Datasheet

Key Specifications

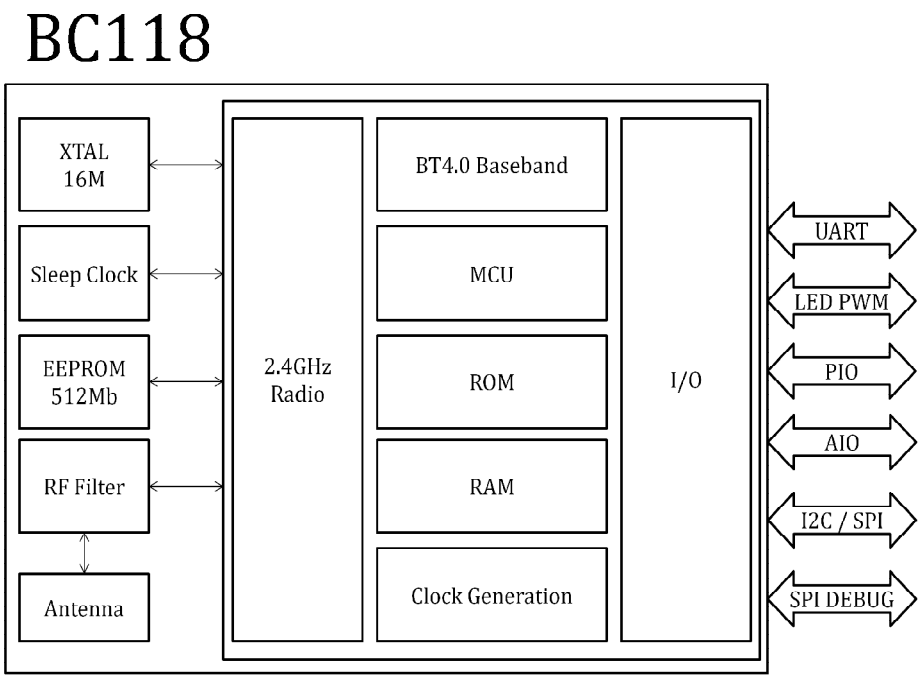
- Bluetooth Certified 4.0 Audio module
- Single Mode: Bluetooth Low Energy (BLE)
- Embedded Bluetooth Protocol Stack
- Supports GATT Profile, Audio, Proximity, and iBeacon
- Supports I2C and UART transparent Data Modes
- Simple UART and GPIO interface for command and control
- Small form factor (14.4mm x 19.3mm x 2.2mm)
- Bluetooth, FCC and CE certified

Applications

- Industrial Automation
- Lighting
- Automotive
- Medical Devices
- Wearable Devices
- Sensors, Actuators

Description

BC118 is a highly flexible, ultra low power, small form factor Bluetooth Version 4.0 Certified module. It comes preloaded with BlueCreation Melody Smart software, and is ideal for developers who want to quickly and cost effectively integrate Bluetooth Low Energy functionality into their products or develop standalone sensors or accessories.



General Specifications

Specifications	Description
Bluetooth Standard	Bluetooth 4.0
Interfaces	UART, AIO, GPIO, USB, I2C
Size	19.3mm x 14.4mm x 2.8mm
Weight	0.9g

