

BLUE bean is a high performance and ultra low power surface mount USB radio combining single-stream 11ac Wave2 Wi-Fi and Bluetooth® 4.2 in a very small form factor

BLUE bean is IEEE 802.11b/g/n/a/ac Wave2 dual-band wireless LAN and Bluetooth 4.2 USB module optimised for small size and low power consumption.

It is based on Qualcomm QCA9377-7 chipset. Has an integrated dual-band (2.4 and 5 GHz) 1x1 802.11ac Wave2 WiFi (supporting MU-MIMO) and Bluetooth® 4.2 transceivers and combined in to very small form factor (17 x 12 mm with RF connector and 24 x 12mm with integrated antenna).

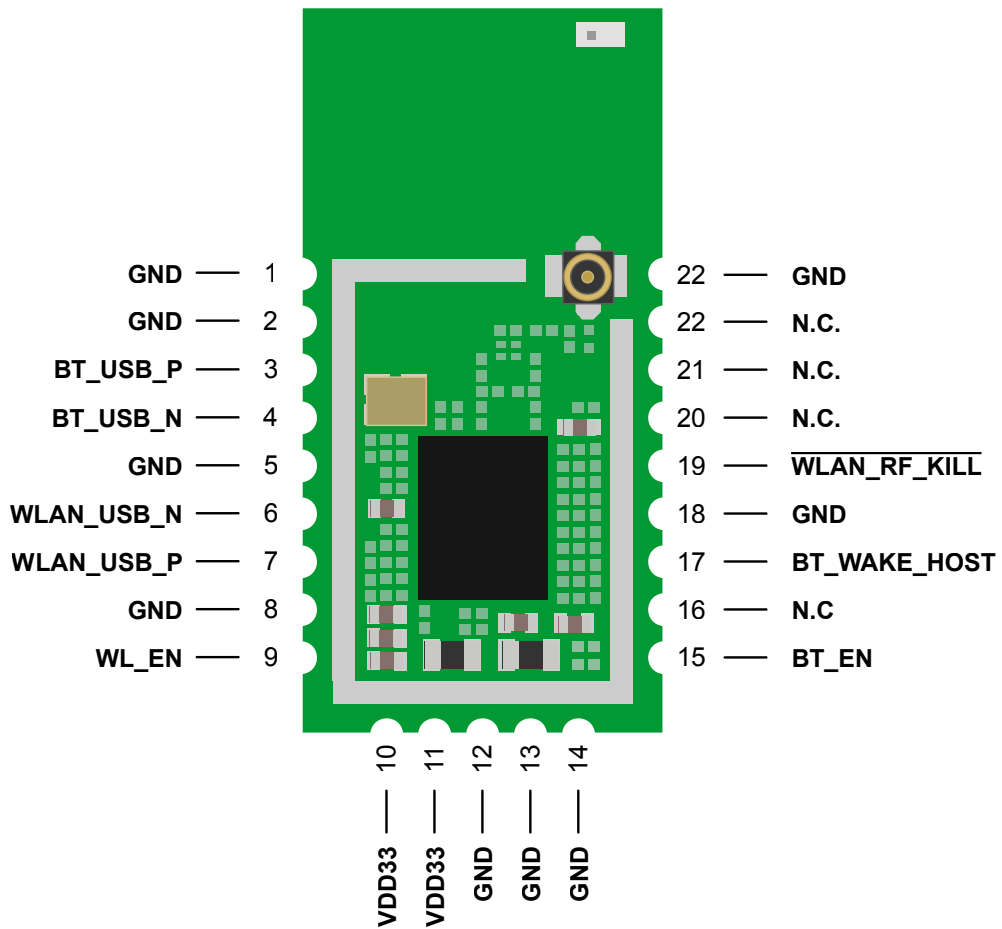
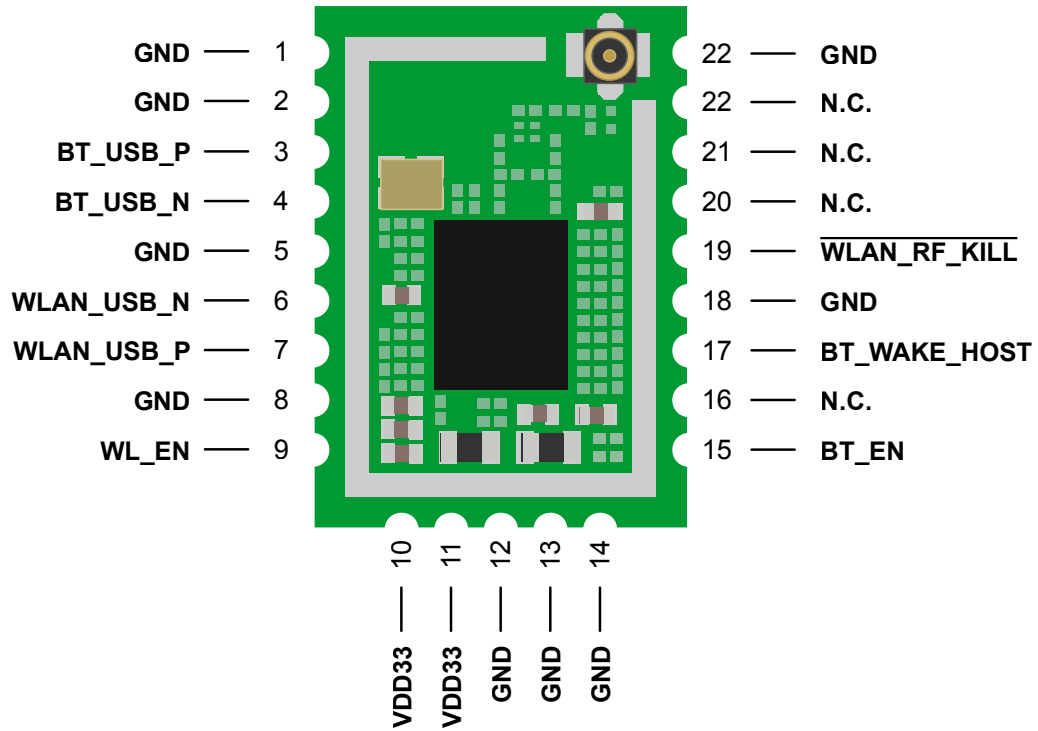
The radio module supports advanced power saving techniques. Bluetooth supports both Class1 and Class2 transmissions and advanced coexistence mechanisms allow it to work seamlessly with Wi-Fi ensuring good quality and high performance.

