



FCC SDoC TEST REPORT

Guangdong Anjou Robot Technology Co., Ltd

Robot Vacuum Cleaner

Test Model: L100

Additional Model No.: Please Refer To Page 7

Prepared for : Guangdong Anjou Robot Technology Co., Ltd
Address : Room 501, Building 7, No.2 Xinghui Road, Songshan Lake Park, Dongguan City, Guangdong Province

Prepared by : Shenzhen LCS Compliance Testing Laboratory Ltd.
Address : Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China

Tel : (+86)755-82591330
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Web : www.LCS-cert.com
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Date of receipt of test sample : August 05, 2021
Number of tested samples : 1
Serial number : Prototype
Date of Test : August 05, 2021 ~ August 20, 2021
Date of Report : September 10, 2021





FCC SDoC TEST REPORT

FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014

Report Reference No. : **LCS210730117AE**

Date Of Issue : September 10, 2021

Testing Laboratory Name : **Shenzhen LCS Compliance Testing Laboratory Ltd.**

Address : Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China

Testing Location/ Procedure... : Full application of Harmonised standards
 Partial application of Harmonised standards
 Other standard testing method

Applicant's Name..... : **Guangdong Anjou Robot Technology Co., Ltd**

Address : Room 501, Building 7, No.2 Xinghui Road, Songshan Lake Park, Dongguan City, Guangdong Province

Test Specification

Standard : FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014

Test Report Form No..... : LCSEMC-1.0

TRF Originator..... : Shenzhen LCS Compliance Testing Laboratory Ltd.

Master TRF..... : Dated 2011-03

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Test Item Description..... : **Robot Vacuum Cleaner**

Trade Mark : N/A

Test Model..... : L100

Ratings : Please Refer To Page 7

Result : **Positive**

Compiled by:

Emma Wang

Emma Wang/ File administrators

Supervised by:

Baron Wen

Baron Wen/Technique principal

Approved by:



Gavin Liang/ Manager



FCC -- TEST REPORT

Test Report No. : LCS210730117AE	<u>September 10, 2021</u> Date of issue
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Test Model	: L100
EUT.....	: Robot Vacuum Cleaner
Applicant.....	: Guangdong Anjou Robot Technology Co., Ltd
Address.....	: Room 501, Building 7, No.2 Xinghui Road, Songshan Lake Park, Dongguan City, Guangdong Province
Telephone.....	: /
Fax.....	: /
Manufacturer.....	: Guangdong Anjou Robot Technology Co., Ltd
Address.....	: Room 501, Building 7, No.2 Xinghui Road, Songshan Lake Park, Dongguan City, Guangdong Province
Telephone.....	: /
Fax.....	: /
Factory.....	: Guangdong Anjou Robot Technology Co.,Ltd
Address.....	: Floor 2, 4 and 5, Building 7, No.2 Xinghui Road, Songshan Lake Park, Dongguan City, Guangdong Province
Telephone.....	: /
Fax.....	: /

Test Result according to the standards on page 6: **Positive**

The test report merely corresponds to the test sample.
It is not permitted to copy extracts of these test result without the written permission of the test laboratory.



Revision History

Revision	Issue Date	Revisions	Revised By
000	September 10, 2021	Initial Issue	Gavin Liang



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1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below.

EMISSION			
Description of Test Item	Standard	Limits	Results
Conducted disturbance at mains terminals	FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014	Class B	PASS
Radiated disturbance	FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014	Class B	PASS

N/A is an abbreviation for Not Applicable.

Test mode:		
Mode 1	Charging	Record
Mode 2	Working	Record

***Note: All test modes were tested, but we only recorded the worst case in this report.



2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT	: Robot Vacuum Cleaner
Trade Mark	: N/A
Test Model	: L100
Additional Model	: L106 Pro, L108, L106, L101, L103, L105, L100 Pro, L108 Pro, L101 Pro, L103 Pro, L105 Pro
Model Declaration	: PCB board, structure and internal of these model(s) are the same, So no additional models were tested
Power Supply	: FX24U-190100C: Input:100-240V, 50/60Hz, 0.6A, MAX Output:19V=1A, Max:19W FX18U-190060Z: Input:100-240V, 50/60Hz, 0.5A, MAX Output:19V=0.6A, Max:12W CZH024190100USWM: Input:100-240V, 50/60Hz, 0.8A, MAX Output:19V=1A, Max:19W CZH013190060USWH: Input:100-240V, 50/60Hz, 0.4A, MAX Output:19V=0.6A, Max:11.4W CZH015190060TRWM: Input:100-240V, 50/60Hz, 0.5A, MAX Output:19V=0.6A, 11.4W CZH024190100TRWO: Input:100-240V, 50/60Hz, 0.8A, MAX Output:19V=1.0A, 19.0W FX24U-190100K: Input:100-240V 50/60Hz 0.6A MAX Output:19V=1A FX18U-190060K: Input:100-240V, 50/60Hz, 0.5A, MAX Output:19V=0.6A

Highest internal freq. : Fx≤108MHz



Highest internal frequency (Fx)	Highest measured frequency
$F_x \leq 108 \text{ MHz}$ $108 \text{ MHz} < F_x \leq 500 \text{ MHz}$ $500 \text{ MHz} < F_x \leq 1 \text{ GHz}$ $F_x > 1 \text{ GHz}$	1 GHz 2 GHz 5 GHz $5 \times F_x$ up to a maximum of 6 GHz
NOTE 1 For FM and TV broadcast receivers, Fx is determined from the highest frequency generated or used excluding the local oscillator and tuned frequencies. NOTE 2 Fx is defined in EN 55032 Section 3.1.19. Where Fx is unknown, the radiated emission measurements shall be performed up to 6 GHz	

2.2. Support equipment List

Name	Manufacturers	M/N	S/N
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2.3. Description of Test Facility

Site Description

EMC Lab. : NVLAP Accreditation Code is 600167-0.

