

CB-OLX425 ELECTRICAL MECHANICAL DATA SHEET

Document Revision

Document number: 8486970

Release: Mar 05, 2012 16:49

Document version: [4](#)

Copyright © 2012 connectBlue AB. The contents of this document can be changed by connectBlue AB without prior notice and do not constitute any binding undertakings from connectBlue AB. connectBlue AB is not responsible under any circumstances for direct, indirect, unexpected damage or consequent damage that is caused by this document. All rights reserved. All brand and product names are trademarks or service marks of their respective owners.

1 Table of Content

- 1 [Table of Content](#)
- 2 [Introduction](#)
 - 2.1 [Product Variants](#)
 - 2.2 [Block Diagram](#)
 - 2.3 [Bluetooth Stack and Application software](#)
- 3 [Electrical Interface and Connectors](#)
 - 3.1 [Interfaces](#)
 - 3.2 [Peripherals](#)
 - 3.3 [Pin Numbering](#)
 - 3.4 [Pin Description](#)
 - 3.5 [Characteristics](#)
 - 3.6 [Hardware Reset](#)
- 4 [Antennas](#)
 - 4.1 [Surface Mounted Antennas \(Internal\)](#)
 - 4.2 [External antennas](#)
- 5 [Mechanics](#)
 - 5.1 [Module Outlines](#)
 - 5.2 [Antenna Issues](#)
- 6 [Bluetooth Information](#)
 - 6.1 [General information](#)
- 7 [Regulatory Information](#)
 - 7.1 [Declaration of Conformity](#)
 - 7.2 [Safety Compliance](#)
 - 7.3 [FCC and IC Compliance](#)
 - 7.4 [UL listing information](#)
 - 7.5 [Compliance with RoHS directive](#)
- 8 [Guidelines for Efficient and Safe Use](#)
 - 8.1 [General](#)
 - 8.2 [Product Care](#)
 - 8.3 [Radio Frequency Exposure](#)
 - 8.4 [Electronic Equipment](#)
 - 8.5 [Potentially Explosive Atmospheres](#)
 - 8.6 [Power Supply](#)

2 Introduction

 The license could not be verified: There is no license certificate installed for CustomWare Scaffolding Plugin for Confluence.

The connectBlue OLP425 is a Bluetooth low energy platform module with a unique set of features and functionality that provides customers with a turnkey complete solution. The OLP425 can either be delivered as is with digital and analog GPIOs or complete with battery holder, temperature sensor, 3-axis motion sensor/accelerometer, switch. There are also 4x1 through holes for solder wires or through hole components. Using the IAR Embedded Workbench, the customer embeds their own software and application in the OLP425 module. Such possible software includes Bluetooth low energy profiles/services/attributes and customer application such as machine/device access and asset management, data conversion, data acquisition, logic etc.

The hardware of the cB-OLP425 product is referred as cB-0950 and the module is Type Approved with the type name cB-0950.

The module is available in different configuration (see [Product Variants](#)) with [internal antennas](#) or a U.FL. connector for connecting an [external antenna](#).

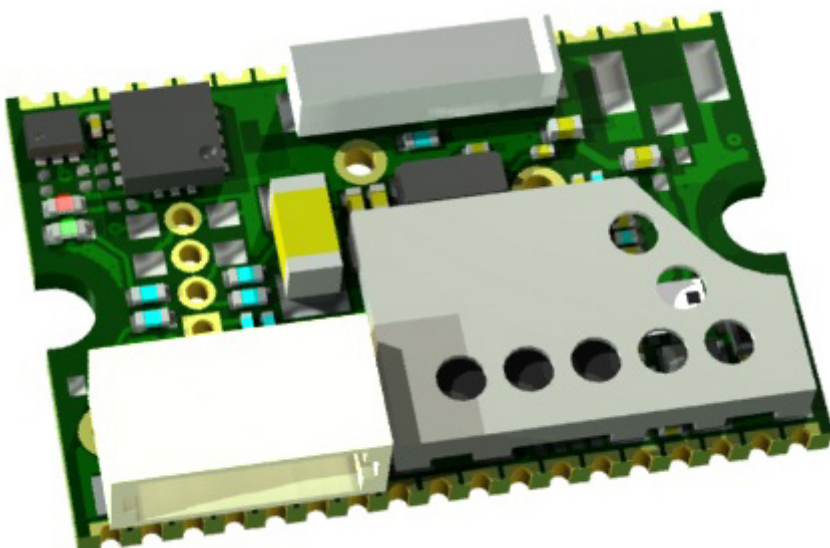
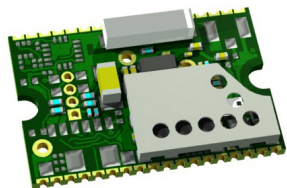
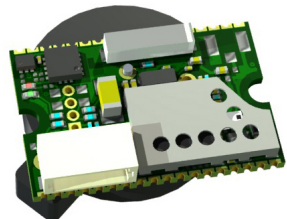
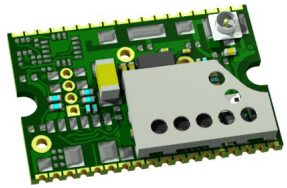


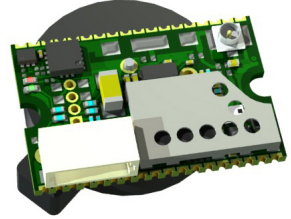
Figure 1: cB-OLP425i OEM Low Energy Platform with internal antenna.

2.1 Product Variants

The module is available in two antenna options (integrated antenna, or u.fl. connector for external antenna) and in different configurations of the mounting options.