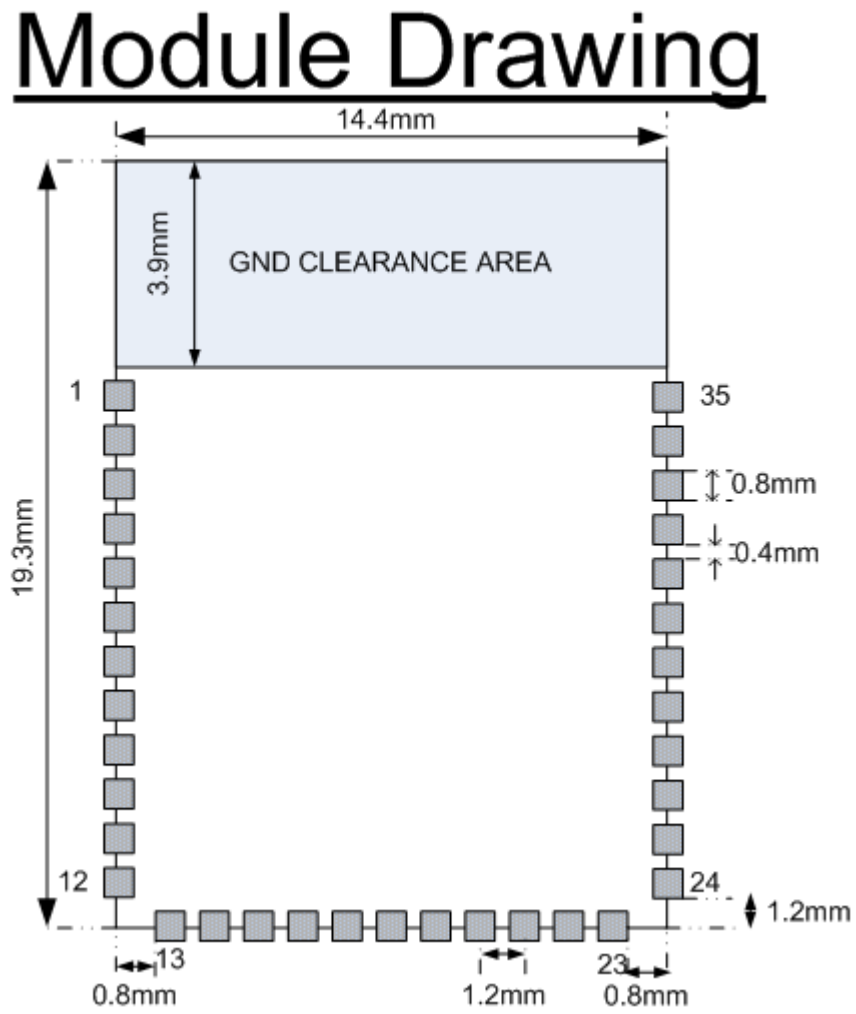
RF Specifications

Specifications	Description
Frequency Band	2,402 MHz to 2,480 MHz
Modulation	8 DPSK, PI/4 DQPSK, GFSK
Maximum Data Rate	270kbps (typical 60kbps)
Operating Range	30m
RF Sensitivity	0.1% BER at -92.5dBm
Transmit Power	7.5dBm

