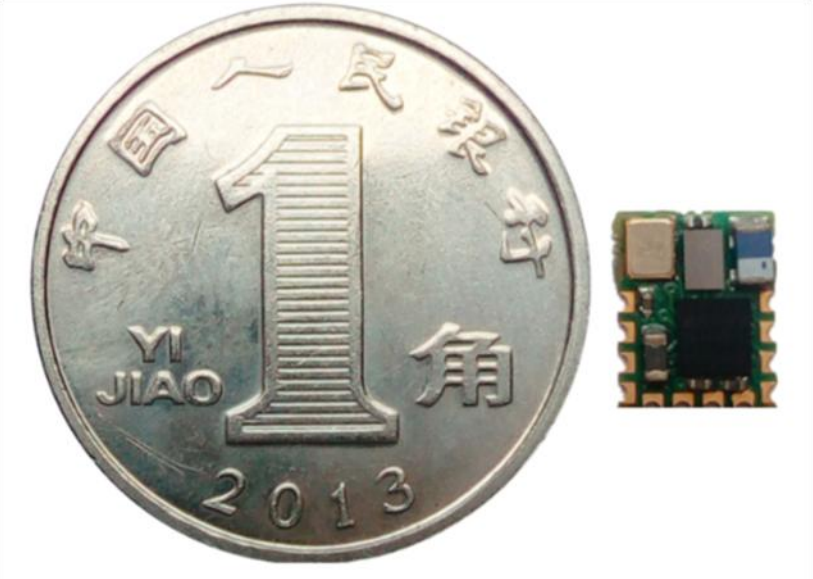
HJ-580XP

ultra-low power Bluetooth module, based on Dialog DA14580

Date Sheet version: V8.7



CATALOG

1 Version History

Table 1-1 Revision history

No.	Version number	Release time	Reviser	Checker	Description
1	V8.3	20190704	ZDY	LMY	First edition
2	V8.30	20190705	ZDY	LMY	Nordic change to Dialog, at Table 6-1
3	V8.4	20190730	ZDY	LMY	Update chapter definitions
4	V8.5	20190806	ZDY	LMY	Update pin definition, P15, P00 and P06
5	V8.6	20210329	LMY	LJH	Update pin definition ,P14
6	V8.7	20231114	FJW	LMY	Update pages

2 Overview

2.1 Features

●Power supply: 2.5V(Cold boot, the minimum voltage for normal operation is 1.8V)~3.7V
●GPIO maximum number: 8
●On-board PCB antenna
●Optional 64K external EEPROM, can be used to save data or programs(SDA=P02, SCL=P03)

●Function
- Embedded Bluetooth low energy protocol stack and GATT service
- BLE supported master-slave integration
- Supported WeChat, MiSDK. You also can develop your own firmware and download to the unprogrammed module.

●RF Features
- Operating Frequency is 2.4GHz, support ISM free Frequency band
- Maximum Transmit Power: 0dBm
- High Receive sensitivity: -93dBm
- On the open land, the wireless signal can spread more than 10 metres and less than 40 metres.

●Low Power Dissipation
- Dormant current < 2uA
- One second broadcast current: 11.5uA
- Two second broadcast current: 6.3uA

●Size: 5.3mm*6.6mm(Built-in antenna inside)
●Welding pad with stamp hole pattern, pad spacing: 1.0mm
●Weight: 0.116g
●Operating temperature range: -40~85℃
●ROHS compliant

3 Hardware specification

3.1 Package and Dimensions

Size: 5.3mm*6.6mm, 13 welding feet, pad spacing is 1.0mm. Detailed dimensions are shown in the figure 3-1, 3-2.

