



Shenzhen GUOREN Certification Technology Service Co., Ltd.

101#, Building K & Building T, The Second Industrial Zone, Jiazitang Community,
Fenghuang Street, Guangming District, Shenzhen, China

TEST REPORT

47 CFR FCC Part 15 Subpart B (Class A)

Radio Frequency Devices – Unintentional Radiators – Limits and methods of
measurement

ANSI C63.4: 2014

American National Standard for Methods of Measurement of Radio-Noise
Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of
9 kHz to 40 GHz

Report Reference No.: GRCTR220502001

FCC ID: 2A6XW-NOVAX

Compiled by

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Date of issue: May. 18, 2022

Testing Laboratory Name: Shenzhen GUOREN Certification Technology Service Co., Ltd.

Address: 101#, Building K & Building T, The Second Industrial Zone, Jiazitang
Community, Fenghuang Street, Guangming District, Shenzhen,
China

Applicant's name: Allegro 3D, Inc.

Address: 6868 Nancy Ridge Drive, San Diego, CA 92121, USA

Test specification:

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

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Test item description: BIONOVA X

Trade Mark: /

Manufacturer: Beijing ZhiGuang Technology Co. Ltd.

Model/Type reference: NOVAX-1001

List Model: /

Ratings: AC 100-240V 50/60Hz

Result: PASS

TEST REPORT

Equipment under Test : BIONOVA X

Model /Type : NOVAX-1001

Listed Models : /

Applicant : **Allegro 3D, Inc.**

Address : 6868 Nancy Ridge Drive, San Diego, CA 92121, USA

Manufacturer : **Beijing ZhiGuang Technology Co. Ltd.**

Address : No. 22 Information Road, Shichuang Zonghe Building East
6th Fl., Haidian District, Beijing, 100085, P.R. China

Test Result:	PASS
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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.

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1. TEST STANDARDS

The tests were performed according to following standards:

[47 CFR FCC Part 15 Subpart B \(Class A\)](#) Radio Frequency Devices – Unintentional Radiators – Limits and methods of measurement

[ANSI C63.4: 2014](#) American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

2. SUMMARY

2.1. General Remarks

Date of receipt of test sample	:	May. 05, 2022
Testing commenced on	:	May. 05, 2022
Testing concluded on	:	May. 18, 2022

2.2. Product Description

Product Name:	BIONOVA X
Model/Type reference:	NOVAX-1001
Listed Model:	/
Testing sample ID:	GRCTR220502001-1#
Power supply:	AC 100-240V 50/60Hz
Remark:/	

2.3. Equipment Under Test

Power supply system utilised

Power supply voltage	:	<input type="radio"/> 230V / 50 Hz	<input checked="" type="radio"/> 120V / 60Hz
		<input type="radio"/> 12 V DC	<input type="radio"/> 24 V DC
		<input type="radio"/> Other (specified in blank below)	

/

2.4. EUT operation mode

As the function of the EUT, test mode selected to test as below to conform this standard:

Operation mode	Description
Mode 1	Working

Test item	Test mode
Radiated Emission	Mode 1
Conducted Emission	Mode 1

2.5. EUT configuration

The following peripheral devices and interface cables were connected during the measurement:

Item	Manufacturer	Description	Model	Certificate	Note
1 ^{Note1}	/	/	/	/	/
2 ^{Note1}	/	/	/	/	/

Note1: This Auxiliary used during the test is provided by the test laboratory.

2.6. Modifications

No modifications were implemented to meet testing criteria

3. TEST ENVIRONMENT

3.1. Address of the test laboratory

Shenzhen GUOREN Certification Technology Service Co., Ltd.

101#, Building K & Building T, The Second Industrial Zone, Jiazitang Community, Fenghuang Street, Guangming District, Shenzhen, China

3.2. Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

FCC-Registration No.: 920798 Designation Number: CN1304

Shenzhen GUOREN Certification Technology Service Co., Ltd. has been listed on the US Federal Communications Commission list of test facilities recognized to perform electromagnetic emissions measurements.

A2LA-Lab Cert. No.: 6202.01

Shenzhen GUOREN Certification Technology Service Co., Ltd. has been listed by American Association for Laboratory Accreditation to perform electromagnetic emission measurement.

ISED#: 27264 CAB identifier: CN0115

Shenzhen GUOREN Certification Technology Service Co., Ltd has been listed by Innovation, Science and Economic Development Canada to perform electromagnetic emission measurement.

CNAS-Lab Code: L15631

Shenzhen GUOREN Certification Technology Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories for the Competence of Testing and Calibration Laboratories.

The 3m-Semi anechoic test site fulfils CISPR 16-1-4 according to ANSI C63.10 and CISPR 16-1-4:2010.

3.3. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature:	15-35 ° C
Humidity:	30-60 %
Atmospheric pressure:	950-1050mbar

3.4. Test Description

Emission Measurement		
Radiated Emission	47 CFR FCC Part 15 Subpart B Class A ANSI C63.4 2014	PASS
Conducted Emission	47 CFR FCC Part 15 Subpart B Class A ANSI C63.4 2014	PASS

Remark:1. N/A means “not applicable”.

2. The measurement uncertainty is not included in the test result.

3.5. 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 TR-100028-01 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 1" and TR-100028-02 "Electromagnetic compatibility and Radio spectrum Matters (ERM); Uncertainties in the measurement of mobile radio equipment characteristics; Part 2" and is documented in the Shenzhen GUOREN Certification Technology Service Co., Ltd. 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.

