

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 1 of 22

Applicant : Home Tech Innovation, Inc
Address of Applicant : 1035 Cambridge St, Suite 11A, Cambridge, MA 02141

Product Name : Suvie Starch Cooker
Model No. : S020S
Sample No. : E21100025-01#01
FCC ID : 2AT2K-S020S
:

Standards : FCC CFR47 Part 15, Subpart C

Date of Receipt : 2021-10-25
Date of Test : 2021-11-16
Date of Issue : 2021-11-17

Remark:

This report details the results of the testing carried out on one sample, the results contained in this report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

Prepared by: Chris Chen (Chris Chen) Reviewed by: Oliver Xiang (Oliver Xiang) Approved by: Guoyou Chi (Authorized signatory: Guoyou Chi)

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 2 of 22

Contents

1	GENERAL INFORMATION	3
1.1	TESTING LABORATORY	3
1.2	DETAILS OF APPLICATION	3
1.3	DETAILS OF EUT	3
1.4	TEST METHODOLOGY	4
1.5	TEST VERDICT	4
2	TEST CONDITION	5
2.1	ENVIRONMENTAL CONDITIONS	5
2.2	EQUIPMENT LIST	5
2.3	MEASUREMENT UNCERTAINTY	5
3	TEST SET-UP AND OPERATION MODES	6
3.1	DETAILS OF TEST MODE	6
3.2	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	6
3.3	SUPPORT SOFTWARE	6
3.4	TEST SETUP DIAGRAM	7
4	TEST RESULTS	8
4.1	TRANSMITTER REQUIREMENT & TEST SUITES	8
4.1.1	<i>Antenna Requirement</i>	8
4.1.2	<i>Frequency Tolerance</i>	9
4.1.3	<i>20dB Bandwidth</i>	10
4.1.4	<i>Radiated Emission</i>	12
4.2	MAINS EMISSIONS	17
4.2.1	<i>Conducted Emission on AC Mains</i>	17
5	APPENDIXES	20
5.1	PHOTOGRAPHS OF THE SAMPLE	20
5.2	PHOTOGRAPHS OF THE TEST SET-UP	21

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 3 of 22

1 General Information

1.1 Testing Laboratory

Company Name	ICAS Testing Technology Service (Shanghai) Co., Ltd.
Address	No.1298 Pingan Rd, Minhang District, Shanghai, China
Telephone	0086 21-51682999
Fax	0086 21-54711112
Homepage	www.icasiso.com

1.2 Details of Application

Applicant Company Name	Home Tech Innovation, Inc
Address	1035 Cambridge St, Suite 11A, Cambridge, MA 02141
Contact Person	Kevin Incorvia
Telephone	+1 617 800 5336
Email	kincorvia@suvie.com
Manufacturer Company Name	Home Tech Innovation, Inc
Address	1035 Cambridge St, Suite 11A, Cambridge, MA 02141

1.3 Details of EUT

Product Name	Suvie Starch Cooker
Brand Name	Suvie
Model Name Under Test	S020S
FCC ID	2AT2K-S020S
Mode of Operation	NFC
Frequency Range	13.56MHz
Modulation Type	ASK
Hardware version	S020S1.0.1
Software version	fw
Antenna Type	Internal Antenna
Test Temperature	25°C
Test Voltage	AC 120V 60Hz

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 4 of 22

1.4 Test Methodology

47 CFR Part 15, Subpart C (10-1-16 Edition)	Miscellaneous Wireless Communications Services
ANSI C63.10-2013	American National Standard for Testing Unlicensed Wireless Devices

Note(s):

All test items were verified and recorded according to the standards and without any addition/deviation/exclusion during the test.

1.5 Test Verdict

No.	FCC Part No.	Description	Test Result	Verdict
1	15.203	Antenna Requirement	Clause 4.1.1	PASS
2	15.225(e)	Frequency Tolerance	Clause 4.1.2	PASS
3	15.215(c)	20dB Bandwidth	Clause 4.1.3	PASS
4	15.225	Radiated Emission	Clause 4.1.4	PASS
5	15.207	Conducted Emission	Clause 4.2.1	PASS

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 5 of 22

2 Test Condition

2.1 Environmental conditions

Temperature (°C)	18-25
Humidity (%RH)	40-65
Barometric Pressure (mbar)	960-1060

2.2 Equipment List

Name of Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. Due Date
Spectrum Analyzer	KEYSIGHT	N9020B	MY59260184	2021-08-17	2022-08-16
Spectrum Analyzer	ROHDE & SCHWARZ	FSV40N	101450	2021-06-10	2022-06-09
EMI Test Receiver	ROHDE & SCHWARZ	ESPI3	100173	2021-06-10	2022-06-09
EMI Test Receiver	ROHDE & SCHWARZ	ESR 7	101911	2021-06-10	2022-06-09
V-network	SCHWARZBECK	NSLK 8127	8127-902	2021-06-10	2022-06-09
Broadband Antenna	SCHWARZBECK	VULB9163	9163-1037	2021-06-08	2022-06-07
Loop Antenna	SCHWARZBECK	FMZB 1513	N/A	2020-11-22	2021-11-21
EMC chamber 9*6*6 (L*W*H)	CHANGNING	966	N/A	2020-12-16	2022-12-15
Shielded Enclosure 8*5*4 (L*W*H)	CHANGNING	854	N/A	2020-06-09	2022-06-08
Test Software	BL	BL410_E	N/A	N/A	N/A

