

# FCC PART 15C TEST REPORT FOR CERTIFICATION On Behalf of

**Arovast Corporation** 

Smart True HEPA Air Purifier

Model Number: LAP-V102S-WUS

Additional Model: LAP-V102S-AUSR, LAP-V102S-Followed by up to 4 characters

FCC ID: 2ARBY-VITAL100S

Applicant :	Arovast Corporation		
Address:	1202 N Miller St. Suite A, Anaheim, California 92806, United States		
Prepared By:	EST Technology Co., Ltd.		
	Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China		
Tel: 86-769-83081888-808			

Report Number:	ESTE-R2212121-1
Date of Test:	Apr. 08, 2024~ Apr. 17, 2024
Date of Report:	Apr. 22, 2024



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Applicant: Address:	Arovast Corporation 1202 N Miller St. St		ifornia 92806, United States		
Manufacturer: Address:	Arovast Corporation 1202 N Miller St. Suite A, Anaheim, California 92806, United States				
Factory: Address:	Guang Dong Xinbao Electrical Appliances Holdings Co., Ltd Zhenghe South Road, Leliu Town, Shunde District, Foshan City, Guangdong Province, China				
E.U.T:	Smart True HEPA	ir Purifier	Al-Al-al-al-al-al-al-al-al-al-al-al-al-al-al		
Model Number:	LAP-V102S-WUS				
Additional Model:	Note: Only the appe sales channels are	earance color, mode different, among wh	ed by up to 4 characters I, front and rear panels and ich the screen printing of the -WUS and LAP-V102S-AUSR		
Power Supply:	DC 24V From Adap	oter Input AC 120V/6	0Hz		
Trade Name:	Levoit	Serial No.:			
Date of Receipt:	Apr. 08, 2024	Date of Test:	Apr. 08, 2024~ Apr. 17, 2024		
Test Specification:	FCC Part 15 Subpa ANSI C63.10:2013 FCC KDB 558074 I	art C (15.247) D01 15.247 Meas Gi	uidance v05r02		
Test Result:	measurement resulted Technology Co., Lt and completeness the EUT to be to Regulations Part 18.  This report applies	ults were contained and was assumed ful of these measurement echnically compliant Subpart C requirents to above tested	sample only and shall not be		
			oval of EST Technology Co., Ltd.  Date: Apr. 22, 2024		
Prepared by:	Reviewe	ed by:	Approved by:		
	/		115		

Ring Yang / Assistant

Seven Wang / Engineer

Iceman Ho I Manager

Other Aspects: This report base on the previous report with report number:

ESTE-R2212121, motor and supply power were added in this report, The rf module has not changed, So only need re-tested conducted emissions and radiated(30-1000MHz), other test item needn't re-tested.

Abbreviations: OK/P=passed

fail/F=failed

n.a/N=not applicable

E.U.T=equipment under tested

This test report is based on a single evaluation of one sample of above mentioned products ,lt is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.



### **1.GENERAL INFORMATION**

### 1.1.Description of Device (EUT)

Product Name	:	Smart True HEPA Air Purifier
Model Number	:	LAP-V102S-WUS
Software Version	:	1.0.06
Hardware Version	:	Vital 100S-C_V1.3P1.3SP4
Operation frequency	:	2402MHz~2480MHz
Number of channel	:	40
Modulation Type	:	GFSK
Sample Type	:	Prototype production

Note: For a more detailed features description, please refer to the manufacturer's specifications or the user's manual.

### 1.2.Antenna Information

	Ant No.	Brand	Model Name	Antenna Type	Connector	Gain (dBi)
	1	ı	-	PCB	-	3.37
Ш						

#### Note:

- 1.The antenna gain is declared by the customer and the laboratory is not responsible for the accuracy of the antenna gain.
- 2. The test results of this report only apply to the sample as received



# 2.SUMMARY OF TEST

# 2.1.Summary of test result

No.	Description of Test Item	FCC Standard Section	Results
1	6dB Bandwidth	15.247(a)(2)	N/A
2	Maximum Peak Output Power	15.247(b)(3)	N/A
3	Power Spectral Density	15.247(e)	N/A
4	Conducted Band Edge	15.247(d)	N/A
5	Conducted Spurious Emissions	15.247(d)	N/A
6	Radiated Spurious Emissions and Band Edge	15.205 15.209 15.247(d)	PASS
7	AC Power Line Conducted Emissions	15.207	PASS
8	Antenna Requirement	15.203	N/A

Note: "N/A" denotes test is not applicable in this test report.



