



D73-nRF52840C08 Product Specification

nRF52840 2.4GHz BLE4.2/5.0

Low Energy Bluetooth Module



深圳市大熊智能有限公司

Shenzhen Daxiong Intelligent Co., Ltd.



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Notes

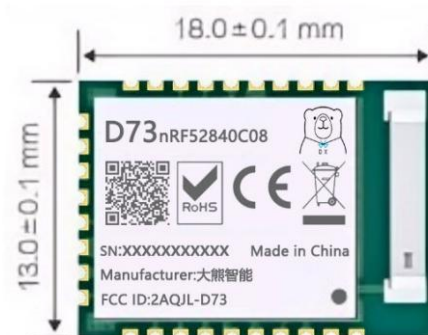
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Chapter 1 Product Overview

1.1 Product Introduction

D73-nRF52840C08 is a compact, low-power Bluetooth module developed by Daxiong Intelligent. It adopts the original imported nRF52840 RF chip from Nordic, supporting BLE 4.2 and BLE 5.0. The chip integrates a high-performance ARM Cortex-M4 core, adopts a 32MHz industrial-grade crystal oscillator, and is equipped with abundant peripheral resources including UART, I2C, SPI, ADC, DMA, PWM, etc. Most I/O ports of the nRF52840 chip are led out; please refer to the pin definition for details to facilitate multi-dimensional secondary development by users.



D73-nRF52840C08 is a hardware platform without factory preloaded firmware, requiring users to conduct secondary development. For chip specifications of nRF52840, please refer to the official Datasheet. The module fully maximizes the RF performance of the chip.

1.2 Features & Functions

- Ultra-small size: only 13×18mm
- Supports BLE 4.2 and BLE 5.0
- Maximum transmit power 6mW with multi-level software adjustment
- Compliant with global license-free ISM 2.4GHz frequency band
- Built-in high-performance low-power ARM® Cortex®-M4 processor
- Abundant storage resources: 1024KB FLASH, 256KB RAM
- Supports 1.7~5.5V power supply; optimal performance guaranteed at supply voltage $\geq 3.3V$
- Industrial-grade design, supports long-term operation at $-40^{\circ}\sim+85^{\circ}C$
- Integrated ceramic antenna, no external antenna required
- Maximum communication distance up to 120m under ideal conditions



1.3 Application Scenarios

- Smart home & industrial sensors
- Security systems, positioning systems
- Wireless remote controls, drones
- Wireless game controllers
- Medical healthcare products
- Wireless audio, wireless earphones
- Automotive industry applications

Chapter 2 Specification Parameters

2.1 Absolute Maximum Ratings

Parameter	Performance		Remarks
	Min	Max	
Supply Voltage (V)	0	5.5	Permanent module damage if exceeding 5.5V
Blocking Power (dBm)	–	10	Low probability of damage for short-distance use
Operating Temperature (°C)	–40	+85	Industrial grade



2.2 Operating Parameters

Parameter		Typical			Remarks
		Min		Max	
Operating Voltage (V)		1.7	3.3	5.5	Output power guaranteed at $\geq 3.3V$
Communication Level (V)			3.3		Risk of burnout when using 5V TTL
Operating Temperature (°C)		-40	-	+85	Industrial-grade design
Operating Frequency Band (MHz)		2360	-	2500	ISM band compliant
Transmit Current	TX only run current (DC/DC, 3 V) PRF = +8 dBm		17.05		mA
	TX only run current (DC/DC, 3 V) PRF = +4 dBm		12.68		mA
	TX only run current (DC/DC, 5 V, REG0 out = 3.3V) PRF = 0 dBm		7.25		mA
	TX only run current (DC/DC, 3 V) PRF = 0 dBm		7.63		mA
	TX only run current (DC/DC, 3 V) PRF = +8 dBm		17.05		mA
receive current	RX only run current (DC/DC, 3V) 1 Mbps / 1 Mbps BLE		7.71		mA
	RX only run current (DC/DC, 3V) 2 Mbps / 2 Mbps BLE		8.27		mA
Transmit Power (dBm)		7	8	9	dBm
Receiver Sensitivity (dBm)		-103dBm @ BLE 125kbps			Long-range mode
		-95dBm @ BLE 1Mbps			