2.3 Measurement Uncertainty

Parameter	Frequency	Uncertainty
Antenna Port Conducted Emission	< 1GHz	± 1.5 dB
	> 1GHz	± 1.5 dB
Radiated Emission	9 kHz – 30 MHz	± 3.54 dB
	30 MHz – 1 GHz	± 3.42 dB
	> 1GHz	± 4.20 dB
Conducted Emission on AC Mains	9 kHz to 30 MHz	± 1.71 dB

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 6 of 22

3 Test Set-up and Operation Modes

3.1 Details of Test Mode

Using test software was control EUT work in continuous transmitter and receiver mode. Select test channel as below:

Channel	Frequency
Test channel	13.56MHz

The basic operation modes are:

- A. On
 - 1. test mode
 - a. Transmitting
 - i. Test Channel
- B. Standby
- C. Off

3.2 Special Accessories and Auxiliary Equipment

Description	Manufacturer	Model No.	Serial No.
Laptop	Lenovo	TP00083A	N/A

3.3 Support Software

Description	Manufacturer	Software Name
Software	/	/

TEST REPORT

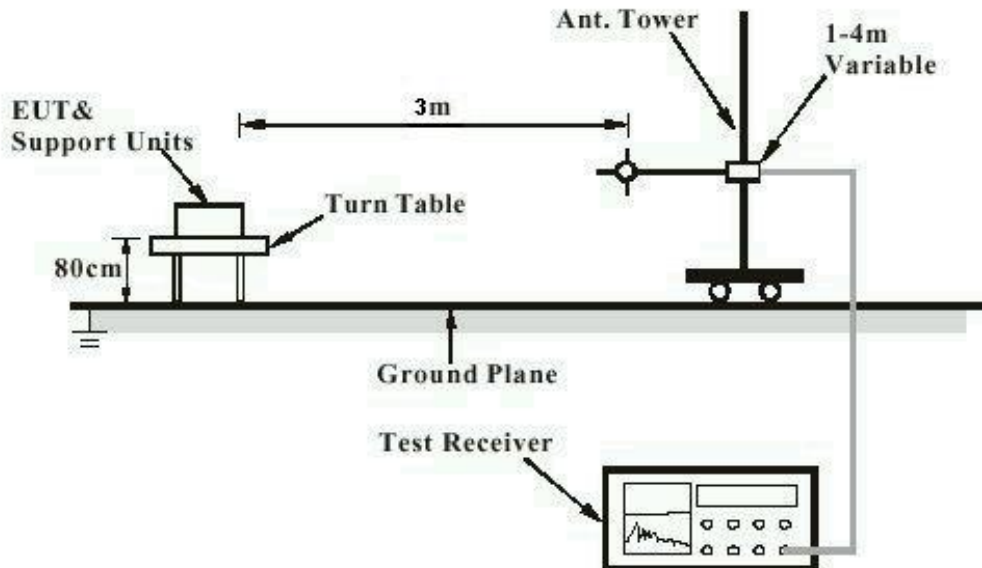
Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 7 of 22

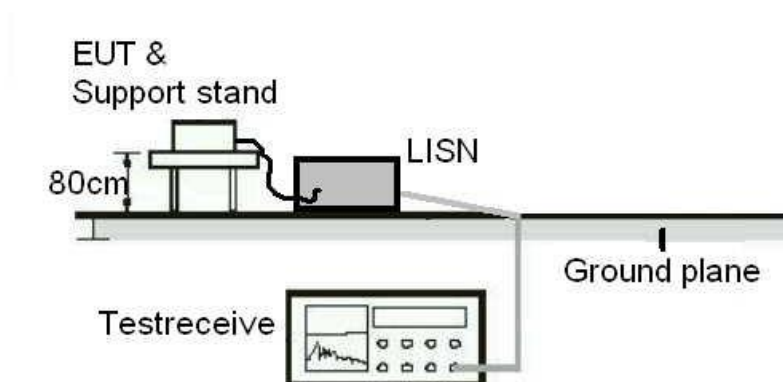
3.4 Test Setup Diagram

Diagram of Measurement Configuration for Radiation Test



Note: Measurements above 30MHz are done with a table height of 0.8m.

