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# TEST REPORT

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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)  
Address: 15th Building, No.30 Shixing Street, Shijingshan District  
City: Beijing  
Country or Region: China  
Contacted person: Liu Jia  
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### 1.3 Applicant's details

Company: Barrot Technology Limited  
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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: 1<sup>st</sup> Aug. 2018

Date of test: 2<sup>nd</sup> Aug. 2018 to 7<sup>th</sup> 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<br>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、<br>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<br>Director of the test department<br><br>刘巍 | Checked by Mr. He Jia<br>Project manager of the test department<br><br>何佳 |
| Tested by: Mr. Lv Youyou<br>Test engineer<br><br>吕友友                 | Issued Date:<br>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:

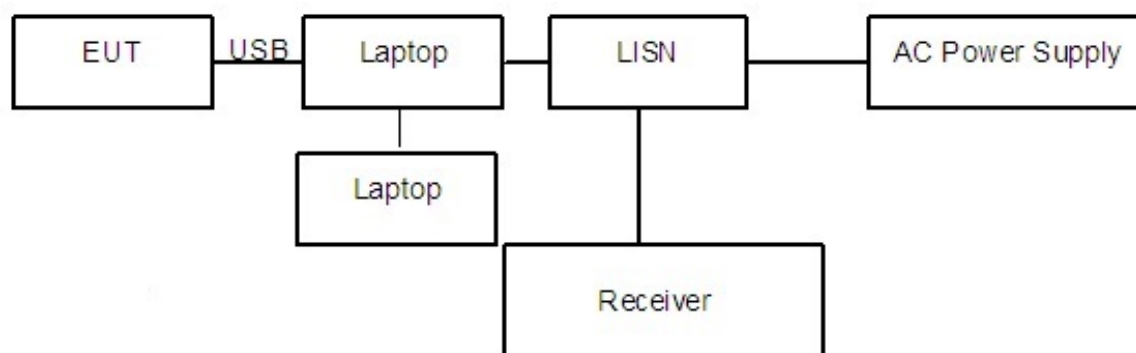


Figure 1

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.

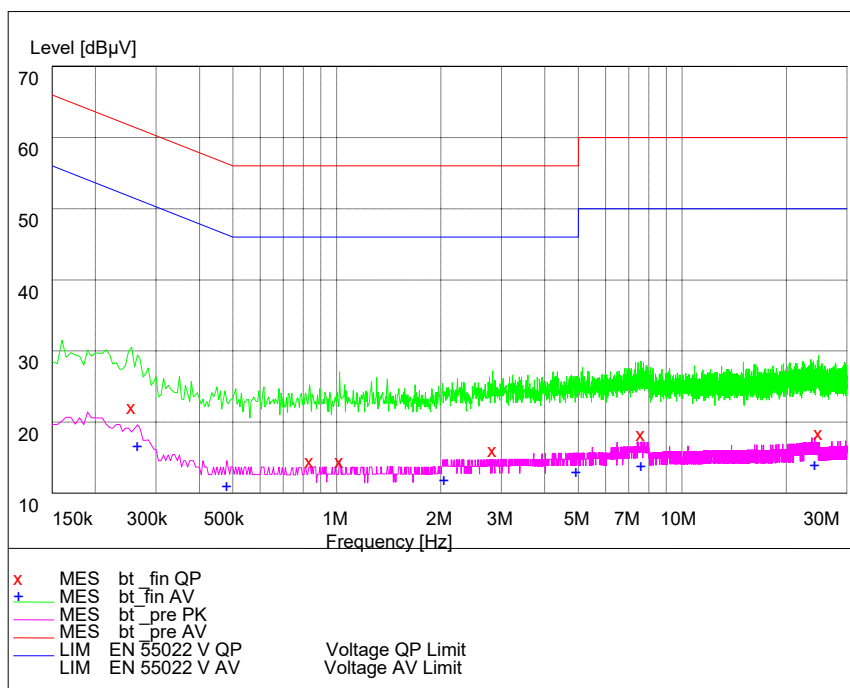
Limit:

| Frequency of Emission(MHz) | Limits(dB $\mu$ 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:

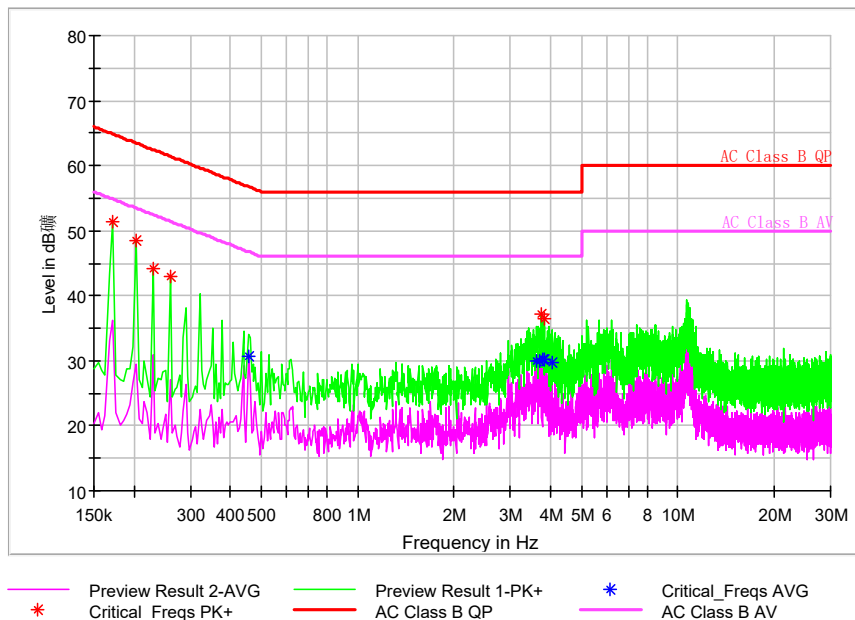
Noise Level of the Measuring Instrument



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:

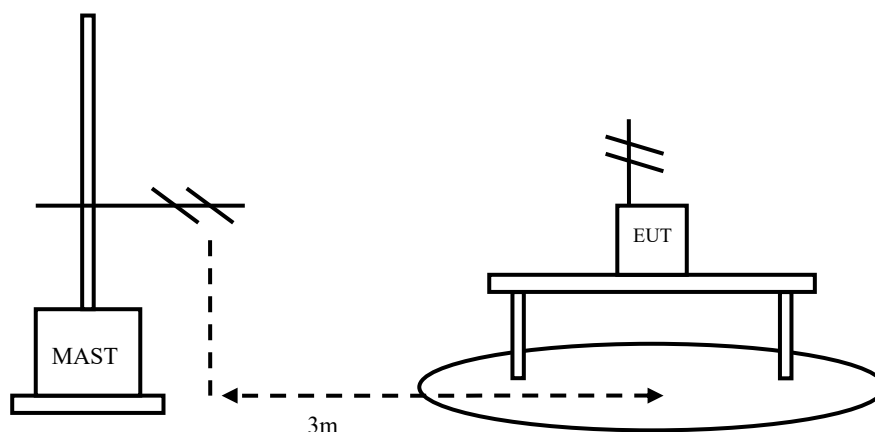


Figure 2

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:

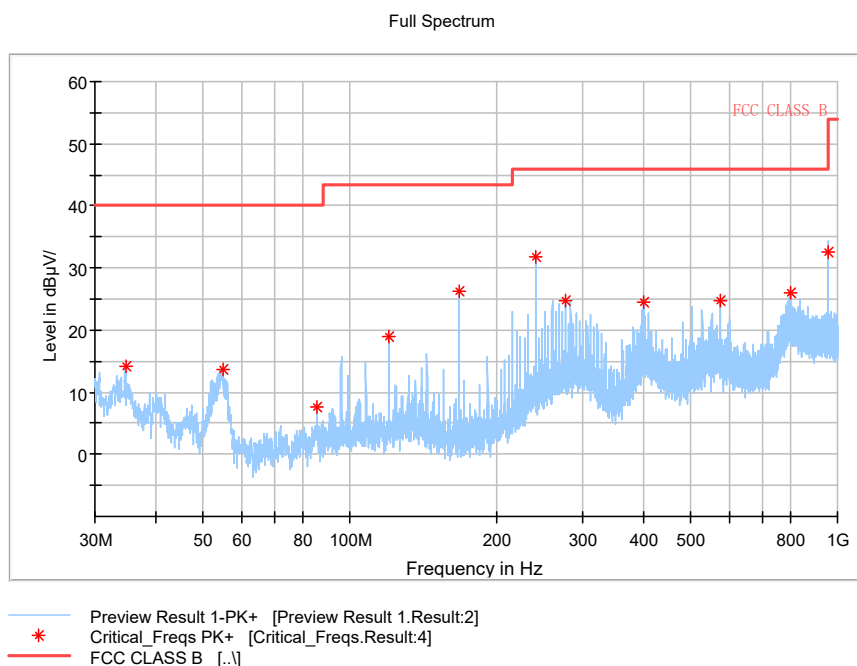
| Frequency of Emission(MHz)                                              | Limits       |                     |
|-------------------------------------------------------------------------|--------------|---------------------|
|                                                                         | Detector     | Unit (dB $\mu$ 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<br>74            |

Test result:

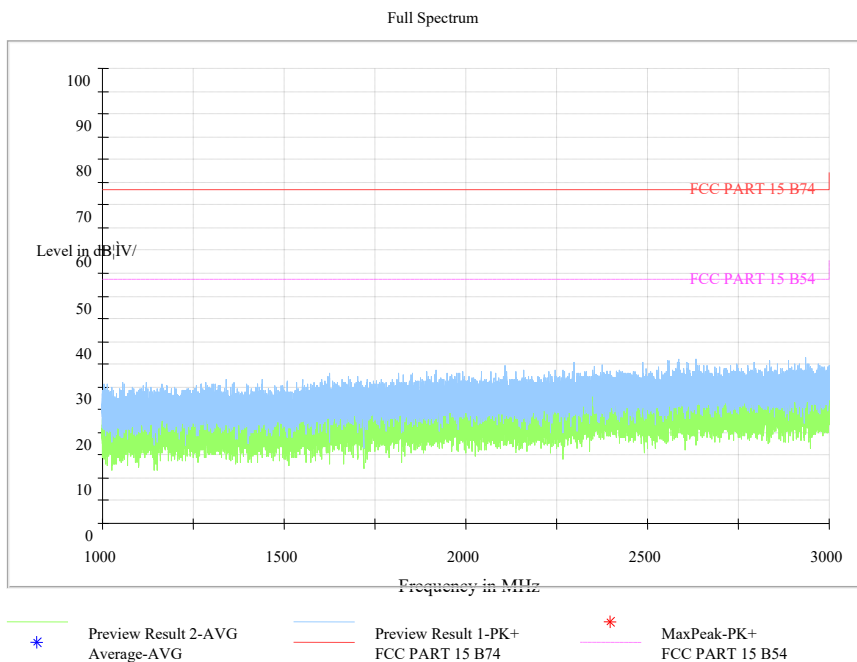
EUT+Laptop

| Frequency(MHz) | Result(dBuV/m) | $A_{Rpl}$ (dB) | $P_{\text{mea}}$ (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        |

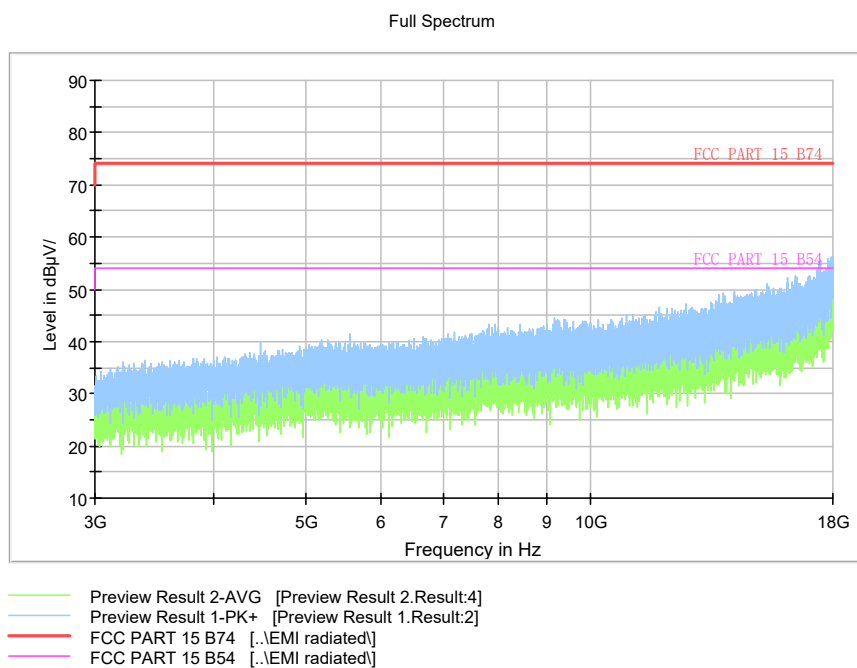
EUT+Laptop:



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<br>emi-AnechoicChamber    | FRANKONIA    | -----            | 20th Aug.<br>2018             | 20th Aug.<br>2017             |
| 2   | ESI 40EMI test receiver                        | R&S          | 100015           | 20th Aug.<br>2018             | 20th Aug.<br>2017             |
| 3   | E5515C(8960) Mobile<br>Station Tester          | Agilent      | GB4405090<br>4   | 20th Aug.<br>2018             | 20th Aug.<br>2017             |
| 4   | 9.080m×5.255m×3.525m<br>Shielding room         | FRANKONIA    | -----            | 20th Aug.<br>2018             | 20th Aug.<br>2017             |
| 5   | ESCS30EMI test receiver                        | R&S          | 100029           | 20th Aug.<br>2018             | 20th Aug.<br>2017             |
| 6   | HL562Ultra log test<br>antenna                 | R&S          | 100016           | 20th Aug.<br>2018             | 20th Aug.<br>2017             |
| 7   | ENV216 AMN                                     | R&S          | 3560.6550.<br>12 | 20th Aug.<br>2018             | 20th Aug.<br>2017             |
| 8   | HF 907 Double-Ridged<br>Waveguide Horn Antenna | R&S          | 100512           | 25 <sup>th</sup> May.<br>2018 | 25 <sup>th</sup> May.<br>2017 |
| 9   | HF 907 Double-Ridged<br>Waveguide Horn Antenna | R&S          | 100513           | 20th Aug.<br>2018             | 20th Aug.<br>2017             |
| 10  | PS2000 Turn Table                              | FRANKONIA    | -----            | 20th Aug.<br>2018             | 20th Aug.<br>2017             |
| 11  | MA260 Antenna Master                           | FRANKONIA    | -----            | 20th Aug.<br>2018             | 20th Aug.<br>2017             |
| 12  | EMC32EMI test software                         | R&S          | -----            | 20th Aug.<br>2018             | 20th Aug.<br>2017             |
| 13  | HL562 Receive antenna                          | R&S          | 100167           | 20th Aug.<br>2018             | 20th Aug.<br>2017             |