

MPE REPORT

Report No.: SRTC2022-9004(F)-22090602(I)
Product Name: The bluetooth module
Model Name: i480e, i480e-MD2
Applicant: Barrot Technology Limited
Manufacturer: Barrot Technology Limited
FCC ID: 2AOXV-I480EI480EMD2

Reference Specification
FCC Part2.1093 FCC KDB447498 D01

The State Radio_monitoring_center Testing Center (SRTC)

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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
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1.3 Applicant's details

Company:	Barrot Technology Limited
Address:	C710, Shangdi International Pioneering Park No.2, Shang Di Xin Xi Road, Haidian District, Beijing

1.4 Manufacturer's details

Company:	Barrot Technology Limited
Address:	C710, Shangdi International Pioneering Park No.2, Shang Di Xin Xi Road, Haidian District, Beijing

1.5 Test environment

Testing Start Date:	2018/7/25
Testing End Date:	2018/8/10

Environmental Data:	Temperature (°C)	Humidity (%)
Ambient:	25	30

2 DESCRIPTION OF THE EQUIPMENT UNDER TEST

2.1 Final equipment build status

Frequency Range:	2.402GHz~2.480GHz
Mode:	BT: GFSK, $\pi/4$ DQPSK, 8DPSK BLE: GFSK
Antenna gain:	3.0dBi
Hardware Version:	BB
Software Version:	I480E.STD3.0.20180328.1
Normal Supply Voltage	3.7V

3 SPECIFICATION

Specification	Version	Title
Part2.1093	2021	Radiofrequency radiation exposure evaluation: portable devices.
KDB447498 D01	v06	General RF Exposure Guidance.

4 RESULT SUMMARY

Case	Verdict
MPE	Pass

This Test Report Is Issued by: Mr. Peng Zhen 	Checked by: Mr. Li Bin 
Tested by: Ms. Li Jin 	Issued date: 2022/10/8

5 CALCULATION RESULT

5.1 Average output power

BLE

Modulation type	Average Power Output (dBm)		
	2402MHz (Ch0)	2440MHz (Ch19)	2480MHz (Ch39)
GFSK (LE 1Mbps)	5.78	6.06	5.98
GFSK (LE 2Mbps)	5.87	6.35	6.27

BT

Modulation type	Average Power Output (dBm)		
	2402MHz (Ch0)	2441MHz (Ch39)	2480MHz (Ch78)
GFSK	3.54	3.61	2.62
$\pi/4$ DQPSK	-0.14	-0.09	-1.28
8DPSK	-0.08	-0.12	-1.27

5.2 Maximum permissible exposure (MPE)

Limit:

Method1:

For 100 MHz to 6 GHz and test separation distances ≤ 50 mm, the SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR, and ≤ 7.5 for 10-g extremity SAR, where

- $f(\text{GHz})$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

Method2:

Exclusion Thresholds for 100 MHz – 6 GHz and ≤ 50 mm

MHz	5	10	15	20	25	mm
150	39	77	116	155	194	SAR Test Exclusion Threshold (mW)
300	27	55	82	110	137	
450	22	45	67	89	112	
835	16	33	49	66	82	
900	16	32	47	63	79	
1500	12	24	37	49	61	
1900	11	22	33	44	54	
2450	10	19	29	38	48	
3600	8	16	24	32	40	
5200	7	13	20	26	33	
5400	6	13	19	26	32	
5800	6	12	19	25	31	
MHz	30	35	40	45	50	mm
150	232	271	310	349	387	SAR Test Exclusion Threshold (mW)
300	164	192	219	246	274	
450	134	157	179	201	224	
835	98	115	131	148	164	
900	95	111	126	142	158	
1500	73	86	98	110	122	
1900	65	76	87	98	109	
2450	57	67	77	86	96	

3600	47	55	63	71	79	
5200	39	46	53	59	66	
5400	39	45	52	58	65	
5800	37	44	50	56	62	

Exclusion Thresholds for 100 MHz – 6 GHz and > 50 mm

MHz	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	mm
100	474	481	487	494	501	507	514	521	527	534	541	547	554	561	567	mW
150	387	397	407	417	427	437	447	457	467	477	487	497	507	517	527	
300	274	294	314	334	354	374	394	414	434	454	474	494	514	534	554	
450	224	254	284	314	344	374	404	434	464	494	524	554	584	614	644	
835	164	220	275	331	387	442	498	554	609	665	721	776	832	888	943	
900	158	218	278	338	398	458	518	578	638	698	758	818	878	938	998	
1500	122	222	322	422	522	622	722	822	922	1022	1122	1222	1322	1422	1522	
1900	109	209	309	409	509	609	709	809	909	1009	1109	1209	1309	1409	1509	
2450	96	196	296	396	496	596	696	796	896	996	1096	1196	1296	1396	1496	
3600	79	179	279	379	479	579	679	779	879	979	1079	1179	1279	1379	1479	
5200	66	166	266	366	466	566	666	766	866	966	1066	1166	1266	1366	1466	
5400	65	165	265	365	465	565	665	765	865	965	1065	1165	1265	1365	1465	
5800	62	162	262	362	462	562	662	762	862	962	1062	1162	1262	1362	1462	

Exclusion Thresholds for < 100 MHz and < 200 mm

MHz	< 50	50	60	70	80	90	100	110	120	130	140	150	160	170	180	190	mm
100	237	474	481	487	494	501	507	514	521	527	534	541	547	554	561	567	mW
50	308	617	625	634	643	651	660	669	677	686	695	703	712	721	729	738	
10	474	948	961	975	988	1001	1015	1028	1041	1055	1068	1081	1095	1108	1121	1135	
1	711	1422	1442	1462	1482	1502	1522	1542	1562	1582	1602	1622	1642	1662	1682	1702	
0.1	948	1896	1923	1949	1976	2003	2029	2056	2083	2109	2136	2163	2189	2216	2243	2269	
0.05	1019	2039	2067	2096	2125	2153	2182	2211	2239	2268	2297	2325	2354	2383	2411	2440	
0.01	1185	2370	2403	2437	2470	2503	2537	2570	2603	2637	2670	2703	2737	2770	2803	2837	

Note1: 10-g Extremity SAR Test Exclusion Power Thresholds are 2.5 times higher than the 1-g SAR Test Exclusion Thresholds indicated above. These thresholds do not apply, by extrapolation or other means, to occupational exposure limits.

Note2: Method2 is based on method1, SRTC use method2 evaluate the compliance.

Result:

Standalone Transmission Result

Band	Freq. (MHz)	Maximum Power (dBm)	Antenna Gain (dBi)	Maximum EIRP (mW)	test separation distance, (mm)	SAR test exclusion Threshold (mW)	SAR Required
GFSK (BER)	2.441	3.61	3.0	4.58	10	19	NO
GFSK (LE)	2.440	6.35	3.0	8.61	10	19	NO

Note: SRTC use the maximum value of EIRP and power.

---End of Test Report---