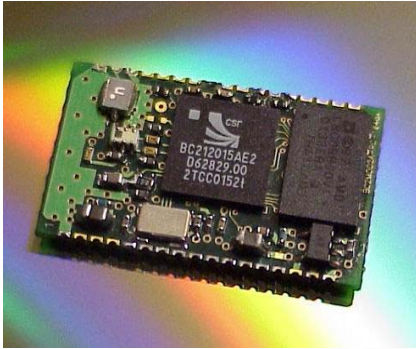




## **BLUETOOTH MODULE**

**Model BT-20**

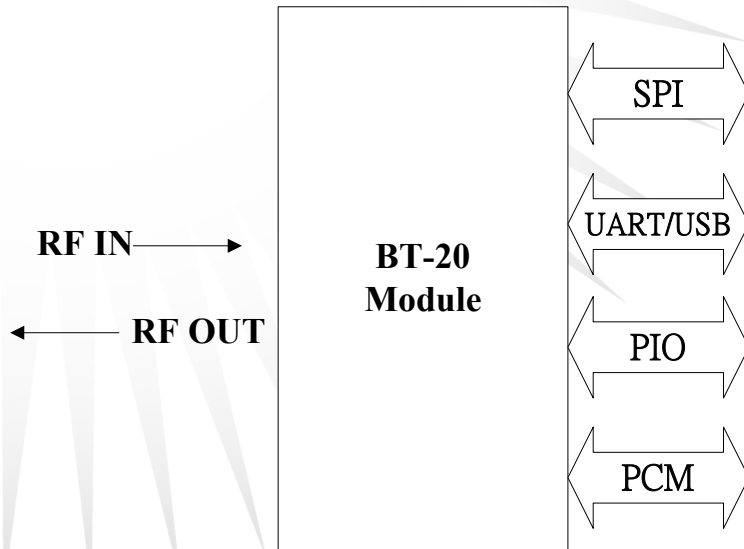
### **Device Features**

- ◆ 3.3V power operation
- ◆ Fully qualified by BQB
- ◆ Full speed Bluetooth operation with full piconet support
- ◆ 8M flash memory for application firmware

### **Applications**

- ◆ PC Notebooks
- ◆ Cordless Headsets
- ◆ Bluetooth hand free
- ◆ Personal Digital Assistants(PDA)
- ◆ RS-232 Cable replacement
- ◆ USB Dongle
- ◆ Bluetooth HID device(Keyboard, mouse and Joystick)
- ◆ Other Bluetooth specification profile

## **BT-20 Bluetooth Module Diagram**



## **Key features**

### ***Radio***

- ◆ No external trimming is required in production.
- ◆ UP to +4dBm RF transmit power
- ◆ Supports Class 2 and Class 3 Radios

### ***Baseband/software and physical Interfaces***

- ◆ 8M bit slash memory for complete system solution
- ◆ Transcoders for A-law, u-law and linear voice from host and A-law, u-law and CVSD voice over air
- ◆ UART interface with programmable baud rate up to 1.5M
- ◆ Full speed USB interface support

## Device Pinout Diagram

### PIN FUNCTIONS VIEWED FROM COMPONENT SIDE

|    |            |          |    |
|----|------------|----------|----|
| 1  | } GND      | GND      | 34 |
| 2  | } N.C.     | RF_Out   | 33 |
| 3  | } N.C.     | GND      | 32 |
| 4  | } AIO(0)   | PIO(0)   | 31 |
| 5  | } AIO(1)   | PIO(1)   | 30 |
| 6  | } RESET    | PIO(2)   | 29 |
| 7  | } SPI_MISO | PIO(3)   | 28 |
| 8  | } SPI_CSB  | PIO(4)   | 27 |
| 9  | } SPI_CLK  | PIO(5)   | 26 |
| 10 | } SPI_MOSI | PIO(6)   | 25 |
| 11 | } UART_CTS | PIO(7)   | 24 |
| 12 | } UART_TX  | USB_DN   | 23 |
| 13 | } UART_RTS | USB_DP   | 22 |
| 14 | } UART_RX  | PCM_CLK  | 21 |
| 15 | } 1V8      | PCM_IN   | 20 |
| 16 | } 3V3      | PCM_SYNC | 19 |
| 17 | } GND      | PCM_OUT  | 18 |