Table 1: Product variants

Product Name	Regulatory ID FCC ID IC ID	Bluetooth Type	Description	
cB-OLP425i-04	cB-0950 PVH0950 5325A-0950	Bluetooth Low Energy Output power: 3 dBm EIRP* Sensitivity: TBD dBm EIRP*	OEM Low Energy Platform 425 with internal antenna. No battery holder, no sensors, no JST connector, no LEDs.	
cB-OLP425i-26***	cB-0950 PVH0950 5325A-0950	Bluetooth Low Energy Output power: 3 dBm EIRP* Sensitivity: TBD dBm EIRP*	OEM Low Energy Platform 425 with internal antenna, JST connector, LEDs, Temperature Sensor, Accelerometer and CR1632 battery holder.	
cB-OLP425x-04	cB-0950 PVH0950 5325A-0950	Bluetooth Low Energy Output power: 3 to 6 dBm EIRP** Sensitivity: TBD to TBD dBm EIRP**	OEM Low Energy Platform 425 with external antenna. No battery holder, no sensors, no JST connector, no LEDs.	

cB-OLP425x-26***	cB-0950 PVH0950 5325A-0950	Bluetooth Low Energy Output power: 3 to 6 dBm EIRP** Sensitivity: TBD to TBD dBm EIRP**	OEM Low Energy Platform 425 with external antenna, JST connector, LEDs, Temperature Sensor, Accelerometer and CR1632 battery holder.	
------------------	----------------------------------	---	---	---



The license could not be verified: There is no license certificate installed for CustomWare Scaffolding Plugin for Confluence.

*** EIRP is including antenna gain.**

**** EIRP is including antenna gain and cable loss and thus depends on the antenna selection.**

***** The JST connector is specified down to -25 °C. See [#Environmental](#) for more information.**

Please contact connectBlue for discussion about customer specific mounting options. Components that are available for optional mountings are:

- CR1632 coin cell battery holder
- 3-axis motion sensor / accelerometers
- Temperature sensor
- Pushbutton
- JST connector
- 2x LEDs
- Internal antenna or u.fl. connector for external antenna
- Through hole mounted analog or digital discrete sensors (4x1 through holes at 1.27 mm pitch)
- PCB wings/flaps with holes for mounting of the module (module size including wings 16x36 mm)
- Voltage regulator for 3.0-6.0 VDC power supply

2.2 Block Diagram

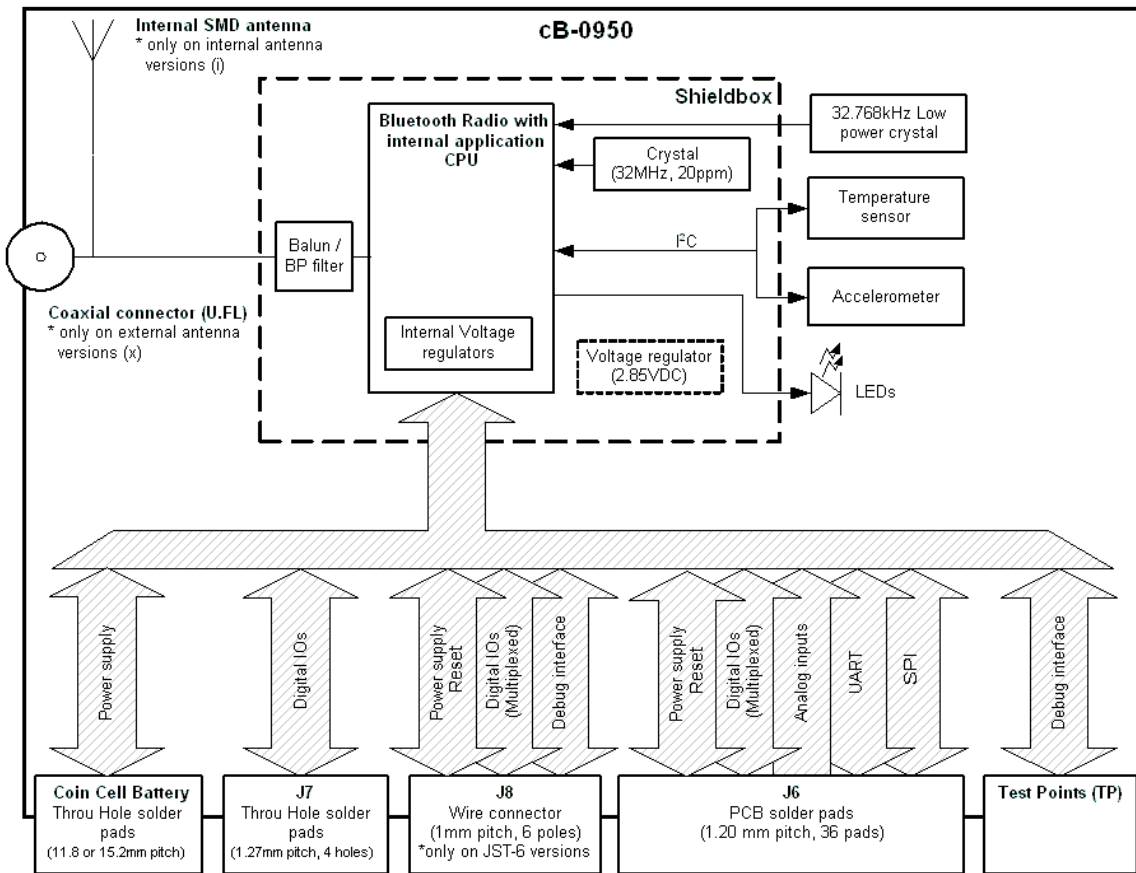


Figure 2: Block diagram of cB-OBP425

2.3 Bluetooth Stack and Application software

The platform module OLP425 is a hardware platform based on the [TI CC2540](#) system-on-chip (256 kB flash memory and 8 kB SRAM).