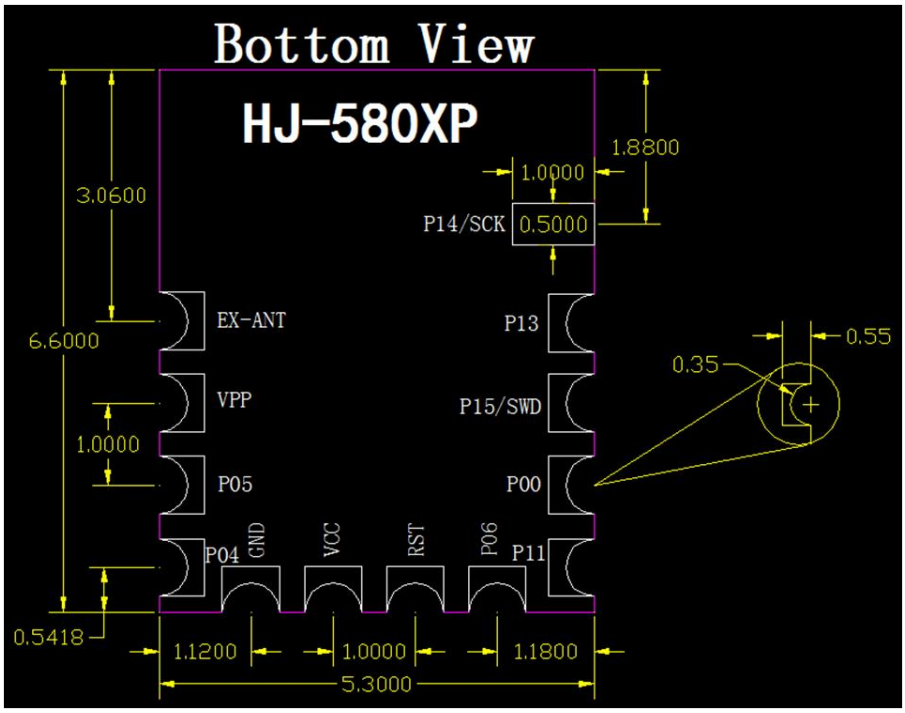


Figure 3-1 Dimensions picture

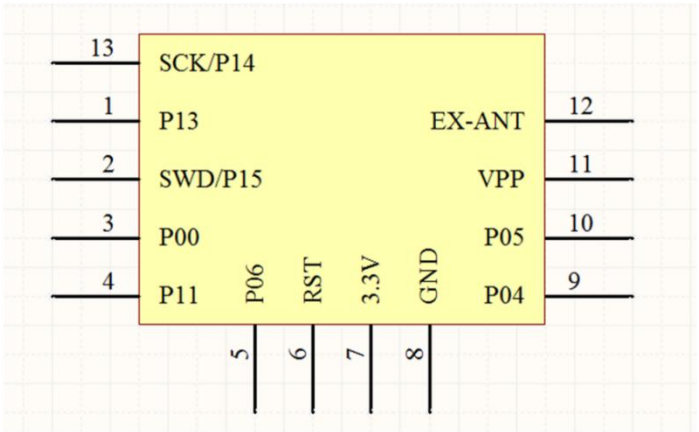


Figure 3-2 Pin diagrams

3.2 Pin Definition

Table 3-1 Pin definition table

Pin	Name	Typ.	Description	Remarks
1	Connect flag (P13)	IO	Connected=Low(0),Disconnected=High(1)	Can be customized for other functions
2	Master-slave mode select （P15）	IO/SWD	Select the master mode or slave mode according to this pin's status during power-on. When input low, the module enter master mode. When input high, the module enter slave mode. This pin is in the pull-up input state during power-on and is in the NC state after power-on. When this pin is in NC state, the module enter slave mode.	Can be customized for other functions
3	Config mode Select （P00）	IO	After 100ms power-on delay, the pin function to configuration mode: the external input is low to the configuration mode, and the high is the Uart transparent transmission mode (it must be valid when the Uart RX enable (P22) is input low.) When this pin is in NC state, the module enter the Uart transparent transmission mode. This pin is input pull-up by default.	Can be customized for other functions
4	APP data ready send flag （P11）	IO	After receiving APP data by mobile phone, the module will first pull the pin=low(0), for about 20ms delay, the data will be output from the serial port TX pin,When send completed, the pin will automatically output high(1).	Can be customized for other functions
5	Uart RX enable (P06)	IO	When the external serial data needs to be sent to the BLE module, you must first drive the pin=low(0) and ensure the serial port receiving enable, and then send the data to the serial port after pulling down for at least 5ms. (If you do not consider power consumption, you can pull this pin=low(0) or connect to GND.) After the transmission is	Can be customized for other functions

			completed, pull the pin high to save power. When this pin is in NC state, the serial port receiving function is disabled when the module is powered on. This pin is input pull-up by default.	
6	RST	IO	The DA14580 RESET Pin,if the pin is drive by high(1),will reset the DA14580; High is active.	If this pin not used,please connect the pin to GND or keep it float.
7	VCC	Power In	POWER INPUT PIN	Range = 2.5V - 3.7V
8	GND	Power Ground	GND	
9	BLE TX (P04)	IO	BLE Uart TX pin	Can be customized for other functions
10	BLE RX (P05)	IO	BLE Uart RX pin	Can be customized for other functions
11	VPP	OTP Program Power	Please keep it float	
12	EX-ANT	RF out	DA14580 RF OUTPUT pin	
13	P14/SCK	IO/SCK	DEBUG SWCLK	Can be customized for other functions