### 2.2.Test Facilities

EMC Lab : Accredited by CNAS, CHINA

Registration No.: L5288

This Accreditation is valid until: November 12, 2029

Recognized by FCC, USA Designation Number: CN1215

This Recognition is valid until: January 31, 2026

Accredited by A2LA, USA Registration No.: 4366.01

This Accreditation is valid until: January 31, 2026

Recognized by Industry Canada CAB identifier No.: CN0035

This Recognition is valid until: January 31, 2026

Recognized by VCCI, Japan

Registration No.:C-14103; T-20073; R-13663;

R-20103; G-20097

Date of registration: Apr. 20, 2020

This Recognition is valid until: Apr. 19, 2026

Recognized by TUV Rheinland, Germany Registration No.: UA 50413872 0001 Date of registration: July 31, 2018

Recognized by Intertek

Registration No.: 2011-RTL-L2-64

Date of registration: November 08, 2018

Name of Firm : EST Technology Co., Ltd.

Site Location : Chilingxiang, Qishantou, Santun, Houjie, Dongguan,

Guangdong, China



### 2.3. Measurement uncertainty

Test Item	Uncertainty	
Uncertainty for Conduction emission test	±3.48dB	
Uncertainty for spurious emissions test (Below 30MHz)	±1.62 dB	
Uncertainty for spurious emissions test	±4.60 dB(Polarize: H)	
(30MHz-1GHz)	±4.68 dB(Polarize: V)	
Uncertainty for spurious emissions test (1GHz to 25GHz)	±4.96dB	
Uncertainty for radio frequency	7×10 <sup>-8</sup>	
Uncertainty for conducted RF Power	1.08dB	
Uncertainty for Power density test	0.26dB	

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

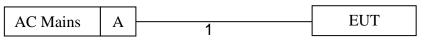
### 2.4. Assistant equipment used for test

Item	Equipment	Brand	Model Name/Type No.	FCC ID	Series No.
Α	Adapter	-	GQ36-240150-AU	-	-
Α	Adapter	-	DZ036CHL240150U	-	-
Α	Adapter	-	DZ048BHL240200U	-	-

Item	Shielded Type	Ferrite Core	Length	Note
1	NO	NO	1.8m	DC Cable

### 2.5.Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground. EUT was beset into BLE test mode by software before test.



DC 24V From Adapter Input AC 120V/60Hz

(EUT: Smart True HEPA Air Purifier)



### 2.6.Test Mode

The test mode was selected for the final test as listed below.

Test Item	Modulation Type	Test Channel
Radiated Spurious Emissions(Below 1GHz)	GFSK	Low/Middle/High
AC Power Line Conducted Emissions	GFSK	Low/Middle/High

Note: In radiated measurement, the EUT had been pre-scan on the positioned of each 3 axis(X,Y,Z), the worst case was found when positioned on **X-plane**.

### 2.7. Power Setting of Test Software

Software Name	EspRFTestTool_v2.8_Manual			
Frequency(MHz)	2402	2440	2480	
GFSK 1Mbps Setting	10	10	10	
GFSK 2Mbps Setting	10	10	10	

Note: This information is provided by the applicant.



### 2.8.Channel List

Channel	Frequency	Channel	Frequency
No.	(MHz)	No.	(MHz)
0	2402	1	2404
2	2406	3	2408
4	2410	5	2412
6	2414	7	2416
8	2418	9	2420
10	2422	11	2424
12	2426	13	2428
14	2430	15	2432
16	2434	17	2436
18	2438	19	2440
20	2442	21	2444
22	2446	23	2448
24	2450	25	2452
26	2454	27	2456
28	2458	29	2460
30	2462	31	2464
32	2466	33	2468
34	2470	35	2472
36	2474 37		2476
38	2478	39	2480