The chip runs both application and the Bluetooth low energy protocol stack. The [TI Bluetooth low energy software stack and tools](#) includes object code with the latest BLE protocol stack supporting multiple connections, sample projects and applications covering an extensive set of profiles with source code. Please note that this package is not provided by connectBlue.

The connectBlue OLP425 sample code package includes sample projects for accessing the LEDs, temperature sensor and accelerometers.

All embedded software is developed using [IAR Embedded Workbench for 8051](#).

NOTE

Software/firmware support is not included by connectBlue. To sign a support agreement for software support or to discuss a full implementation project please contact us.



TIP

For higher quantity orders the customer developed software/firmware may be loaded to the module during the production at connectBlue.

3 Electrical Interface and Connectors

3.1 Interfaces

This section describes the signals available on the module interface connectors. There are three ways to connect to the module:

- Via the PCB solder pads on the edge of the PCB, J6 (see Figure 3). See Section "[Using the J6 PCB solder pads](#)" for more information.
- Via the JST connector, J8 (see Figure 4). The connector is a 6 poles wire connector. The pitch is 1mm. The manufacturer of the mounted connector is JST and the part number is SM06B-SRSS-TB. The SM06B-SRSS-TB connector is mated with the wire connector SHR-06V-S from JST. Other connector options are also available from JST.
- Via the 4x1 through holes row J7 (see Figure 4) for solder wires or through holes components to the board (1.27mm pitch).

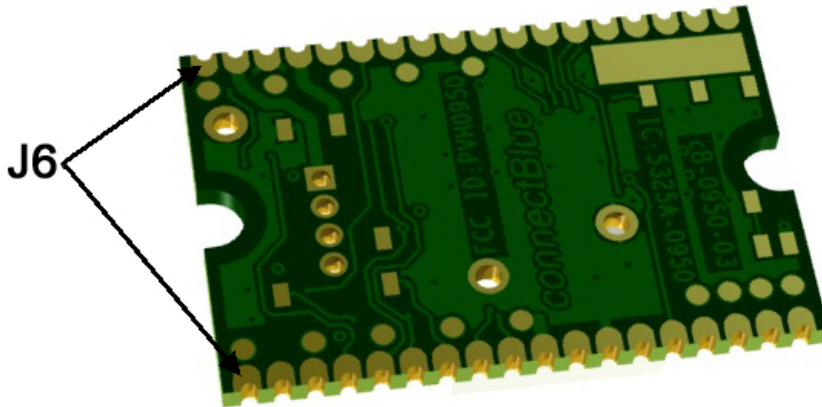


Figure 3: The solder pads J6 are available on the long edges of the bottom side of the PCB.

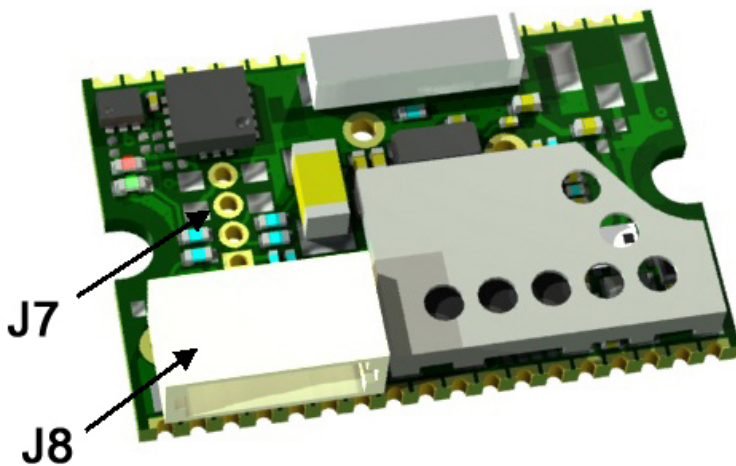


Figure 4: The JST connector J8 mounted on the component side of the PCB.

3.2 Peripherals

The OEM Low Energy Platform can be customized to suit an end application e.g. with the on board 3 axes motion sensor, the temperature sensor and two LEDs. There are also a 4x1 through holes (1.27mm pitch) available for solder wires or through holes components to the board (see [Pin Numbering](#) for more info).

3.2.1 Temperature Sensor

A Texas Instrument high accurate [TMP112](#) temperature sensor is available on board on the platform version. The communication is via I²C with the device address 0x49. The communication interface is an software implemented I²C:

Signal	CC2540 port	Description
SDA	P1-6	Serial Data
SCL	P1-5	Clock
Alert	P0-7	Interrupt signal (optional)

3.2.2 Accelerometer

A ST Microelectronics [LIS3DH](#) 2/4/8/16 g accelerometer is available on board. The communication is via I²C with the device address 0x19. The communication interface is an software implemented I²C:

Signal	CC2540 port	Description
SDA	P1-6	Serial Data
SCL	P1-5	Clock
Interrupt1	P1-3	Interrupt signal (optional)

3.2.3 LEDs

One green and one red LED are available on board:

LED	CC2540 port	Description
Green	P1-4	Active Low green signal
Red	P1-7	Active low red signal

3.3 Pin Numbering

See [Module Outlines](#) for pin numbering.

3.4 Pin Description

Table 2: OBP425 Signals description.