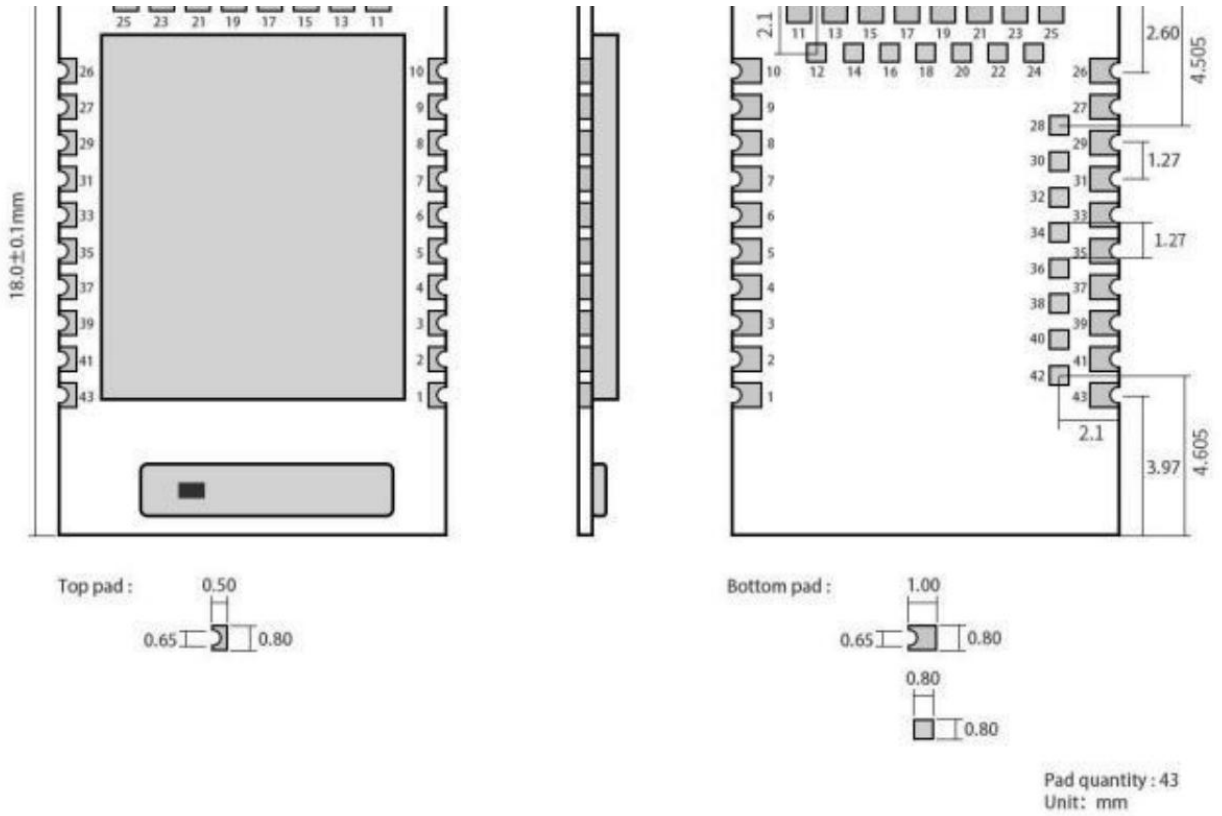


2.3 Main Parameter Summary Table

Main Parameter	Description	Remarks
Reference Communication Distance	120m	Clear open space, height 2.5m, air rate 1Mbps
Crystal Oscillator Frequency	32MHz/32.768KHz	32.768KHz crystal requires external connection
Supported Protocols	BLE 4.2/5.0	
Package Type	SMD SMT	
Pin Pitch	1.27mm	Stamp hole pins
Main IC Model	nRF52840-QIAAC0/aQFN™ 73	
FLASH Capacity	1024KB	
RAM Capacity	256KB	
Core Processor	ARM® Cortex® -M4	
Outline Dimension	13*18mm	
Antenna Type	Integrated Ceramic Antenna	Equivalent impedance -50Ω