Hereafter the best measurement capability for Shenzhen GUOREN Certification Technology Service Co., Ltd.:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission	30~1000MHz	4.06 dB	(1)
Radiated Emission	1~18GHz	5.14 dB	(1)
Conducted Disturbance	0.15~30MHz	2.14 dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$.

3.6. Equipments Used during the Test

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Equipment No.	Last Cal.	Cal.Due
1	EMI Test Receiver	R&S	ESPI	GRCTEE017	2021/10/30	2022/10/29
2	LISN	R&S	ENV216	GRCTEE009	2021/10/30	2022/10/29
3	LISN	R&S	ENV216	GRCTEE010	2021/10/30	2022/10/29
4	EMI Test Software	ROHDE & SCHWARZ	ESK1-V1.71	GRCTEE060	N/A	N/A

Radiated Emission						
Item	Test Equipment	Manufacturer	Model No.	Equipment No.	Last Cal.	Cal.Due
1	Ultra-Broadband Antenna	Schwarzbeck	VULB9163	GRCTEE018	2020/10/25	2023/10/24
2	Horn Antenna	Schwarzbeck	BBHA 9120D	GRCTEE019	2020/10/25	2023/10/24
3	Amplifier	Schwarzbeck	BBV 9745	GRCTEE021	2021/10/30	2022/10/29
4	Amplifier	Taiwan chengyi	EMC051845B	GRCTEE022	2021/10/30	2022/10/29
5	EMI Test Software	Fera	EZ-EMC	GRCTEE061	N/A	N/A

4. TEST CONDITIONS AND RESULTS

4.1. EMISSION

4.1.1. LIMITS OF DISTURBANCE (CLASS A)

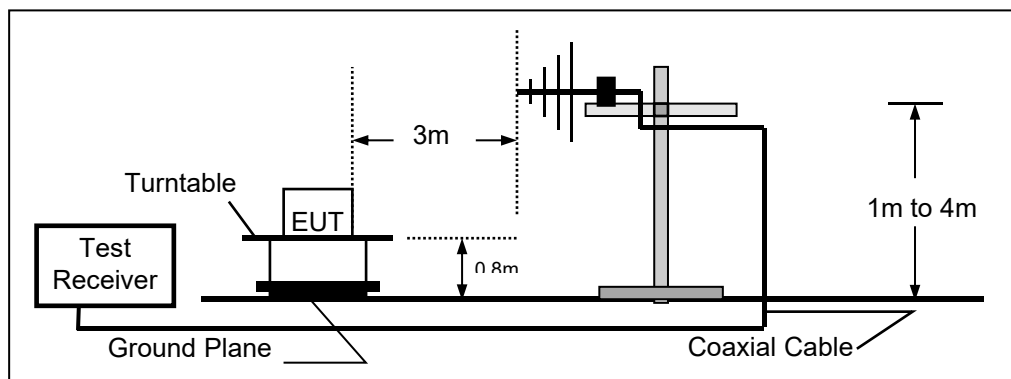
Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB μ V/m)
30 ~ 88	3	49.5
88~216	3	53.5
216 ~ 960	3	56
Above 960(AV)	3	60
Above 960(PK)	3	80

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

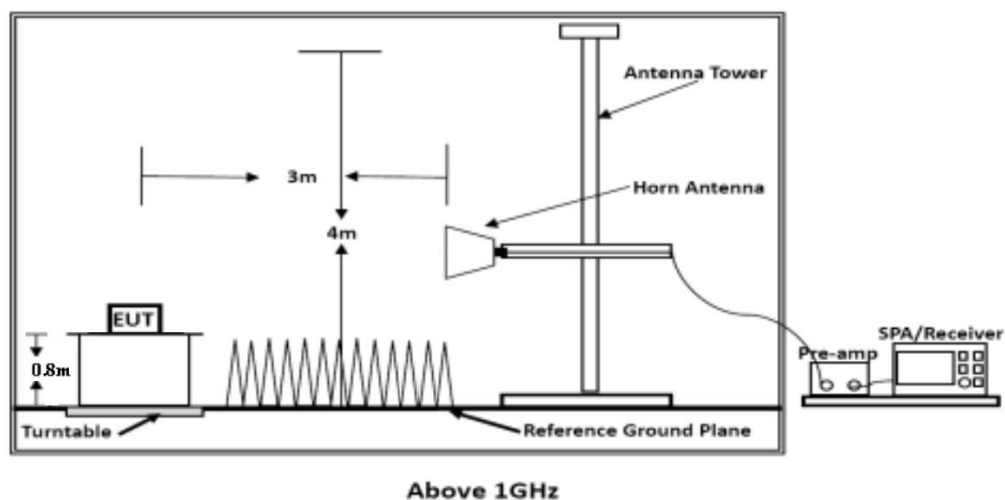
(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

4.1.2. TEST CONFIGURATION

a) Radiated emission test set-up, frequency below 1000MHz:



b) Radiated emission test set-up, frequency above 1000MHz:



4.1.3. TEST PROCEDURE

EUT is tested in Semi-Anechoic Chamber. EUT is placed on a nonmetal table which is 0.8 meter above a grounded turntable. The turntable can rotate 360 degrees to determine the azimuth of the maximum emission level. EUT is set 3 meters away from the center of receiving antenna. The antenna can move up and down from 1 to 4 meter to find out the maximum emission level. Both horizontal and vertical polarizations of the antenna are set on the test.

4.1.4. TEST RESULTS

Passed

Remark:

Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below.