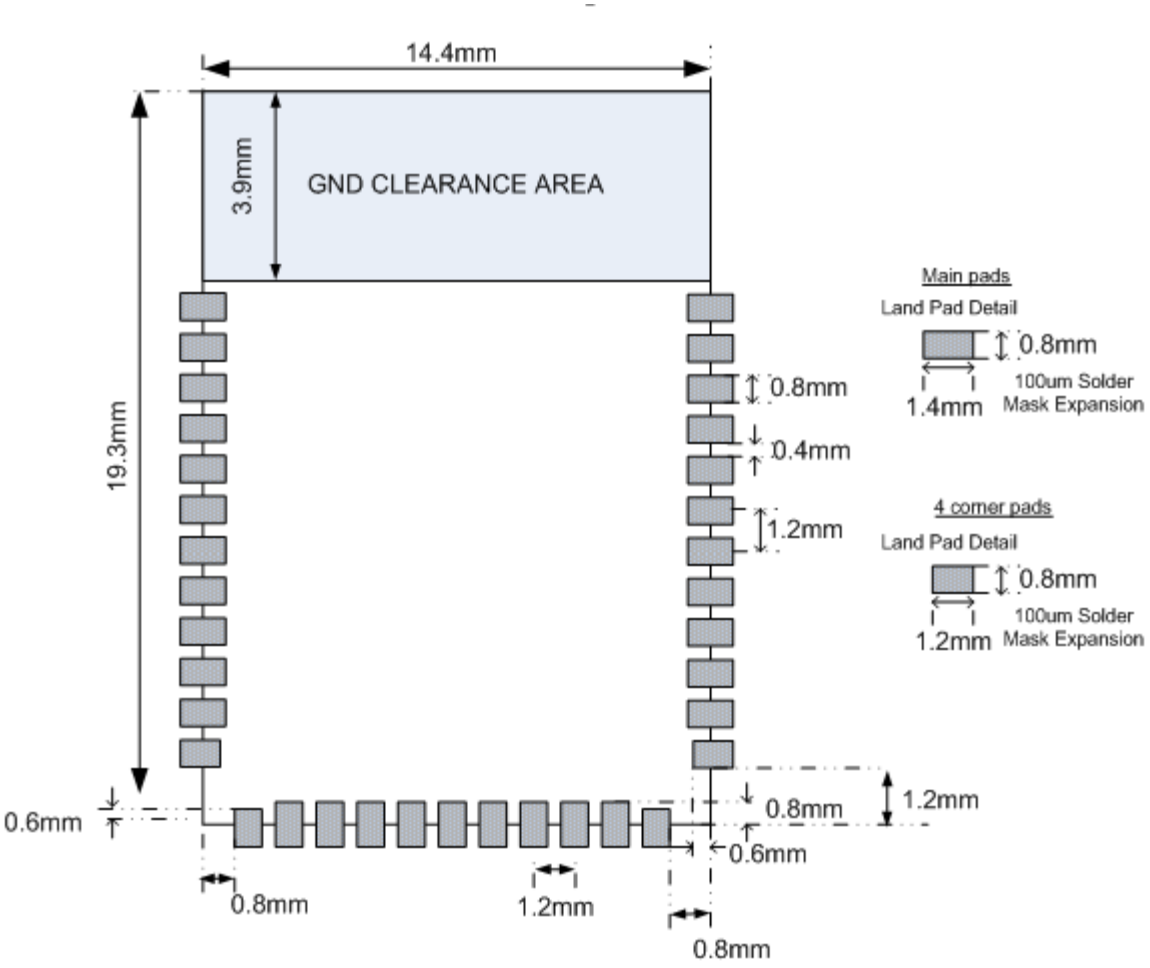
Electric Specifications

Specifications	Description
Supply Voltage	1.8V to 4.3V DC (Supports Li Ion battery voltage range)
Typical Current Tx	16mA (Only on Tx/Rx)
Typical Deep Sleep	<5µA (Connected)
Typical Hibernate	<1.9µA (Connected)
Typical Dormant	>900nA
Operating Temperature	-40°C to 85°C