Chapter 3 Mechanical Dimensions & Pin Definition





Pin No.	Pin Name	Corresponding Chip Pin	Direction	Pin Function
1	P1.11	B19	General I/O	Refer to official chip datasheet
2	P1.10	A20	General I/O	Low-frequency I/O, standard driver
3	P0.03	B13	General I/O	Analog input 1, low-frequency I/O, standard driver
4	AI4	B11	General I/O	Analog input 4
5	GND	–	–	Common ground, power reference ground
6	P1.13	A16	General I/O	Low-frequency I/O, standard driver
7	AI0	A12	General I/O	Analog input 0, low-frequency I/O, standard driver
8	AI5	A10	General I/O	Analog input 5, low-frequency I/O, standard driver
9	AI7	A8	General I/O	Analog input 7, low-frequency I/O, standard driver
10	AI6	B9	General I/O	Analog input 6, low-frequency I/O, standard driver
11	XL1	D2	General I/O	32.768kHz crystal connection pin
12	P0.26	G1	General I/O	Refer to official chip datasheet
13	XL2	F2	General I/O	32.768kHz crystal connection pin
14	P0.06	L1	General I/O	Refer to official chip datasheet
15	AI3	K2	General I/O	Analog input 3
16	P0.08	N1	General I/O	Refer to official chip datasheet
17	P1.09	R1	General I/O	Refer to official chip datasheet
18	AI2	J1	General I/O	Analog input 2
19	VCC	–	–	Power supply input
20	P0.12	U1	General I/O	Refer to official chip datasheet
21	GND	–	–	Power reference ground
22	P0.07	M2	General I/O	Refer to official chip datasheet
23	VDH	VDDH	–	High-voltage power supply
24	GND	–	–	Power reference ground
25	DCH	DCCH	–	DC/DC converter output
26	RST	P0.18/RESET	General I/O	QSPI/CSN / external reset pin
27	VBS	VBUS	–	USB 5V input, for USB 3.3V regulator
28	P15	AD10	General I/O	Refer to official chip datasheet



Pin No.	Pin Name	Corresponding Chip Pin	Direction	Pin Function
29	D-	D-	–	USB differential data negative
30	P17	AD12	General I/O	Refer to official chip datasheet
31	D+	D+	–	USB differential data positive
32	P0.20	AD16	General I/O	Refer to official chip datasheet
33	P0.13	AD8	General I/O	Refer to official chip datasheet
34	P0.22	AD18	General I/O	QSPI interface
35	P0.24	AD20	General I/O	
36	P1.00	AD22	General I/O	Refer to official chip datasheet
37	SWD	SWDIO	–	Serial debug data pin
38	P1.02	P1.02	General I/O	Refer to official chip datasheet
39	SWC	AC24	–	Serial debug clock pin
40	P1.04	U24	General I/O	Low-frequency I/O, standard driver
41	NF1	L24	General I/O	NFC input pin
42	P1.06	R24	General I/O	Low-frequency I/O, standard driver
43	NF2	J24	General I/O	NFC input pin



Chapter 4 Development & Usage

No.	Key Item	Precautions
1	Firmware Flashing	1. The module integrates an ARM microcontroller; firmware download must use J-LINK debugger. Serial port, JTAG, ISP, ICP tools are not supported. 2. Two flashing steps are required for secondary development: Nordic official protocol stack is not preloaded. Users shall flash protocol stack via official tool nRFgo Studio first, then flash application hex file via nRFgo Studio; alternatively, flash protocol stack via nRFgo Studio then download application code via IAR or KEIL. Official tool download link: http://www.nordicsemi.com/eng/Products/Bluetooth-low-energy/nRF52832/(language)/eng-GB 
2	Test Baseboard	No matching test baseboard provided by our company temporarily.





