



Registration
No.788871

TEST REPORT

Report No.: SRTC2018-9003(F)-0005
Product Name: OnePlus Bullets Wireless
Model Name: BT31B
Applicant: OnePlus Technology (Shenzhen) Co., Ltd.
Manufacturer: OnePlus Technology (Shenzhen) Co., Ltd.
Specification: FCC Part15B (Certification)
(October 1, 2017 edition)
FCC ID: 2ABZ2-BT31B

The State Radio_monitoring_center Testing Center (SRTC)

15th Building, No.30 Shixing Street, Shijingshan District,

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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: No.80 Beilishi Road, Xicheng District
City: Beijing
Country or Region: China
Contacted person: Liu Jia
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Fax: +86 10 57996388
Email: liujiaf@srtc.org.cn

1.3 Applicant's details

Company: OnePlus Technology (Shenzhen) Co., Ltd.
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Contacted person: Kevin Ke
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Fax: ---
Email: kevin.ke@oneplus.net

1.4 Manufacturer's details

Company: . OnePlus Technology (Shenzhen) Co., Ltd.
Address: 18C02, 18C03, 18C04 and 18C05, Shum Yip Terra Building, Binhe Avenue North, Futian District, Shenzhen
City: Shenzhen
Country or Region: CHINA
Contacted person: Kevin Ke
Tel: +86- 18923701470
Fax: ---
Email: kevin.ke@oneplus.net

1.5 Application details

Date of reception of test sample: 5th March 2018

Date of test: 6th March 2018 to 9th March 2018

1.6 Reference specification

FCC Part 15B, 2017 (Certification)

1.7 Information of EUT

1.7.1 General information

Name of EUT	BT31B
FCC ID	2ABZ2-BT31B
Frequency Range	WiFi: 2.4~2.4835GHz
Antenna Type	chip antenna
Power Supply	Battery
Rated Power Supply Voltage	5V
HW Version	V1.6
SW Version	V0.5

1.7.2 EUT details

Product Name	Model Name	IMEI
OnePlus Bullets Wireless	BT31B	/

1.7.3 Auxiliary equipment details

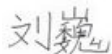

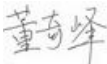
AE (Auxiliary Equipment) 1#: Computer

Equipment	Computer
Manufacturer	Lenovo
Model Number	7000
S/N	MP199J70
Input Voltage	100V-240V AC
Frequency	50/60Hz

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 	Checked by Mr. He Jia Project manager of the test department 
Tested by: Mr. Dong Qifeng Test engineer 	Issued date: 2018.03.13

2.2 Test result

2.2.1 Conducted Emissions-FCC Part15.107

Ambient condition:

Temperature	Relative humidity	Pressure
22.6°C	40.1%	100.8kPa

Test Setup with laptop:

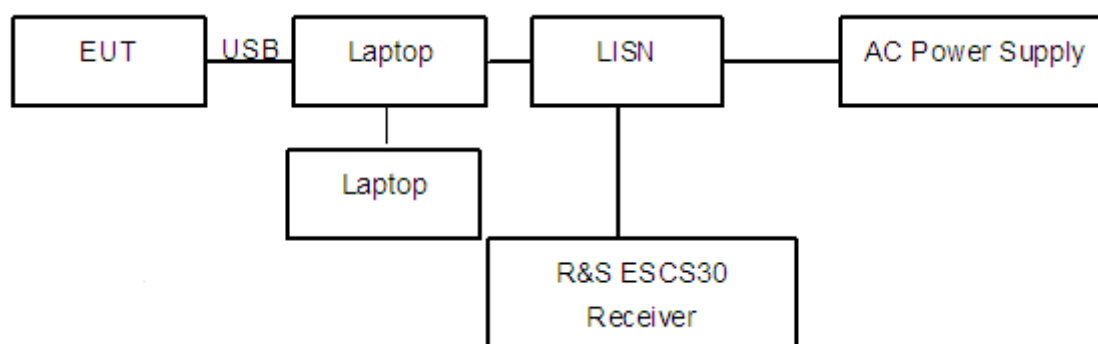


Figure 1

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 ES-K1. 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.