BLUE bean software drivers are available for Linux, Windows 10 and Android operating systems.

Quick specs

- 802.11a/b/g/n/ac, 2.4 and 5 GHz, 1x1 SISO, 433 Mbps data rate, up to 20 dBm output power
- 20/40/80 MHz channel size support
- STBC, MU-MIMO, transmit beam-forming
- Bluetooth v4.2 + HS backwards compatible with v1.x and v2.x
- Connectorized (Murata HSC type connector: MM4829-2702RB0) or an integrated dual-band antenna version
- Linux, Windows and Android drivers available
- Based on QCA9377-7 chipset
- Industrial temperature range -40 to +85 C°
- Very small form factor (17 by 12 mm without antenna or 24 by 12 mm with antenna)
- Surface mount, dual-side design
- Available interfaces - Bluetooth USB 1.1, WLAN USB 2.0

Pinout Information



Pin	Name	I/O	Description
1	GND	-	Ground connection
2	GND	-	Ground connection
3	BT_USB_P	IO	Bluetooth USB data +
4	BT_USB_N	IO	Bluetooth USB data -
5	GND	-	Ground connection
6	WLAN_USB_N	IO	WLAN USB data +
7	WLAN_USB_P	IO	WLAN USB data -
8	GND	-	Ground connection
9	WL_EN	PD	WLAN enable. Active high.
10	+3V3	PI	+3V3 digital power supply
11	+3V3	PI	+3V3 digital power supply
12	GND	-	Ground connection
13	GND	-	Ground connection
14	GND	-	Ground connection
15	BT_EN	PD	Bluetooth enable. Active high.
16	N.C.	-	Not connected
17	BT_WAKE_HOST	O	Signal indicating that Bluetooth interface requires requires attention. High - host must wake up and remain awake. Low - host device may sleep.
18	GND	-	Ground connection
19	WLAN_RF_KILL	PU	Turn off WLAN RF analog and front-end. Active low.
20	N.C.	-	Not connected
21	N.C.	-	Not connected
22	N.C.	-	Not connected

PD - Input signals with weak internal pull-down, to prevent signals from floating when left open

PU - Input signals with weak internal pull-up, to prevent signals from floating when left open

PI - Power input

IO - digital bi-directional signal

O - digital output

Power supply

It is recommended to use pin 10 and pin 11 to give power supply to the module.