### **Device Pinout Diagram**

| Pin No. | Pin name | Pad type                                | Description                                             |
|---------|----------|-----------------------------------------|---------------------------------------------------------|
| 1       | GND      | GND                                     | Ground connection                                       |
| 2       | NC       | NC                                      | No connection                                           |
| 3       | NC       | NC                                      | No connection                                           |
| 4       | AIO(0)   | Bi-direction                            | Programmable I/O line                                   |
| 5       | AIO(1)   | Bi-direction                            | Programmable I/O line                                   |
| 6       | RESET    | COMS input with weak internal pull-down | Module reset if high>5ms to cause a reset               |
| 7       | SPI_MISO | COMS input with weak internal pull-down | Serial Peripheral Interface data output                 |
| 8       | SPI_CSB  | COMS input with weak internal pull-down | Chip select for Synchronous Serial Interface active low |
| 9       | SPI_CLK  | COMS input with weak internal pull-down | Serial Peripheral Interface clock                       |
| 10      | SPI_MOSI | COMS input with weak internal pull-down | Serial Peripheral Interface data input                  |
| 11      | UART_CTS | CMOS input                              | UART clear to send                                      |
| 12      | UART_TX  | CMOS output                             | UART data output                                        |
| 13      | UART_RTS | CMOS output                             | UART request to send                                    |
| 14      | UART_RX  | CMOS input                              | UART data input                                         |
| 15      | 1.8V     | Voltage output for testing              | 1.8 V output when 3.3V VDD connected                    |
| 16      | 3.3V     | VDD                                     | Positive power supply                                   |
| 17      | GND      | GND                                     | Ground connection                                       |

| Pin No. | Pin name | Pad type     | Description                         |
|---------|----------|--------------|-------------------------------------|
| 18      | PCM_OUT  | CMOS output  | PCM Synchronous data output         |
| 19      | PCM_SYNC | Bi-direction | PCM synchronous data SYNC           |
| 20      | PCM_IN   | COMS input   | PCM Synchronous data input          |
| 21      | PCM_CLK  | Bi-direction | PCM Synchronous data clock          |
| 22      | USB_DP   | Bi-direction | USB data plus                       |
| 23      | USB_DN   | Bi-direction | USB data minus                      |
| 24      | PIO(7)   | Bi-direction | Programmable I/O line               |
| 25      | PIO(6)   | Bi-direction | Programmable I/O line               |
| 26      | PIO(5)   | Bi-direction | Programmable I/O line               |
| 27      | PIO(4)   | Bi-direction | Programmable I/O line               |
| 28      | PIO(3)   | Bi-direction | Programmable I/O line               |
| 29      | PIO(2)   | Bi-direction | Programmable I/O line               |
| 30      | PIO(1)   | Bi-direction | Programmable I/O line               |
| 31      | PIO(0)   | Bi-direction | Programmable I/O line               |
| 32      | GND      | Ground       | Ground connections for RF circuitry |
| 33      | RF       | RF           | RF single Input and output          |
| 34      | GND      | Ground       | Ground connections for RF circuitry |