J6 Pin Nbr	J7 Pin Nbr	J8 Pin Nbr	CC2540 pin Nbr / Port name	Signal Level	Type	Description
1	-	5	20 / Reset_N	CMOS	In	Hardware reset
2	1	-	11 / P1_0	3.0 V	Out	IO pin capable of deliver 20 mA. For supplying external components.
3, 25	4	1	-	Ground		GND
4, 27	-	2	-	3.0 V	In	2.0 - 3.6 VDC power supply. The module does not have an external voltage regulator mounted by default, but can be mounted for 3.0-6.0 VDC supply. Please contact connectBlue for more information.
14-17, 19-22	-	-	-	-	-	Reserved, do not connect.
6	-	-	8 / P1_2	CMOS	In	
7	-	-	37 / P1_7	CMOS	Out	
8	-	-	6 / P1_4	CMOS	In/Out	
9	-	-	9 / P1_1	CMOS	Out	
10	-	-	15 / P0_4	CMOS	In	UART0 (alt1) Clear To Send. Hardware flow control. Active low (multiplexed/connected with SPI-CS).
11	-	-	16 / P0_3	CMOS	Out	UART0 (alt1) Transmit Data. "0" : Low, "1" : High (multiplexed/connected with SPI-MOSI).

12	-	-	14 / P0_5	CMOS	Out	UART0 (alt1) Request To Send. Hardware flow control. Active low (multiplexed/connected with SPI-CLK)
13	-	-	17 / P0_2	CMOS	In	UART0 (alt1) Receive Data. "0" : Low, "1" : High (multiplexed/connected with SPI-MISO)
5	-	4	35 / P2_1	CMOS	Out/ In/Out	Data Terminal Ready. Active low/ CC2540 Debug Data.
18	-	3	34 / P2_2	CMOS	In	Data Set Ready. Active low/ CC2540 Debug Clock.
23	-	-	36 / P2_0	CMOS	In	SPI interrupt signal.
24	-	-	17 / P0_2	CMOS	Master In/ Slave Out	SPI0 (alt2) master input slave output (multiplexed/connected with UART-RxD)
26	-	-	14 / P0_5	CMOS	Master Out/ Slave In	SPI0 (alt2) clock (multiplexed/connected with UART-RTS)
28	-	-	16 / P0_3	CMOS	Master Out/ Slave In	SPI0 (alt2) master output slave input (multiplexed/connected with UART-TxD)
29	-	-	15 / P0_4	CMOS	Master Out/ Slave In	SPI0 (alt2) chip select (multiplexed/connected with UART-CTS)
30	-	4	35 / P2_1	CMOS	In/Out	CC2540 Debug Data (multiplexed/connected with UART-DTR).
31	2	6	19 / P0_0	Analog (0-VCC)	In	Analog input.
32	3	-	18 / P0_1	Analog (0-VCC)	In	Analog input.
33	-	-	13 / P0_6	Analog (0-VCC)	In	Analog input.
34	-	-	12 / P0_7	Analog (0-VCC)	In	Analog input.
35	-	-	5 / P1_5	CMOS	Out	I ² C-SCL: I ² C clock.
36	-	-	38 / P1_6	CMOS	Out / Bidirectional	I ² C-SDA: I ² C Serial data.



The license could not be verified: There is no license certificate installed for CustomWare Scaffolding Plugin for Confluence.

3.5 Characteristics

3.5.1 Power supply



NOTE

Read the [Guidelines for Efficient and Safe Use](#) before using the modules.

Table 3: Power supply

Symbol	Parameter		Value	Unit
VCC	Power supply	Min	2.0*	VDC
		Max	3.6*	VDC

* The module does not have an external voltage regulator mounted by default but can be mounted for 3.0-6.0 VDC supply. Please contact connectBlue for more info.

Table 4: Current consumption

Symbol	Mode			Value	Unit
$I_{CC}@ VCC = 3.0V$	Not connected	Connectable, discoverable	Average	TBD	mA
			Peak	TBD	mA
	Not connected, stop mode enabled	Not connectable, not discoverable	Average	TBD	mA
			Peak	TBD	mA
		Connectable, not discoverable	Average	TBD	mA
			Peak	TBD	mA
		Connectable, discoverable	Average	TBD	mA
			Peak	TBD	mA
	Connected	Idle or Receiving	Average	TBD	mA
			Peak	TBD	mA

	Transmitting @TBD kbit/s		Average	TBD	mA
			Peak	TBD	mA

3.5.2 Input/Output signals

Table 5: Input/output signals. VCC = 3.0V

Symbol	Parameter		Value	Unit
V_{IN} Low	Logic LOW level input voltage	Min	-0.3	V
		Max	0.5	V
V_{IN} High	Logic HIGH level input voltage	Min	2.5	V
		Max	3.3	V
V_{OUT} Low	Logic LOW level output voltage	Max	0.5	V
V_{OUT} High	Logic HIGH level output voltage	Min	2.4	V
I_{IO}	Sink and source current VCC_Peripheral and Blue Signal	Max	20	mA
	Sink and source current all other IO pins	Max	4	mA
$R_{IN_PULL-UP}$	Input signals (including $\overline{RESET}$) internal pull-up	Typ	20	kOhm
t_{Reset}	Reset pulse length	Min	1	s

See the TI [CC2540 Data sheet](#) for more information.

3.5.3 Environmental

Table 6: Temperatures characteristics

Parameter		Model	Value	Unit
Storage temperature	Min	Without JST connector	-40	°C
		With JST connector	-25	°C
	Max	Without JST connector	+125	°C
		With JST connector	+85	°C

Operating temperature	Min	Without JST connector	-40	°C
		With JST connector	-25	°C
	Max	All	+85	°C

3.6 Hardware Reset

A hardware $\overline{\text{RESET}}$ input is available on the J6 and J8 connectors (see [#Pin Numbering](#)). An external reset source must be open drain collector, see section [#Reset](#) for design examples. The $\overline{\text{RESET}}$ pin is internally pulled-up with 15kOhm.

— The license could not be verified: There is no license certificate installed for CustomWare Scaffolding Plugin for Confluence.

4 Antennas

This chapter gives a quality overview of the different antenna options.

There are 2 different antenna options available:

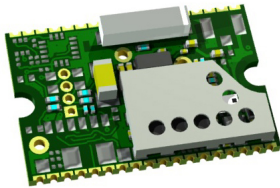
- Internal surface mounted (SMD) antenna.
- An U.FL. connector for external antennas. Different types of external antennas are available.