# 2.9. Test Equipment List

For conducted emission test						
Equipment	Manufacturer	Model No.	Serial No.	Calibration Body	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESHS30	EST-E001	LISAI	June 12,23	1 Year
Artificial Mains Network	Rohde & Schwarz	ENV216	EST-E002	LISAI	June 12,23	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	EST-E078	LISAI	June 12,23	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A

For radiated emission test(9kHz-30MHz)						
Equipment	Equipment Manufacturer Model No. Serial No. Calibration Body Last Cal. Next					
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 12,23	1 Year
Active Loop Antenna	SCHWAREBE CK	FMZB 1519B	EST-E054	LISAI	June 12,23	1 Year
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A
9kHz-30MHz Cable	N/A	EST-001	N/A	N/A	N/A	N/A

For radiated emissions test (30MHz-1000MHz)							
Equipment Manufacturer Model No. Serial No. Calibration Body Last Cal. Next Cal.							
EMI Test Receiver	Rohde & Schwarz	ESR7	EST-E047	LISAI	June 12,23	1 Year	
Bilog Antenna	Teseq	CBL 6111D	EST-E034	LISAI	June 12,23	1 Year	
Test Software	Audix	e3-6.111221a	N/A	N/A	N/A	N/A	
30-1000MHz Cable	N/A	EST-002	N/A	N/A	N/A	N/A	



### 3. RADIATED SPURIOUS EMISSIONS AND BAND EDGE

#### 3.1.Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

#### 15.205 Restricted frequency band

MHz	MHz MHz		GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(2)

#### 15.209 Limit

Frequency (MHz)	Field Strength(µV/m)	Distance(m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

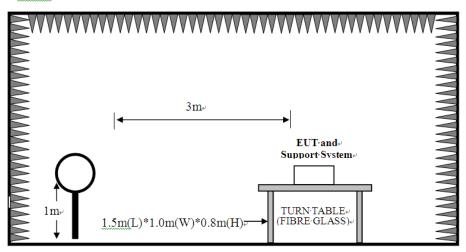
#### Note:

- (1) Emission level  $dB\mu V = 20 \log Emission level \mu V/m$ .
- (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.



# 3.2.Test Setup

9kHz~30MHz



# 3.3. Spectrum Analyzer Setting

#### For 9KHz-150KHz

Spectrum Parameters	Setting				
RBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)				
VBW	300Hz(for Peak&AVG)/CISPR 200Hz(for QP)				
Start frequency	9KHz				
Stop frequency	150KHz				
Sweep Time	Auto				
Detector	PEAK/QP/AVG				
Trace Mode	Max Hold				



#### For 150KHz-30MHz

Spectrum Parameters	Setting
RBW	9KHz
VBW	9KHz
Start frequency	150KHz
Stop frequency	30MHz
Sweep Time	Auto
Detector	QP
Trace Mode	Max Hold

#### For 30MHz-1GHz

Spectrum Parameters	Setting				
RBW	120KHz				
VBW	300KHz				
Start frequency	30MHz				
Stop frequency	1GHz				
Sweep Time	Auto				
Detector	QP				
Trace Mode	Max Hold				

Note: T is the on-time time of the duty cycle, when EUT transmit continuously with maximum output power, unit is seconds.

#### 3.4.Test Procedure

- a. EUT was placed on a turn table, which is 0.8 meter high above ground for below 1GHz test.
- b. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower.
- c. Set the EUT transmit continuously with maximum output power.
- d. The turn table can rotate 360 degrees to determine the position of the maximum emission level
- e. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.
- f. Spectrum analyzer setting parameters in accordance with section 3.3.
- g. Repeat above procedures until all channels were measured.
- h. Record the results in the test report.

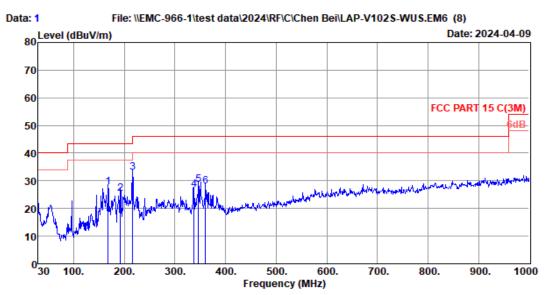


### 3.5.Test Result

#### **Radiated Emissions Below 1GHz**

### EST Technology

Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China Tel:+86-769-83081888 Fax:+86-769-83081878



: 1# 966 Chamber Site no.