- Use DC regulated power supply for module power supply with low ripple factor; reliable grounding of the module is required. Ensure correct power polarity connection; reverse polarity will cause permanent module damage.
- Verify power supply voltage within the rated operating range; exceeding maximum voltage leads to permanent damage. Ensure stable power without frequent drastic voltage fluctuations.
- Reserve more than 30% power margin when designing power circuits for stable long-term operation of complete equipment. Place the module far from power sources, transformers and high-frequency traces with strong electromagnetic interference.
- High-speed digital traces, high-speed analog traces and power traces must avoid routing under the module. If routing under the module is unavoidable (module mounted on Top Layer), fully copper pour the Top Layer under the module with solid grounding, and route related traces on Bottom Layer beside digital section of the module.
- Random routing on Bottom Layer or other layers under the module will degrade spurious emission and receiver sensitivity of the module to varying degrees.
- Devices or traces with severe electromagnetic interference near the module will greatly degrade performance. Keep sufficient distance or add isolation/shielding if conditions permit.
- If 5V-level communication lines are necessary, connect 1k~5.1k series resistors (not recommended, damage risk still exists).
- Keep the module away from 2.4GHz physical layer protocols such as USB3.0.
- Antenna layout strongly affects module performance: ensure antenna is exposed and vertically upward for best performance. If the module is enclosed inside housing, use high-quality antenna extension cable to route antenna outside housing.
- Never place antenna inside metal housing; signal transmission distance will be drastically attenuated.



Chapter 6 Frequently Asked Questions

6.1 Unsatisfactory Transmission Distance

- Linear obstacles between transmitter and receiver attenuate communication distance significantly.
- Ambient temperature, humidity and co-frequency interference increase packet loss rate.
- Radio waves are absorbed and reflected by ground; poor test performance when placed close to ground.
- Seawater strongly absorbs radio waves, resulting in poor test performance at coastal areas.
- Metal objects near antenna or metal enclosure housing cause severe signal attenuation.
- Incorrect transmit power register configuration or excessive air rate (higher air rate leads to shorter communication range).
- Power supply voltage lower than recommended value at room temperature reduces transmit output power.
- Poor matching or inferior quality of antenna connected to module.

6.2 Module Prone to Damage

- Confirm power supply voltage within rated range; overvoltage causes permanent burnout.
- Ensure stable power supply without drastic frequent voltage fluctuations.
- Implement anti-static protection during installation and operation; RF chips are highly sensitive to ESD.
- Avoid high humidity environment during usage; partial components are moisture-sensitive.
- Avoid operation under extreme high/low temperature unless specially require

6.3 High Bit Error Rate

- Co-frequency RF interference nearby: move away from interference sources or switch frequency/channels to avoid interference.
- Unstable power supply may cause garbled data; reliable power circuit is mandatory.
- Poor quality or overlong extension cables/feeders raise bit error rate.