Remark: The highest frequency of the internal sources of the EUT is 1.5GHz, it is more than 108 MHz, the measurement shall only be made up to 18GHz.

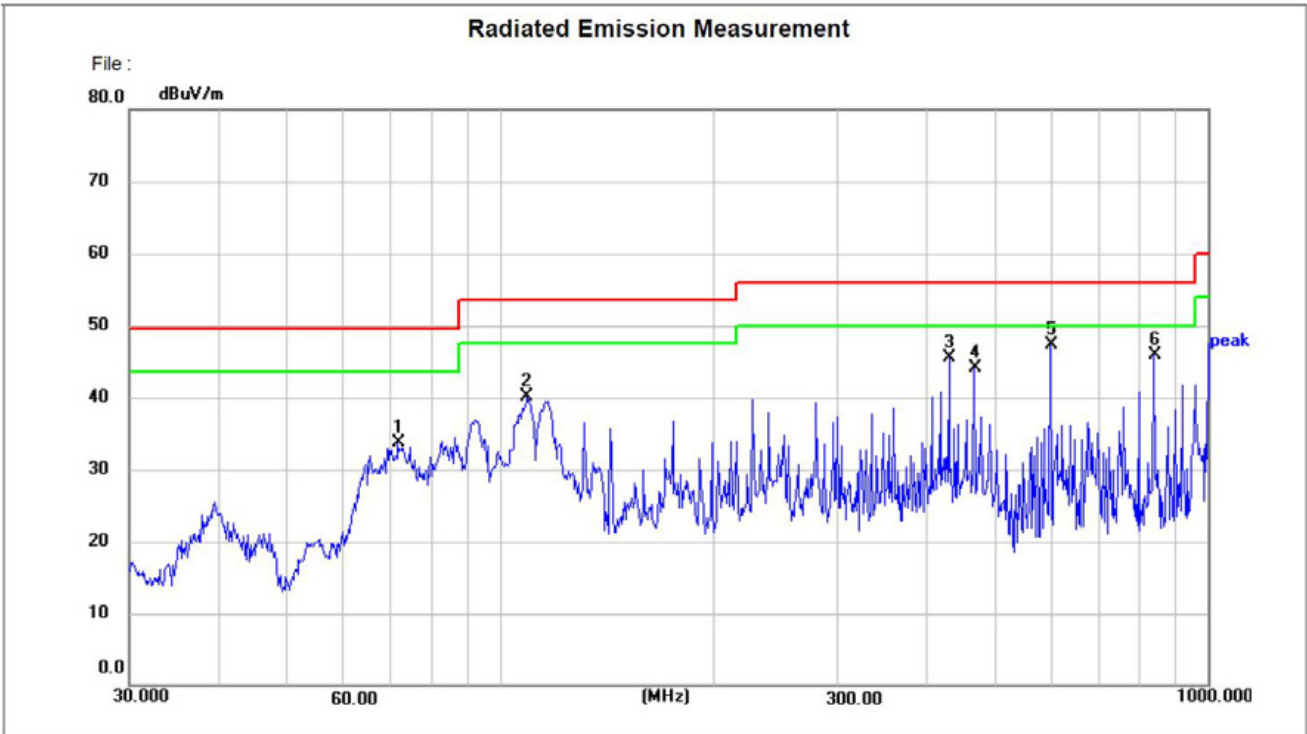
Please refer to the below test data:

Polarization:

Horizontal

Test mode:

Mode 1



Site LAB

Limit: FCC Part15 RE-Class A(3m)_30-1000MHz

EUT:

M/N:

Mode:

Note:

Polarization: *Horizontal*

Power: AC120V/60Hz

Distance: 3m

Temperature: 24.5(C)