Diagram of Measurement Equipment Configuration for Conduction Measurement



TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 8 of 22

4 Test Results

4.1 Transmitter Requirement & Test Suites

4.1.1 Antenna Requirement

RESULT:

PASS

Test standard : Part 15.203

Requirement : The use of approved antennas only with directional gains that do not exceed 6 dBi

According to the manufacturer declaration, the EUT has an antenna with a gain of 0 dBi. The antenna is an internal antenna with no possibility of replacement with a non-approved antenna by the end-user.

Therefore, the EUT is considered to comply with this provision.

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 9 of 22

4.1.2 Frequency Tolerance

RESULT:

PASS

Test standard : FCC Part 15.225(e)

Requirement : ANSI C63.10-2013

Kind of test site : Shielded room

Test setup

Test Channel : Test channel

Operation Mode : A.1.a

Ambient temperature : 25°C

Relative humidity : 50%

Test Procedure

1.The test is performed in a Temperature Chamber.

2.The EUT is configured as MS + AC Power Supply.

Table 1: Frequency Tolerance

Temperature (°C)	Voltage (VAC)	Measured		Deviation Limit
		Frequency (MHz)	Tolerance (ppm)	
-20	120	13.560075	5.530973	±0.01% or 100ppm
-10		13.559670	-24.336283	
0		13.560194	14.306785	
+10		13.559850	-11.061947	
+20		13.559900	-7.374631	
+40		13.560150	11.061947	
+50		13.559925	-5.530973	
+20	102	13.560000	0.000000	
+20	138	13.559700	-22.123894	

Note: NT=20°C NV=AC120V LT=-20°C LV=AC102V HT=50°C HV=AC138V

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 10 of 22

4.1.3 20dB Bandwidth

RESULT:

PASS

Test standard : FCC Part 15.215(c)
ANSI 63.10 Section 6.9

Requirement : ANSI C63.10-2013

Kind of test site : Chamber

Test setup

Test Channel : Test channel

Operation Mode : A.1.a

Ambient temperature : 25°C

Relative humidity : 50%

Test procedure

The spectrum analyzer connected via a receive antenna placed near the EUT in peak Max hold mode.

The resolution bandwidth of 1 kHz and the video bandwidth of 3 kHz were used.

Measured the spectrum width with power higher than 20dB below carrier.

Table 2: 20dB Bandwidth

Test Mode	Test Channel (MHz)	20dB Bandwidth (kHz)
ASK	13.56	2.626

Remark: Because the measured signal is CW adjusting the RBW per C63.10 would not be practical since measured bandwidth will always follow the RBW and the result will be approximately twice the RBW.

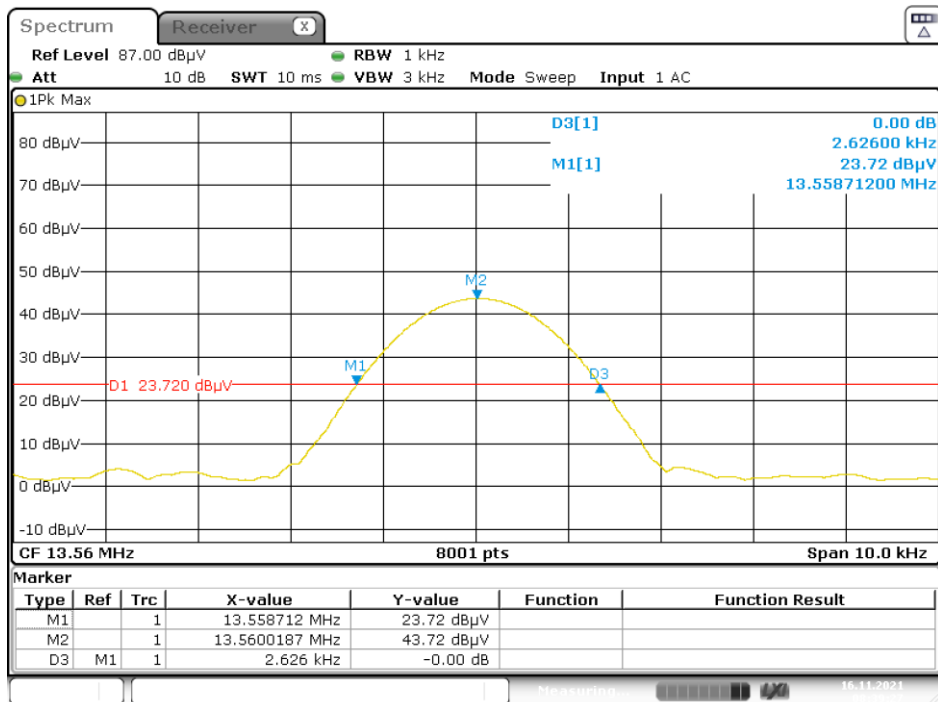
TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 11 of 22

Figure: 20dB Bandwidth



Date: 16.NOV.2021 08:39:26

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 12 of 22

4.1.4 Radiated Emission

RESULT:

PASS

Test standard : FCC Part 15.225
Requirement : ANSI C63.10-2013
Kind of test site : 3m Semi-Anechoic Chamber

Test setup

Test Channel : Test channel
Operation Mode : A
Ambient temperature : 25°C
Relative humidity : 50%

Notes:

Operation within the band 13.110-14.010 MHz as contained in §15.225:

(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.