FCC Designation Number is CN5024.

CAB identifier is CN0071.

CNAS Registration Number is L4595.

2.4. Statement of the Measurement Uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. To CISPR 16 – 4 “Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements” and is documented in the LCS quality system acc. To DIN EN ISO/IEC 17025. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

2.5. Measurement Uncertainty

Test	Parameters	Expanded Uncertainty (U _{lab})	Expanded Uncertainty (U _{cispr})
Conducted Emission	Level accuracy (9kHz to 150kHz) (150kHz to 30MHz)	± 2.63 dB ± 2.35 dB	± 3.8 dB ± 3.4 dB
Radiated Emission	Level accuracy (9kHz to 30MHz)	± 3.68 dB	N/A
Radiated Emission	Level accuracy (30MHz to 1000MHz)	± 3.48 dB	± 5.3 dB
Radiated Emission	Level accuracy (above 1000MHz)	± 3.90 dB	± 5.2 dB

(1) Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus.

(2) The reported expanded uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor of $k=2$, which for a normal distribution corresponds to a coverage probability of approximately 95%.

3. TEST RESULTS

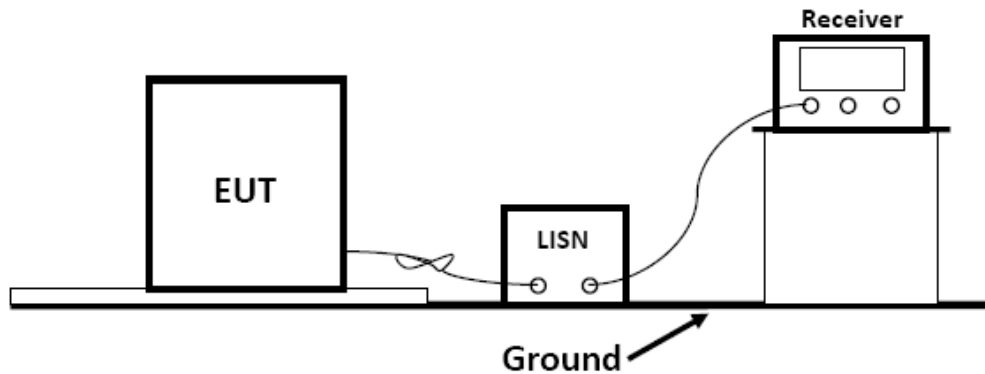
3.1. POWER LINE CONDUCTED EMISSION MEASUREMENT

3.1.1. Test Equipment

The following test equipments are used during the power line conducted measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	EZ	EZ-EMC	/	N/A	N/A
2	EMI Test Receiver	R&S	ESR3	102312	2021-03-16	2022-03-15
3	Artificial Mains	R&S	ENV216	101119	2021-06-21	2022-06-20
4	10dB Attenuator	SCHWARZBEC K	MTS-IMP-136	261115-001-0032	2021-06-21	2022-06-20

3.1.2. Block Diagram of Test Setup



3.1.3. Test Standard

Power Line Conducted Emission Limits (Class B)

Frequency (MHz)			Limit (dB μ V)	
			Quasi-peak Level	Average Level
0.15	~	0.50	66.0 ~ 56.0 *	56.0 ~ 46.0 *
0.50	~	5.00	56.0	46.0
5.00	~	30.00	60.0	50.0

NOTE1-The lower limit shall apply at the transition frequencies.
NOTE2-The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.50MHz.

3.1.4. EUT Configuration on Test

The following equipments are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner, which tends to maximize its emission characteristics in a normal application.



3.1.5. Operating Condition of EUT

3.1.5.1. Setup the EUT as shown on Section 3.1.2

3.1.5.2. Turn on the power of all equipments.

3.1.5.3. Let the EUT work in measuring Mode 1 and measure it.

3.1.6. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC/ANSI C63.4-2014 on Conducted Emission Measurement.

The bandwidth of the test receiver is set at 9kHz.