Humidity: 52 %

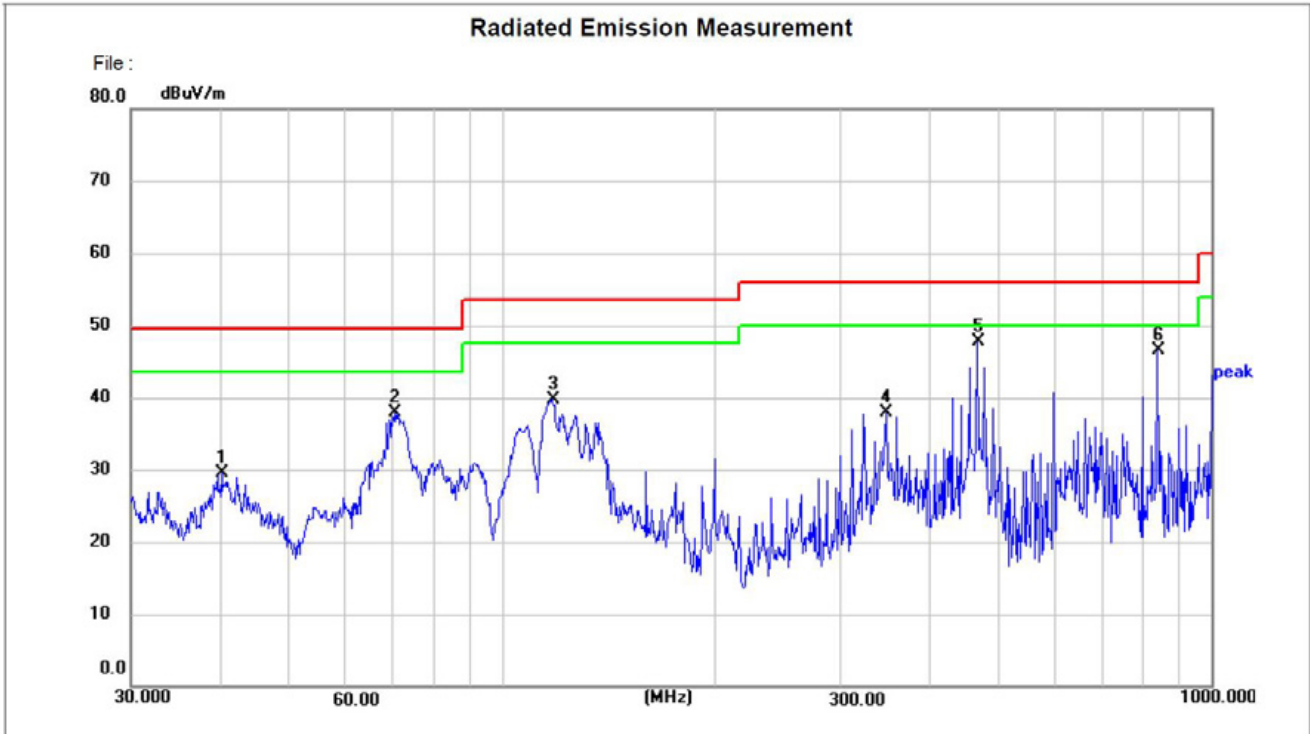
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	71.8320	55.12	-21.33	33.79	49.50	-15.71	peak	199	141	P	
2	109.4116	59.41	-19.31	40.10	53.50	-13.40	peak	199	350	P	
3	431.0316	60.41	-14.91	45.50	56.00	-10.50	peak	199	350	P	
4	467.2349	58.31	-14.30	44.01	56.00	-11.99	peak	199	350	P	
5 *	599.3212	58.05	-10.71	47.34	56.00	-8.66	peak	100	40	P	
6	839.1818	54.67	-8.77	45.90	56.00	-10.10	peak	199	55	P	

Polarization:

Vertical

Test mode:

Mode 1



Site LAB

Limit: FCC Part15 RE-Class A(3m)_30-1000MHz

EUT:

M/N:

Mode:

Note:

Polarization: **Vertical**

Power: AC120V/60Hz

Distance: 3m

Temperature: 24.5(C)

Humidity: 52 %

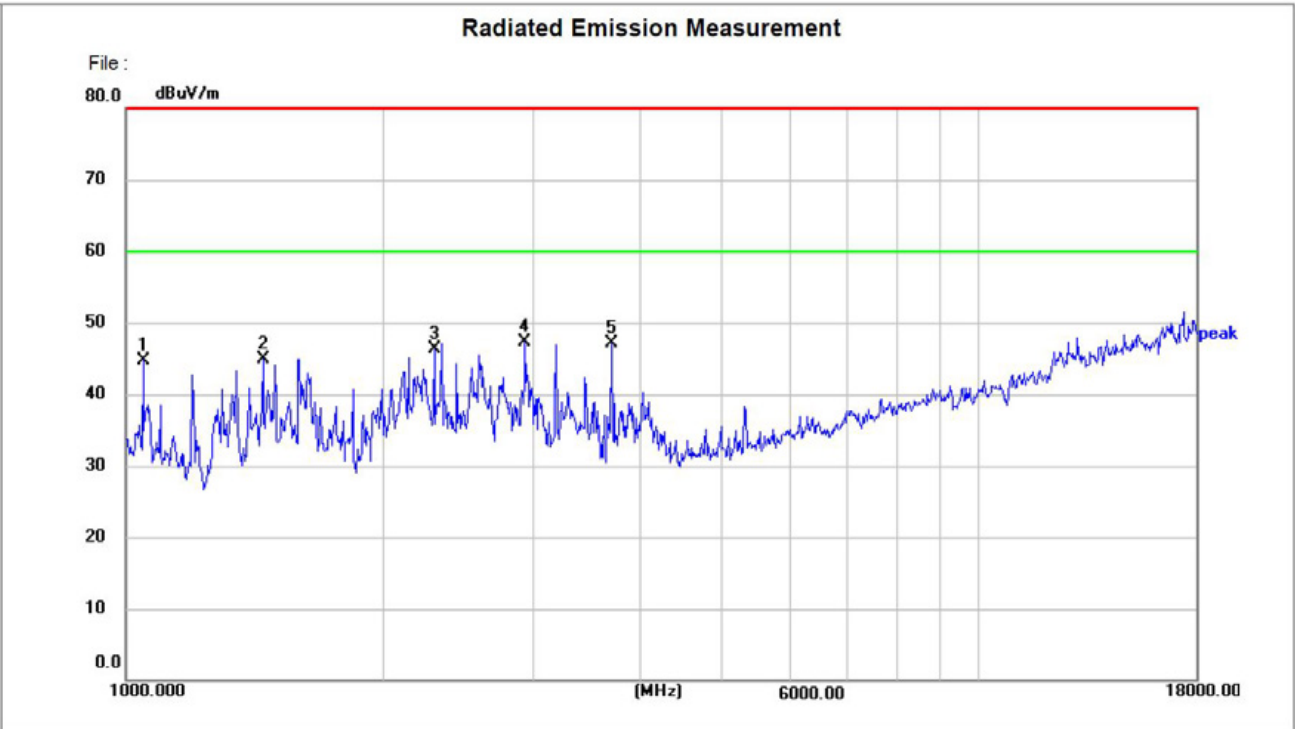
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	40.2757	47.72	-18.21	29.51	49.50	-19.99	peak	100	233	P	
2	70.5836	58.85	-21.01	37.84	49.50	-11.66	peak	100	10	P	
3	117.7725	59.54	-19.76	39.78	53.50	-13.72	peak	100	10	P	
4	348.0274	54.26	-16.39	37.87	56.00	-18.13	peak	100	10	P	
5 *	467.2349	61.91	-14.30	47.61	56.00	-8.39	peak	100	336	P	
6	839.1818	55.19	-8.77	46.42	56.00	-9.58	peak	100	71	P	