(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any at 30 meters.

(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in §15.209.

(f) The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The Z-plane results were found as the worst case and were shown in this report.

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009 ~ 0.490	300	2400/F(KHz)	67.6-20log(F)
0.490 ~ 1.705	30	24000/F(KHz)	87.6-20log(F)
1.705 ~ 13.110	30	30	29.54
13.110 ~ 13.410	30	106	40.51
13.410~ 13.553	30	334	50.47
13.553~13.567	30	15848	84.00
13.567~13.710	30	334	50.47
13.710~14.010	30	106	40.51
14.010~30	30	30	29.54
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 13 of 22

(1) The emission limits shown in the above table are based on measurements employing a CISPR QP detector except for the frequency bands 9-90KHz, 110-490KHz and above 1000MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

(2) At frequencies below 30MHz, measurement may be performed at a distance closer than that specified, and the limit at closer measurement distance can be extrapolated by below formula:

$$\text{Limit}_{3\text{m}}(\text{dBuV/m}) = \text{Limit}_{300\text{m}}(\text{dBuV/m}) + 40\text{Log}(300\text{m}/3\text{m}) = \text{Limit}_{300\text{m}}(\text{dBuV/m}) + 80$$

$$\text{Limit}_{3\text{m}}(\text{dBuV/m}) = \text{Limit}_{30\text{m}}(\text{dBuV/m}) + 40\text{Log}(30\text{m}/3\text{m}) = \text{Limit}_{30\text{m}}(\text{dBuV/m}) + 40$$

(3) EUT was placed on a non-metallic table, 100 cm above the ground plane inside a semi-anechoic chamber.

(4) Test antenna was located 3m from the EUT on an adjustable mast

According ANSI C63.10:2013 clause 6.4.4.2 and 6.5.3, for measurements below 30 MHz, the loop antenna was positioned with its plane vertical from the EUT and rotated about its vertical axis for maximum response at each azimuth position around the EUT. And the loop antenna also be positioned with its plane horizontal at the specified distance from the EUT. The center of the loop is 1 m above the ground. for measurement above 30MHz, the Trilog Broadband Antenna or Horn Antenna was located 3m from EUT, Measurements were made with the antenna positioned in both the horizontal and vertical planes of Polarization, and the measurement antenna was varied from 1 m to 4 m. in height above the reference ground plane to obtain the maximum signal strength.

TEST REPORT

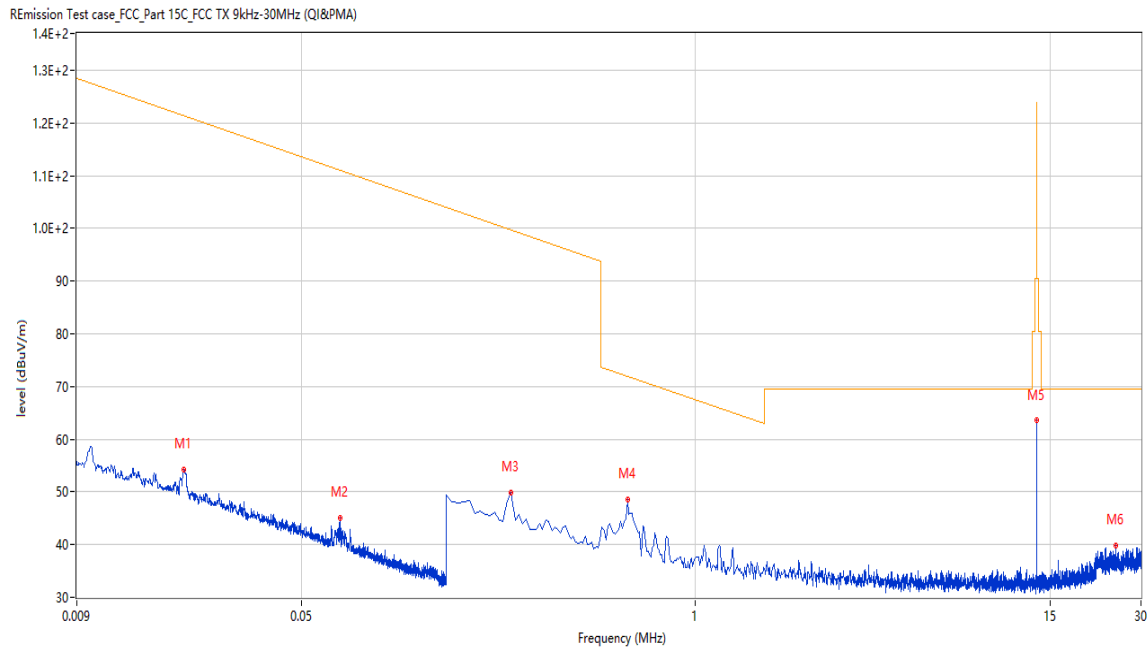
Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 14 of 22

