
TEST REPORT

Report No.: SRTC2018-9003(F)-0017
Product Name: The bluetooth module
Model Name: i480e、i480e-MD2
Applicant: Barrot Technology Limited
Manufacturer: Barrot Technology Limited
Specification: FCC Part15B (Certification)
(2018 edition)
FCC ID: 2AOXV-I480EI480EMD2

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 test results relate only to individual items of the samples which have been tested.

1.2 Information about the testing laboratory

Company: The State Radio_monitoring_center Testing Center (SRTC)
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City: Beijing
Country or Region: China
Contacted person: Liu Jia
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1.3 Applicant's details

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City: Beijing
Country or Region: Beijing
Contacted person: Kerlwin Qiu
Tel: +86 10 82702580
Fax: +86 10 62963059
Email: marketing@barrot.com.cn

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
City: Beijing
Country or Region: Beijing
Contacted person: Kerlwin Qiu
Tel: +86 10 82702580
Fax: +86 10 62963059
Email: marketing@barrot.com.cn

1.5 Application details

Date of reception of test sample: 1st Aug. 2018

Date of test: 2nd Aug. 2018 to 7th Aug. 2018

1.6 Reference specification

FCC Part 15B, 2018 (Certification)

1.7 Information of EUT

1.7.1 General information

Name of EUT	The bluetooth module
FCC ID	2AOXV-I480EI480EMD2
Rated Power Supply Voltage	3.7V
Extreme Temperature	Lowest: -40°C Highest: +85°C
Extreme Voltage	Minimum: 2.5 V Maximum: 4.25V
HW Version	BB
SW Version	I480E.STD3.0.20180328.1

1.7.2 EUT details

Product Name	Model Name	IMEI
The bluetooth module	i480e、 i480e-MD2	-----

Note: The two products i480e and i480e-MD2 are use the same software and hardware, no mechanical changes, no other differences except the model name.

1.7.3 Auxiliary equipment details

AE (Auxiliary Equipment) 1#: Computer

Manufacturer	Lenovo
Model Number	7000
S/N	MP1965WU
Input Voltage	100V-240V AC

2. Test information

2.1 Summary of the test results

No.	Test case	FCC reference	Verdict
1	Conducted emissions	15.107	Pass
2	Radiated emissions	15.109	Pass

Approved by Mr. Liu Wei Director of the test department 刘巍	Checked by Mr. He Jia Project manager of the test department 何佳
Tested by: Mr. Lv Youyou Test engineer 吕友友	Issued Date: 2018.08.09

2.2 Test result

2.2.1 Conducted Emissions-FCC Part15.107

Ambient condition:

Temperature	Relative humidity	Pressure
24.3°C	40.7%	100.9kPa

Test Setup with laptop:

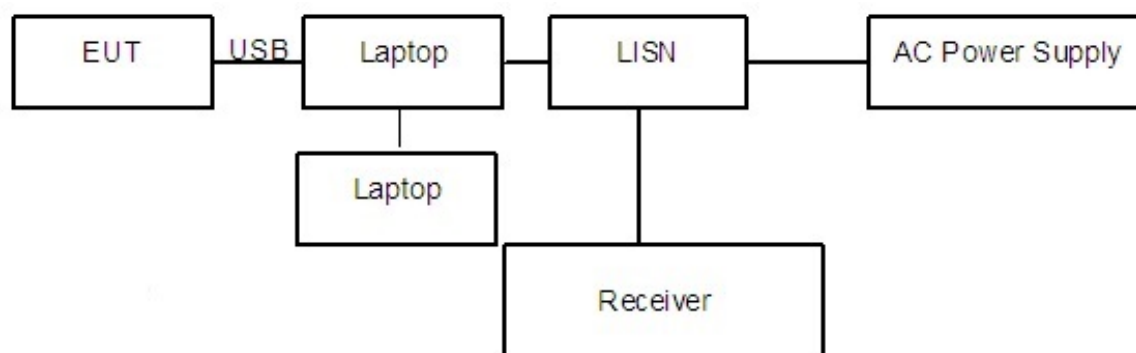


Figure 1

Test Procedure:

The EUT is placed on a non-metallic table 0.8m above the horizontal metal reference ground plane. The accessories of the EUT are connected with the EUT such as headset etc. The EUT was connected with a laptop via the USB cable and was charged. The laptop's LAN port is connected with another laptop via cable. And the data transferring between two laptops is maintained.