The sections below lists the antennas that are included in the radio type approvals of the module. For each antenna the "Approvals" field defines in which test reports the antenna is included. Definitions of the "Approvals" field are:

- **FCC** - The antenna is included in the FCC test reports, and thus approved for use in countries that accept the FCC radio approvals, primarily US.
- **IC** - The antenna is included in the IC (Industrie Canada) test reports, and thus approved for use in countries that accept the IC radio approvals, primarily Canada.
- **R&TTE** - The antenna is included in the R&TTE test reports, and thus approved for use in countries that accept the R&TTE radio approvals, primarily the European countries.

In general, antennas with SMD antenna, Reverse Polarity SMA connector or U.FL connector are included in FCC, IC and R&TTE radio tests. Antennas with SMA connector are in general included in R&TTE radio tests but not FCC or IC due to FCC/IC regulations.

4.1 Surface Mounted Antennas (Internal)

Part Number	OLx425i	
Antenna name	ANCG12G44SAA162	
Manufacture	muRata	
Gain	0 dBi	
Antenna size (LxWxH)	8.0 x 2.0 x 2.0 mm	
Comment	The antenna gain is very dependent of the mounting of the module. See section Antenna Issues for mounting the module considering the antenna.	

Approval	FCC, IC and R&TTE	
----------	-------------------	--

4.2 External antennas

The external antennas are connected to the board through a U.FL connector. Some of the antennas are connected directly to the U.FL connector of the board and some are connected using an SMA or reversed polarity SMA connector through a short U.FL to SMA or reversed polarity SMA adapter cable.

Antennas with a part number in the form "cB-ACC-XX" are available for orders via the connectBlue distribution network. For information about other antennas please contact connectBlue.

4.2.1 Antenna Accessories

Part Number	cB-ACC-18 / cB-ACC-48	
Name	U.FL to SMA adapter cable	
Connector	U.FL and SMA jack (outer thread and pin receptacle)	
Cable length	120 mm	
Cable loss	Less than 0.5dB	
Comment	The SMA connector may be mounted in a panel.	
Approval	R&TTE	

Part Number	cB-ACC-38	
Name	U.FL to reverse polarity SMA adapter cable	
Connector	U.FL and reverse polarity SMA jack (outer thread and pin)	
Cable length	120 mm	
Cable loss	Less than 0.5dB	
Comment	The reverse polarity SMA connector may be mounted in a panel.	

Approval	FCC, IC and R&TTE	
----------	-------------------	--

4.2.2 Recommended antennas

Part Number	cB-ACC-61	
Name	Ex-IT 2400 RP-SMA 28-001	
Manufacture	ProAnt	
Polarization	Vertical	
Gain	+3.0 dBi	
Size	Ø 12.0 x 28.0 mm	
Connector	Reverse Polarity SMA plug (inner thread and pin receptacle)	
Comment	To be mounted on the U.FL to Reverse Polarity SMA adapter cable (cB-ACC-38). An SMA version antenna is also available but not recommended to use (Ex-IT 2400 SMA 28-001).	
Approval	FCC, IC and R&TTE	

Part Number	cB-ACC-63	
Name	Ex-IT 2400 MHF 28	
Manufacture	ProAnt	
Polarization	Vertical	
Gain	+2.0 dBi	
Size	Ø 12.0 x 28.0 mm	
Cable length	100 mm	

Connector	U.FL. connector	
Comment	To be mounted on the U.FL connector on the PCB.	
Approval	FCC, IC and R&TTE	

Part Number	cB-ACC-64	
Name	Ex-IT 2400 RP-SMA 70-002	
Manufacture	ProAnt	
Polarization	Vertical	
Gain	+3.0 dBi	
Size	Ø 10 x 83 mm	
Connector	Reverse Polarity SMA plug (inner thread and pin receptacle)	
Comment	To be mounted on the U.FL to Reverse Polarity SMA adapter cable (cB-ACC-38). An SMA version antenna is also available but not recommended to use (Ex-IT 2400 SMA 70-002).	
Approval	FCC, IC and R&TTE	

Part Number	cB-ACC-60	
Name	Ex-IT 2400 MHF 70-001	
Manufacture	ProAnt	
Polarization	Vertical	

Gain	+3.0 dBi	
Size	Ø 9.4 x 70.5 mm	
Cable length	100 mm	
Connector	U.FL. connector	
Comment	To be mounted on the U.FL connector on the PCB.	
Approval	FCC, IC and R&TTE	

Part Number	cB-ACC-57	
Name	InSide-2400	
Manufacture	ProAnt	
Gain	+3.0 dBi	
Size	27 x 12 mm (triangular)	
Cable length	100 mm	
Connector	U.FL. connector	
Comment	To be mounted on the U.FL connector on the PCB.	
Approval	FCC, IC and R&TTE	

Part Number	cB-ACC-66	
Name	FlatWhip-2400	
Manufacture	ProAnt	
Gain	+3.0 dBi	
Size	Ø 50.0 x 30.0 mm	
Connector	SMA plug (inner thread and pin)	
Comment	To be mounted on the U.FL to SMA adapter cable.	
Approval	R&TTE	

Part Number	cB-ACC-67	
Name	Outside-2400	
Manufacture	ProAnt	
Gain	+3.0 dBi	
Size	36.0 x 18.0 x 16.0 mm	
Cable length	70 mm	
Connector	U.FL. connector	
Comment	To be mounted on the U.FL connector on the PCB.	
Approval	FCC, IC and R&TTE	

4.2.3 Alternative antennas

The alternative antennas are available for backward compatibility but not recommended for new designs.