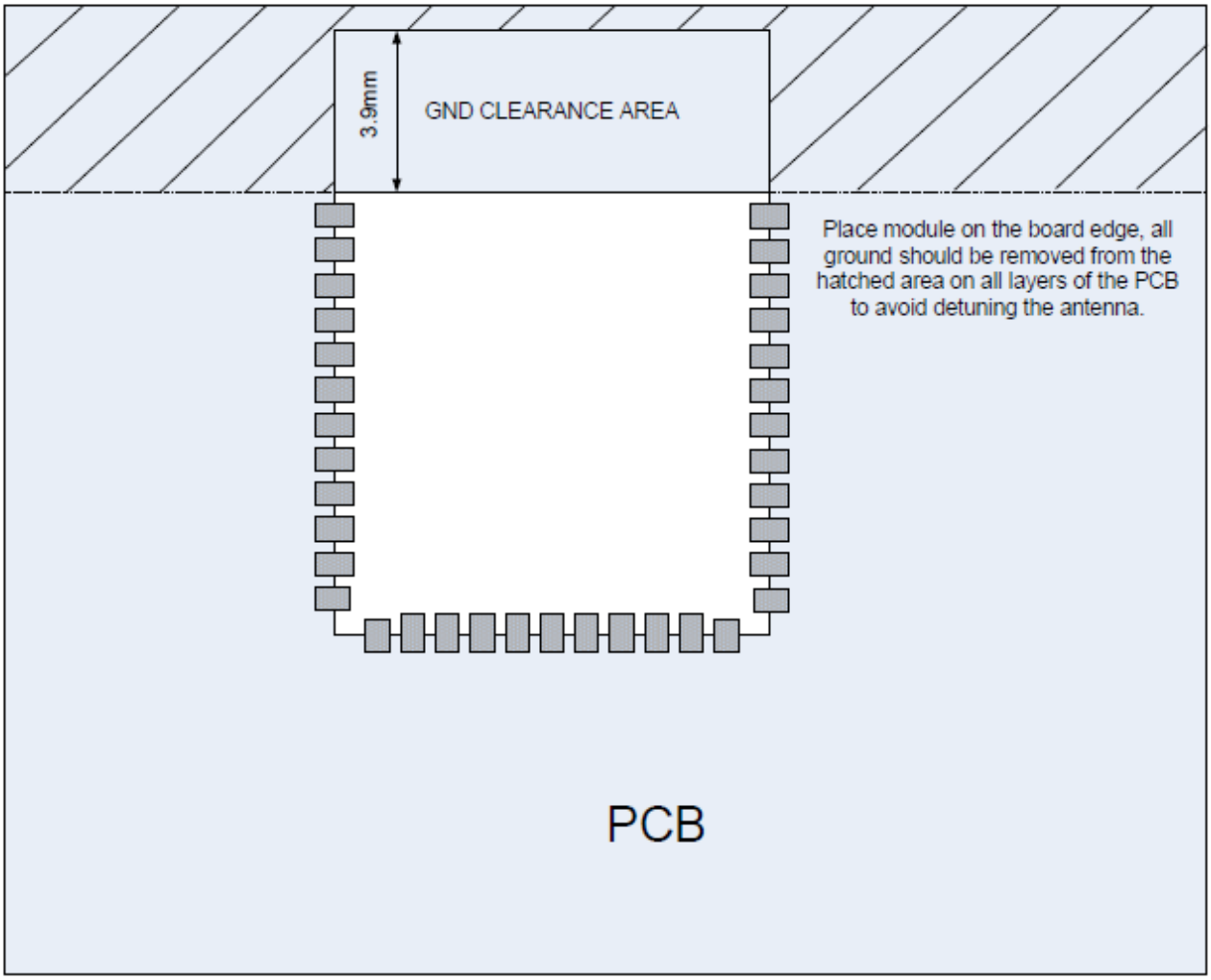
Module Drawing



Module Footprint



Placement Considerations



PIN Description

No1 is top left on the module and then it goes anti clockwise

No	Pin Name	Pin Type	Pin Description
1	GND	GND	Common Ground
2	GND	GND	Common Ground
3	AIO_2	Bi-Directional	Analog programmable input/output line
4	AIO_1	Bi-Directional	Analog programmable input/output line
5	AIO_0	Bi-directional	Analog programmable input/output line
6	UART_TX	Bi-directional	UART TX Data
7	UART_RX	Bi-directional	UART RX Data
8	PIO_3	Bi-directional	Programmable input/output line
9	PIO_4	Bi-directional	Programmable input/output line
10	PIO_5/SPI_CLK	Bi-directional	Programmable input/output line
11	PIO_6/SPI_CSB	Bi-directional	Programmable input/output line
12	GND	GND	Common Ground
13	GND	GND	Common Ground
14	PIO_7/SPI_MOSI	Bi-directional	Programmable input/output line
15	GND	GND	Common Ground
16	GND	GND	Common Ground
17	VDD_PADS	Supply	Positive Supply input
18	GND	GND	Common Ground
19	PIO_8/SPI_MISO	Bi-directional	Programmable input/output line
20	SPI_PCM#	Input	Select PCM/SPI
21	PIO_2	Bi-directional	Programmable input/output line
22	I2C_SCL	Bi-directional	Programmable input/output line
23	GND	GND	Common Ground
24	GND	GND	Common Ground
25	I2C_SDA	Bi-directional	Programmable input/output line
26	PIO_9	Bi-directional	Programmable input/output line
27	VBAT	Battery terminal +ve	Battery Positive
28	PIO_10	Bi-directional	Programmable input/output line
29	PIO_11	Bi-directional	Programmable input/output line
30	WAKE	Wake Pin	Wake Pin
31	GND	GND	Common Ground
32	GND	GND	Common Ground
33	GND	GND	Common Ground
34	GND	GND	Common Ground
35	GND	GND	Common Ground

