

# Rayson Bluetooth® Module

## Low Energy Smart Module

## BTM-800

### Features

- Bluetooth standard V4.0 conformity.
- CSR1000/1010 chip
- Programmable general purpose PIO controller :
- Switch-mode power supply.
- I2C for EEPROM and ICs peripherals.
- -92.5dBm Bluetooth low energy RX sensitivity.
- 12 digital PIOs
- 3 analogue AIOs
- 4 PWM modules
- Watchdog timer
- Option for built-in G-sensor
- RoHS Compliant
- Small outline. 20 (16) x 12 x2.0mm (option wo/antenna)

### Applications

- Sports and fitness
- Healthcare
- Automotive
- Home entertainment
- Office and mobile accessories
- Commercial

### Outline



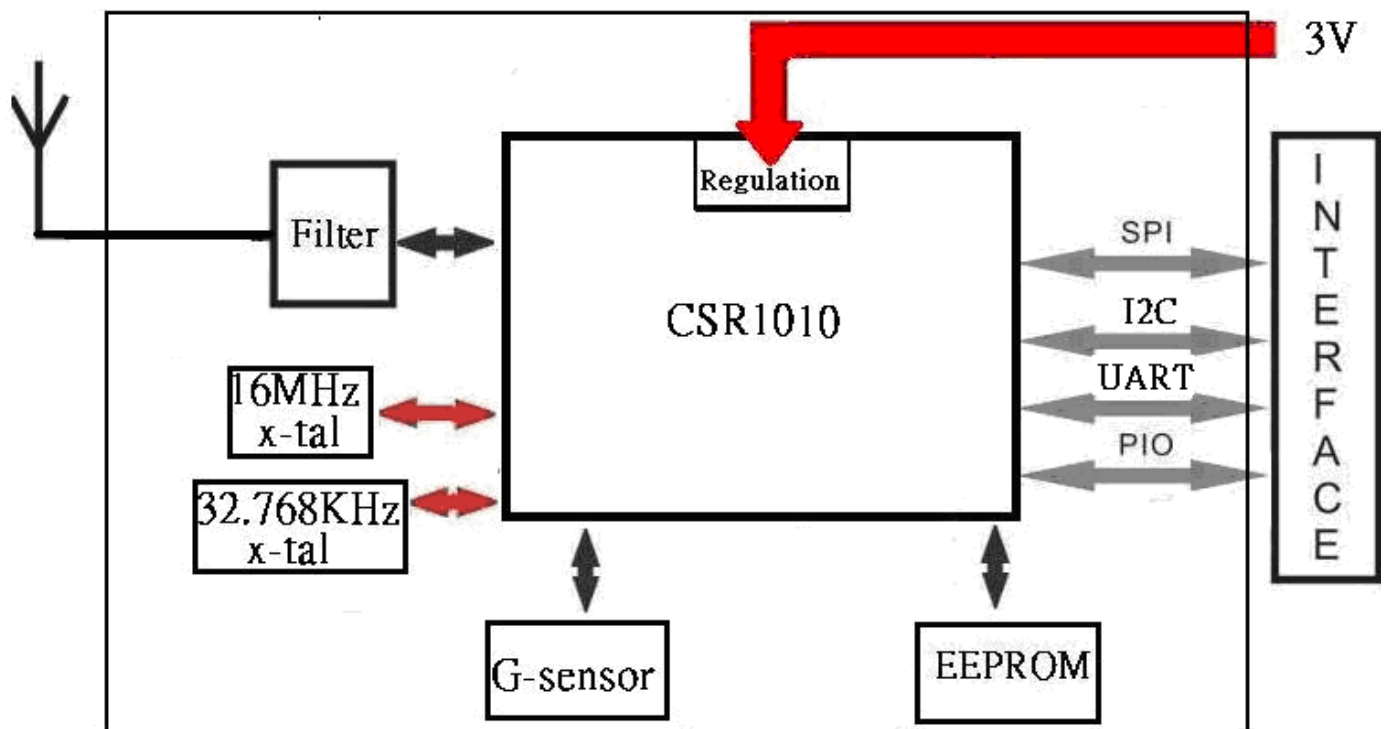
## Electrical Characteristics

Absolute Maximum Ratings		
Ratings	Min.	Max.
Storage Temperature	-40 °C	+85°C
Supply Voltage : 3V	1.8V	3.6 V
Recommended Operating Condition		
Operating Condition	Min.	Max.
Operating Temperature range	-30 °C	+85°C
Supply voltage: 3V	1.8V	3.6V