## Electrical Characteristics

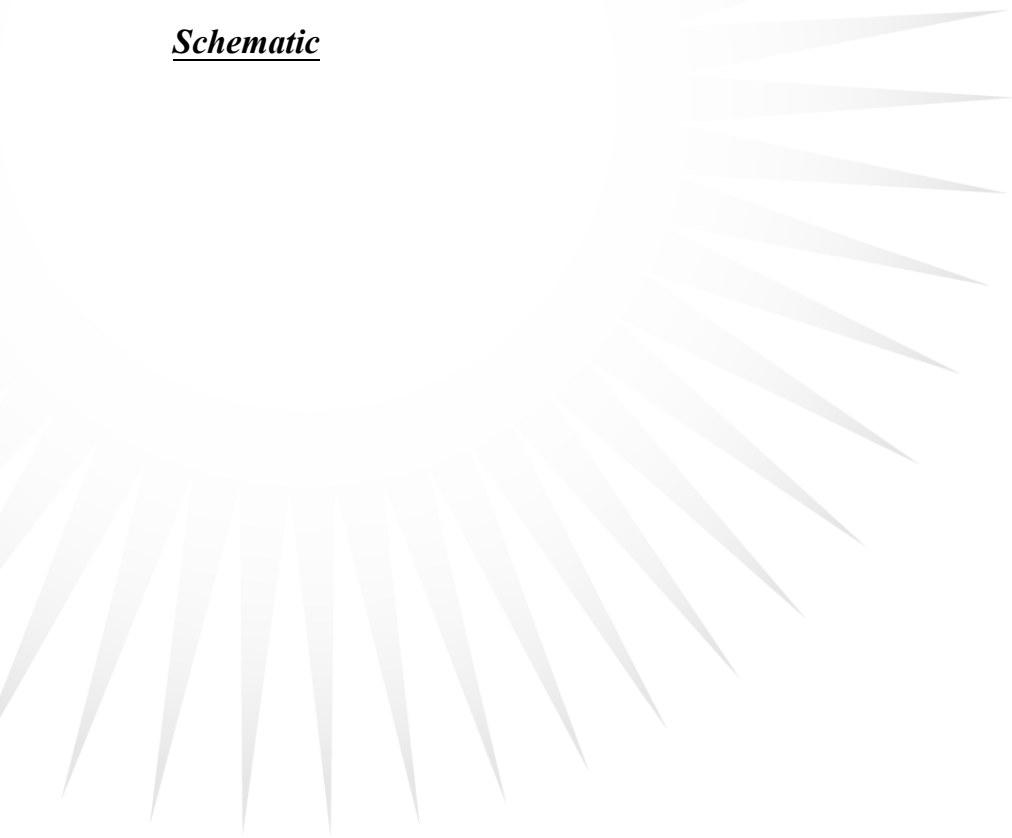
| Absolute Maximum Ratings |       |        |
|--------------------------|-------|--------|
| Rating                   | Min   | Max    |
| Storage Temperature      | -40°C | +120°C |
| Operating Temperature    | -40°C | +105°C |

| Recommended Operating Conditions |       |      |
|----------------------------------|-------|------|
| Operating Condition              | Min   | Max  |
| Supply Voltage:                  | 3.0 V | 3.6V |

| Radio Characteristics,    VDD=3.3V            Temperature=+20 °C |                 |     |     |     |                         |      |
|------------------------------------------------------------------|-----------------|-----|-----|-----|-------------------------|------|
| Receiver                                                         | Frequency (GHz) | Min | Typ | Max | Bluetooth Specification | Unit |
| Sensitivity at 0.1% BER                                          | 2.402           | -   | -83 | -80 | ≤ -70                   | dBm  |
|                                                                  | 2.441           | -   | -83 | -82 |                         | dBm  |
|                                                                  | 2.480           | -   | -83 | -82 |                         | dBm  |
| Maximum received signal at 0.1% BER                              |                 | -   | -5  |     | ≤ -20                   | dBm  |

| <b>Current Consumption VDD=3.3V</b>                      |     |      |
|----------------------------------------------------------|-----|------|
| Mode                                                     | Avg | Unit |
| SCO connection HV3(Slave)                                | 28  | mA   |
| SCO Connection HV3(Master)                               | 28  | mA   |
| ACL data transfer 115.2kbps UART(Master)                 | 15  | mA   |
| ACL data transfer 720kbps USB(Slave)                     | 61  | mA   |
| ACL data transfer 720kbps USB(Master)                    | 61  | mA   |
| ACL connection, Sniff mode 40ms interval, 38.4kbps UART  | 4   | mA   |
| ACL connection, Sniff mode 1.28s interval, 38.4kbps UART | 0.5 | mA   |
| Parked Slave, 1.28s beacon interval, 38.4kbps UART       | 0.6 | mA   |
| Deep Sleep mode                                          | 20  | uA   |
| Peak RF current during TX burst(+4dBm)                   | 70  | mA   |
| Peak RF current during TX burst(0dBm)                    | 60  | mA   |
| Peak RF current during RX burst(-80dBm)                  | 55  | mA   |