3.3 Internal Structure

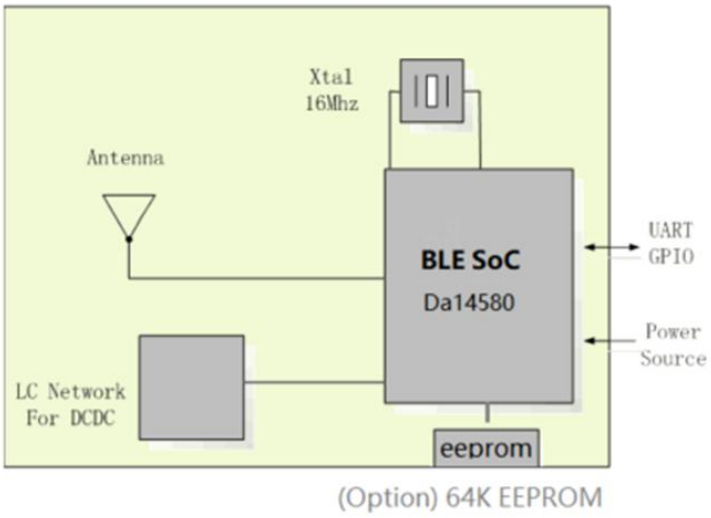


Figure 3-3 HJ-580XP internal structure frame

3.4 Additional functions

HJ-580XP optionally adds 64K EEPROM memory, it can be used to store some parameters, use as OTA storage, etc. If there is any need, please contact us. Thank you.