## Current Consumption (CSR1010 QFN total typical current consumption measured at the battery)

MODE	Description	Total Typical Current at 3V
Dormant	functions are shutdown. To wake up toggle the WAKE pin	<600nA
Deep sleep	VDD_PADS = ON, REFCLK = OFF, SLEEPCLK = ON, VDD_BAT = ON, RAM = ON, digital circuits = ON, SMPS = ON (low-power mode), 1ms wake-up time	<5μA
Idle	VDD_PADS = ON, REFCLK = ON, SLEEPCLK = ON, VDD_BAT = ON, RAM = ON, digital circuits = ON, MCU = IDLE, <1μs wake-up time	~1mA
RX / TX active	-	~16mA @ 3V peak current

## Block Diagram

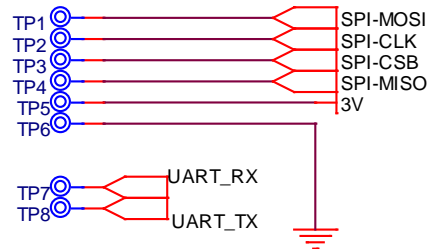
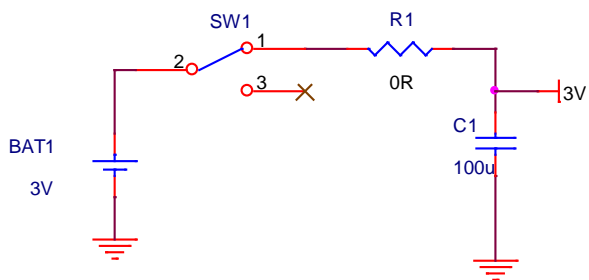
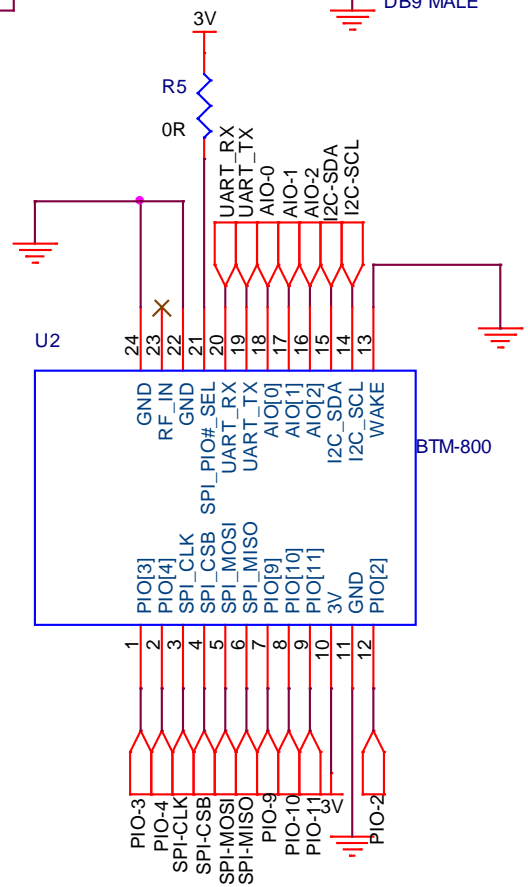
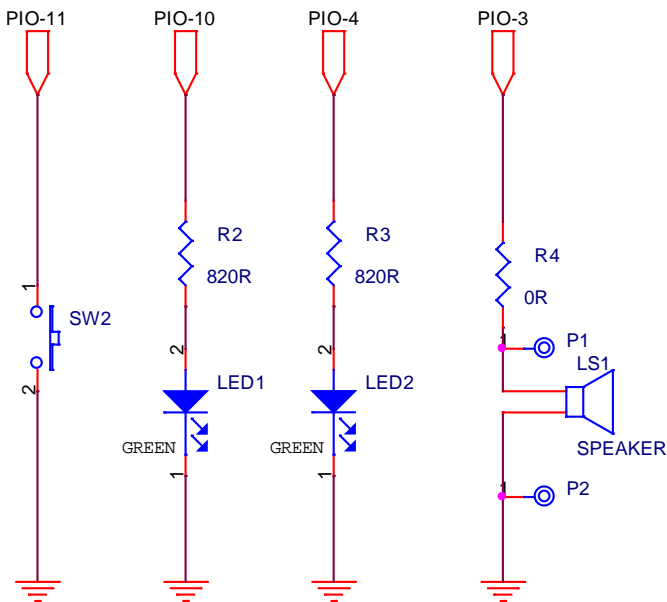
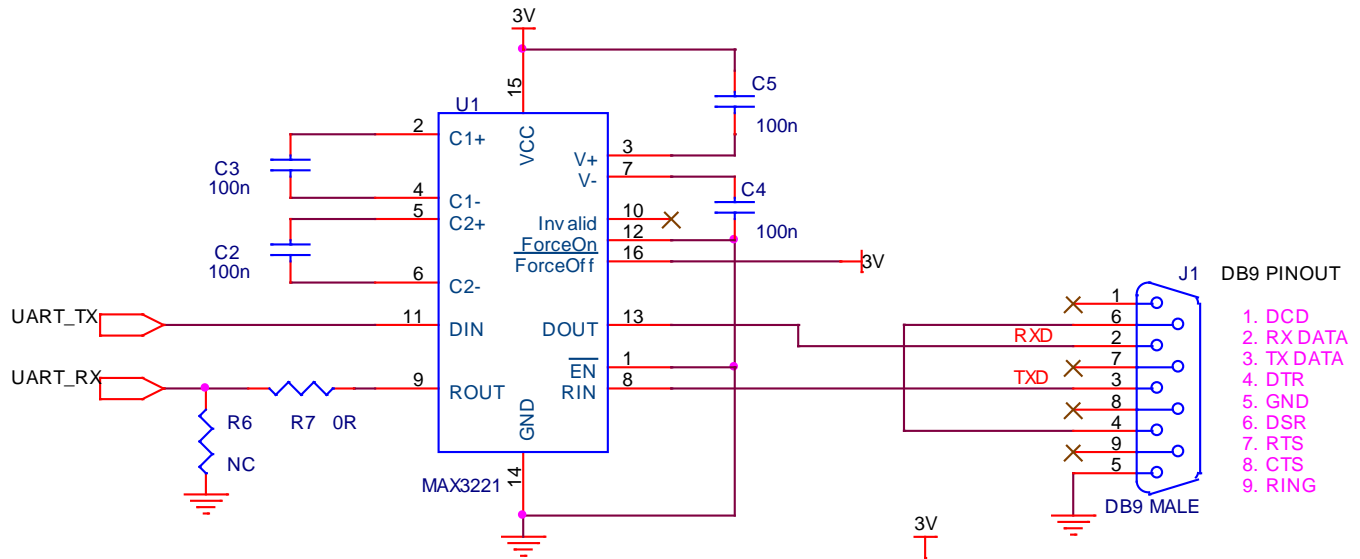


## Radio Characteristics

- Note:** (a) Up to five exceptions are allowed in the Bluetooth V4.0+EDR specification on receiver part..
- (b) Measured at  $F_0 = 2441\text{MHz}$ .
- (c) Measured at  $f_1-f_2=5\text{MHz}$ . Measurement is performed in accordance with Bluetooth RF test RCV/CV/05.., i.e., wanted signal at  $-64\text{dBm}$
- (d) Measured at unbalanced port of balun. Integrated in  $100\text{KHz}$  bandwidth and normalised to  $1\text{Hz}$ . actual figure is typically below  $-130\text{dBm/Hz}$  except for peaks  $-80\text{dBm}$  at  $1600\text{MHz}$ ,  $-80\text{dBm}$  in band at  $2.4\text{GHz}$  and  $-80\text{dBm}$  at  $3.2\text{GHz}$

- Note:** (1) Measurements methods are in accordance with the Bluetooth V4.0+EDR specification.
- (2) Up to five exceptions are allowed in the Bluetooth V4.0+EDR specification on receiver part.
- (3) Measured at  $F_0 = 2405\text{MHz}, 2441\text{MHz}, 2477\text{MHz}$ .