Test data :

Note: The EUT was pretested with 3 orientations placed on the table for the radiated emission measurement –X, Y, and Z-plane. The X-plane results were found as the worst case and were shown in this report.



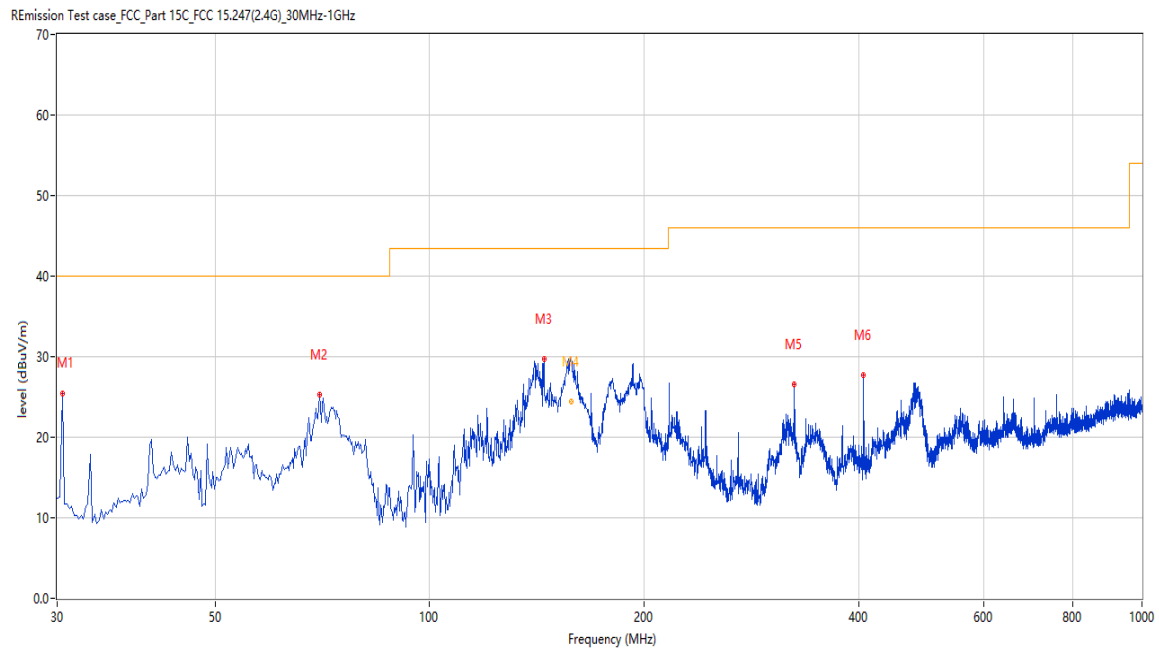
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	0.020	54.16	19.75	121.4	-67.24	QP	153.20	100	X	Pass
2	0.067	44.54	20.06	111.0	-66.46	QP	87.70	100	X	Pass
3	0.247	49.94	19.94	99.7	-49.76	QP	77.50	100	X	Pass
4	0.598	48.48	19.88	72.0	-23.52	QP	99.70	100	X	Pass
5	13.557	63.53	19.88	124.0	-60.47	QP	358.70	100	X	Pass
6	24.800	39.75	20.10	69.5	-29.75	QP	156.80	100	X	Pass