Part Number	cB-ACC-16 / cB-ACC-36	
Name	WCR2400-SMA / WCR2400-SMRP	
Manufacture	Laird Technologies / Centurion	
Polarization	Vertical	
Gain	+2.0 dBi	
Size	100 mm (Straight)	
Connector	cB-ACC-16: SMA plug (inner thread and pin) cB-ACC-36: Reverse Polarity SMA plug (inner thread and pin receptacle)	
Comment	cB-ACC-16 is to be used together with the U.FL to SMA adapter cable (cB-ACC-18 or cB-ACC-48). cB-ACC-36 is to be used together with the U.FL to Reverse Polarity SMA adapter cable (cB-ACC-38).	
Approval	cB-ACC-36: FCC, IC and R&TTE cB-ACC-16: R&TTE	

Part Number	cB-ACC-27 / cB-ACC-29	
Name	WCR-2400-IP04 / WCR-2400-IP10	
Manufacture	Laird Technologies / Centurion	
Polarization	Vertical	
Gain	+2.0 dBi	

Size	108 mm (Straight)	
Cable length	cB-ACC-27: 100 mm cB-ACC-29: 250 mm	
Connector	U.FL. connector	
Comment	To be mounted on the U.FL connector on the PCB.	
Approval	FCC, IC and R&TTE	

Part Number	cB-ACC-23	
Name	PSTG0-2400HS	
Manufacture	Mobile Mark Communications Antennas	
Polarization	Vertical	
Gain	0 dBi	
Size	Ø 9.5 x 26 mm	
Connector	SMA plug (inner thread and pin)	
Comment	To be used together with the U.FL to SMA adapter cable (cB-ACC-18 or cB-ACC-48). An alternative Reverse Polarity SMA version antenna is available (PSTG0-2400HRS).	
Approval	R&TTE	

Part Number	cB-ACC-28	
Name	NanoBlue-IP04	
Manufacture	Laird	
Polarization	Linear	
Gain	+2.0 dBi	
Size	47.8 x 12.7 x 0.9 mm	
Cable length	100 mm	

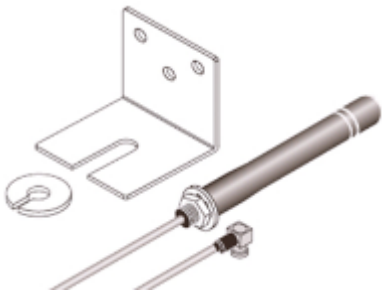
Connector	U.FL. connector	
Comment	To be mounted on the U.FL connector on the PCB.	
Approval	FCC, IC and R&TTE	

Part Number	cB-ACC-17 / cB-ACC-37	
Name	Reel planTec Bluetooth m70	
Manufacture	REEL	
Gain	+1.0 dBi	
Size	Ø 75 x 20 mm	
Mounting	M16 x 13.6 mm	
Connector	cB-ACC-17: SMA plug (inner thread and pin) cB-ACC-37: Reverse Polarity SMA plug (inner thread and pin receptacle)	
Cable length	300 cm. Other cable lengths are available on request.	
Comment	cB-ACC-17 is to be used together with the U.FL to SMA adapter cable (cB-ACC-18 or cB-ACC-48). cB-ACC-37 is to be used together with the U.FL to Reverse Polarity SMA adapter cable (cB-ACC-38).	
Approval	cB-ACC-37: FCC, IC and R&TTE. cB-ACC-17: R&TTE.	

Part Number	cB-ACC-21	
Name	R380.500.127	
Manufacture	Pulse	
Polarization	Vertical	

Gain	+2.0 dBi	
Size	Ø 14.3 x 61.4 mm	
Connector	SMA plug (inner thread and pin)	
Comment	To be mounted on the U.FL to SMA adapter cable (cB-ACC-18 or cB-ACC-48). A Reverse Polarity SMA version is also available (R380.500.125).	
Approval	R&TTE	

Part Number	—	
Name	R380.500.139	
Manufacture	Pulse	
Polarization	Vertical	
Gain	+2.0 dBi	
Size	Ø 14.3 x 61.1 mm	
Connector	Reverse Polarity SMA plug (inner thread and pin receptacle)	
Comment	The difference compared to the R380.500.125 antenna is that the R380.500.139 antenna has a seal ring. To be mounted on the U.FL to Reverse Polarity SMA adapter cable (cB-ACC-38). An SMA version antenna is also available (R380.500.124).	
Approval	FCC, IC and R&TTE	

Part Number	—	
Name	IHF-242	
Manufacture	Joymax	
Polarization	Vertical	
Gain	+2.0 dBi	

Size	Ø 9.2 x 82.5 mm	
Cable length	150 cm	
Connector	MCX male connector	
Comment	To be mounted on a MCX to U.FL adapter cable.	
Approval	FCC, IC and R&TTE	

5 Mechanics

5.1 Module Outlines

5.1.1 Module dimensions

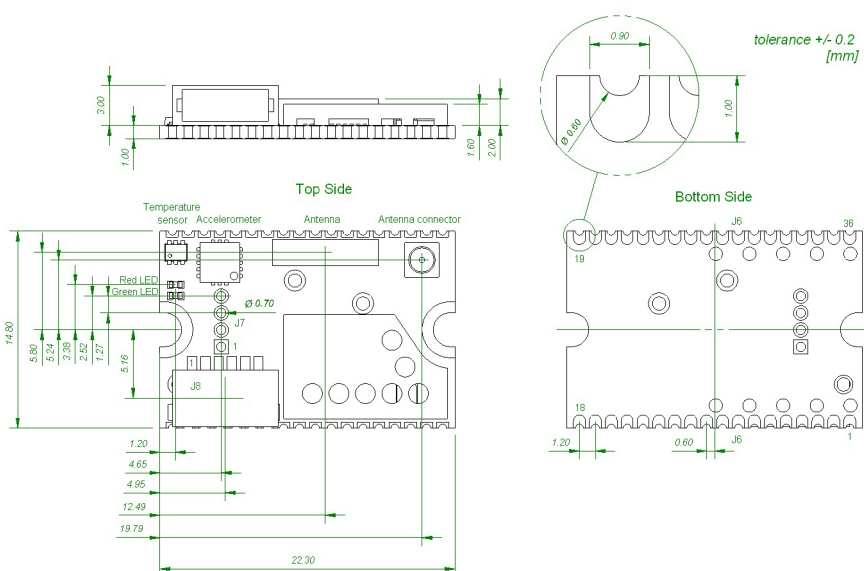


Figure 7: cB-OLx425 module dimensions.