Software

Drivers for BLUE bean USB module (based on QCA9377-7) are available for Windows 7, Windows 10, Linux and Android operating systems. Drivers for Linux are included since Kernel v4.1.

Power ratings

Parameter	Units	Min	Nominal	Max
Supply Voltage (+3V3)	V	3.135	3.3	3.465

Power consumption

Wi-Fi mode	USB 2.0 mA
Standby (deep sleep)	0.24
2G tx99 11b 1Mbps	356
2G tx99 11n HT20 MCS7	326
5G tx99 11n HT20 MCS0	487
5G tx99 11n HT20 MCS7	423
5G tx99 11ac VHT80 MCS9	421

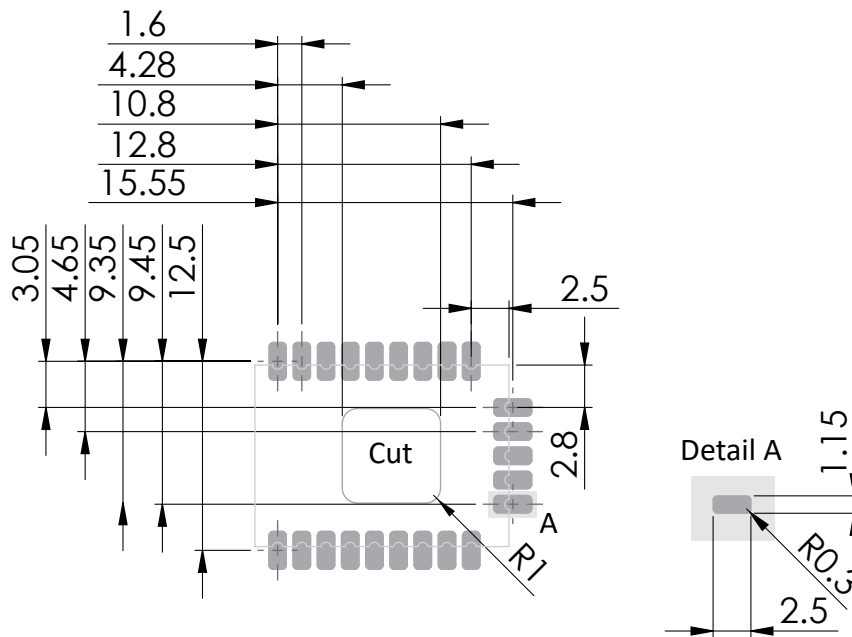
Bluetooth mode	USB 1.1 mA
Continuous Rx burst	22.5
Continuous Tx Class 2 (+4 dBm)	38.5
Continuous Tx Class 2 (+12.5 dBm)	64.5
1.28 sec page scan (non-interlaced)	0.36
1.28 sec LE ADV	0.23
1.28 sec sniff as master	0.22
1.28 sec sniff as slave	0.27

Operating conditions

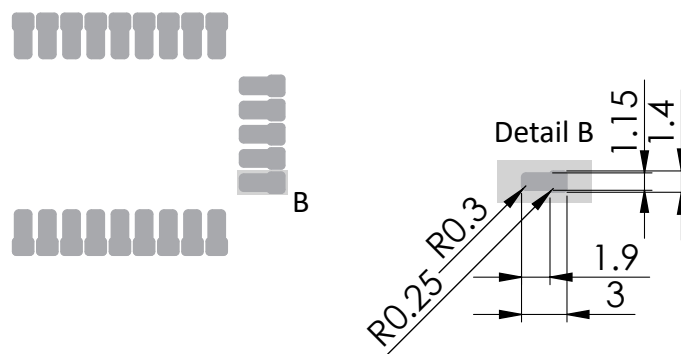
The module can operate in a wide temperature range and different conditions depending on the enclosure. The following guidelines guarantee that it will work correctly.

Parameter	Units	Min	Max
Working temperature	°C	-40	85
Storage temperature	°C	-40	90
Humidity	%RH	10	90
Storage humidity	%RH	5	90

PCB footprint (same for BLUE bean C and BLUE bean A modules)