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 15 of 22



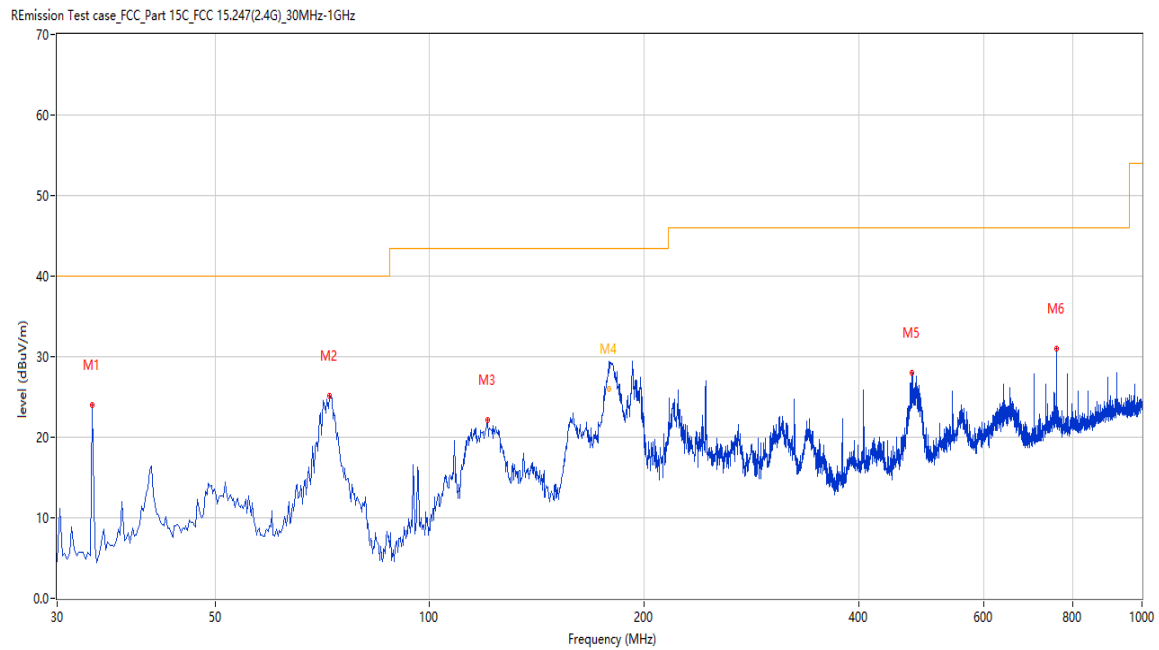
No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	30.000	12.49	-29.82	40.0	-27.51	Peak	112.50	200	Vertical	Pass
2	70.002	25.30	-29.39	40.0	-14.70	Peak	75.10	100	Vertical	Pass
3	144.674	29.69	-30.01	43.5	-13.81	Peak	345.00	100	Vertical	Pass
4	158.191	30.29	-29.53	43.5	-13.21	Peak	360.00	107	Vertical	Pass
4*	158.191	24.45	-29.53	43.5	-19.05	QP	360.00	107	Vertical	Pass
5	325.291	26.59	-22.96	46.0	-19.41	Peak	360.00	200	Vertical	Pass
6	406.751	27.73	-20.63	46.0	-18.27	Peak	315.10	100	Vertical	Pass

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 16 of 22



No.	Frequency (MHz)	Results (dBuV/m)	Factor (dB)	Limit (dBuV/m)	Over Limit (dB)	Detector	Table (Degree)	Height (cm)	Antenna	Verdict
1	33.637	24.04	-28.53	40.0	-15.96	Peak	182.00	300	Horizontal	Pass
2	72.427	25.08	-30.25	40.0	-14.92	Peak	360.00	300	Horizontal	Pass
3	120.672	22.19	-28.39	43.5	-21.31	Peak	108.30	200	Horizontal	Pass
4	178.507	29.22	-28.39	43.5	-14.28	Peak	105.60	121	Horizontal	Pass
4*	178.507	25.98	-28.39	43.5	-17.52	QP	105.60	121	Horizontal	Pass
5	475.119	28.00	-19.48	46.0	-18.00	Peak	119.70	200	Horizontal	Pass
6	759.258	30.99	-12.55	46.0	-15.01	Peak	0.00	200	Horizontal	Pass

Note : margin (Over Limit) >10dB,so do not need to test by QP Detector

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 17 of 22

4.2 Mains Emissions

4.2.1 Conducted Emission on AC Mains

RESULT:

PASS

Test standard : FCC Part 15.207(a)

Requirement : ANSI C63.10-2013

Kind of test site : Shielded room

Test setup

Input Voltage : AC 120V, 60Hz

Operation Mode : A.1.a

Earthing : Not Connected

Ambient temperature : 25°C

Relative humidity : 50%

For details refer to following test plot.

Note:

The all configurations were tested respectively, but only the worst configuration shown here.