3.5 Reference Design

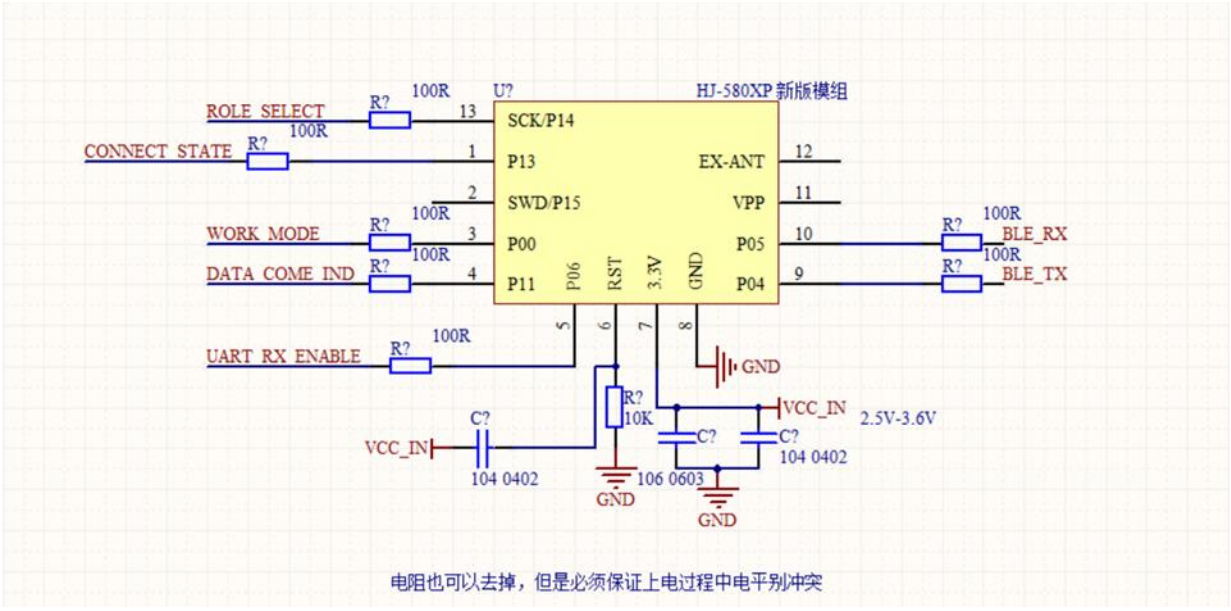


Figure 3-4 HJ-580XP Reference design drawings

Tips: A.Unneeded pins can be suspended for handling. B.RST pin should be connected according to the diagram if conditions permit, externally add a 105 capacitor to Pin7, then a 1K-10K resistor is connected to GND. If the PCB space is really not available, RST can be suspended for handling or directly connected to GND.

3.6 Matters needing attention in the use of products

A. The module should not be placed in a metal-based enclosure. If a metal enclosure is required, the antenna must be taken out.

B. Among the products that need to install this wireless module, some metal materials such as screws, inductors, etc. should be kept away from the RF antenna part of the wireless module.

C. On the wireless module antenna, Do not place other components. Because other components can degrade wireless performance.

D. The wireless module should be placed on the four sides of the motherboard as much as possible. The antenna part should be close to the side or corner of the motherboard. The motherboard PCB under the module antenna should be hollowed out with the keepout layer. If the request cannot be hollowed out, no copper or trace is allowed under the antenna. Otherwise it will affect RF performance.

E. Please pay attention to the pin diagram for all pins. Please pay attention to the IO mode and status of the IO connected to it.

F. GND must be sound grounding.

G. It is recommended that magnetic beads or inductance filters be applied to the input power supply.

4 Electrical Parameters

4.1 Absolute Maximum Ratings

Table 4-1 Absolute maximum ratings

Parameter	MIN	MAX	Unit
Power Supply Voltage (VCC)	2.5	3.8	V
IO Supply Voltage	0	VCC	V
Vpp(OTP Program Voltage)	6.6	6.8	V
Operating Temperature	-40	+85	℃
Storage Temperature	-40	+85	℃

4.2 Recommended Operating Conditions

Table 4-2 Recommended operating conditions

Parameter	MIN	TYP	MAX	Unit
Power Supply Voltage (VCC)	2.6	3.3	3.7	V
Vpp(OTP Program Voltage)	6.6	6.7	6.8	V
IO Supply Voltage	0	3.3	3.4	V
Dormant working current		<2.0		μA
Maximum Operating Current		4.8		mA
Operating Temperature	-40	+25	+85	℃

4.3 I/O DC Characteristics

Table 4-3 I/O DC Characteristics

I/O Pin	Driving Capability	MIN	MAX	Unit
Input low voltage		0	0.4	V
Input high voltage		0.7	VCC	V
Output low voltage	4.8mA	0	0.6	V
Output high voltage	4.8mA	3.3	VCC	V

4.4 RF Features

Table 4-4 RF Features

Attribute	Value	Remarks
Modulation	GFSK	
Frequency range	2.402 ~ 2.480GHz	Bandwidth: 2MHz
Number of channels	40	
Air speed	1Mbps	
RF Port Impedance	50Ω	
Transmit Power	MAX: +0dBm	
TX Current consumption	TYP: 4.8mA	
RX Current consumption	TYP: 5mA	
Receive sensitivity	TYP: -91dBm, MAX: -93dBm	
Antenna	Onboard PCB Antenna	

4.5 Power Dissipation

Table 4-5 Power Dissipation

Test conditions	TYP	Unit
Dormancy mode	1.5	μA
20ms Interval Broadcasting in Slave Mode	51.5	μA
1S Interval Broadcasting in Slave Mode	11.5	μA
20ms Connection Gap Holding Connection in Slave Mode	170	μA
Scanning in Host Mode	3.05	mA
20ms Connection Gap Holding Connection in Host Mode	175	μA

5 Reflow Soldering Information

Reflow soldering is recommended for welding.

HJ-580XP module use high temperature resistant materials, Manufacturing by Lead-free Process. The maximum temperature resistance is 265℃. Ten continuous reflow soldering has no effect on properties and strength. Specific parameters as shown in Table 5-1.

