

## MPE REPORT

Report No.: SRTC2023-9004(F)-23040601(I)  
Product Name: Bluetooth Module  
Model Name: BR2551e-sc  
Applicant: BARROT TECHNOLOGY CO., LTD.  
Manufacturer: BARROT TECHNOLOGY CO., LTD.  
FCC ID : 2AOXV-BR2551E-SC

Reference Specification
FCC Part§1.1310

The State Radio\_monitoring\_center Testing Center (SRTC)

15th Building, No.30 Shixing Street, ShijingshanDistrict, Beijing,P.R.China

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# 1 GENERAL INFORMATION

## 1.1 Notes of the test report

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The certification and accreditation identifiers used in this report shall not be applicable to the tested or calibrated samples thereof. The manufacturer shall not mark the tested samples or items (or a separate part of the item) with the identifiers of certification and accreditation to mislead relevant parties about the tested samples or items.

## 1.2 Information about the testing laboratory

Company:	The State Radio_monitoring_center Testing Center (SRTC)
Designation number:	CN1267
Registration number:	239125
Certificate Number:	5055.02
Address:	15th Building, No.30 Shixing Street, Shijingshan District, Beijing P.R.China
Contacted person:	Liu Jia
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## 1.3 Applicant's details

Company:	BARROT TECHNOLOGY CO., LTD.
Address:	A1009, Block A, Jia Hua Building, No.9 Shangdisanjie St, Haidian District, Beijing

## 1.4 Manufacturer's details

Company:	BARROT TECHNOLOGY CO., LTD.	Qing
Address:	A1009, Block A, Jia Hua Building, No.9 Shangdisanjie St, Haidian District, Beijing	No.2 Zone

## 1.5 Test environment

Date of Receipt of test sample at SRTC:	2023/04/06
Testing Start Date:	2023/04/07
Testing End Date:	2023/04/10

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient	25	40
Maximum Extreme	85	---
Minimum Extreme	-40	---

Normal Supply Voltage (V d.c.):	3.3
Maximum Extreme Supply Voltage (V d.c.):	3.6
Minimum Extreme Supply Voltage (V d.c.):	1.9

## 2 DESCRIPTION OF THE EQUIPMENT UNDER TEST

### 2.1 Final equipment build status

BT:

Frequency Range:	2.402GHz~2.480GHz
Number of Channel:	79
Modulation Type:	GFSK, $\pi/4$ DQPSK, 8DPSK
Duplex Mode:	TDD
Channel Spacing:	1MHz
Data Rate:	1Mbps, 2 Mbps, 3 Mbps
Antenna Gain:	1.32dBi
Power Supply:	USB
Software Revision:	BR8051A01B_00_210727_r6853
Hardware Revision:	V1.2

BLE:




Frequency Range:	2.402GHz~2.480GHz
Number of Channel:	40
Modulation Type:	GFSK
Equipment Class:	DTS
Channel Spacing:	2MHz
Data Rate:	LE 1Mbps/2Mbps
Antenna Gain:	1.32dBi
Power Supply:	USB
Software Revision:	BR8051A01B_00_210727_r6853
Hardware Revision:	V1.2

## 3 SPECIFICATION

Specification	Version	Title
Part 1.1310	Latest	Radio frequency radiation exposure limits.

## 4 RESULT SUMMARY

Case	Verdict
MPE	Pass

This Test Report Is Issued by: Mr. Peng Zhen 	Checked by: Mr. Li Bin 
Tested by: 	Issued date: 2023/04/11

## 5 CALCULATION RESULT

### 5.1 Average output power

#### BT

Test Mode	Frequency (MHz)	Average power output (dBm)	Tune up (dBm)
GFSK(DH5)	2402MHz	2.86	3.0
$\pi/4$ DQPSK(2DH5)	2402MHz	-0.12	0
8DPSK(3DH5)	2402MHz	0.57	1.0
GFSK(DH5)	2441MHz	3.37	3.5
$\pi/4$ DQPSK(2DH5)	2441MHz	0.34	0.5
8DPSK(3DH5)	2441MHz	0.29	0.5
GFSK(DH5)	2480MHz	3.30	3.5
$\pi/4$ DQPSK(2DH5)	2480MHz	0.33	0.5
8DPSK(3DH5)	2480MHz	0.42	0.5

#### BLE

Test Mode	Frequency (MHz)	Average power output (dBm)	Tune up (dBm)
GFSK	2402MHz	2.87	3.0
GFSK	2440MHz	3.00	3.0
GFSK	2480MHz	3.31	3.5

## 5.2 Maximum permissible exposure(MPE)

### Limit:

(A) Limits for Occupational/Controlled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-3.0	614	1.63	*100	6
3.0-30	1842/f	4.89/f	*900/f <sup>2</sup>	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6

(B) Limits for General Population/Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm <sup>2</sup> )	Averaging Time  E  <sup>2</sup> ,  H  <sup>2</sup> or S (minutes)
0.3-1.34	614	1.63	*100	30
1.34-30	824/f	2.19/f	*180/f <sup>2</sup>	30
30-300	27.5	0.073	0.2	30
300-1500	--	--	f/1500	30
1500-100,000	--	--	1.0	30

f = frequency in MHz \*Plane-wave equivalent power density



**Result:**

According to§1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy levels in excess of the Commission’s guidelines.

The MPE was calculated at 20 cm to show compliance with the power density limit.

The following formula was used to calculate the Power Density:

$$S = PG / (4\pi R^2)$$

Where S = power density in mW/cm<sup>2</sup>

P = transmit power in mW

G = numeric gain of transmit antenna

R = distance (cm)

**Standalone Transmission Result**

Band	Freq. (MHz)	Maximum Power (dBm)	Maximum EIRP (dBm)	Maximum EIRP (mW)	Power Density at 20cm (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Power Density/ Limit
BT	2441	3.87	5.19	3.304	0.001	1	0.001
BLE	2480	3.31	4.63	2.904	0.001	1	0.001

**Simultaneous Transmission Result**

Power Density1 / Limit	Power Density2 / Limit	Σ(Power Density / Limit)
0.001	0.001	0.002

Note: Simultaneous Transmission Limit = Power Density\_1 / Limit\_1 + Power Density\_2 / Limit\_2 < 1.