



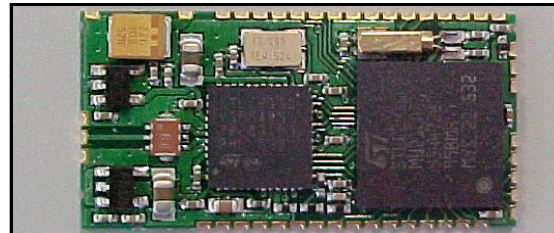
## Bluetooth class 2 module

### Features

- Bluetooth specification V.1.2 compliant
- Output power class 2 (0 dBm typ.)
- Transmission rate up to 721 Kbps
- Working distance up to 10 meters
- ACL & SCO links
- AFH interference resistance
- Supports USB (1.1) /UART/PCM (Pulse Code Modulation)/SPI/I<sup>2</sup>C interfaces
- Optimized link manager and control
- Support wireless LAN coexistence in collocated scenario
- Integrated 4 Mbit flash, 64 KBytes RAM, KBytes ROM
- 3.3V single supply voltage
- Hardware based UART flow control

### Applications

- Serial cable replacement
- Industrial control
- POS terminals
- Data acquisition equipment
- Internet access points
- Machine control
- Sensor monitoring
- Robotic and picnic control
- Security control
- Patient monitoring
- Audio gateway applications
  - Hands-free sets
  - Wireless printers
  - Cordless terminals
- Laptops, PCs and accessories
- Hand held devices and accessories
- HID devices (keyboard, mouse, joystick, game controller)



### Order codes

- GS-BT2416C2

### Description

ST Bluetooth Modules are highly integrated for easy implementation in embedded applications. Class 2 modules enable wireless communication with other Bluetooth enabled devices up to 10 m away. The GS-BT2416C2 integrates on a unique FR4 PCB support: BT 1.2 radio and baseband, memory, 32 KHz and 13 MHz oscillators, as well Vreg. The antenna has not been included in order to grant a degree of freedom to the user in selecting the most suitable design and placement between external and integrated antenna that could be SMA aerial or a low cost antenna trace designed on PCB. For more details please refer to GS-BT2416C2DB Application Note. Modules are coming without any SW to offer a further freedom degree to user that can embed his own solution or any available BT certified SW upon his choose and preference.

### Certification

- CE Compliant IMQ Exp. Opinion 0081-AREF0017
  - Safety EN60950-1 (2001)
  - EMC EN301 489 17V1.2.1
  - Radio ES 300 328 V1.6
- FCC certified on GS-BT2416C2DB ( for a more exhaustive explanation , please refer to GS-BT2416C2DB Application Note )
- FCC ID: S9N16C2
- BQB qualified module BQB ID: B012535

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# 1 Maximum ratings

## 1.1 Absolute maximum ratings

Operation of the module beyond these limits is not guaranteed.

Sustained exposure to these limits will adversely affect device reliability.

**Table 1. Absolute maximum ratings**

Symbol	Parameter	Values		Unit
		Min	Max	
$V_{DD}$	Module supply voltage		4	V
$V_{IN}$	Input voltage on any digital pin	$V_{SS}-0.5$	$V_{DD}+0.3$	V
$T_{stg}$	Storage temperature	-40	+85	°C
$T_{sold}$	Soldering temperature		240	

## 1.2 Operating ranges

Operating ranges define the limits for functional operation and parametrics characteristics of the module.

Functionality outside these limits is not implied

**Table 2. Operating ranges**

Symbol	Parameter	Conditions	Values			Unit
			Min	Typ	Max	
$V_{DD}$	Module supply voltage	$-20^{\circ}\text{C} < T < 70^{\circ}\text{C}$	3.13	3.3	3.47	V
$T_{stg}$	Operating ambient temperature		-20		+70	°C

## 2 I/O specification

**Table 3. DC Input / Output specification**

Symbol	Parameter	Conditions	Values			Unit
			Min	Typ	Max	
$V_{il}$	Low level input voltage	$3.13\text{ V} < V_{DD} < 3.47\text{ V}$			0.8	V
$V_{ih}$	High level input voltage	$3.13\text{ V} < V_{DD} < 3.47\text{ V}$	2			V
$V_{hyst}$	Schmitt trigger hysteresis	$3.13\text{ V} < V_{DD} < 3.47\text{ V}$	0.4			V
$V_{ol}$	Low level output voltage	Io load = pin drive capability			0.15	V
$V_{oh}$	High level output voltage	Io load = pin drive capability	$V_{DD} - 0.15$			V