The frequency range from 150kHz to 30MHz is investigated

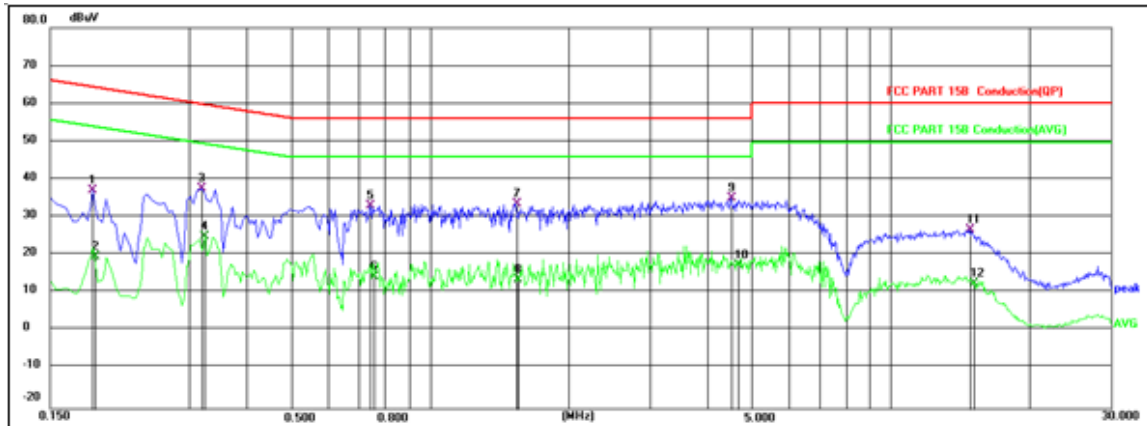
3.1.7. Test Results

PASS.

The test result please refer to the next page.



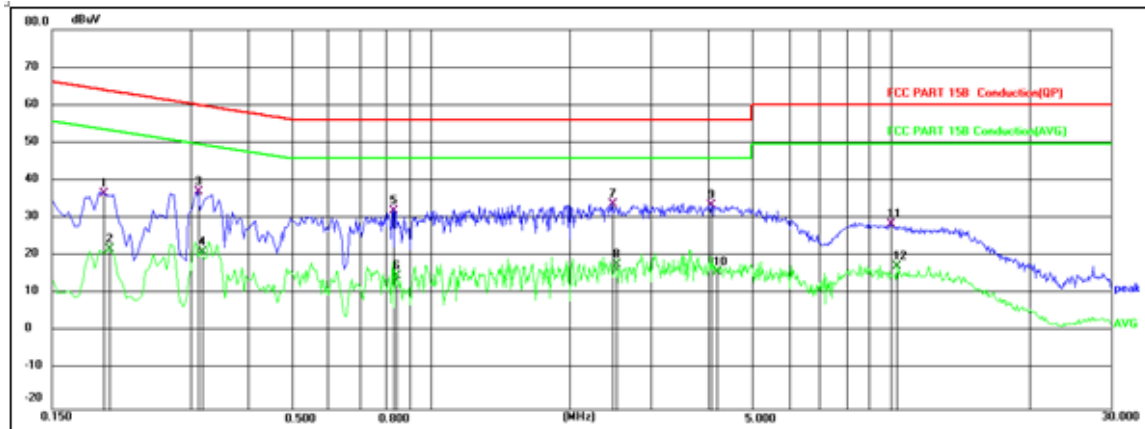
Test Model	L100	Test Mode	Mode 1
Environmental Conditions	23.3°C, 53.7% RH	Test Engineer	Terence Tang
Pol	Line	Test Voltage	AC 120V/60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1853	27.30	9.89	37.19	64.24	-27.05	QP
2	0.1874	10.00	9.89	19.89	54.15	-34.26	AVG
3	0.3200	27.79	9.90	37.69	59.71	-22.02	QP
4	0.3251	15.41	9.90	25.31	49.58	-24.27	AVG
5	0.7391	23.29	9.93	33.22	56.00	-22.78	QP
6	0.7589	4.67	9.92	14.59	46.00	-31.41	AVG
7	1.5355	23.82	9.96	33.78	56.00	-22.22	QP
8	1.5518	3.87	9.96	13.83	46.00	-32.17	AVG
9	4.5015	25.15	10.02	35.17	56.00	-20.83	QP
10	4.6469	7.66	10.02	17.68	46.00	-28.32	AVG
11	14.8281	16.43	10.55	26.98	60.00	-33.02	QP
12	15.0656	2.39	10.57	12.96	50.00	-37.04	AVG



Test Model	L100	Test Mode	Mode 1
Environmental Conditions	23.3°C, 53.7% RH	Test Engineer	Terence Tang
Pol	Neutral	Test Voltage	AC 120V/60Hz



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1934	26.93	9.89	36.82	63.89	-27.07	QP
2	0.1996	12.18	9.89	22.07	53.63	-31.56	AVG
3	0.3121	27.49	9.90	37.39	59.91	-22.52	QP
4	0.3166	11.46	9.90	21.36	49.80	-28.44	AVG
5	0.8296	22.48	9.91	32.39	56.00	-23.61	QP
6	0.8431	5.22	9.91	15.13	46.00	-30.87	AVG
7	2.4766	23.98	9.97	33.95	56.00	-22.05	QP
8	2.5216	8.30	9.97	18.27	46.00	-27.73	AVG
9	4.0876	23.76	10.00	33.76	56.00	-22.24	QP
10	4.1865	6.18	10.00	16.18	46.00	-29.82	AVG
11	9.9781	18.62	10.14	28.76	60.00	-31.24	QP
12	10.3336	7.52	10.17	17.69	50.00	-32.31	AVG

Note: Pre-Scan all mode, Thus record worse case mode result in this report.