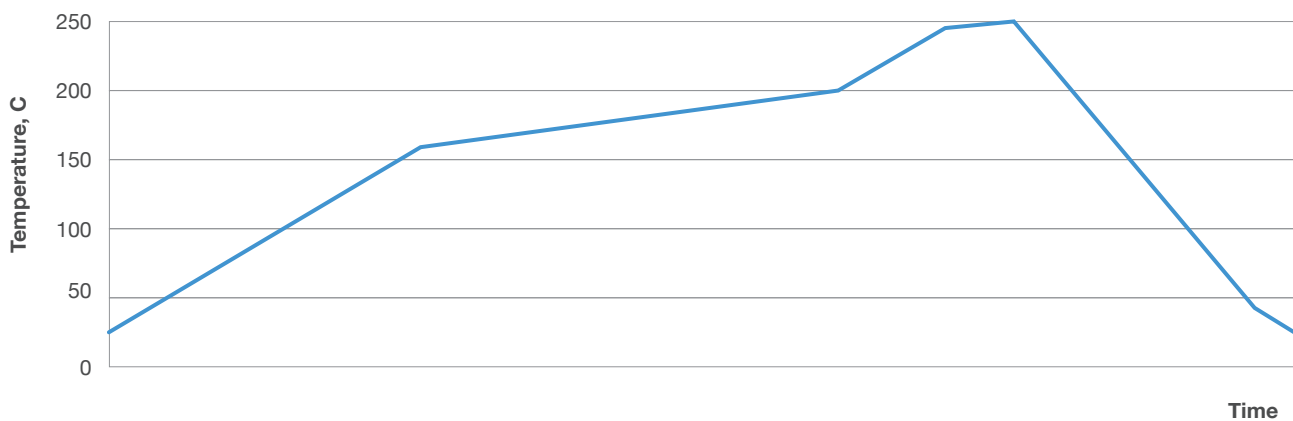
Soldering paste footprint (same for BLUE bean C and BLUE bean A modules)



Reflow profile recommendation

Ramp up rate	3°C/second max
Maximum time maintained above 217°C	120 seconds
Peak temperature	250°C
Maximum time within 5°C of peak temperature	20 seconds
Ramp down rate	6°C/second max