Polarization:

Horizontal

Test mode:

Mode 1



Site LAB
Limit: FCC Part15 RE-Class A(3m)_Above
EUT: 1GHz_PK
M/N:
Mode:
Note:

Polarization: **Horizontal**
Power: AC120V/60Hz
Distance: 3m

Temperature: 24.5(C)
Humidity: 52 %

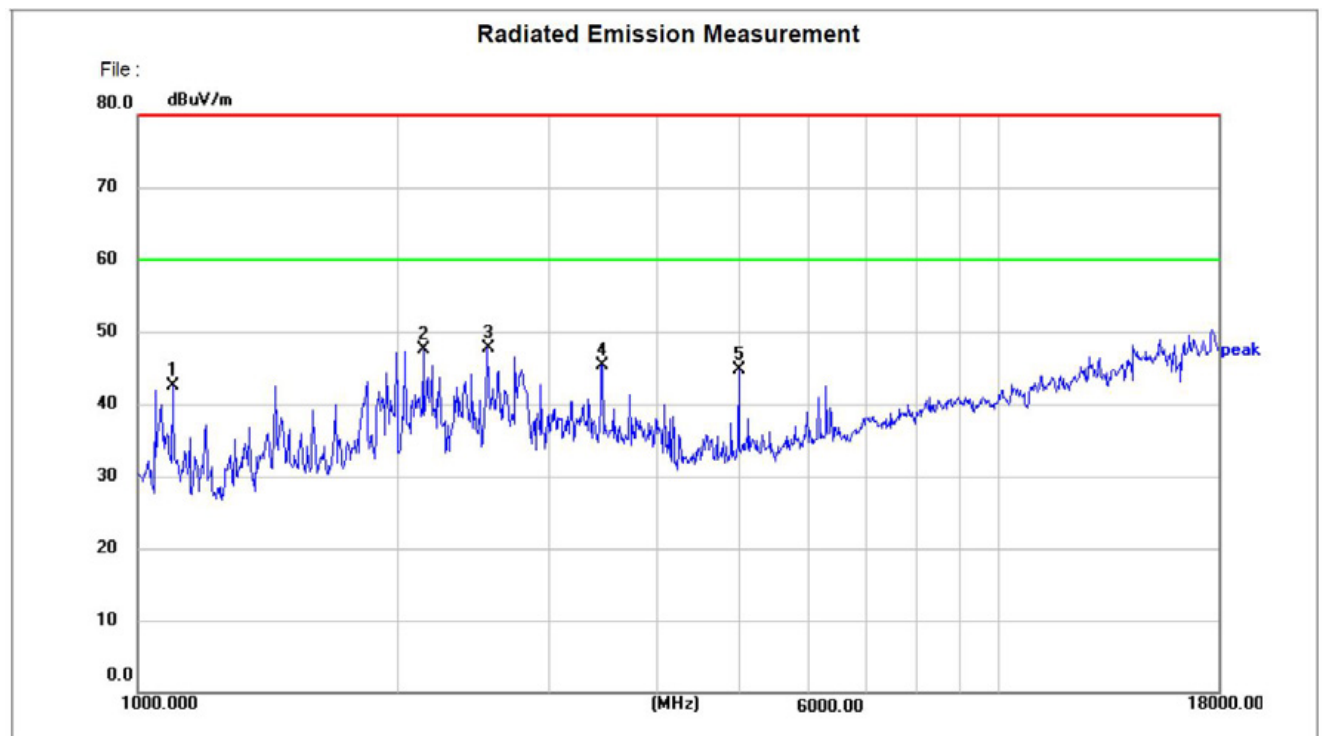
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1047.332	72.30	-27.60	44.70	80.00	-35.30	peak	200	158	P	
2	1447.688	71.85	-26.91	44.94	80.00	-35.06	peak	100	107	P	
3	2298.892	71.59	-25.34	46.25	80.00	-33.75	peak	100	132	P	
4 *	2939.115	71.64	-24.29	47.35	80.00	-32.65	peak	100	146	P	
5	3714.443	70.18	-23.05	47.13	80.00	-32.87	peak	200	350	P	

Polarization:

Vertical

Test mode:

Mode 1



Site LAB

Polarization: **Vertical**

Temperature: 24.5(C)

Limit: FCC Part15 RE-Class A(3m)_Above

Power: AC120V/60Hz

Humidity: 52 %

EUT: 1GHz_PK

Distance: 3m

M/N:

Mode:

Note:

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	1096.904	69.81	-27.22	42.59	80.00	-37.41	peak	100	341	P	
2	2144.825	72.39	-24.82	47.57	80.00	-32.43	peak	200	341	P	
3 *	2543.625	72.03	-24.26	47.77	80.00	-32.23	peak	200	359	P	
4	3455.508	68.26	-22.96	45.30	80.00	-34.70	peak	100	8	P	
5	4988.058	63.42	-18.69	44.73	80.00	-35.27	peak	100	265	P	