The AC main power supply of the laptop is connected to LISN and LISN is connected to the reference ground. The test set-up and the test methods are performed according to ANSI C63.4:2014.

Then start the test software EMC32. Sweep the whole frequency band through the range from 150 KHz to 30 MHz. The measurement should be done for both L line and N line. During pre-test, the receiver uses both peak detector and average detector. And the final test, the receiver uses both average detector and Quasi-peak detector.

The data of cable loss has been calibrated in full testing frequency range before the testing.

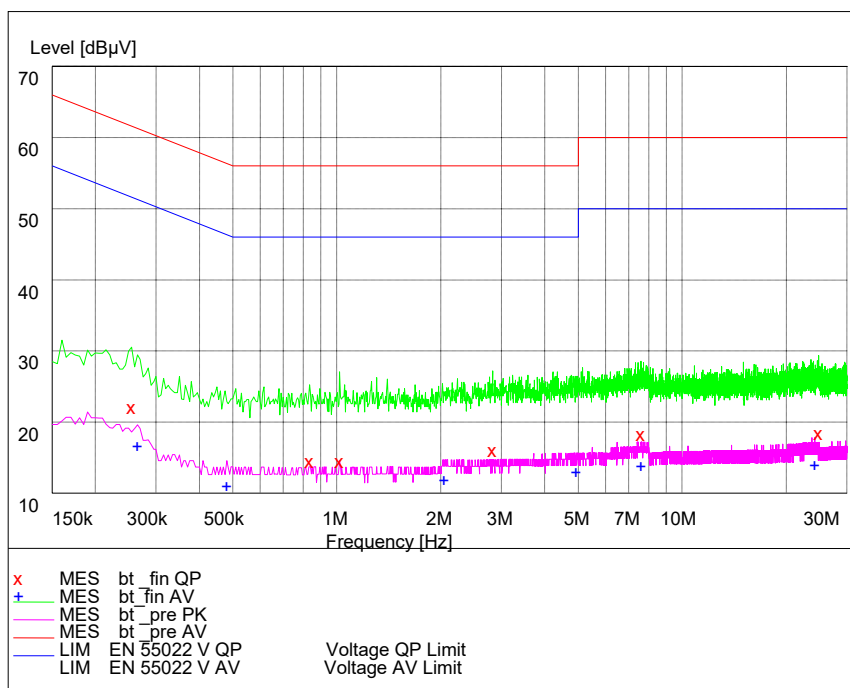
Limit:

Frequency of Emission(MHz)	Limits(dB μ V)	
	Quasi-peak	Average
0.15~0.5	66 to 56*	56 to 46*
0.5~5	56	46
5~30	60	50

Note: * Decreases with the logarithm of the frequency

Test result:

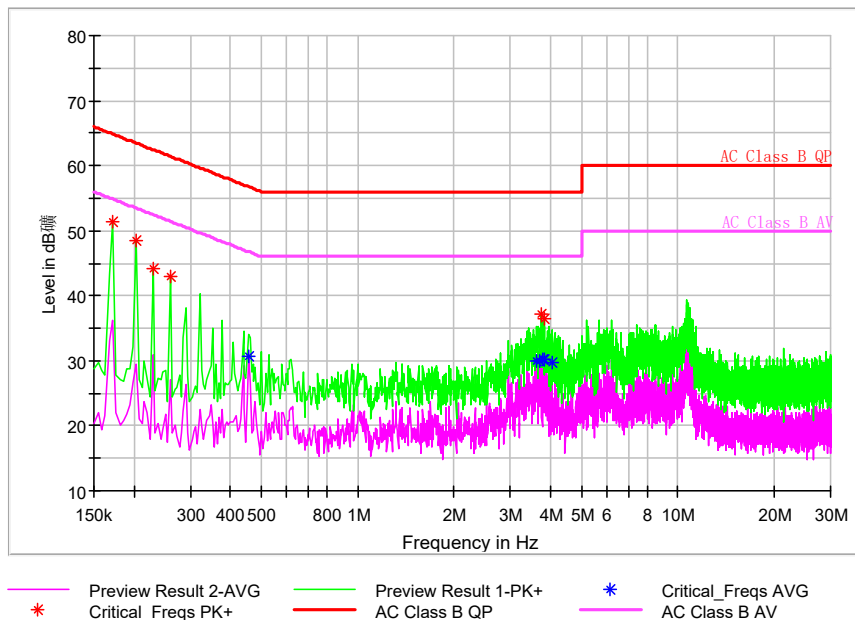
Noise Level of the Measuring Instrument



Pic1. Conducted emission L and N Line

EUT+Laptop:

Full Spectrum



Pic2. Conducted emission L+N Line

MEASUREMENT RESULT: "MOBILE_fin QP"

Frequency (MHz)	QuasiPeak (dBμ)	Limit (dBμ)	Margin (dB)	Line
0.171949	51.29	64.87	13.57	L1
0.202676	48.40	63.50	15.10	L1
0.229015	44.20	62.49	18.29	L1
0.259743	43.01	61.44	18.43	L1
3.732000	37.25	56.00	18.75	N
3.846132	36.55	56.00	19.45	L1

MEASUREMENT RESULT: "MOBILE_fin AV"

Frequency (MHz)	Average (dBμ)	Limit (dBμ)	Margin (dB)	Line
0.457279	30.57	46.74	16.17	L1
3.609088	29.92	46.00	16.08	L1
3.710051	30.04	46.00	15.96	N
3.784676	30.10	46.00	15.90	L1
3.832963	30.14	46.00	15.86	L1
4.030500	29.74	46.00	16.26	L1

2.2.2 Radiated Emissions-FCC Part15.109

Ambient condition:

Temperature	Relative humidity	Pressure
24.5°C	40.6%	100.8kPa

Test Setup:

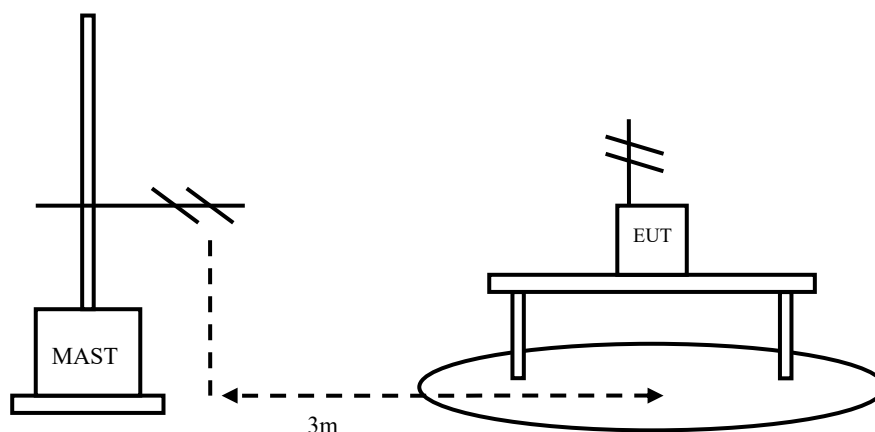


Figure 2

Test Procedure:

EUT+Laptop:

The EUT should be placed on a non-metallic table 80cm above the ground plane. The receive antennas shall be moved from 1 to 4 meters. The distance between EUT and receive antenna should be 3 meters.

The accessories of the EUT are connected with the EUT such as headset etc. The EUT was connected with a laptop via the USB cable and was charged. The laptop's LAN port is connected with another laptop via cable. And the data transferring between two laptops is maintained. The test set-up and the test methods are performed according to ANSI C63.4:2014

Then start the test software EMC32. Sweep the whole frequency band through the range from 30MHz to 1GHz, using receive log period antenna HL562.

During the test, the height of receive antenna shall be moved from 1 to 4 meters, and the antenna shall be performed under horizontal and vertical polarization. The turn table shall be rotated from 0 to 360 degrees for detecting the maximum of radiated spurious signal level. The measurements shall be repeated with orthogonal polarization of the test antenna. The EUT is laid in two modes as follow:

1. put the EUT in horizontal direction; 2. put the EUT in vertical direction.
The data of cable loss and antenna factor have been calibrated in full testing frequency range before the testing.

A “reference path loss” is established and the A_{Rpl} is the attenuation of “reference path loss”, and including the gain of receive antenna, the gain of the preamplifier, the cable loss.