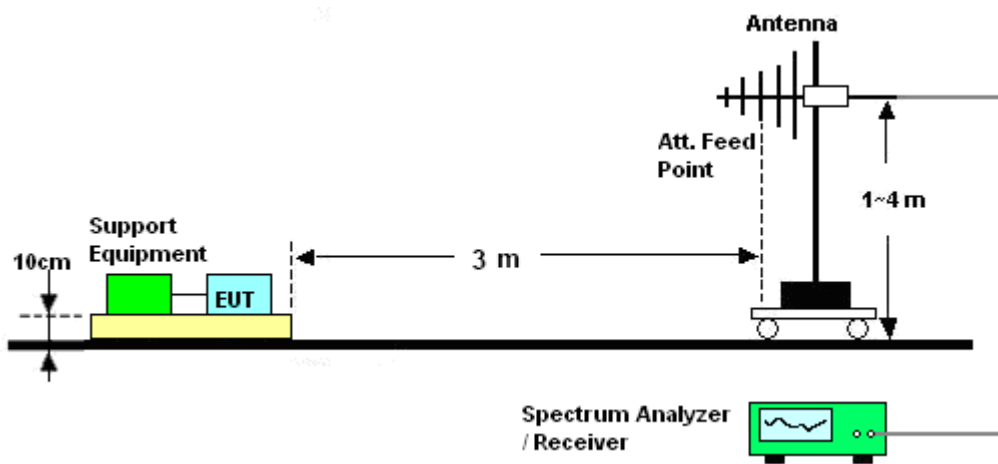
3.2. Radiated emission Measurement

3.2.1. Test Equipment

The following test equipments are used during the radiated emission measurement:

Item	Equipment	Manufacturer	Model No.	Serial No.	Cal Date	Due Date
1	EMI Test Software	E3	E3-EMC	/	N/A	N/A
2	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2021-07-25	2024-07-24
3	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2021-07-01	2024-06-30
4	EMI Test Receiver	R&S	ESR3	102311	2021-06-21	2022-06-20
5	Broadband Preamp	/	BP-01M18G	P190501	2020-06-22	2021-06-21

3.2.2. Block Diagram of Test Setup



3.2.3. Radiated Emission Limit (Class B)

Limits for Radiated Disturbance Below 1GHz

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46
960 ~ 1000	3	500	54
Remark : (1) Emission level $(\text{dB})\mu\text{V} = 20 \log$ Emission level $\mu\text{V/m}$ (2) The smaller limit shall apply at the cross point between two frequency bands. (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.			
Limits for Radiated Emission Above 1GHz			
Frequency (MHz)	Distance (Meters)	Peak Limit ($\text{dB}\mu\text{V/m}$)	Average Limit ($\text{dB}\mu\text{V/m}$)
Above 1000	3	74	54
***Note: The lower limit applies at the transition frequency.			

3.2.4. EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.2.5. Operating Condition of EUT

3.2.5.1. Setup the EUT as shown in Section 3.2.2.

3.2.5.2. Let the EUT work in test Mode 1 and measure it.

3.2.6. Test Procedure

EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1.0 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated by-log antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna is set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2014 on radiated emission measurement.



3.2.7. Measuring Instruments and Setting

Please refer to equipment list in this report. The following table is the setting of spectrum analyzer and receiver

Receiver Parameter	Setting
Attenuation	Auto
Start ~ Stop Frequency	9kHz~150kHz / RB/VB 200Hz/1KHz for QP/AVG
Start ~ Stop Frequency	150kHz~30MHz / RB/VB 9kHz/30KHz for QP/AVG
Start ~ Stop Frequency	30MHz~1000MHz / RB/VB 120kHz/1MHz for QP

Spectrum Parameter	Setting
Attenuation	Auto
Start Frequency	1000 MHz
Stop Frequency	10 th carrier harmonic
RB / VB (Emission in restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average
RB / VB (Emission in non-restricted band)	1MHz / 1MHz for Peak, 1 MHz / 1/B kHz for Average

The frequency range from 30MHz to 1000MHz and above 1000MHz is checked.