# Application circuit

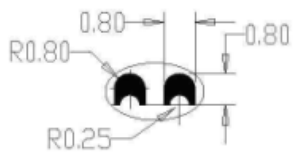
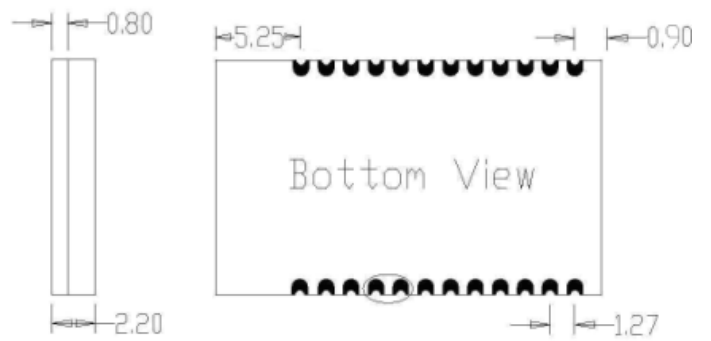
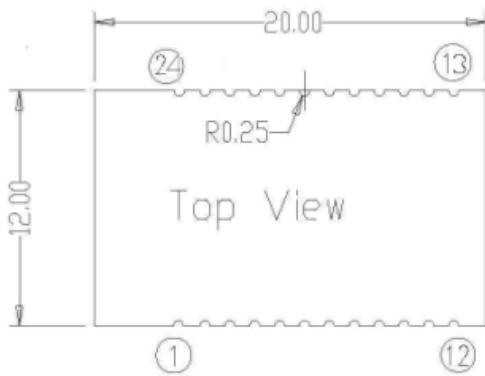


## BTM-800 Pins Function

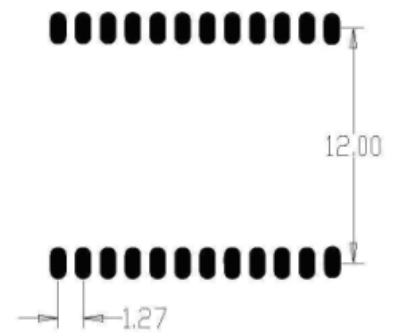
No.	Pin Name	Pin Type	Pin description
1	PIO[3]	Bi-directional	Programmable input/output line or PWN signal output
2	PIO[4]	Bi-directional	Programmable input/output
3	SPI_CLK( PIO5)	Bi-directional	Programmable input/output or debug SPI_CLK selected
4	SPI_CSB( PIO6)	Bi-directional	Programmable input/output or debug SPI chip selected
5	SPI_MOSI( PIO7)	Bi-directional	Programmable input/output or debug SPI_MOSI selected
6	SPI_MISO(PIO8)	Bi-directional	Programmable input/output or debug SPI_MISO selected
7	PIO[9]	Bi-directional	Programmable input/output line
8	PIO[10]	Bi-directional	Programmable input/output line
9	PIO[11]	Bi-directional	Programmable input/output line or button input
10	3V	Power input	Connect to external 3V ( battery ) and regulator enable
11	GND	GND output	Common ground
12	PIO2	Bi-directional	Provide I2C Power can be used for power saving indication
13	WAKE	Bi-directional	Input to wake module from demand/hibernate mode. if no use, pls pull down.
14	I2C-SCL	Bi-directional	I2C clock or SPI serial flash clock output(SF_CLK)
15	I2C-SDA	Bi-directional	I2C data input/output or SPI serial flash data output(SF_DOUT)
16	AIO(2)	Bi- Analogue	Analogue Programmable input/output line
17	AIO(1)	Bi- Analogue	Analogue Programmable input/output line
18	AIO(0)	Bi- Analogue	Analogue Programmable input/output line
19	UART TX	Bi-directional	Programmable input/output or UART TX
20	UART RX	Bi-directional	Programmable input/output or UART RX
21	SPI_PIO#_SEL	Bi-directional	Programmable input/output or SPI/PIO selected, set HI for SPI
22	GND	GND	Common ground
23	RF_IN	Analogue	Antenna interface Request
24	GND	GND	Common ground