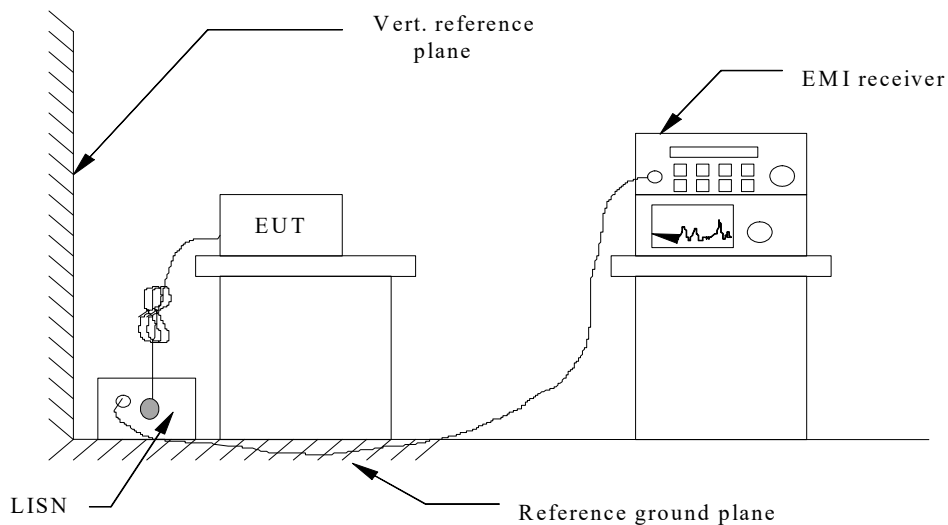
4.2. Conducted Emission

4.2.1. LIMITS OF DISTURBANCE (CLASS A)

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	79	66
0.500~30.000	73	60

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

4.2.2. TEST CONFIGURATION



4.2.3. TEST PROCEDURE

EUT is placed on a nonmetal table which is 0.8 meter (or 0.1 meter for floor-stood equipments) above the grounded reference plane. Connect the power line of the EUT to the LISN. Voltage of the power supply is varied over a range of 0.9 to 1.1 times of the rated voltage in order to check whether the level of disturbance varies considerably with the supply voltage at the selected frequency about 160KHz. Perform an initial measurement on each line with peak detector to identify the frequencies where the maximum disturbances may occur. Then measure and record the maximum disturbances with quasi-peak and average detector.

4.2.4. TEST RESULTS

Passed

Remark:

Both 120 VAC, 50/60 Hz and 240 VAC, 50/60 Hz power supply have been tested, only the worst result of 120 VAC, 60 Hz was reported as below.

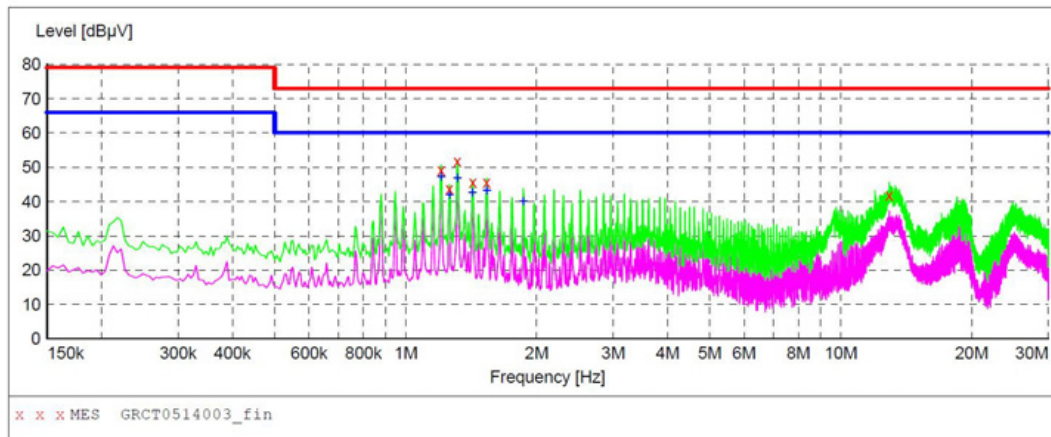
Please refer to the below test data:

Line:

L

Test mode:

Mode 1

**MEASUREMENT RESULT: "GRCT0514003_fin"**

5/14/2022 9:52AM

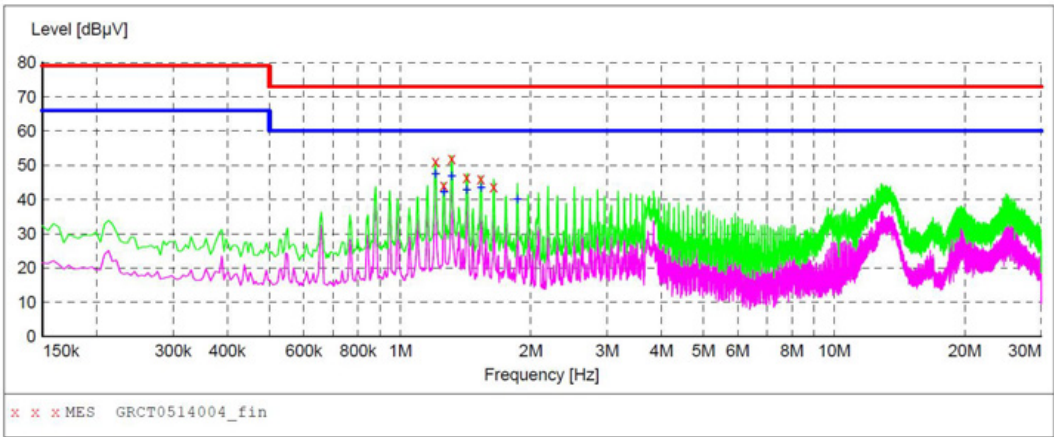
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
1.207500	49.20	9.9	73	23.8	QP	L1	GND
1.261500	43.70	9.9	73	29.3	QP	L1	GND
1.315500	51.80	9.9	73	21.2	QP	L1	GND
1.428000	45.60	9.9	73	27.4	QP	L1	GND
1.536000	45.70	9.9	73	27.3	QP	L1	GND
12.934500	41.80	10.2	73	31.2	QP	L1	GND