Data no. : 1 Ant. pol. : HORIZONTAL Dis. / Ant. : 3m 37062

: FCC PART 15 C(3M)

Env. / Ins. : Temp;24.5°C;Humi:46.3%;Press:101.47kPa

: DCY Engineer

EUT : Smart True HEPA Air Purifier

Power : DC 24V From Adapter Input AC 120V/60Hz

: LAP-V102S-WUS M/N Test Mode : TX Mode

	Freq.	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	167.74	10.50	1.86	15.30	27.66	43.50	15.84	QP
2	191.99	7.80	2.00	15.61	25.41	43.50	18.09	QP
3	216.24	9.94	2.14	20.99	33.07	46.00	12.93	QP
4	337.49	14.30	2.79	9.68	26.77	46.00	19.23	QP
5	346.22	15.08	2.82	10.76	28.66	46.00	17.34	QP
6	360.77	15.36	2.89	9.92	28.17	46.00	17.83	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.

2. Margin= Limit - Emission Level.

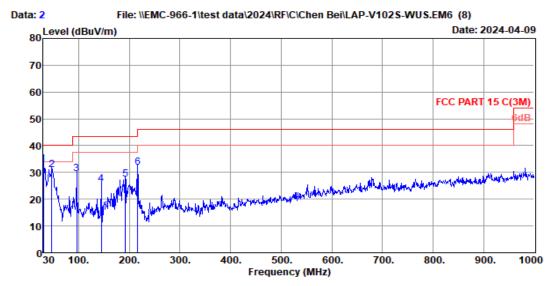
3. The emission levels that are 20dB below the official limit are not reported.



### EST Technology

Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China Tel:+86-769-83081888

Fax:+86-769-83081878



Site no. : 1# 966 Chamber Data no. : 2
Dis. / Ant. : 3m 37062 Ant. pol. : VERTICAL

Limit : FCC PART 15 C (3M)

Env. / Ins. : Temp;24.5°C;Humi:46.3%;Press:101.47kPa

Engineer : DCY

EUT : Smart True HEPA Air Purifier

Power : DC 24V From Adapter Input AC 120V/60Hz

M/N : LAP-V102S-WUS Test Mode : TX Mode

	Freq.	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.00	19.00	0.70	13.42	33.12	40.00	6.88	QP
2	46.49	10.40	0.91	19.78	31.09	40.00	8.91	QP
3	95.96	10.90	1.38	17.27	29.55	43.50	13.95	QP
4	144.46	11.60	1.72	12.29	25.61	43.50	17.89	QP
5	191.99	7.80	2.00	17.71	27.51	43.50	15.99	QP
6	216.24	9.94	2.14	19.70	31.78	46.00	14.22	QP

Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.

2. Margin= Limit - Emission Level.

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

#### Note:

- 1. The amplitude of 9KHz to 30MHz spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.
- 2. All channels had been pre-test, only the worst case was reported.



### **4.AC POWER LINE CONDUCTED EMISSIONS**

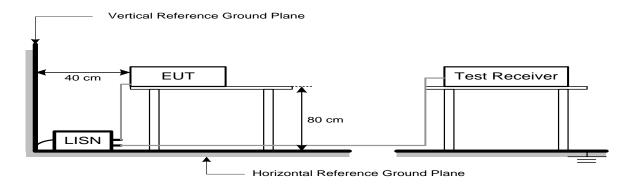
#### 4.1.Limit

			Maximum RF Line Voltage			
Frequency			Quasi-Peak Level	Average Level		
			dB(μV)	dB(μV)		
150kHz	1	500kHz	66 ~ 56*	56 ~ 46*		
500kHz	~	5MHz	56	46		
5MHz	~	30MHz	60	50		

#### Note:

- 1. \* Decreasing linearly with logarithm of frequency.
- 2. The lower limit shall apply at the transition frequencies.