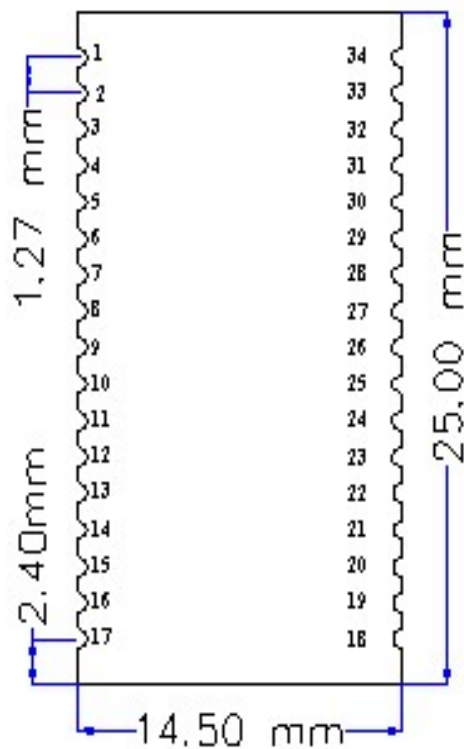
## *Schematic*



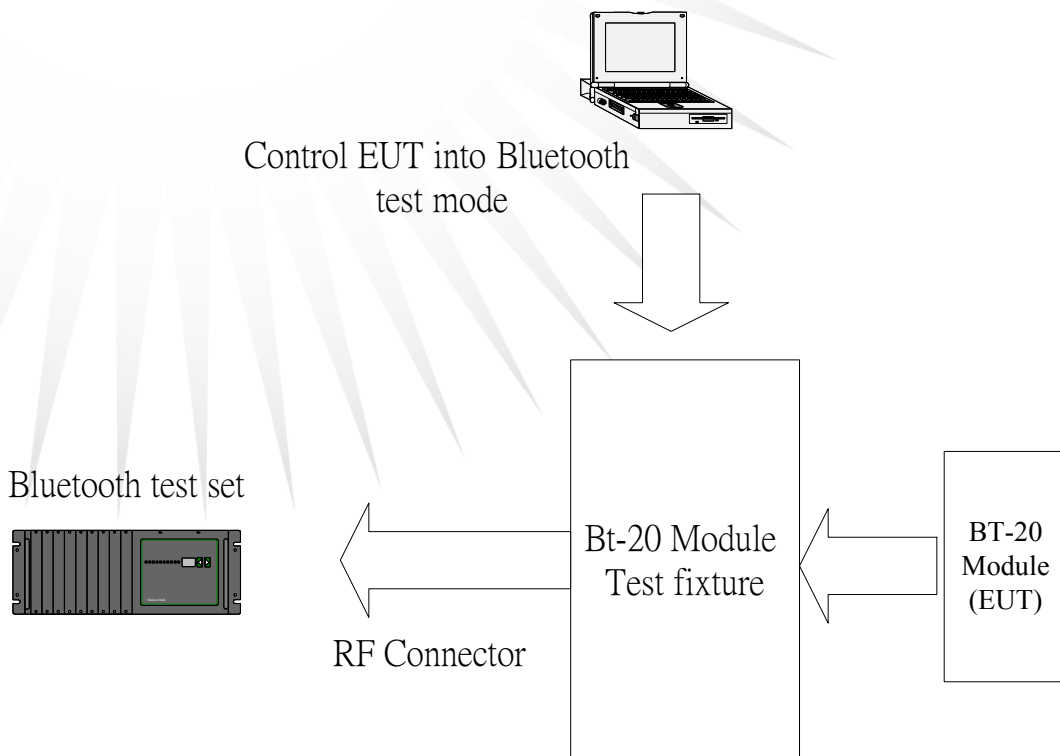


## Package Dimensions

Top View

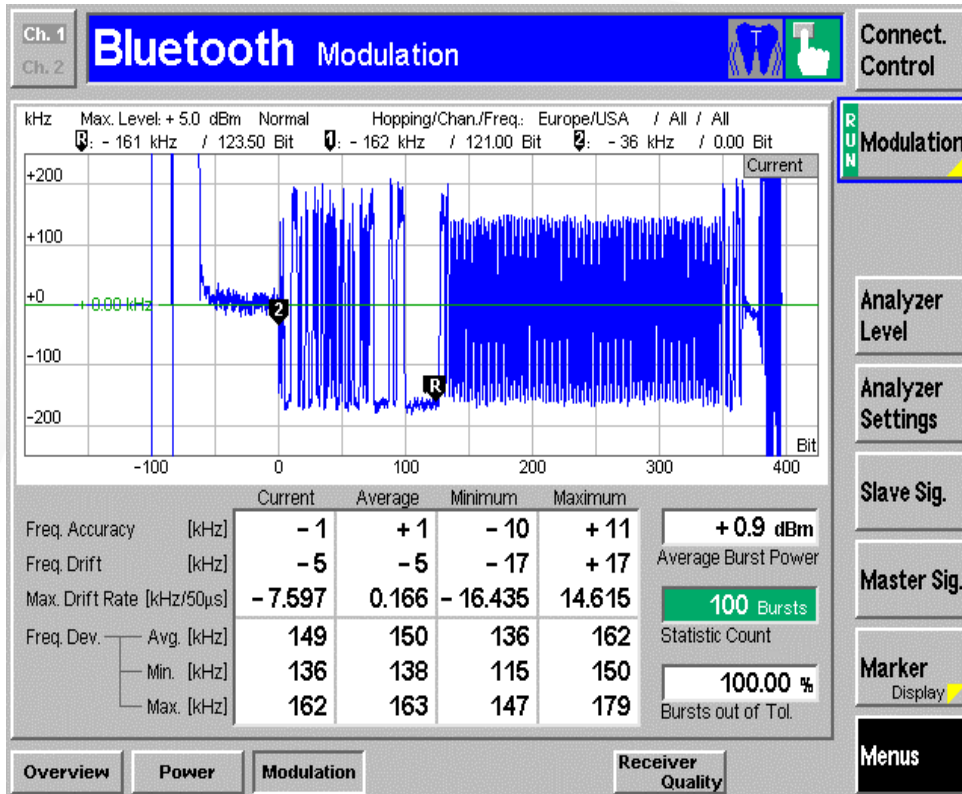


## Bluetooth module testing block



Remark: RF Connector in test fixture and cable lose about 2.5dBm

# Bluetooth Modulation Characteristics(by R&S CMU-200)



# BQB (Bluetooth Qualification Body) Certificate



## TEST CERTIFICATE

Nº: 17413RTC

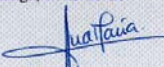
|                                            |                                                                          |
|--------------------------------------------|--------------------------------------------------------------------------|
| Product                                    | : BT-20 Bluetooth Module                                                 |
| Trade Mark                                 | : N/A                                                                    |
| Model / Type Ref.                          | : BT-20                                                                  |
| Manufacturer                               | : Rainbright Enterprise Co., Ltd.                                        |
| Tested on request of                       | : Rainbright Enterprise Co., Ltd.                                        |
| Full identification of the product - n/s   | : Bluetooth Module                                                       |
| Standard(s)                                | : Bluetooth RF Specification 1.1 (revision 0.91) +<br>Applicable Erratas |
| Test certificate based on the test reports | : Nº. 17413RTC and Nº. 17541RET dated: 2002-10-11                        |
| Summary                                    | : COMPLIANT                                                              |

CETECOM is a testing laboratory competent to carry out the tests described in the report.

CETECOM is a testing laboratory authorized by *Bluetooth Special Interest Group Inc.* to carry out the tests of Bluetooth RF Conformance testing.

Note: This test certificate is applicable to the unit(s) of the product submitted and the corresponding tests shown in the reference report.

Málaga, 2002-10-11

  
Ana Rivera  
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Telecommunications Director