Notes

- PIO_X are bidirectional with weak pull down
- Reset Input is with strong pull-up
- USB data positive with selectable internal 1.5kΩ pull up resistor
- UART are Bidirectional with weak pull up
- PCM_OUT, IN, SYNC and CLK can be used as SPI_MISO, MOSI, CSB and CLK respectively. SPI-PCM# high switches SPI/PCM lines to SPI, low switches to PCM/PIO use

Solder Reflow Profile

- Preheat Temperature: 150°C for 100 seconds
- Temperature: 240°C for 40 seconds.
- Single Pass

Regulatory Certifications

BC118 is delivered with FCC, CE, IC and Bluetooth SIG certifications. This allows to integrate the module in an end product without the need to obtain subsequent and separate approvals from these regulatory agencies. This is valid in the case no other intentional or un-intentional radiator components are incorporated into the product. Without these certification, an end product cannot be marketed in the relevant regions.

United States - FCC

- In case no other intentional or un-intentional radiator is incorporated, the BC118's FCC certification allows users to integrate the module into products without the need to obtain subsequent and separate approval.
- The BC118 was approved as "intentional transmitter radio module" by the United States' Federal Communications Commission (FCC) with accordance to CFR47 Telecommunications Part 15, Subpart C, section 212. This certification is applicable in all the states in the United States.
- The certification allows products to be listed in the NRTL (National Recognized Test Laboratory) as appointed by OSHA (Occupational Safety and Health Administration).

Labelling

- The BC118 has been labelled with its own FCC ID number. In order to the extend the certification granted to the BC118, its FCC ID number must be displayed on the finished product in which the module is integrated. The following wording should be used "Contains Transmitter Module FCC ID: SSS - BC11X " or “Contains FCC ID: SSS-BC11X”.
- The user-manual for any product in which the BC118 is integrated in must include the following statements:

> 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.

To satisfy FCC RF Exposure requirements for mobile and base station transmission devices, a separation distance of 20 cm or more should be maintained between the antenna of this device and persons during operation. To ensure compliance, operation at closer than this distance is not recommended. The antenna(s) used for this transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

For further information regarding the FCC certification requirements please review the following websites:

Federal Communications Commission (FCC):
http://www.fcc.gov

FCC Office of Engineering and Technology (OET) Laboratory Division Knowledge Database (KDB):
http://apps.fcc.gov/oetcf/kdb/index.cfm

Europe - CE and RoHS Marking

- In case no other intentional or un-intentional radiator is incorporated, the BC118's CE marking certification allows users to integrate the module into products without the need to obtain subsequent and separate CE approval.
- The BC118 has been tested and granted approval as R&TTE Directive product under the 1999/5/EC Essential Requirements for Health and Safety (Article (3.1(a)), Electromagnetic Compatibility, (EMC) (Article 3.1(b)), and Radio (Article 3.2). A Notified Body Opinion has been issued.
- The BC118 has also been tested and granted approval under the directive on the restriction of the use of certain hazardous substances in electrical and electronic equipment 2002/95/EC (commonly referred to as the Restriction of Hazardous Substances Directive or RoHS). This certification ensures the module is environmental safe and free from hazardous substances (including Lead).
- Both certifications are applicable in all the 27 countries of the European Economic Area.

Labelling and Documentation

- Products complying with all relevant essential requirements shall bear the CE conformity marking accompanied by the identification number XXX-XXX
- The RoHS certification does not dictate any specific product labelling. However, we recommend marking the product with a "RoHS Compliant" statement.
- R&TTE Directive requires a manufacturer to establish technical documentation. It must be kept by the manufacturer or his authorised representative in the EU for at least 10 years after the last product has been manufactured. The documentation must cover:
    - a general description of the product,
    - conceptual design and manufacturing drawings and schemes of components, sub-assemblies, circuits and other design documentation,
    - descriptions and explanations necessary for the understanding of said drawings and schemes and the operation of the product,
    - a list of the standards referred to in Article 5, applied in full or in part, and descriptions and explanations of the solutions adopted to meet the essential requirements of the Directive where such standards
    - results of design calculations made, examinations carried out, etc.,
    - test reports.