### 4.2.Test Setup



### 4.3. Spectrum Analyzer Setting

Spectrum Parameters	Setting		
RBW	9KHz		
VBW	9KHz		
Start frequency	150KHz		
Stop frequency	30MHz		
Sweep Time	Auto		
Detector	QP/AVG		
Trace Mode	Max Hold		

#### 4.4.Test Procedure

- a. The EUT was placed on a non-metallic table, 80cm above the ground plane.
- b. The EUT Power connected to the power mains through a line impedance stabilization network.
- c. Provides a 50 ohm coupling impedance for the EUT (Please refer the block diagram of the test setup and photographs).
- d. Set the EUT transmit continuously with maximum output power.
- e. Spectrum analyzer setting parameters in accordance with section 4.3.
- f. The 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 ANSI C63.10: 2013 on Conducted Emission Test.
- g. Record the results in the test report.



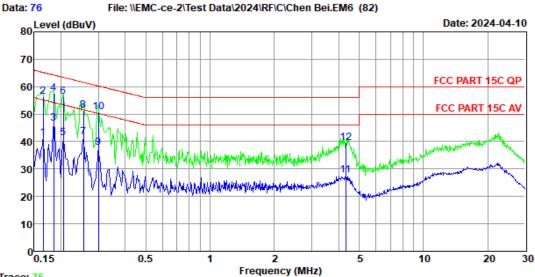


### 4.5. Test Result

### EST Technology

Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China

Tel:+86-769-83081888 Fax:+86-769-83081878



Trace: 75

: 2#CE Shield Room Site no

Data no. : 76 Env. / Ins. : Temp:24.8°C Humi:55% Press:101.50kPa LINE Phase : LINE

Limit : FCC PART 15C QP

Engineer : XJF

: Smart True HEPA Air Purifier EUT

Power : DC 24V From Adapter Input AC 120V/60Hz

M/N : LAP-V102S-WUS

Test Mode : TX Mode

	Freq.	LISN Factor (db)	Cable Loss (db)	Reading dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.165	10.12	9.89	21.44	41.45	55.21	13.76	Average
2	0.165	10.12	9.89	36.25	56.26	65.21	8.95	QP
3	0.185	10.16	9.93	26.66	46.75	54.24	7.49	Average
4	0.185	10.16	9.93	37.44	57.53	64.24	6.71	QP
5	0.205	10.16	9.94	21.12	41.22	53.40	12.18	Average
6	0.205	10.16	9.94	36.15	56.25	63.40	7.15	QP
7	0.255	10.15	9.95	21.40	41.50	51.60	10.10	Average
8	0.255	10.15	9.95	31.27	51.37	61.60	10.23	QP
9	0.300	10.15	9.87	17.77	37.79	50.24	12.45	Average
10	0.300	10.15	9.87	30.65	50.67	60.24	9.57	QP
11	4.315	10.00	9.99	7.88	27.87	46.00	18.13	Average
12	4.315	10.00	9.99	19.65	39.64	56.00	16.36	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.

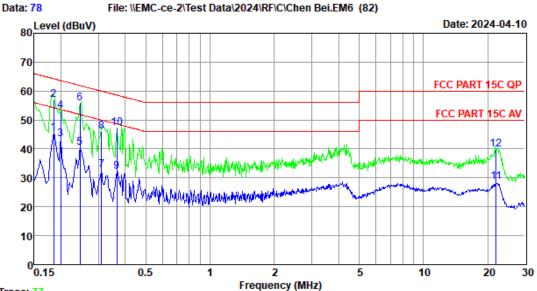
<sup>2.</sup> Margin= Limit - Emission Level.

<sup>3.</sup> If the average limit is met when useing a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



### EST Technology

Chilingxiang, Qishantou, Santun, Houjie, Dongguan, Guangdong, China Tel:+86-769-83081888 Fax:+86-769-83081878