Table 5-1 Reflow soldering parameters

Parameter	Value
Features	Lead-free process
Average ramp up rate(T_{SMAX} to Tp)	3℃/sec. max
Temperature Min($T_S$min) Temperature Max(TSmax) Preheat time (Min to Max) (tS)	150℃ 200℃ 80~100secs.
Peak Temperature (T_P)	250±5℃
Ramp-down Rate	6℃/sec. max
Time 25℃ to Peak Temp (T_P)	8 min. max

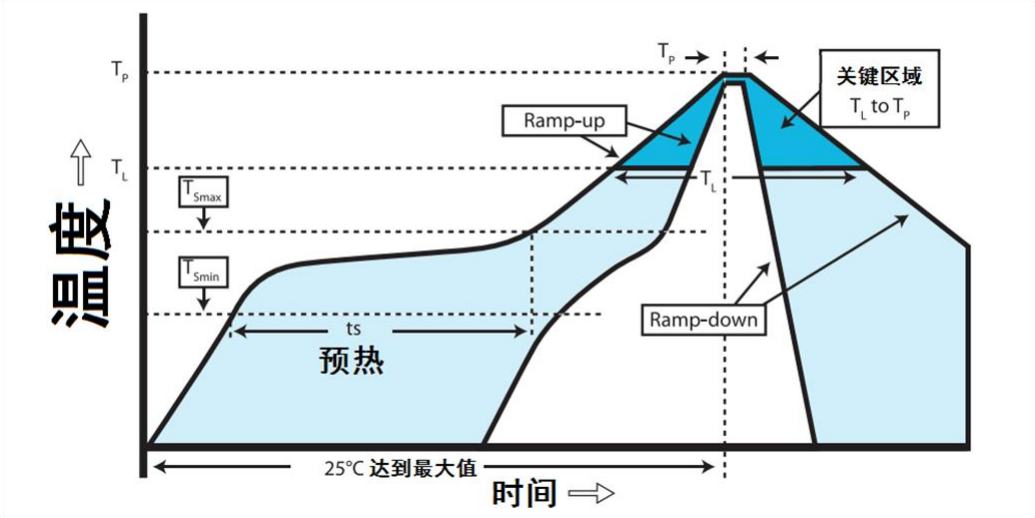


Figure 5-1 Temperature Curve of Reflow Welding

6 Notices for Ultrasound Welding

Warning: Please carefully consider using ultrasonic welding technology. If it is necessary to use ultrasonic welding technology, please use 40KHz high frequency ultrasound welding technology. Keep the module away from the ultrasonic soldering line and the fixing column during the design method to prevent damage to the module!

For specific ultrasonic welding matters, please contact our company for technical consultation.

7 Supply Information

7.1 Model Definition

Table 7-1 Model Definition

Type	Model	Description
Standard Edition of uart transparent transmission	HJ-580XP_SPPv2	Include UART port transparent transmission firmware, the firmware module is a bridge between the Bluetooth device or the mobile phone and the MCU. The Customer does not need to understand the BLE protocol stack, and control the UART port command operation and the UART port data, and the operation is simple, short Development cycle to speed up product launch.
Custom version	HJ-580XP_CUSv2	This version supports custom firmware, the customer proposes functions according to the product requirements, and we will customize the module with the special version firmware to supply the customer.
MI profile Version	HJ-580XP_MICv2	This version of the firmware is similar to the "Custom Version", but it include Xiaomi MISDK certification protocol, other functional requirements are also customized according to customer requirements.
WeChat Edition of uart transparent transmission	HJ-580XP_WSPPv2	This version of the firmware adds the WeChat serial port transparent transmission function based on the "Standard Edition of uart transparent transmission" version. The external GPIO can select the WeChat data transmission and reception method.
Customer development Version	HJ-580XP_EMP	This version of the module has no built-in firmware, customer can develop their own firmware according to the Dialog official chip data sheet and support documents, and only need to provide firmware for us to burn.

7.2 Packaging method

Packaging with tapes and reel. Sealed with chip-level anti-static aluminum foil bag, each bag contains desiccant, use industrial grade vacuum machine to ensure airtight, moisture-proof, waterproof and dustproof (IP65). The actual packing effect is shown in Figure 7-1.

Figure 7-1 External Packing Image

All packages will be labeled with goods information. All packages will be marked with the cargo information, including ROHS and anti-static signs. The production batch information in the item number is 15 bits.

TangShan HongJia Electronic Technology Co., Ltd.