The measurement results are obtained as described below:

$$\text{Result} = P_{\text{mea}} + A_{Rpl}$$

Limit:

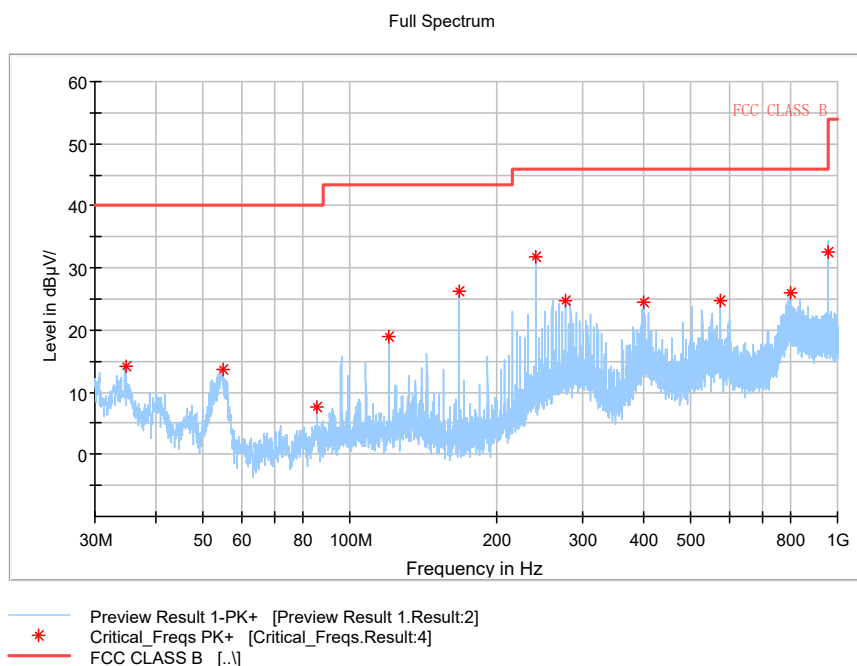
Frequency of Emission(MHz)	Limits	
	Detector	Unit (dB μ V/m)
30~88	Quasi-peak	40
88~216	Quasi-peak	43.5
216~960	Quasi-peak	46
960~1000	Quasi-peak	54
1000~5th harmonic of the highest frequency or 40GHz, whichever is lower	Average Peak	54 74

Test result:

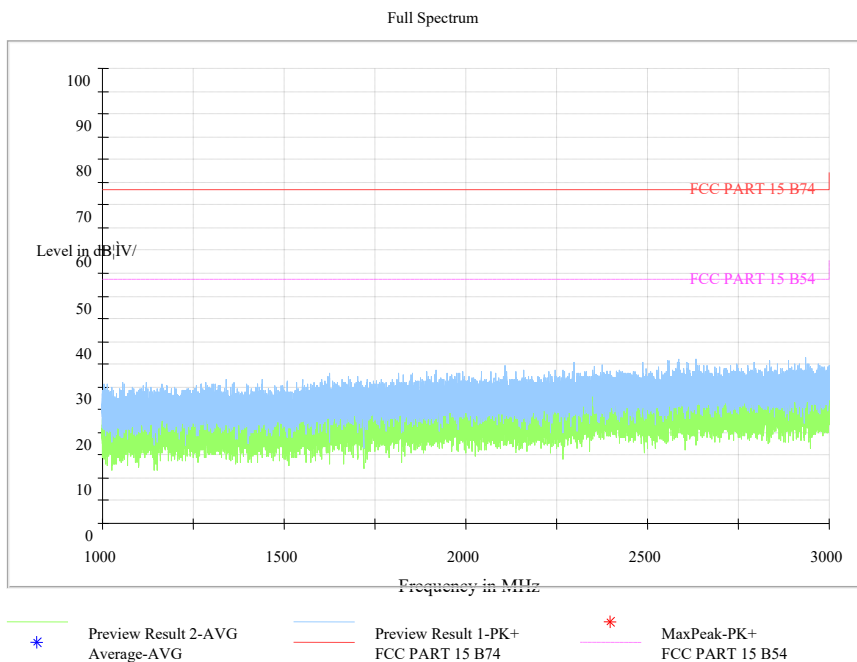
EUT+Laptop

Frequency(MHz)	Result(dBuV/m)	A_{Rpl} (dB)	P_{mea} (dBuV/m)	Polarity
34.647917	14.05	-15.7	29.75	H
55.017917	13.67	-20.5	39.17	V
85.572917	7.56	-19.4	30.96	V
119.9675	18.86	-25.5	40.26	H
167.9825	26.3	-23.4	49.4	V
239.964583	31.89	-21.4	52.39	V
275.975833	24.85	-23.1	44.25	V
399.610417	24.55	-15.4	39.95	V
575.98875	24.66	-11.2	35.86	H
800.018333	25.9	-7.0	32.9	V
959.9875	32.47	-4.7	37.17	V

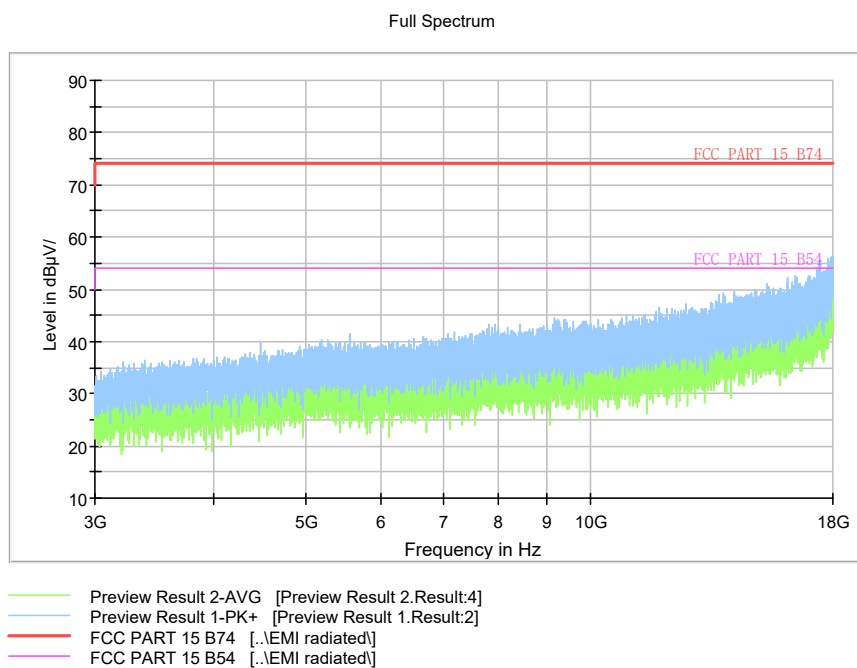
EUT+Laptop:



Pic3. Radiated emission(30MHz – 1GHz)



Pic4. Radiated emission (1GHz – 3Hz)



Pic5. Radiated emission (3GHz – 18Hz)

2.3. List of test equipments

No.	Name/Model	Manufacturer	S/N	Calibration Due Date	Calibration Date
1	23.18m×16.88m×9.60mS emi-AnechoicChamber	FRANKONIA	-----	20th Aug. 2018	20th Aug. 2017
2	ESI 40EMI test receiver	R&S	100015	20th Aug. 2018	20th Aug. 2017
3	E5515C(8960) Mobile Station Tester	Agilent	GB4405090 4	20th Aug. 2018	20th Aug. 2017
4	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	20th Aug. 2018	20th Aug. 2017
5	ESCS30EMI test receiver	R&S	100029	20th Aug. 2018	20th Aug. 2017
6	HL562Ultra log test antenna	R&S	100016	20th Aug. 2018	20th Aug. 2017
7	ENV216 AMN	R&S	3560.6550. 12	20th Aug. 2018	20th Aug. 2017
8	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100512	25 th May. 2018	25 th May. 2017
9	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100513	20th Aug. 2018	20th Aug. 2017
10	PS2000 Turn Table	FRANKONIA	-----	20th Aug. 2018	20th Aug. 2017
11	MA260 Antenna Master	FRANKONIA	-----	20th Aug. 2018	20th Aug. 2017
12	EMC32EMI test software	R&S	-----	20th Aug. 2018	20th Aug. 2017
13	HL562 Receive antenna	R&S	100167	20th Aug. 2018	20th Aug. 2017