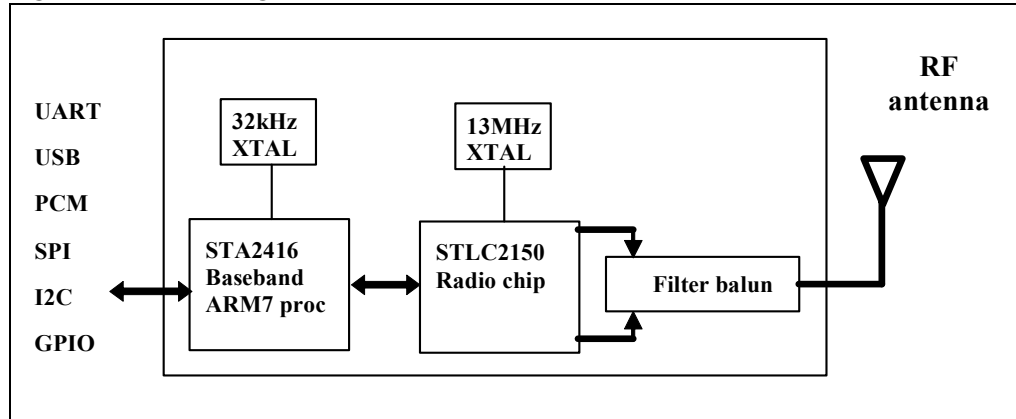
## 3 Bluetooth section

**Table 4. Bluetooth section**

Symbol	Parameter	Conditions	Values			Unit
			Min	Typ	Max	
$P_{tr}$	Transmission power	$3.13\text{V} < V_{DD} < 3.47\text{V}$		0		dBm
Sens	Sensitivity	$3.13\text{V} < V_{DD} < 3.47\text{V}$	-74			dBm
Flim	Frequency limit	$3.13\text{V} < V_{DD} < 3.47\text{V}$	2402		2480	MHz
CHs	channel space			1		MHz
Hop	Hopping			1600		hops/sec
RF ck	RF crystal oscillator			13		MHz
BB ck	Baseband crystal oscillator	C2		32		kHz
Tra	Transmission rate asynchronous				721	kbits/sec
Trs	Transmission rate synchronous				432	kbits/sec
Iop	Operation current TX mode			90		mA
	Operation current RX mode			50		mA

## 4 Block diagram

Figure 1. Block diagram



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## 5 Pin settings

**Table 5. Pin description**

Pin N°	Name	I/O	Description
1	TDI		JTAG pin
2	TMS		JTAG pin
3	NTRST		JTAG pin
4	TDO		JTAG pin
5	TCK		JTAG pin If not used connect to VSS1
6	INT1	I	External Interrupt signal Internally connected to VSS1 with 10 K $\Omega$ If not used connect to VSS1
7	I2C_dat	I/O	I2C bus interface data To be connected to VDD with 10 K $\Omega$ resistor
8	I2C_clk	I/O	I2C bus interface clock To be connected to VDD with 10 K $\Omega$ resistor
9	PCM_CLK	I/O	PCM clock
10	PCM_SYNC	I/O	PCM 8kHz synch
11	PCM_B	I/O	PCM Data In/Out
12	PCM_A	I/O	PCM Data In//Out
13	UART2_RXD	I	UART2 data input If not used connect to VDD
14	UART2_TXD	O	UART2 data output
15	UART2_I1	I	UART2 clear to send input If not used connect to VDD
16	UART2_O2	O	UART2 ready to send output
17	SPI_FRM	I/O	Synchronous Serial Interface frame synch
18	SPI_CLK	I/O	Synchronous Serial Interface clock
19	SPI_TXD	O/T	Synchronous Serial Interface transmit data
20	SPI_RXD	I	Synchronous Serial Interface receive data If not used connect to VSS1
21	USB_DN	I/O	USB data - If not used connect to VSS1
22	USB_DP	I/O	USB data + If not used connect to VSS1
23	RESET	I	Reset pin ( active low)
24	BOOT	I	External downloading Enable ( active low) Internally pul-upped to 1.8V by 10kohm
25	GPIO0	I/O	General purpose I/O line

**Table 5. Pin description (continued)**

Pin N°	Name	I/O	Description
26	GPIO1	I/O	General purpose I/O line
27	GPIO2	I/O	General purpose I/O line
28	GPIO3	I/O	General purpose I/O line
29	GPIO4	I/O	General purpose I/O line
30	GPIO5	I/O	General purpose I/O line
31	GPIO6	I/O	General purpose I/O line
32	GPIO7	I/O	General purpose I/O line
33	GPIO8	I/O	General purpose I/O line
34	GPIO9	I/O	General purpose I/O line
35	LP CLOCK OUT	--	32 kHz - out
36	GPIO11	I/O	General purpose I/O line
37	GPIO12	I/O	General purpose I/O line
38	GPIO13	I/O	General purpose I/O line
39	GPIO14	I/O	General purpose I/O line
40	GPIO15	I/O	General purpose I/O line
41	Vdd	--	Module supply voltage- Single 3.3V
42	Vss1	--	GND
43	Vss2 ( RF GND)	--	RF GND
44	+ANTENNA	--	Antenna out
45	Vss2 (RF GND)	--	RF GND