HJ-580XP_SPPv2

Pb Free Reflow(260℃)

DATE CODE:P16aI15bS17c001

QTY:500PCS SEAL DATE:20170504

Remarks: P16a I15b S17c001 represents PCB production in January 2016, IC production in February 2015, and SMT patch in the first time in March 2017.

Figure 7-2 Label Sample Diagram

8 Appendixes

8.1 CE(Europe)

AGC®
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Recognized by China National Accreditation Service for Conformity Assessment & Taiwan Accreditation Foundation

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EU-RED Certificate of Conformity

Radio Equipment Directive (RED) 2014/53/EU

Registration No.	AGC00637190125E0
Applicant	Tangshan HongJia electronic technology co., LTD. 352 No. 2 # building power springs in Qianxi County, Tangshan City, Hebei Province
Product Designation	HongJia electronic HJ-580(LA)XP Bluetooth BLE4.2 ultra-low power module
Brand Name	HongJia
Model / Series Models	HJ-580XP, HJ-580LA
Manufacturer	Tangshan HongJia electronic technology co., LTD. 352 No. 2 # building power springs in Qianxi County, Tangshan City, Hebei Province

Requirement	Applied Standards	Document Evidence	Result
Art.3.1(a) Health	EN 62479:2010	Test Report: AGC00637190125EH02	Conform
Art.3.1(a) Safety	EN 60950-1:2006+A11:2009 +A1:2010+A12:2011+A2:2013	Test Report: AGC00637190125ES01	Conform
Art.3.1(b) EMC	Drafr EN 301 489-1 V2.2.0 Drafr EN 301 489-17 V3.2.0	Test Report: AGC00637190125EE01	Conform
Art.3.2 Radio	EN 300 328 V2.1.1	Test Report: AGC00637190125EE11	Conform

CE

Signed by Quality Manager
Issue Date: Jan. 17, 2019

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Note: This certificate is part of the full test report(s) and should be used in conjunction with it.
Version: 2.0

8.2 BQB(Bluetooth Organization SIG)

Bluetooth

Project Details

Project Name	HongJia electronic HJ-580(LA)(P Bluetooth BLE4.2 ultra-low power module (HJ-580XP)
Referenced Qualified Design(s)	83565 83573 56907
Listing Date	2019-01-23
Declaration ID	D043311

Product Listing(s)

Name	Website	Category	Publish Date	Model Number	Description
HongJia electronic HJ-580(LA)(P Bluetooth BLE4.2 ultra-low power module		Unique Products	1/23/2019 12:00:00 AM	HJ-580XP	BLE4.2 small size and ultra-low power module based Dialog DA14580
HongJia electronic HJ-580(LA)(P Bluetooth BLE4.2 ultra-low power module		Unique Products	1/23/2019 12:00:00 AM	HJ-580LA	BLE4.2 small size and ultra-low power module based Dialog DA14580

Member Company	Tangshan HongJia electronic technology co., LTD.

Declaring Member Contact / Listing Contact Person

Name	Ying Liu
Address	352 No. 2 # building power springs in Qianxi County, Tangshan City,Hebei Province
City	Tangshan
State	Hebei
Country	China
Postal Code	064300

Complete the Project and Submit Product(s) for Qualification

By typing my name or other symbol of my signature into the "Signature" field below, I agree on behalf of Tangshan HongJia electronic technology co., LTD. ("Company") to Bluetooth Launch Studio Terms of Use, and I make the following representations and warranties personally and on behalf of Company. The following representations and warranties, together with all project information and the Bluetooth Launch Studio Terms of Use, are the Supplier Declaration of Conformity and Declaration of Compliance described in the Program Reference Document (PRD) and Declaration Process Document (DPD).

- ☑ I am authorized by Company to submit all of the information included in this project and all information is complete and accurate.
- ☑ Company does not, by its governing documents or other applicable law, require more than one signatory, a stamp or seal, or a witnessed signature to be legally bound.
- ☑ I agree on behalf of Company to contract in English and electronically, and adopt the characters and symbols input in the signature field below as my signature, with the same effect as an ink signature.
- ☑ The products included in this project are owned and distributed by Company under a Product name that identifies Company as the source of the Product. Company has the right to use and reference all Qualified Designs referenced in the project, and the products and referenced Qualified Designs comply with the version of the Bluetooth Specification identified in the project submission.
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