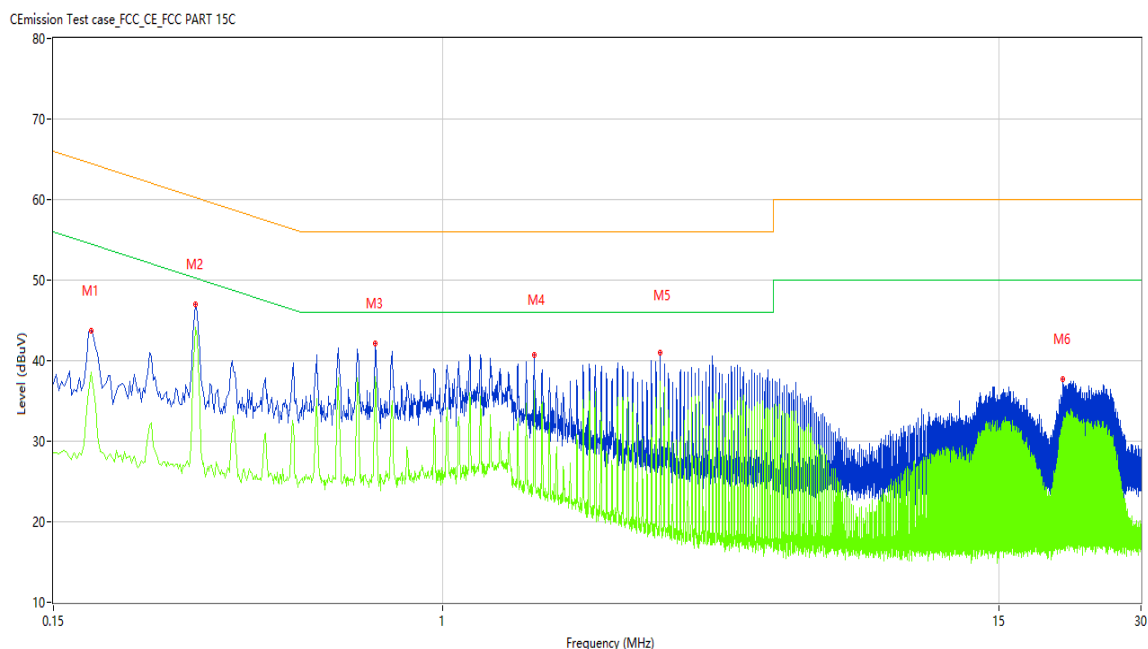
TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 18 of 22

Figure 1: Conducted Emission on AC Mains, L Phase



No.	Frequency (MHz)	Results (dBUV)	Factor (dB)	Limit (dBUV)	Over Limit (dB)	Detector	Line	Verdict
1	0.180	42.64	10.24	64.49	-21.85	Peak	L	Pass
1*	0.180	39.85	10.24	64.49	-24.64	QP	L	Pass
1**	0.180	38.59	10.24	54.49	-15.90	AV	L	Pass
2	0.300	46.07	10.21	60.24	-14.17	Peak	L	Pass
2*	0.300	44.46	10.21	60.24	-15.78	QP	L	Pass
2**	0.300	44.16	10.21	50.24	-6.08	AV	L	Pass
3	0.720	40.00	10.31	56.00	-16.00	Peak	L	Pass
3*	0.720	37.95	10.31	56.00	-18.05	QP	L	Pass
3**	0.720	37.99	10.31	46.00	-8.01	AV	L	Pass
4	1.562	38.80	10.18	56.00	-17.20	Peak	L	Pass
4*	1.562	36.72	10.18	56.00	-19.28	QP	L	Pass
4**	1.562	36.30	10.18	46.00	-9.70	AV	L	Pass
5	2.882	39.63	10.16	56.00	-16.37	Peak	L	Pass
5*	2.882	37.94	10.16	56.00	-18.06	QP	L	Pass
5**	2.882	37.42	10.16	46.00	-8.58	AV	L	Pass
6	20.466	35.80	10.96	60.00	-24.20	Peak	L	Pass
6*	20.466	33.53	10.96	60.00	-26.47	QP	L	Pass
6**	20.466	32.42	10.96	50.00	-17.58	AV	L	Pass

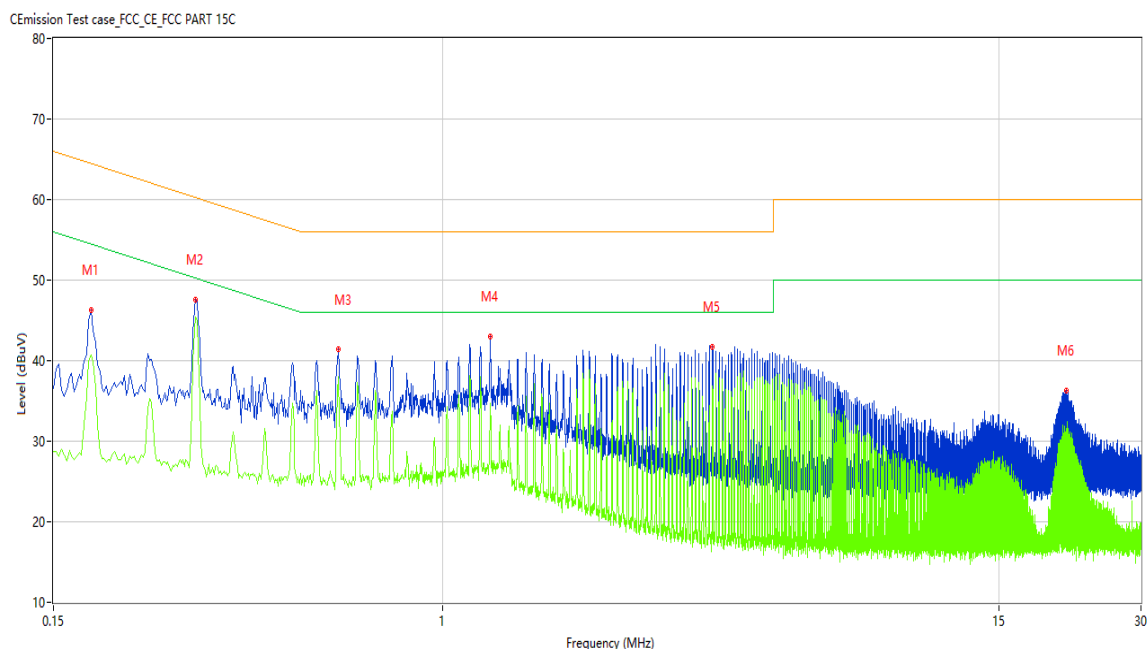
TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 19 of 22