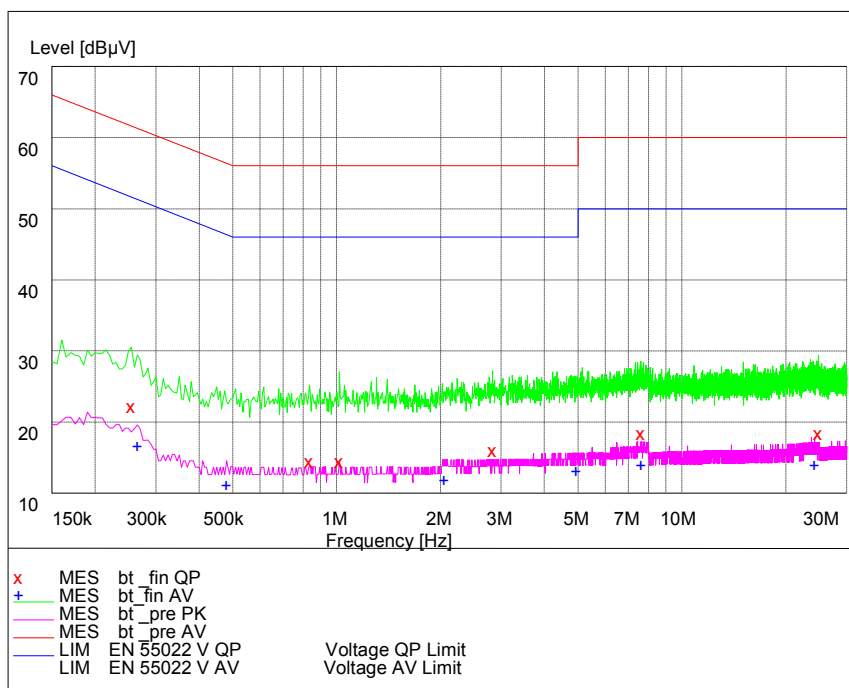
Limit:

Frequency of Emission(MHz)	Limits(dBμV)	
	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

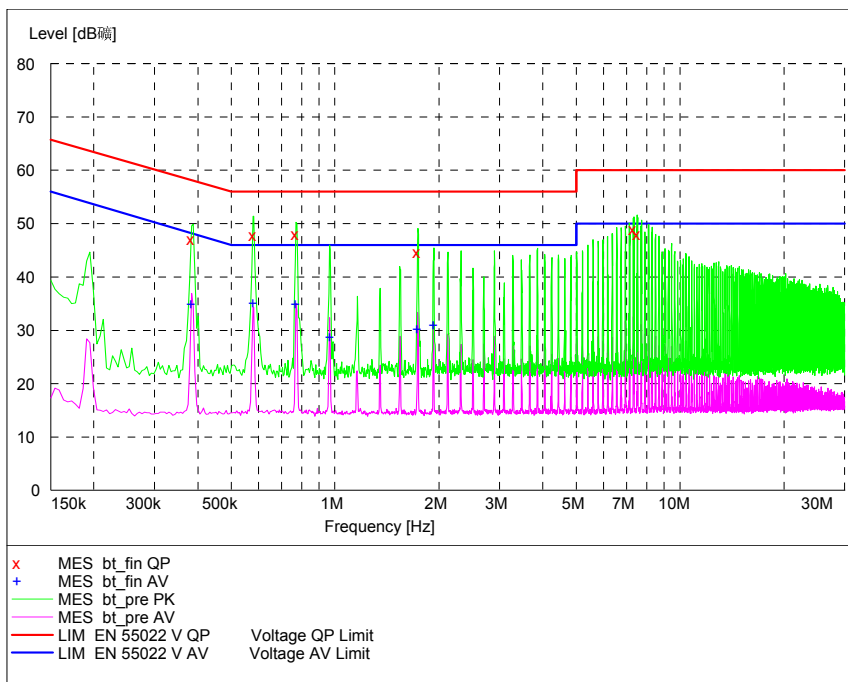
Test result:

Noise Level of the Measuring Instrument



Pic1. Conducted emission L and N Line

EUT+Laptop:



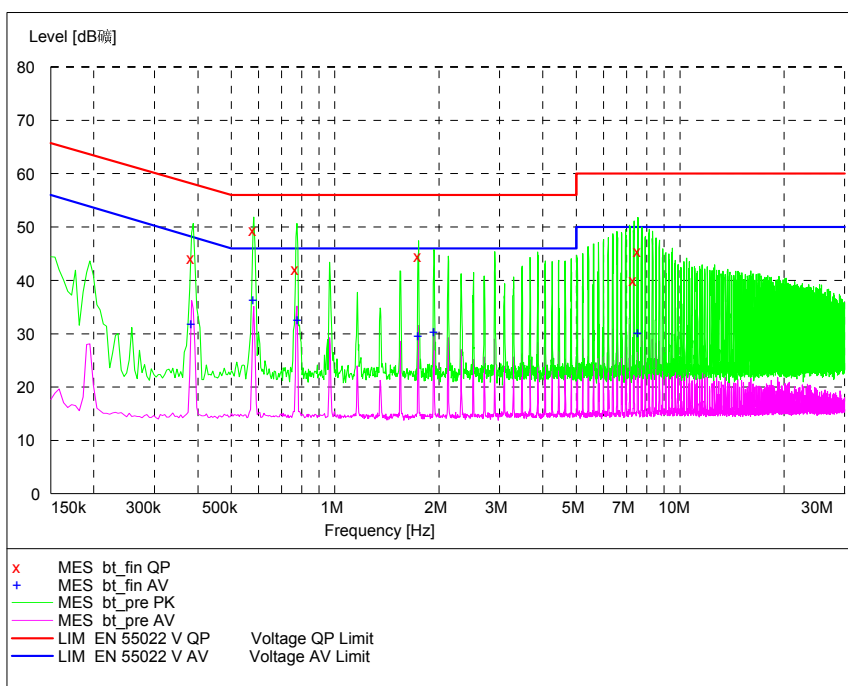
Pic2. Conducted emission L Line

MEASUREMENT RESULT: "EUT_fin QP"

Frequency MHz	Level dBμV	Corr. dB	Limit dBμV	Margin dB
0.384000	47.10	30.2	58	11.0
0.582000	47.90	30.3	56	8.1
0.771000	48.00	30.2	56	8.0
1.734000	44.60	30.2	56	11.4
7.332000	49.00	30.5	60	11.0
7.521000	48.10	30.5	60	11.9

MEASUREMENT RESULT: "EUT_fin AV"

Frequency MHz	Level dBμV	Corr. dB	Limit dBμV	Margin dB
0.384000	35.00	30.2	48	13.2
0.582000	35.10	30.3	46	10.9
0.771000	35.00	30.2	46	11.0
0.969000	28.80	30.2	46	17.2
1.734000	30.30	30.2	46	15.7
1.932000	30.90	30.2	46	15.1



Pic3. Conducted emission N Line

MEASUREMENT RESULT: "EUT_fin QP"

Frequency MHz	Level dBμV	Corr dB	Limit dBμV	Margin dB
0.384000	44.20	30.2	58	14.0
0.582000	49.40	30.3	56	6.6
0.771000	42.20	30.2	56	13.8
1.743000	44.50	30.2	56	11.5
7.359000	40.20	30.5	60	19.8
7.557000	45.50	30.5	60	14.5

MEASUREMENT RESULT: "EUT_fin AV"

Frequency MHz	Level dBμV	Corr dB	Limit dBμV	Margin dB
0.384000	31.70	30.2	48	16.5
0.582000	36.30	30.3	46	9.7
0.780000	32.50	30.2	46	13.5
1.743000	29.50	30.2	46	16.5
1.941000	30.40	30.2	46	15.6
7.566000	30.20	30.5	50	19.8