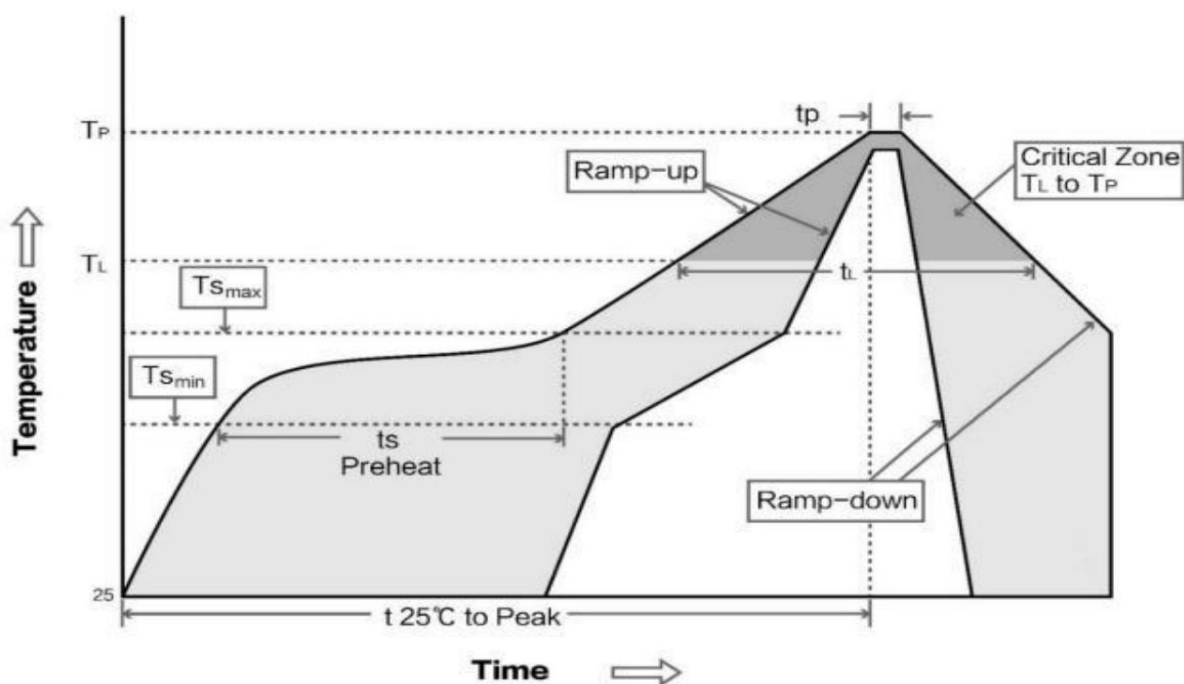


Chapter 7 Soldering Operation Guidelines

7.1 Reflow Soldering Temperature Parameters

Profile Feature	Chinese Description	Sn-Pb Assembly	Pb-Free Assembly
Solder Paste	Solder Paste Type	Sn63/Pb37	Sn96.5/Ag3/Cu0.5
Preheat Temperature min (T_{smin})	Minimum Preheat Temperature	100°C	150°C
Preheat temperature max (T_{smax})	Maximum Preheat Temperature	150°C	200°C
Preheat Time (T_{smin} to T_{smax}) (t_s)	Preheat Time	60-120 sec	60-120 sec
Average ramp-up rate (T_{smax} to T_p)	Average Temperature Rise Rate	3°C/second max	3°C/second max
Liquidous Temperature (T_L)	Liquidus Temperature	183°C	217°C
Time (t_L) Maintained Above (T_L)	Time Maintained Above Liquidus Temperature (T_L)	60-90 sec	30-90 sec
Peak temperature (T_p)	Peak Temperature	220-235°C	230-250°C
Average ramp-down rate (T_p to T_{smax})	Average Temperature Fall Rate	6°C/second max	6°C/second max
Time 25 °C to peak temperature	Total Time from 25°C to Peak Temperature	6 minutes max	8 minutes max