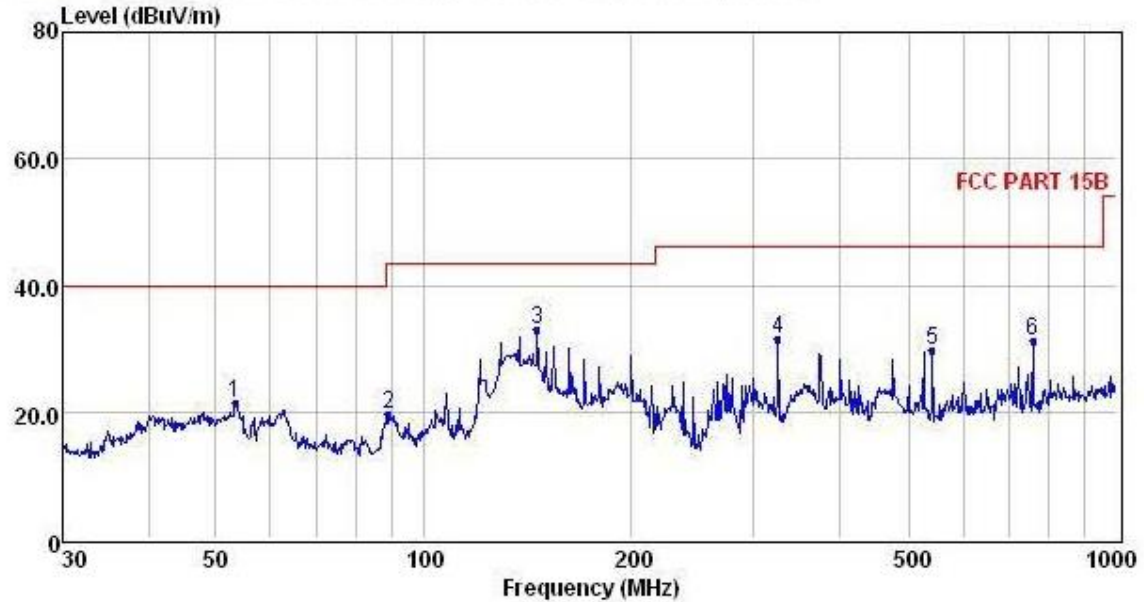
3.2.8. Radiated Emission Noise Measurement Result

PASS.

The scanning waveforms please refer to the next page.



Test Model	L100	Test Mode	Mode 1
Environmental Conditions	22.3°C, 53.6% RH	Detector Function	Quasi-peak
Pol	Vertical	Distance	3m
Test Engineer	Terence Tang	Test Voltage	AC 120V/60Hz



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	53.32	7.75	0.46	13.10	21.31	40.00	-18.69	QP
2	88.96	7.50	0.68	11.57	19.75	43.50	-23.75	QP
3	145.86	24.09	0.77	8.23	33.09	43.50	-10.41	QP
4	325.60	16.85	1.04	13.55	31.44	46.00	-14.56	QP
5	541.37	11.18	1.34	17.35	29.87	46.00	-16.13	QP
6	758.04	9.92	1.69	19.54	31.15	46.00	-14.85	QP

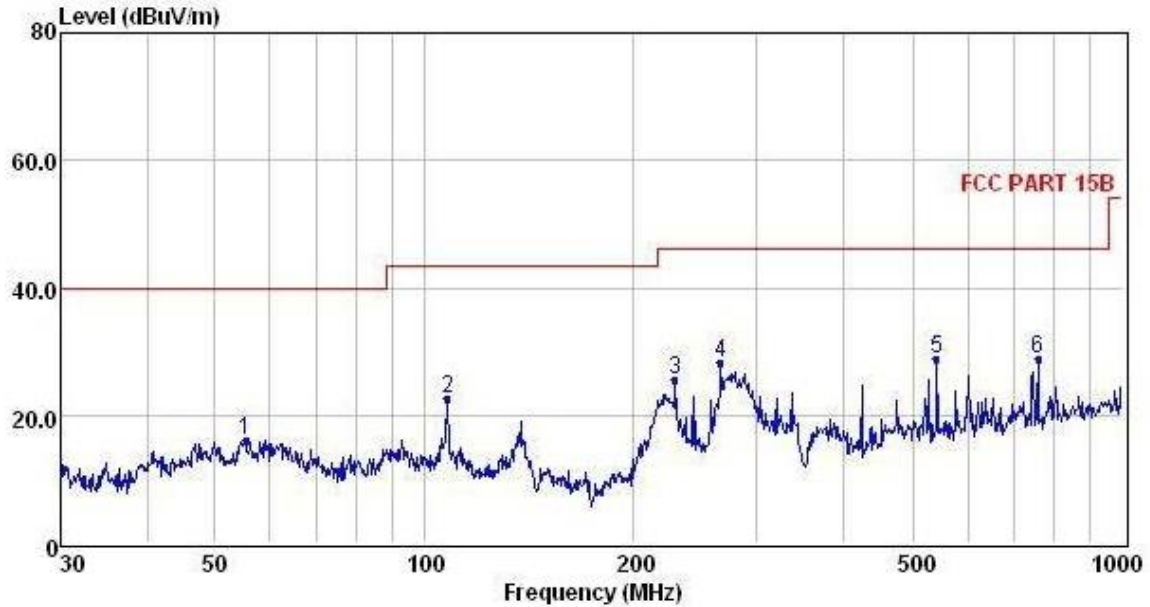
Note: 1. All readings are Quasi-peak values.

2. Measured= Reading + Antenna Factor + Cable Loss

3. The emission that are 20db below the official limit are not reported



Test Model	L100	Test Mode	Mode 1
Environmental Conditions	22.3°C, 53.6% RH	Detector Function	Quasi-peak
Pol	Horizontal	Distance	3m
Test Engineer	Terence Tang	Test Voltage	AC 120V/60Hz



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	55.41	2.63	0.47	12.99	16.09	40.00	-23.91	QP
2	107.89	9.47	0.68	12.44	22.59	43.50	-20.91	QP
3	229.29	12.92	0.93	11.61	25.46	46.00	-20.54	QP
4	266.61	15.01	1.00	12.25	28.26	46.00	-17.74	QP
5	541.37	10.02	1.34	17.35	28.71	46.00	-17.29	QP
6	758.04	7.48	1.69	19.54	28.71	46.00	-17.29	QP

Note: 1. All readings are Quasi-peak values.