2.2.2 Radiated Emissions-FCC Part15.109

Ambient condition:

Temperature	Relative humidity	Pressure
22.6°C	40.1%	100.8kPa

Test Setup:

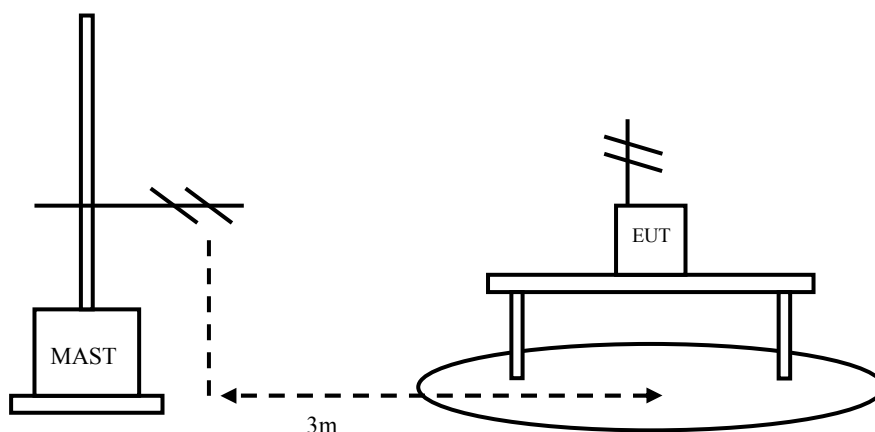


Figure 3

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:

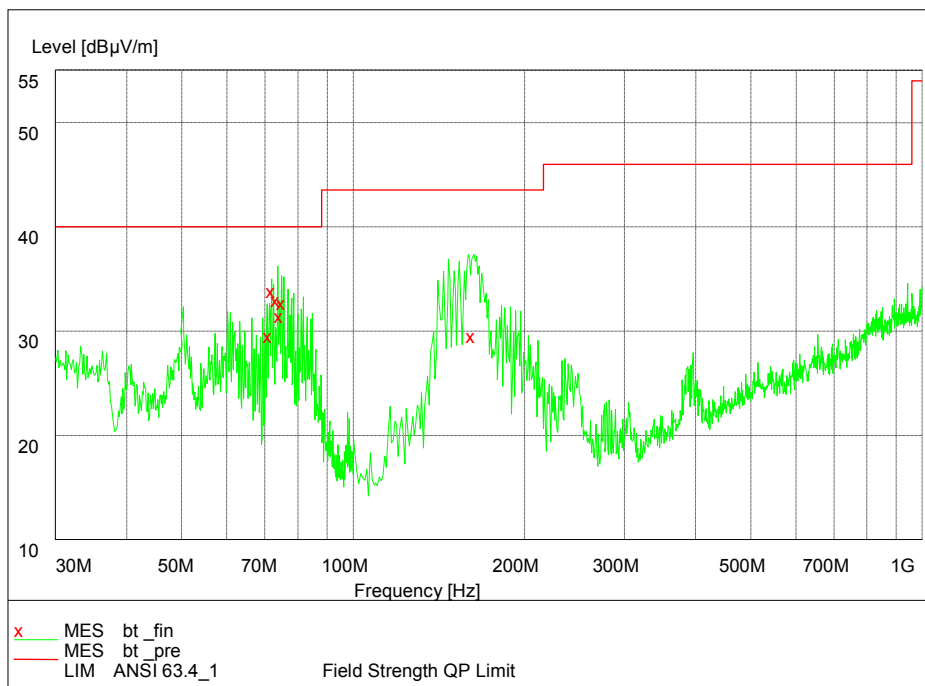
Frequency of Emission(MHz)	Limits	
	Detector	Unit (dB μ V/m)
30~88	Quasi-peak	40
88~216	Quasi-peak	43.5
216~960	Quasi-peak	46
960~1000	Quasi-peak	54
1000~5th harmonic of the highest frequency or 40GHz, whichever is lower	Average	54
	Peak	74