7.2 Reflow Soldering Curve



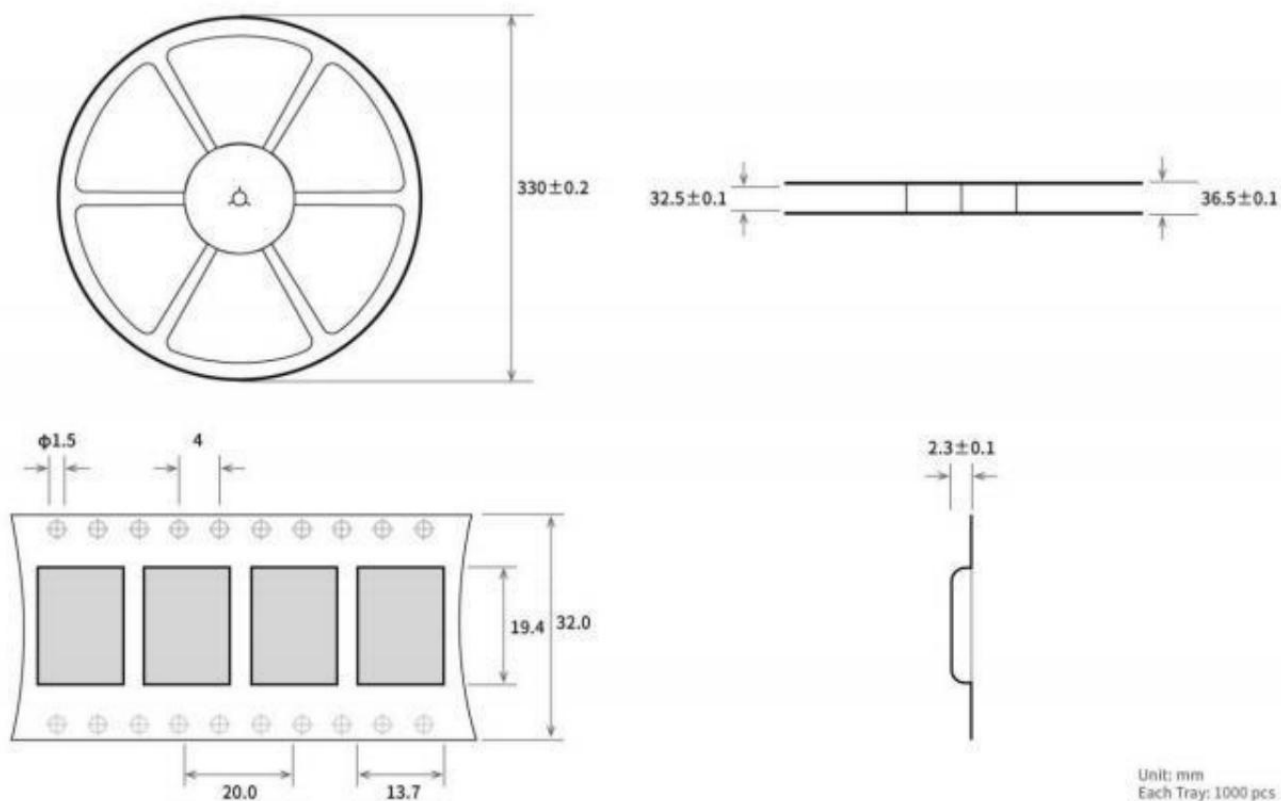


Chapter 8 Related Models

8.1 Related Hardware Modules

Model No.	Chip Solution	Supported Protocols	FLASH	RAM	Transmit Power	Dimension	Antenna Form
D73-nRF52832P04	nRF52832	BLE4. 2/5. 0	512KB	64KB	4dBm	17.5*28.7mm	PCB/ IPEX
D73-nRF52832U04	nRF52832	BLE4. 2/5. 0	512KB	64KB	4dBm	17.5*28.7mm	IPEX
D73-nRF52840C08	nRF52840	BLE4. 2/5. 0	1024KB	256KB	8dBm	13*18mm	Ceramic Antenna
D73-nRF52840U08	nRF52840	BLE4. 2/5. 0	1024KB	256KB	8dBm	13*18mm	IPEX

Chapter 9 Bulk Packaging Method





Revision History

Version	Revision Date	Description	Maintainer
1.0	2019-6-20	Initial Release	Evan
1.1	2021-04-19	Update related model information	Evan
1.2	2026-03-06	Full content revision	Evan

About Us



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FCC WARNING

D73-nRF52840C08 Bluetooth Low Energy Module · FCC ID: 2BW48-D73

1. FCC Compliance Information

1.1 FCC Caution (47 CFR § 15.21)

Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

1.2 FCC Compliance Statement (47 CFR § 15.19)

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

1.3 RF Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

1.4 Class B Digital Device Notice (47 CFR § 15.105(b))

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

1.5 Channel and Frequency Band Availability

The availability of some specific channels and/or operational frequency bands is country dependent and is firmware programmed at the factory to match the intended destination. The firmware setting is not accessible by the end user.

1.6 OEM Integration Conditions

This device is intended only for OEM integrators under the following conditions:

- The transmitter module may not be co-located with any other transmitter or antenna.
- The module shall be used only with the antenna(s) that have been originally tested and certified with this module.

As long as the conditions above are met, further transmitter testing will not be required. However, the OEM integrator is still responsible for testing the end product for any additional compliance requirements required with this module installed (for example, digital device emissions, PC peripheral requirements, etc.).

1.7 Validity of Using the Module Certification

In the event that these conditions cannot be met (for example, certain laptop configurations or co-location with another transmitter), the FCC authorization for this module in combination with the host equipment is no longer considered valid and the FCC ID of the module cannot be used on the final product. In these circumstances, the OEM integrator will be responsible for re-evaluating the end product (including the transmitter) and obtaining a separate FCC authorization.