- Test reports must include the following table containing the BC118 tests:

Certification	Standards	Article	Laboratory	Report Number	Date
Safety	EN 60950-1:2006+A11:2009+A1:2010+A12:2011+A2:2013	(3.1(a))			
Health	EN 62479:2010				
EMC	EN 301 489-1 V1.9.2:2011 EN 301 489-17 V2.2.1:2012	(3.1(b))			
Radio	EN 300 328 V1.8.1:2012	(3.2)			

- For further labelling and CE marking requirements please review the R&TTE Compliance Association Technical Guidance: http://rtteca.com/

For further information regarding the R&TTE certification requirements please review the following websites:

Radio and Telecommunications Terminal Equipment (R&TTE):
http://ec.europa.eu/enterprise/rtte/index_en.htm

European Conference of Postal and Telecommunications Administrations (CEPT):
http://www.cept.org

European Telecommunications Standards Institute (ETSI):
http://www.etsi.org

European Radio Communications Office (ERO):
http://www.ero.dk

Canada - IC

- In case no other intentional or un-intentional radiator is incorporated, the BC118's IC certification allows users to integrate the module into products without the need to obtain subsequent and separate approval.
- The BC118 has been tested and granted approval under Industry Canada (IC) Radio Standards Specification (RSS) RSS-210, RSSGen and ICES-003. This certification is applicable in Canada.

Labelling and Documentation

- The BC118 has been labelled with its own IC ID number. In order to the extend the certification granted to the BC118, its CE ID number must be displayed on the finished product in which the module is integrated. The following wording should be used "Contains Transmitter Module IC: XXX"
- The user-manual for any product in which the BC118 is integrated in must include the following statements:

> This device complies with Industry Canada license exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.
>
> Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

> Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.
>
> Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante

- For further labelling and IC marking requirements please review the Industry Canada website: http://www.ic.gc.ca/

Bluetooth Qualification Program (BQP)

- In case no other non-certified Bluetooth components are incorporated, the BC118's BQP marking certification allows users to integrate the module into products without the need to obtain subsequent and separate approval.

- The BC118 has been approved by the Bluetooth Qualification Body (BQB) to use the Bluetooth trademark and to offer official Bluetooth functionality. The approval according to the V4.0B Bluetooth specification confirms that the module complies with the Bluetooth specification and will successfully operate with other products supporting the same profile. BQP certification also ensures that the module has gone through safety assessment. This certification was granted through a combination of product performance testing and interoperability testing. This certification applies globally.

Labelling

- Products complying with all relevant requirements are allowed to bear the official Bluetooth logo

For further information regarding the BQP certification requirements please review the following websites:

Bluetooth Special Interest Group:
https://www.bluetooth.org/apps/content/

Notes:

- Changes or modifications that are made to the module circuitry can hinder the certification
- Installers must comply with all of the instructions provided by the certification agency, which indicate installation and/or operating conditions necessary for compliance
- It is important to note that the finished product is required to comply with all applicable authorizations regulations and requirement that is not associated with the BC118 module, including non-intentional transmitting modules and other intentionally transmitting modules.
- The previous section represents BlueCreation interpretation of the salient issues of the certifications. For full details of the certification please refer to the local agencies' websites. Where there is any difference between this document and the local agencies' website, the subsequent should be followed.
- At the time of writing this document FCC, CE and BQP certification were still processed by the relevant authorities.

Ordering Information

Part number BC118

Order number	Description
BC118	Standalone Bluetooth 4.0 Module with integrated Antenna
BC118-B	Standalone Bluetooth 4.0 Module with integrated Antenna and iBeacon
BC119	Host Controlled Bluetooth 4.0 Module with integrated Antenna
BC119-B	Host Controlled Bluetooth 4.0 Module with integrated Antenna and iBeacon
BC118-DISKIT001	Evaluation Kit for BC118

General Notes

- BlueCreation's products are not authorised for use in life-support or safety-critical applications. Use in such applications is done at the sole discretion of the customer. BlueCreation will not warrant the use of its devices in such applications.
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