## 6 Mechanical dimensions

Figure 2. Mechanical dimensions

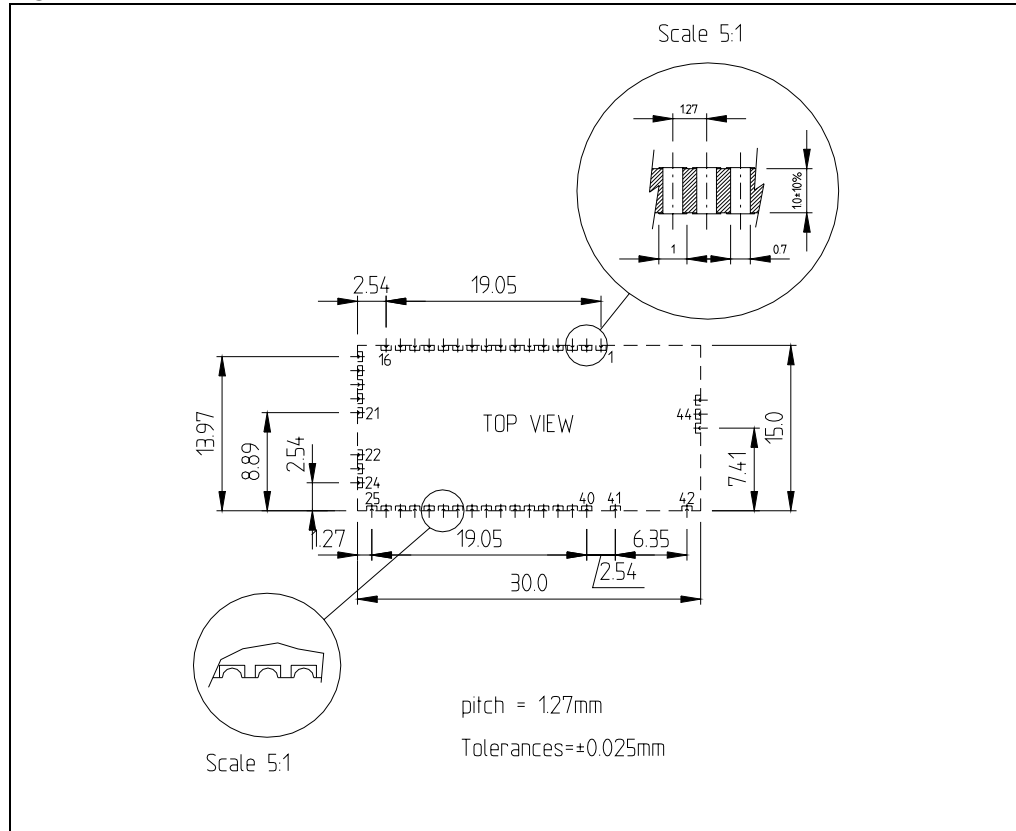
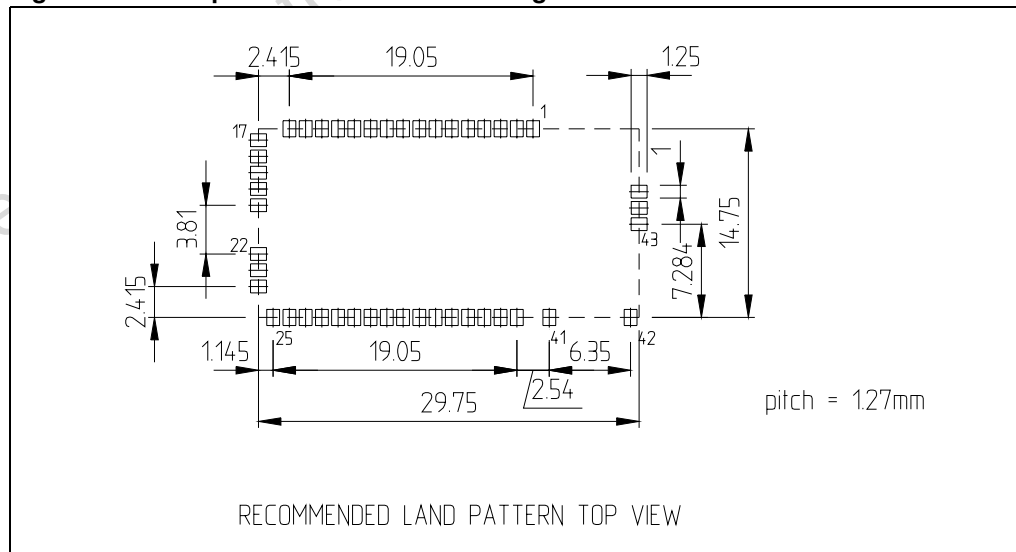


Figure 3. Land pattern and connection diagram





## 7 Revision history

Table 6. Document revision history

Date	Revision	Changes
20-Dec-2006	1	First release
28-Feb-2007	2	Typo <a href="#">Table 5: Pin description on page 6</a>
31-Aug-2007	3	Updates involved: Cover page, <a href="#">Table 4 on page 4</a> , <a href="#">Table 5 on page 6</a> .

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