Trace: 77

Site no : 2#CE Shield Room Data no. : 78

Env. / Ins. : Temp:24.8°C Humi:55% Press:101.50kPa LINE Phase : NEUTRAL

Limit : FCC PART 15C QP

Engineer : XJF

EUT : Smart True HEPA Air Purifier

Power : DC 24V From Adapter Input AC 120V/60Hz

M/N : LAP-V102S-WUS Test Mode : TX Mode

	Freq. (MHz)	LISN Factor (db)	Cable Loss (db)	Reading dBuV)	Emission Level (dBuv)	Limits (dBuv)	Margin (dB)	Remark
1	0.185	10.14	9.93	25.37	45.44	54.24	8.80	Average
2	0.185	10.14	9.93	36.94	57.01	64.24	7.23	QP
3	0.200	10.14	9.93	23.46	43.53	53.62	10.09	Average
4	0.200	10.14	9.93	33.15	53.22	63.62	10.40	QP
5	0.246	10.16	9.95	20.20	40.31	51.91	11.60	Average
6	0.246	10.16	9.95	35.64	55.75	61.91	6.16	QP
7	0.310	10.17	9.87	12.75	32.79	49.97	17.18	Average
8	0.310	10.17	9.87	26.15	46.19	59.97	13.78	QP
9	0.365	10.10	9.89	12.10	32.09	48.61	16.52	Average
10	0.365	10.10	9.89	27.36	47.35	58.61	11.26	QP
11	21.946	10.58	10.32	7.81	28.71	50.00	21.29	Average
12	21.946	10.58	10.32	19.00	39.90	60.00	20.10	QP

Remarks: 1. Emission Level= LISN Factor + Cable Loss + Reading.

- 2. Margin= Limit Emission Level.
- If the average limit is met when useing a quasi-peak detector, the EUT shall be deemed to meet both limits and measurement with average detector is unnecessary.