# Dimension:

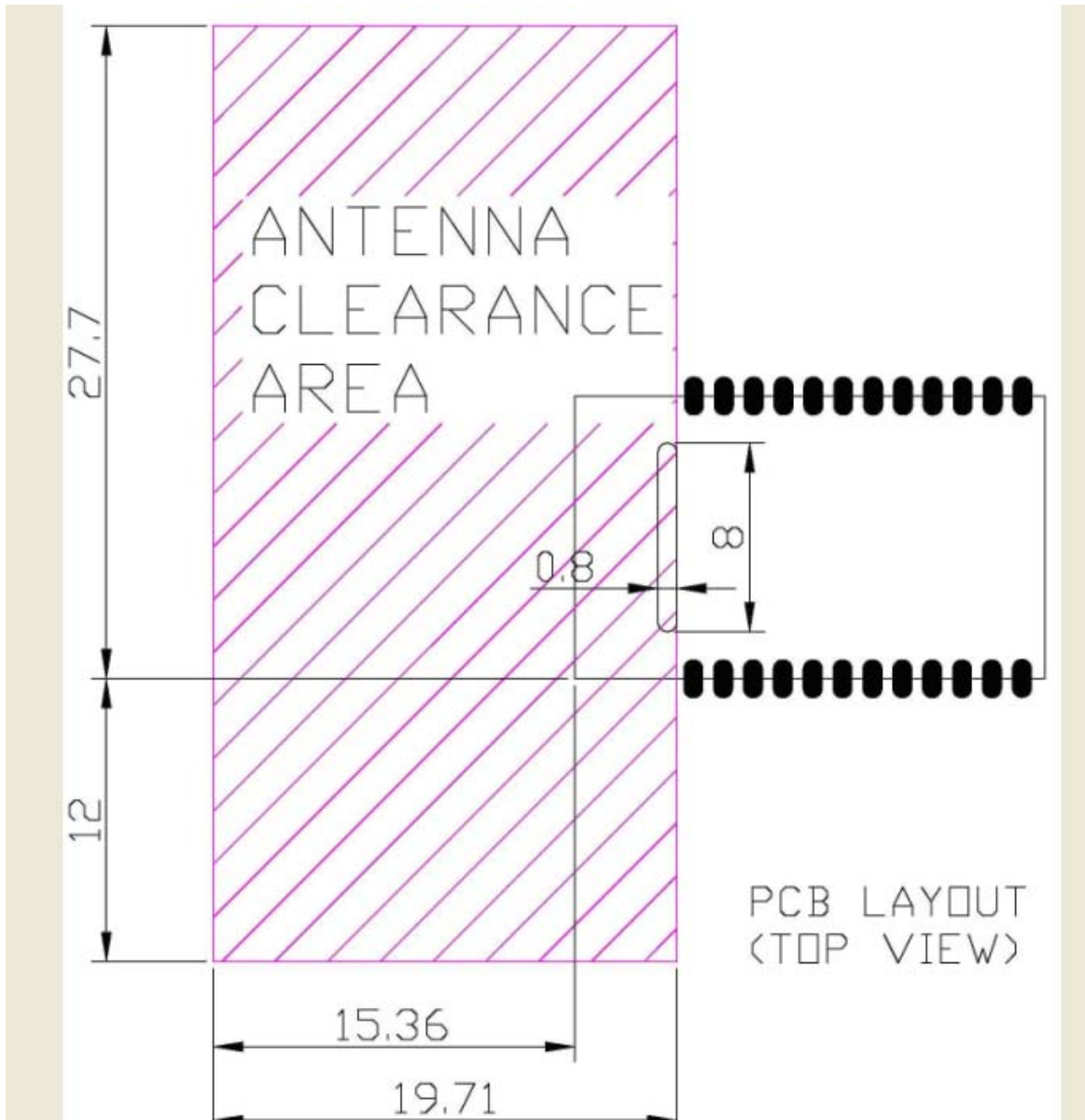
Unit: mm



2 : 1



PCB Layout (Top View)



## Document History

Revision	Date	Change Reason
Rev01	2012/10/12	Draft release
Rev02	2013/10/10	Added CSR1010