MEASUREMENT RESULT: "GRCT0514003_fin2"

5/14/2022 9:52AM

Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
1.207500	47.30	9.9	60	12.7	AV	L1	GND
1.261500	42.00	9.9	60	18.0	AV	L1	GND
1.315500	46.80	9.9	60	13.2	AV	L1	GND
1.423500	42.70	9.9	60	17.3	AV	L1	GND
1.536000	43.30	9.9	60	16.7	AV	L1	GND
1.864500	40.10	9.9	60	19.9	AV	L1	GND

Line: N Test mode: Mode 1



MEASUREMENT RESULT: "GRCT0514004_fin"

5/14/2022 9:55AM

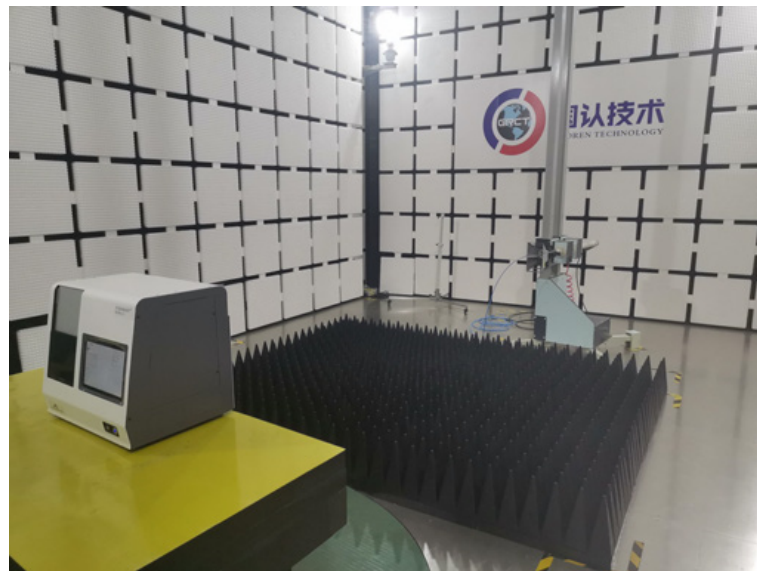
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
1.207500	51.00	9.9	73	22.0	QP	N	GND
1.261500	44.10	9.9	73	28.9	QP	N	GND
1.315500	52.00	9.9	73	21.0	QP	N	GND
1.423500	46.40	9.9	73	26.6	QP	N	GND
1.536000	46.00	9.9	73	27.0	QP	N	GND
1.644000	43.80	9.9	73	29.2	QP	N	GND

MEASUREMENT RESULT: "GRCT0514004_fin2"

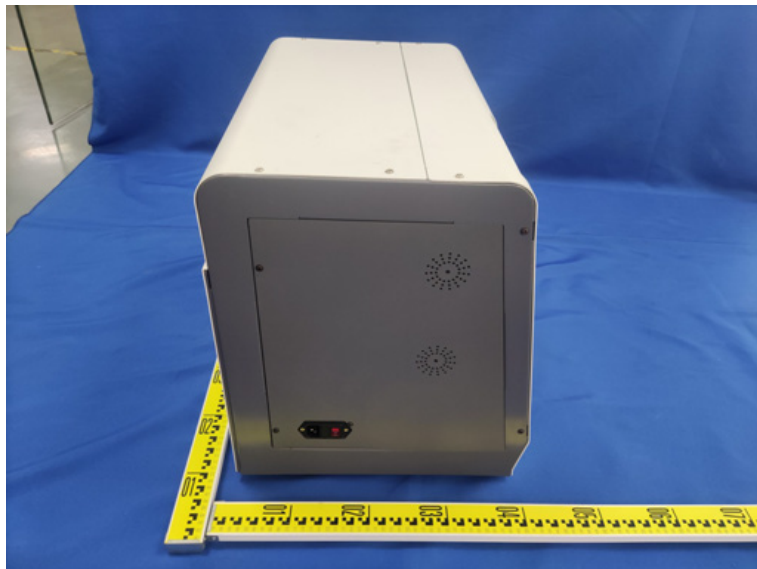
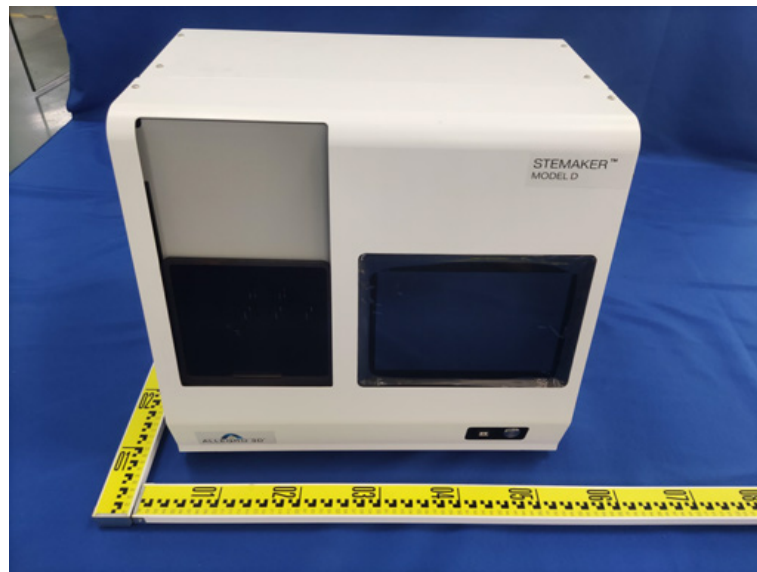
5/14/2022 9:55AM