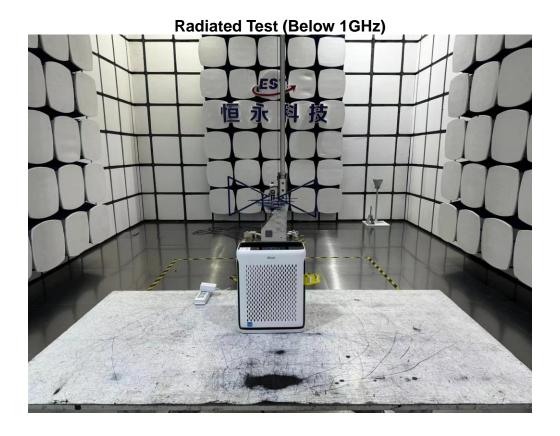
# 5. TEST SETUP PHOTO













# 6. EUT PHOTO







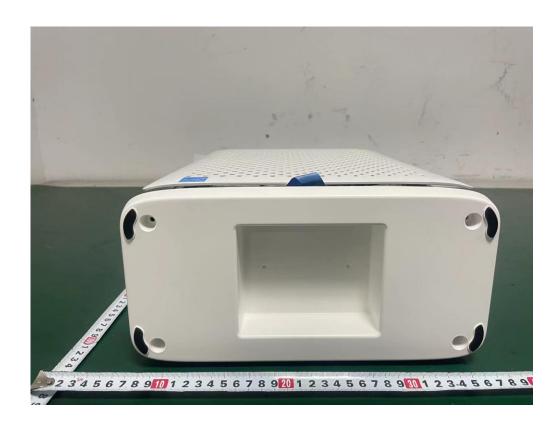






















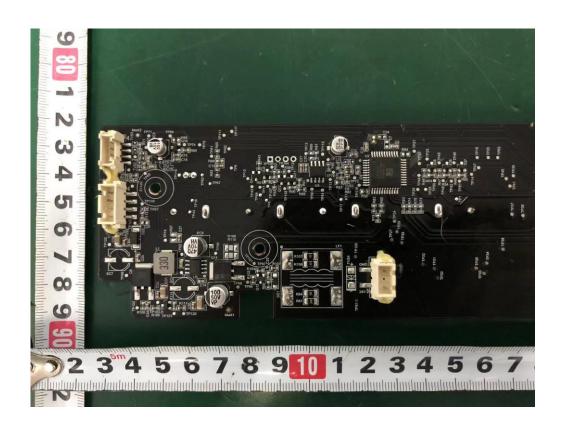




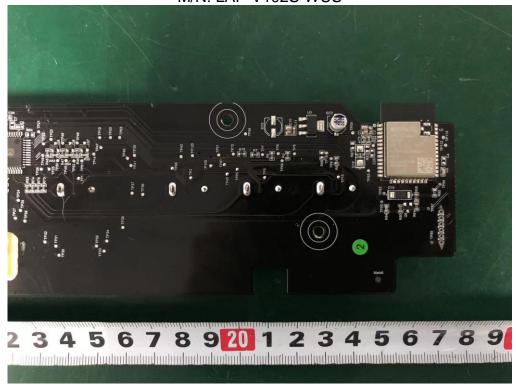






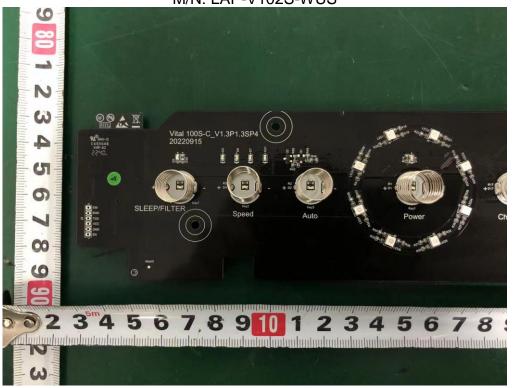










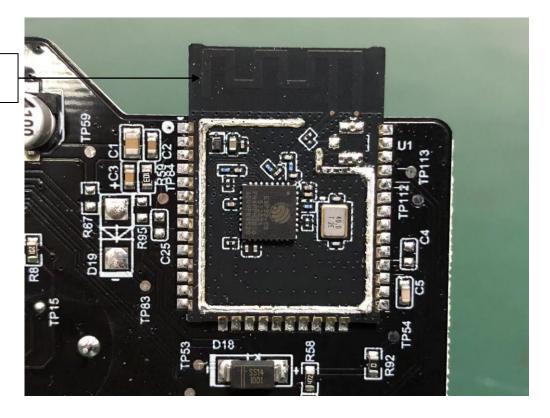






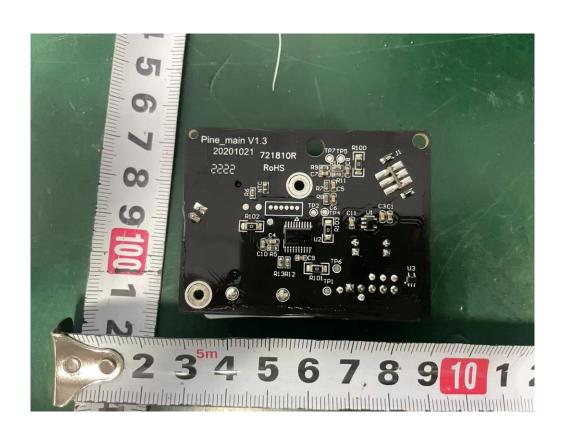


Bluetooth Antenna









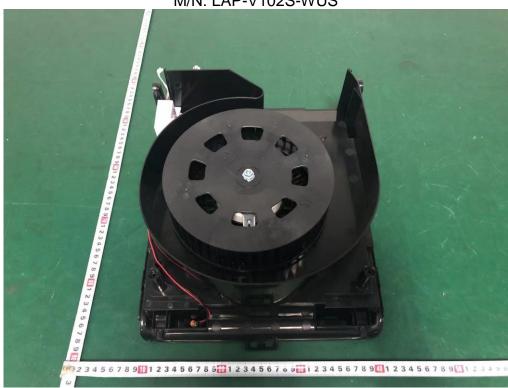


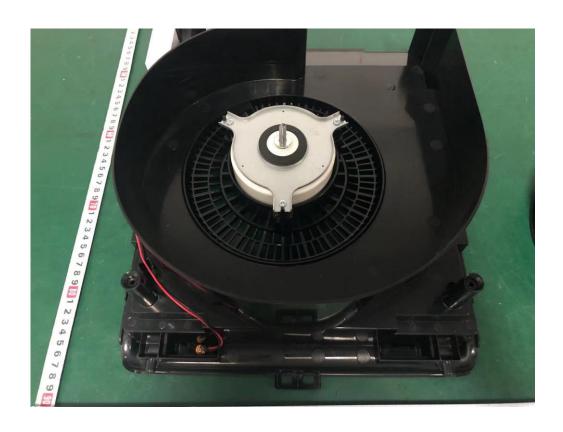
#### **New Photos**













Internal Photos M/N: LAP-V102S-WUS





**End of Test Report**