5.1.2 Battery holder and mounting wings dimensions

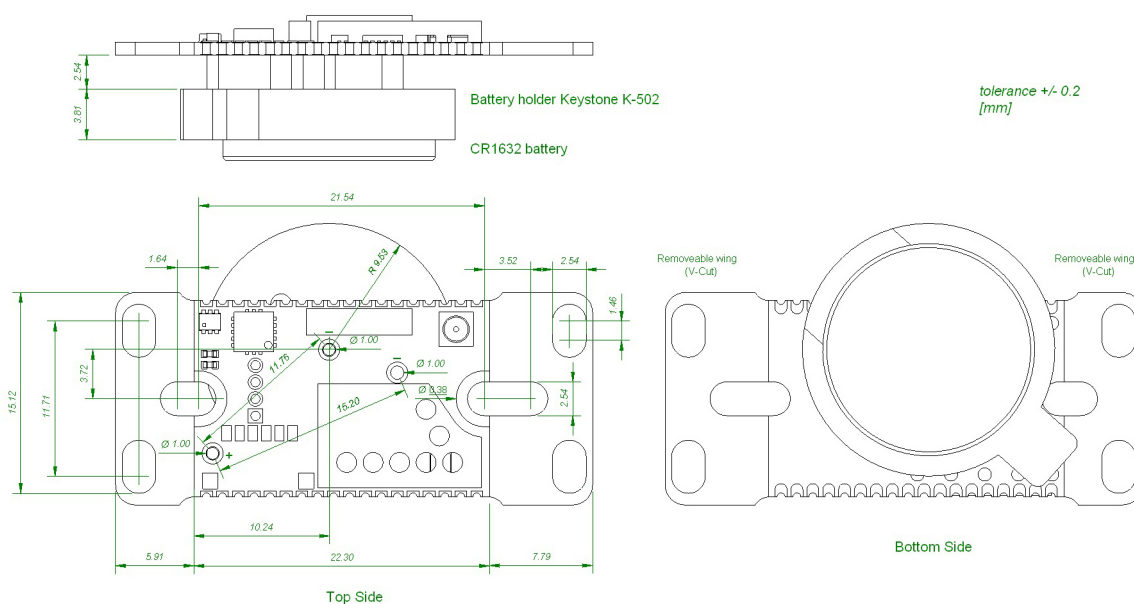


Figure 8: cB-OLx425 dimensions with mounting wings (optional) and CR1632 battery holder.

Weight: <1 g

5.1.3 Using the J6 PCB solder pads

5.1.4 Host Board

The host PCB footprint should not contain any traces or vias under the module except the pads interfacing the J6 pads to avoid contact with traces/vias on the module. The host pads which are soldered to the J6 pads should have the same size as the module and can be extended some mm outside the module for manual soldering or inspection purpose. No other pads than the J6 should be soldered to the host PCB.

5.1.5 Mounting process

We strongly recommend the modules not being soldered more than 1 time after shipping from connectBlue and that the modules are mounted just before the host product is being soldered the last time. Although, connectBlue devices will withstand up to two reflows to an absolute maximum temperature of 250°C.

- The PCB in our modules is made of FR4-type with Chemical Gold Pads.
- The modules are produced in a lead-free process with a lead-free soldering paste.
- It is recommended that the customers make their own electrical, climate, stress and vibration tests on the final assembled product to secure that the manufacturing process hasn't damaged or affected the Bluetooth module in any way.
- The modules are normally delivered without labels on each module when packaged on tape-and-reel or tray since the labels do not withstand soldering. However, if they are delivered with labels on each module, the labels should be removed before the module is processed since the labels do not withstand the heat of soldering.
- The device recommended maximum re-flow temperature is 245°C for 10 sec.
- The device absolute maximum re-flow temperature is 250°C for 3 sec.

5.2 Antenna Issues

The unit cannot be mounted arbitrary, because of the radio communication. The unit with an internal surface mounted antenna (cB-OLx425i) cannot be mounted in a metal enclosure. No metal casing or plastics using metal flakes should be used, avoid also metallic based paint or lacquer. Keep a minimum clearance of 5 mm between the antenna and the casing. Keep minimum 10 mm free space from metal around the antenna including under and above. If a metal enclosure is required, one of the external antenna options has to be used. See [Surface Mounted Antenna \(Internal\)](#) for more information on the antenna options available.

6 Bluetooth Information

6.1 General information

In the tables below you can find information about Bluetooth properties. The conducted output power of the cB-OLx425 device is ~3 dBm (2mW).

Table 10: Bluetooth information cB-OLx425

Parameter	Data
Bluetooth Low Energy radio	Texas Instrument CC2540F256
RF output power (conducted - excluding antenna gain)	~3dBm
Receive sensitive level	TBD dBm
Output frequency	2.402 - 2.480 GHz, ISM band.
Bluetooth standard	4.0 (single mode / Bluetooth Smart)

7 Regulatory Information

WARNING

Radio type approvals and certifications are currently in progress and not yet completed. The information in this section is provided only for reference of what approvals are to be available when the approval process is completed.