Test result:

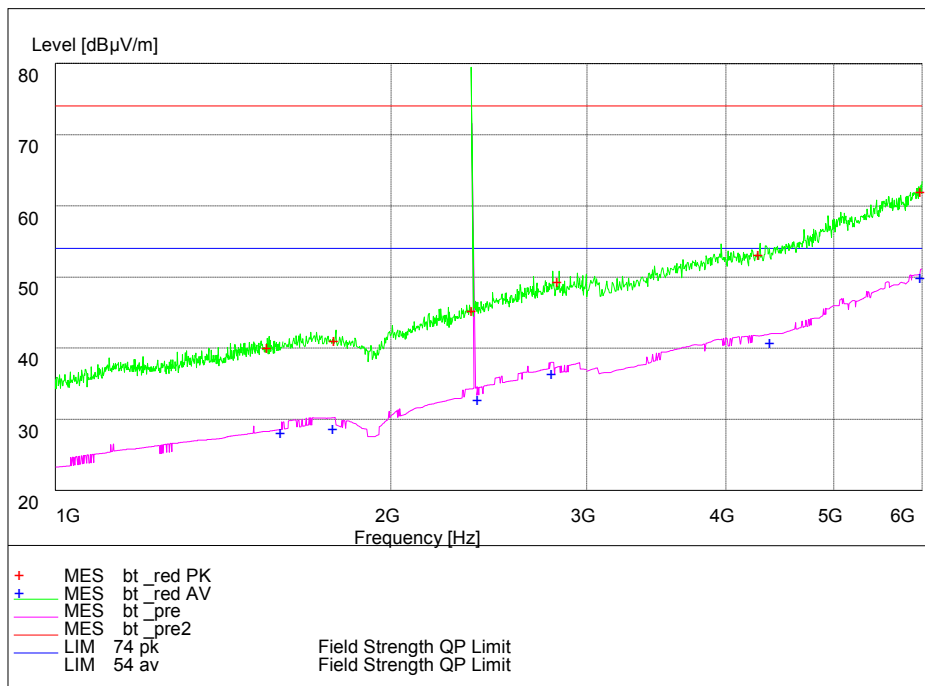
EUT+Laptop

Frequency(MHz)	Result(dBuV/m)	A_{Rpl} (dB)	P_{mea} (dBuV/m)	Polarity
71.94	29.9	10.00	19.90	H
72.60	34.9	10.00	25.00	H
73.84	33.9	10.00	23.90	V
74.92	32.4	10.00	22.50	V
75.62	33.8	10.00	23.80	V
162.57	30.6	11.00	19.60	V

EUT+Laptop:



Pic4. Radiated emission(30MHz – 1GHz)



Pic5. Radiated emission (1GHz – 6GHz)

2.3. List of test equipments

No.	Name/Model	Manufacturer	S/N	Calibration Due Date
1	23.18m×16.88m×9.60m Semi-Anechoic Chamber	FRANKONIA	-----	20th Aug. 2018
2	ESI 40EMI test receiver	R&S	100015	20th Aug. 2018
3	E5515C(8960) Mobile Station Tester	Agilent	GB44050904	20th Aug. 2018
4	9.080m×5.255m×3.525m Shielding room	FRANKONIA	-----	20th Aug. 2018
5	ESCS30EMI test receiver	R&S	100029	20th Aug. 2018
6	HL562 Ultra log test antenna	R&S	100016	20th Aug. 2018
7	ENV216 AMN	R&S	3560.6550.12	20th Aug. 2018
8	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100512	25 th May. 2018
9	HF 907 Double-Ridged Waveguide Horn Antenna	R&S	100513	20th Aug. 2018
10	PS2000 Turn Table	FRANKONIA	-----	20th Aug. 2018
11	MA260 Antenna Master	FRANKONIA	-----	20th Aug. 2018
12	EMC32EMI test software	R&S	-----	20th Aug. 2018
13	HL562 Receive antenna	R&S	100167	20th Aug. 2018