2. Measured= Reading + Antenna Factor + Cable Loss

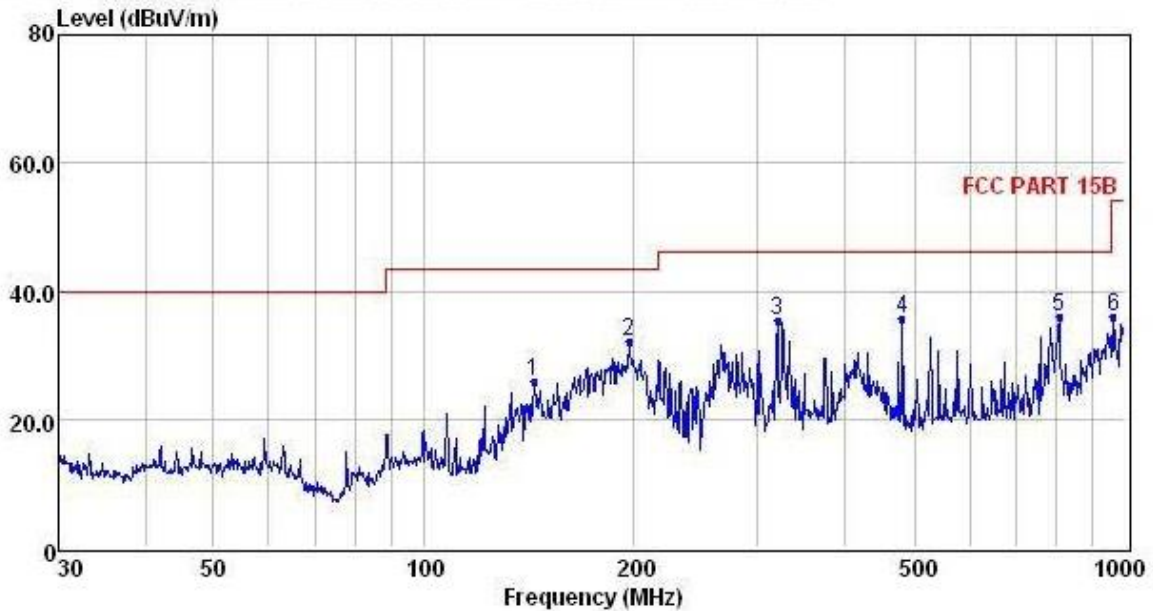
3. The emission that are 20db below the official limit are not reported

Note: Pre-Scan all mode, Thus record worse case mode result in this report.

Remark: For above 1000MHz, Because the emission it too low to be reported.



Test Model	L100	Test Mode	Mode 2
Environmental Conditions	22.3°C, 53.6% RH	Detector Function	Quasi-peak
Pol	Vertical	Distance	3m
Test Engineer	Terence Tang	Test Voltage	AC 120V/60Hz

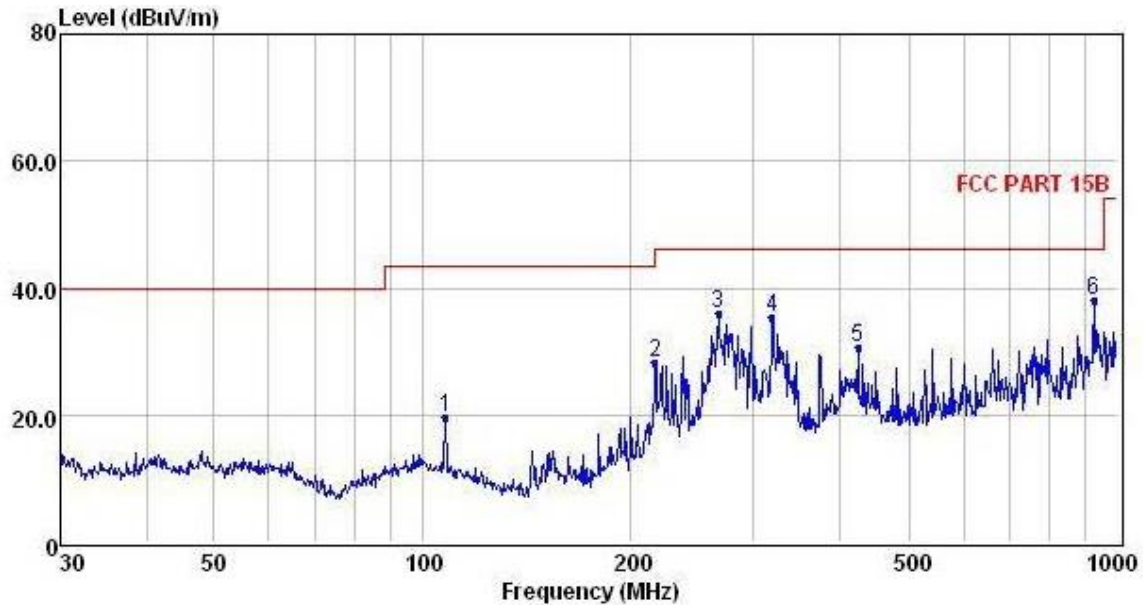


	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	143.83	17.00	0.71	8.22	25.93	43.50	-17.57	QP
2	196.51	20.49	0.96	10.57	32.02	43.50	-11.48	QP
3	321.06	20.91	1.16	13.37	35.44	46.00	-10.56	QP
4	480.53	18.35	1.31	16.08	35.74	46.00	-10.26	QP
5	807.43	13.97	1.76	20.14	35.87	46.00	-10.13	QP
6	965.54	12.49	1.88	21.52	35.89	54.00	-18.11	QP