7.1 Declaration of Conformity

CE 0678 

We, **connectBlue AB**, of **Norra Vallgatan 64 3V**
SE-211 22 Malmö, Sweden

declare under our sole responsibility that our products:

cB-OLP425 and cB-OLS425 (cB-0950), OEM Module Adapter III (cB-0068).

to which this declaration relates, conforms to the following product specifications:

R&TTE Directive 1999/5/EC:

Effective use of frequency spectrum:
EN 300 328 V1.7.1 (2006-10)

EMC:
EN 301 489-1 V1.8.1 (2008-04)
EN 301 489-17 V2.1.1 (2009-05)
EN 61000-6-2 (2005)

Health and safety:
EN 50371:2002
EN 60950-1:2006 + A11:2009 and/or IEC 60950-1:2005 (2nd Edition)

Medical Electrical Equipment

IEC 60601-1-2 (2007)

 The license could not be verified: There is no license certificate installed for CustomWare Scaffolding Plugin for Confluence.

7.2 Safety Compliance

In order to fulfill the safety standard EN 60950-1 the unit must be supplied by a limited power source.

7.3 FCC and IC Compliance

See the [#Product Variants](#) section for information about the different product variants.

7.3.1 Compliance for cB-0950

7.3.1.1 FCC Statement for cB-0950

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.

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.

7.3.1.2 Antenna

Our module type cB-0950 is for OEM integrations only. The end-user product will be professionally installed in such a manner that only the authorized antennas are used.

7.3.1.3 Caution

Any changes or modifications NOT explicitly APPROVED by connectBlue AB could cause the module to cease to comply with FCC rules part 15, and thus void the user's authority to operate the equipment.

7.3.1.4 IC Compliance

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.

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.

This device has been designed to operate with an antenna having a maximum gain of 3.5 dBi. Having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.

To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (EIRP) is not more than that required for successful communication.

The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website www.hc-sc.gc.ca/rpb

7.3.1.5 Labeling Requirements for End Product

For an end product using the product cB-0950 there must be a label containing, at least, the following information:

This device contains
FCC ID: PVH0950
IC: 5325A-0950

The label must be affixed on an exterior surface of the end product such that it will be visible upon inspection in compliance with the modular approval guidelines developed by the FCC.

In accordance with 47 CFR § 15.19 the end product shall bear the following statement in a conspicuous location on the device:

"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."

When the device is so small or for such use that it is not practicable to place the statement above on it, the information shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC ID label must be displayed on the device.

In case, where the final product will be installed in locations where the end-user is not able to see the FCC ID and/or this statement, the FCC ID and the statement shall also be included in the end-product manual.

7.4 UL listing information

If a customer intends to UL list a product including any of the Bluetooth modules based on the PCB cB-0950 this information is useful:

The printed circuit board if produced according to the following specification:

- UL recognized ZPMV2 min. 105 °C flame class V-0 or better.

7.5 Compliance with RoHS directive



All products based on the PCB cB-0950 are produced according to the RoHS (Restriction of the use of certain Hazardous substances in electrical and electronic equipment) directive and complies with the directive.

8 Guidelines for Efficient and Safe Use

8.1 General

Read this information before using your module.

For any exceptions when using your Bluetooth module, due to national requirements or limitations, please visit www.bluetooth.org.



WARNING

Changes or modifications to the product not expressly approved by connectBlue AB will void the user's authority to operate the equipment.

8.2 Product Care

- Do not expose your product to liquid or moisture.
- Do not expose your product to extreme hot or cold temperature (see section [#Environmental](#) for further information).
- Do not expose your product to lit candles, cigarettes, cigars, open flames, etc.
- Do not drop, throw or try to bend your product since rough treatment could damage your product.
- Do not attempt to disassemble your product. Doing so will void warranty. The product does not contain consumer serviceable or replaceable components. Service should only be performed by connectBlue AB.
- Do not paint your product as the paint could prevent normal use.
- If you will not be using your product for a while, store it in a place that is dry, free from damp, dust and extreme heat and cold.
- The clearance and creepage distances required by the end product must be withheld when the module is installed.
- The cooling of the end product shall not negatively be influenced by the installation of the module when the module is installed.

8.3 Radio Frequency Exposure

The module contains a small radio transmitter and receiver. During communication with other Bluetooth products the module receives and transmits radio frequency (RF) electromagnetic fields (microwaves) in the frequency range 2400 to 2500 MHz. The output power of the radio transmitter is very low.

When using the module, you will be exposed to some of the transmitted RF energy. This exposure is well below the prescribed limits in all national and international RF safety standards and regulations.

8.4 Electronic Equipment

Most modern electronic equipment, for example, in hospitals and cars, is shielded from RF energy. However, certain electronic equipment is not. Therefore:



NOTE

This equipment emits RF energy in the ISM (Industrial, Scientific, Medical) band. Please insure that all medical devices used in proximity to this device meet appropriate susceptibility specifications for this type of RF energy.

8.5 Potentially Explosive Atmospheres

Turn off your electronic device before entering an area with potentially explosive atmosphere. It is rare, but your electronic device could generate sparks. Sparks in such areas could cause an explosion or fire resulting in bodily injury or even death.

Areas with a potentially explosive atmosphere are often, but not always, clearly marked. They include fuelling areas, such as petrol station, below deck on boats, fuel or chemical transfer or storage facilities, and areas where the air contains chemicals or particles, such as grain, dust, or metal powders.

8.6 Power Supply

The OEM module must be supplied by a limited power source according to EN 60950-1.

- Connect your power supply only to designated power-sources as marked on the product.
- Make sure all cords and cable are positioned so that they will not be stepped on, tripped over or otherwise subject to damage or stress.
- To reduce risk of electric shock, unplug the unit from any power source before attempting to clean it.