Figure: Conducted Emission on AC Mains, N Phase



No.	Frequency (MHz)	Results (dBuV)	Factor (dB)	Limit (dBuV)	Over Limit (dB)	Detector	Line	Verdict
1	0.180	44.92	10.24	64.49	-19.57	Peak	N	Pass
1*	0.180	42.43	10.24	64.49	-22.06	QP	N	Pass
1**	0.180	40.64	10.24	54.49	-13.85	AV	N	Pass
2	0.300	46.96	10.21	60.24	-13.28	Peak	N	Pass
2*	0.300	45.66	10.21	60.24	-14.58	QP	N	Pass
2**	0.300	45.47	10.21	50.24	-4.77	AV	N	Pass
3	0.600	40.77	10.31	56.00	-15.23	Peak	N	Pass
3*	0.600	38.81	10.31	56.00	-17.19	QP	N	Pass
3**	0.600	38.06	10.31	46.00	-7.94	AV	N	Pass
4	1.260	40.47	10.19	56.00	-15.53	Peak	N	Pass
4*	1.260	37.31	10.19	56.00	-18.69	QP	N	Pass
4**	1.260	34.68	10.19	46.00	-11.32	AV	N	Pass
5	3.722	42.10	10.19	56.00	-13.90	Peak	N	Pass
5*	3.722	40.46	10.19	56.00	-15.54	QP	N	Pass
5**	3.722	36.83	10.19	46.00	-9.17	AV	N	Pass
6	20.826	35.05	10.97	60.00	-24.95	Peak	N	Pass
6*	20.826	32.40	10.97	60.00	-27.60	QP	N	Pass
6**	20.826	30.65	10.97	50.00	-19.35	AV	N	Pass

TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 20 of 22

5 Appendixes

5.1 Photographs of the Sample

Front of the sample



Rear of the sample



TEST REPORT

Report No.: SHE21100025-02GE

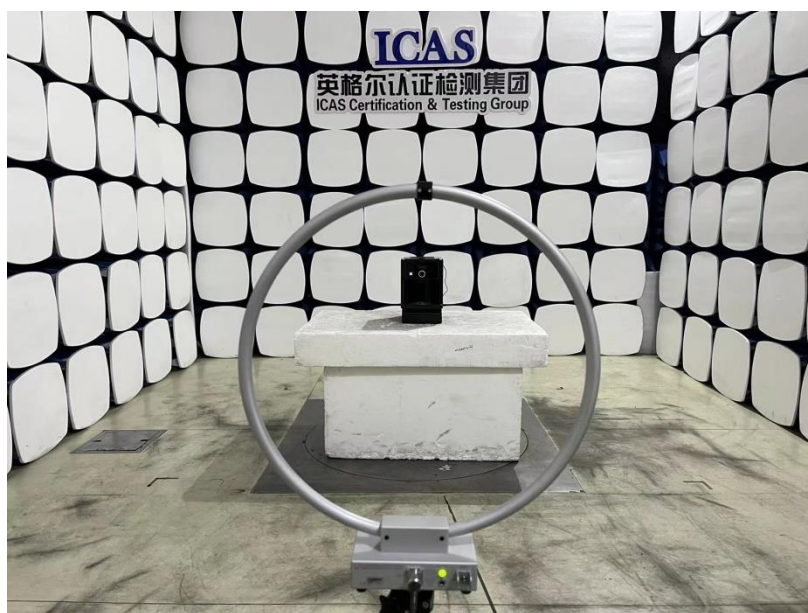
Date: 2021-11-17

Page 21 of 22

5.2 Photographs of the Test Set-up

Radiated Emission test set-up

Below 30MHz



Above 30MHz



TEST REPORT

Report No.: SHE21100025-02GE

Date: 2021-11-17

Page 22 of 22

Conducted Emission test set-up



End of the report