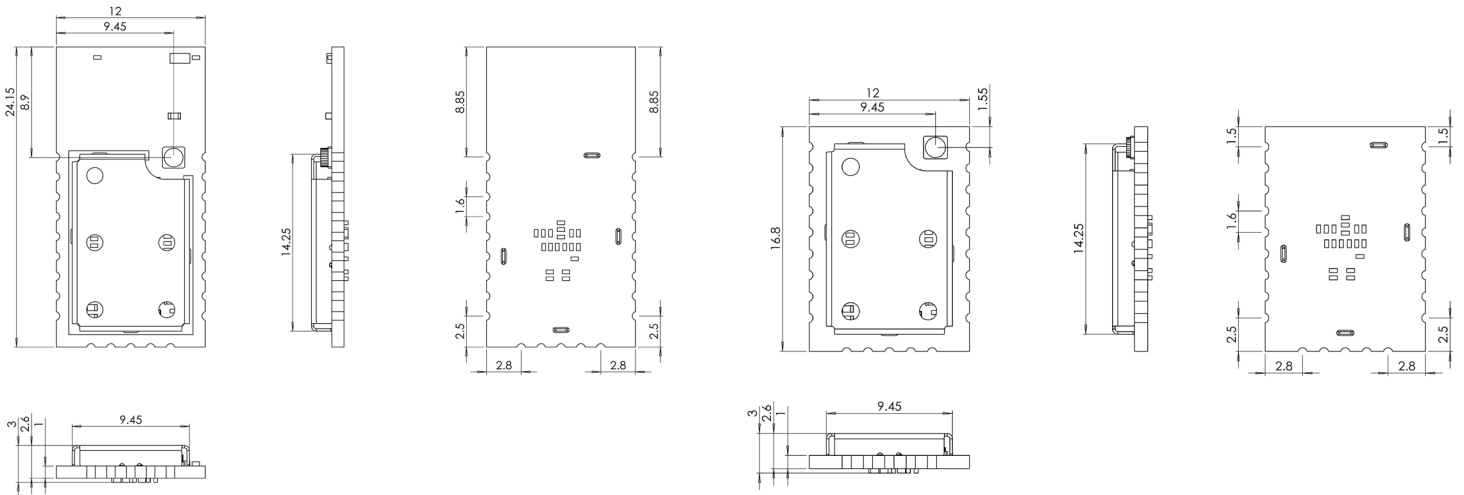
Reflow profile



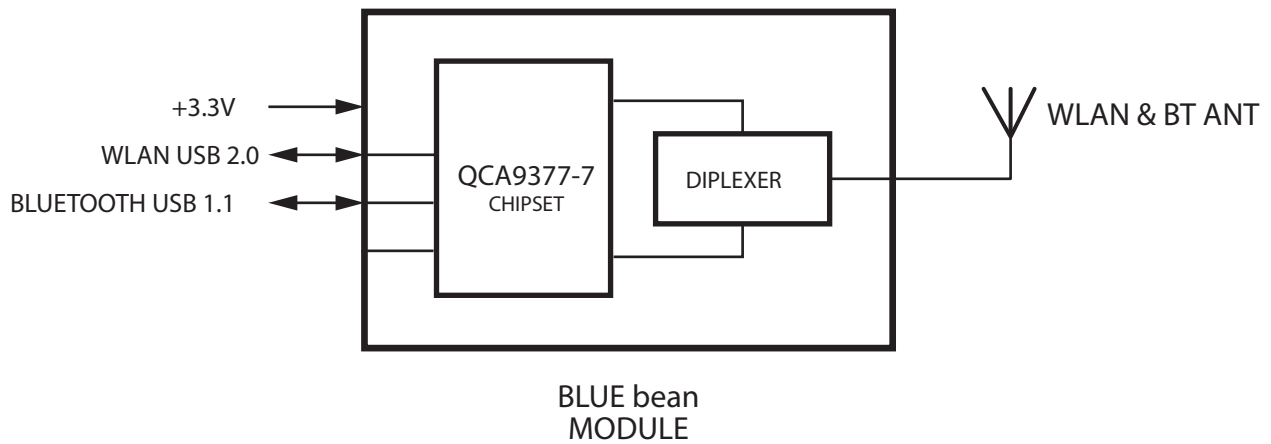
Radio characteristics

2.4 GHz 802.11AC (20 MHz)	Data rate (Mbps)	7.2	14.4	21.7	28.9	43.3	57.8	65	72.2	86.7	
	Sensitivity (dBm)	-92	-89	-87	-83	-80	-76	-75	-73	-69	
	Output power (dBm)	18	18	18	18	18	16	16	16	15	
2.4 GHz 802.11AC (40 MHz)	Data rate (Mbps)	15	30	45	60	90	120	135	150	180	200
	Sensitivity (dBm)	-88	-86	-84	-81	-77	-73	-72	-70	-66	-64
	Output power (dBm)	17	17	17	17	17	15	15	15	13	13
5 GHz 802.11AC (20 MHz)	Data rate (Mbps)	7.2	14.4	21.7	28.9	43.3	57.8	65	72.2	86.7	
	Sensitivity (dBm)	-91	-87	-85	-82	-78	-74	-73	-71	-67	
	Output power (dBm)	15	15	15	14	14	12	11	10	10	
5 GHz 802.11AC (40 MHz)	Data rate (Mbps)	15	30	45	60	90	120	135	150	180	200
	Sensitivity (dBm)	-87	-85	-82	-79	-76	-72	-70	-68	-65	-63
	Output power (dBm)	14	14	14	13	13	12	11	9	9	8
5 GHz 802.11AC (80 MHz)	Data rate (Mbps)	32.5	65	97.5	130	195	260	292.5	325	390	433.3
	Sensitivity (dBm)	-84	-81	-78	-76	-72	-68	-67	-65	-61	-59
	Output power (dBm)	13	13	13	12	12	11	11	9	9	8
Bluetooth	Frequency range	2.402 - 2.480 GHz									
	Supported modes	BT and BLE									
	Max TX power	14 dBm (4 dBm BLE)									
	RX sensitivity (BER >= 0.1%)	-95 dBm (-99 dBm BLE)									

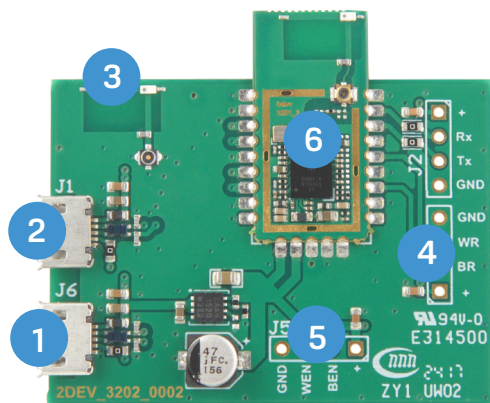
Module dimensions (with antenna/ without antenna)



Block diagram



Development kit



- 1 - USB Wi-Fi
- 2 - USB Bluetooth
- 3 - Dual-band ceramic antenna
- 4 - Turn off WLAN and Bluetooth
- 5 - Turn on WLAN and Bluetooth
- 6 - BLUE bean module