Note: 1. All readings are Quasi-peak values.
 2. Measured= Reading + Antenna Factor + Cable Loss
 3. The emission that are 20db below the official limit are not reported



Test Model	L100	Test Mode	Mode 2
Environmental Conditions	22.3°C, 53.6% RH	Detector Function	Quasi-peak
Pol	Horizontal	Distance	3m
Test Engineer	Terence Tang	Test Voltage	AC 120V/60Hz



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	107.89	6.51	0.68	12.44	19.63	43.50	-23.87	QP
2	216.78	16.18	0.88	11.10	28.16	46.00	-17.84	QP
3	267.55	22.84	1.00	12.28	36.12	46.00	-9.88	QP
4	319.94	20.85	1.16	13.33	35.34	46.00	-10.66	QP
5	425.03	14.08	1.16	15.49	30.73	46.00	-15.27	QP
6	925.76	14.84	1.90	21.26	38.00	46.00	-8.00	QP

Note: 1. All readings are Quasi-peak values.

2. Measured= Reading + Antenna Factor + Cable Loss

3. The emission that are 20db below the official limit are not reported

Note: Pre-Scan all mode, Thus record worse case mode result in this report.

Remark: For above 1000MHz, Because the emission it too low to be reported.

4. PHOTOGRAPH

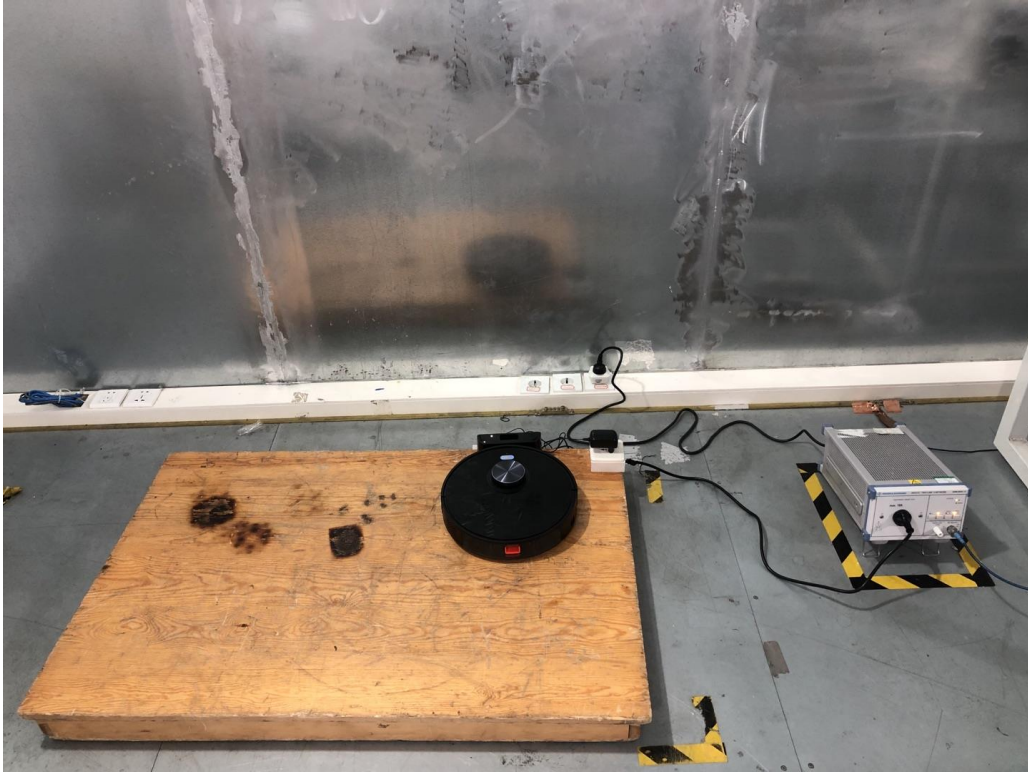


Photo of Power Line Conducted Measurement

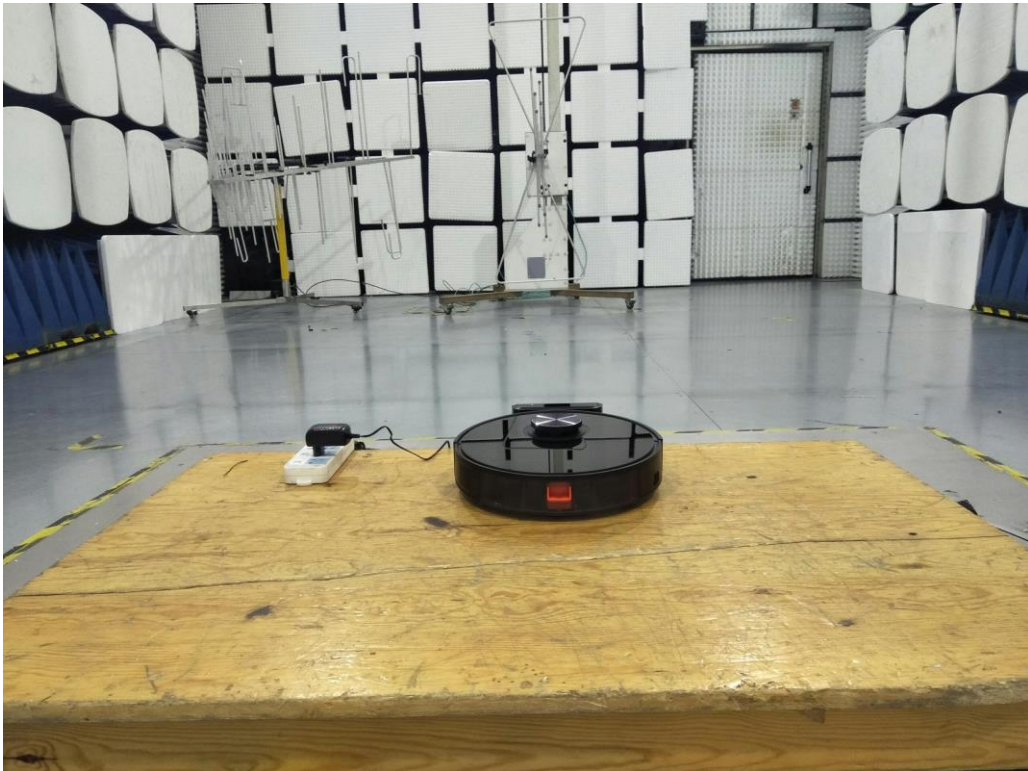


Photo of Radiated emission Measurement

5. EXTERNAL AND INTERNAL PHOTOS OF THE EUT



Fig. 1



Fig. 2



Fig. 3



Fig. 4



Fig. 5



Fig. 6



Fig. 7



Fig. 8



Fig. 9



Fig. 10



Fig. 11



Fig. 12



Fig. 13



Fig. 14



Fig. 15



Fig. 16



Fig. 17



Fig. 18

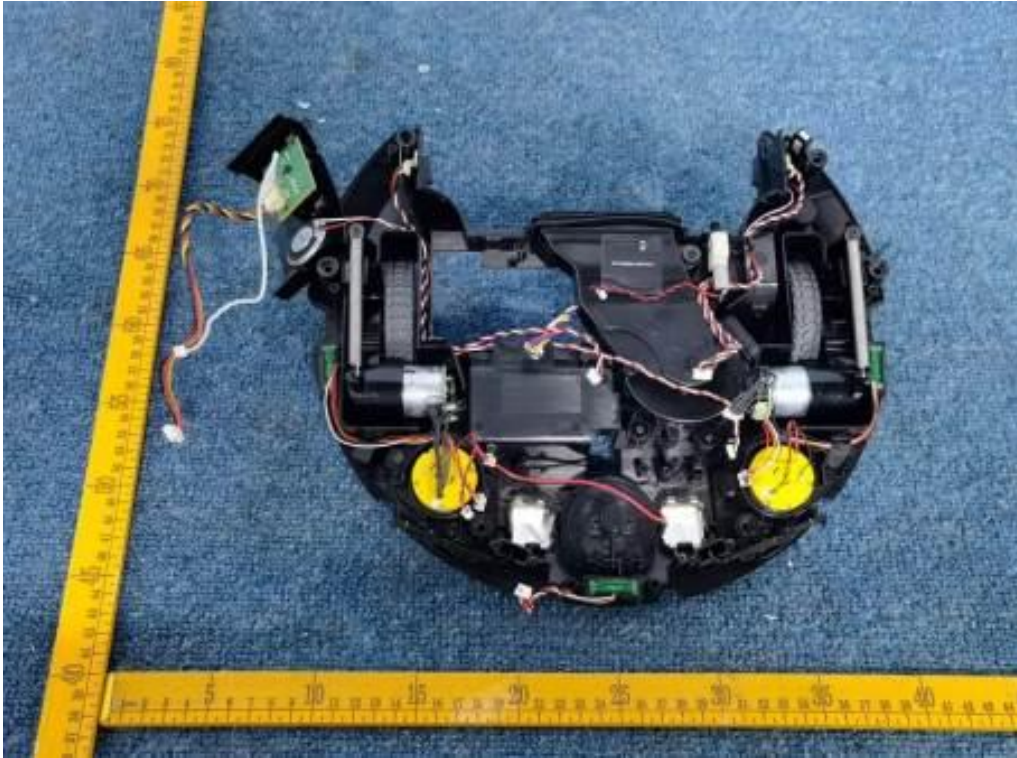


Fig. 19

-----THE END OF TEST REPORT-----