1.8 End Product Labeling

The final end product must be labeled in a visible area with the following: “Contains FCC ID: 2BW48-D73”.

1.9 Information That Must Be Placed in the End User Manual

The OEM integrator must not provide information to the end user regarding how to install or remove this RF module in the user's manual of the end product which integrates this module. The end user manual shall include all required regulatory information/warnings as shown in this manual.

2. Integration Instructions for Host Product Manufacturers (per KDB 996369 D03 OEM Manual v01r01)

2.1 General

This document provides the integration instructions for host product manufacturers that integrate the D73-nRF52840C08 Bluetooth Low Energy module (FCC ID: 2BW48-D73). The host product manufacturer must follow the conditions and limitations described in Sections 2.2 through 2.12 to maintain FCC compliance of the module when installed in a host product.

2.2 List of applicable FCC rules

This module is authorized under FCC Part 15 Subpart C, § 15.247 (digital transmission system operating in the 2402-2480 MHz band). Compliance has been demonstrated for: AC power line conducted emissions, radiated spurious emissions, band edge and RF conducted spurious emissions, conducted peak output power, occupied bandwidth, power spectral density, and antenna requirements.

2.3 Summarize the specific operational use conditions

This module is a single-band Bluetooth Low Energy (BLE) transmitter operating in the 2402-2480 MHz band. The module uses a single integrated ceramic antenna; the antenna cannot be replaced, and the maximum antenna gain is 3 dBi. If the end product involves multiple simultaneously transmitting modules or other transmitters, the host manufacturer must consult the module manufacturer for the correct installation method in the end system.

2.4 Limited module procedures

Not applicable. This module is a stand-alone (single) modular transmitter.

2.5 Trace antenna designs

Not applicable. This module uses an integrated ceramic antenna; no trace antenna design is required from the host manufacturer.

2.6 RF exposure considerations

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cm between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

2.7 Antennas

This radio transmitter (FCC ID: 2BW48-D73) has been approved by the Federal Communications Commission to operate with the antenna types listed below, with the maximum permissible gain indicated. Antenna types not included in this list that have a gain greater than the maximum gain indicated for any type listed are strictly prohibited for use with this device.

Antenna No.	Antenna Model	Manufacturer	Antenna Type	Frequency Range	Antenna Gain (Peak)
1	SLDA92-2R450G-S1TF	Shenzhen Sunlord Electronics Co., Ltd.	Multilayer Ceramic Chip Antenna	2402-2480 MHz	3.0 dBi

2.8 Label and compliance information

The final end product must be labeled in a visible area with the following: "Contains FCC ID: 2BW48-D73".

2.9 Information on test modes and additional testing requirements

The host manufacturer is strongly recommended to confirm compliance with FCC requirements for the transmitter when the module is installed in the host. The grantee can provide instructions that simulate or characterize a connection by enabling a transmitter, to support host product evaluation.

2.10 Additional testing, Part 15 Subpart B disclaimer

This module does not contain unintentional-radiator digital circuitry; therefore the module does not require evaluation under FCC Part 15 Subpart B. The host manufacturer is responsible for compliance of the host system with the module installed with all other applicable requirements, such as Part 15 Subpart B.

2.11 Note EMI Considerations

The host manufacturer is recommended to use KDB 996369 D04 Module Integration Guide v02 as "best practice" RF design engineering, testing, and evaluation in case non-linear interactions generate additional non-compliant limits due to module placement relative to host components or properties.

2.12 How to make changes

This module is a stand-alone (single) modular transmitter. If the end product involves multiple simultaneously transmitting modules or other transmitters, or different operational conditions for a stand-alone modular transmitter in a host, the host manufacturer must consult the module manufacturer for the correct installation method in the end system. Per KDB 996369 D02 Q&A Q12, the host manufacturer only needs to perform an evaluation (no Class II permissive change is required) when no emission exceeds the limit of any individual device (including unintentional radiators) as a composite; the host manufacturer must correct any failure.