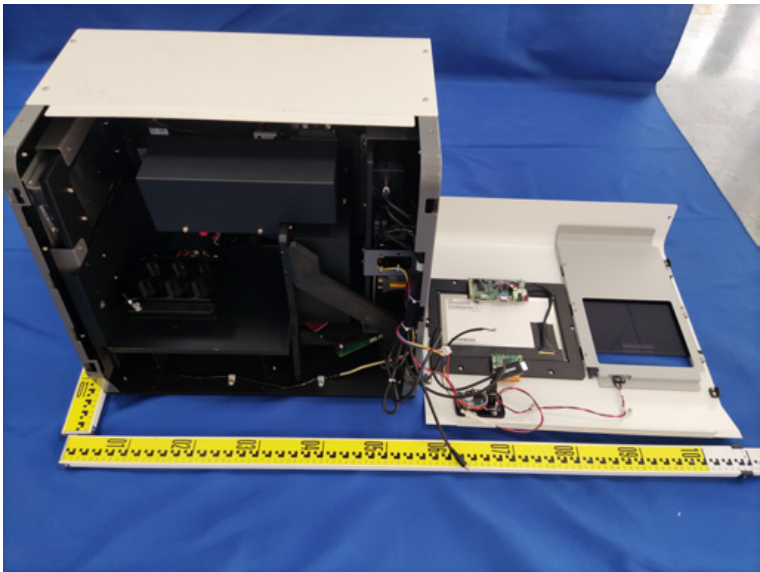
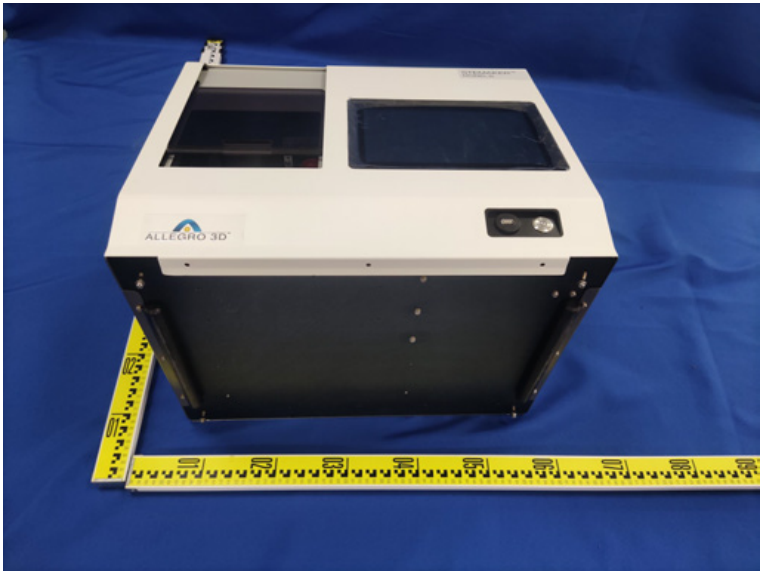
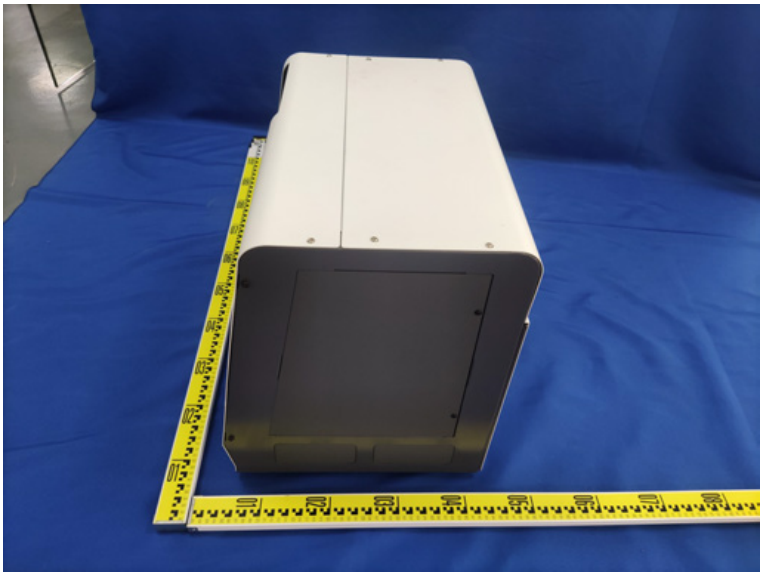
Frequency MHz	Level dBμV	Transd dB	Limit dBμV	Margin dB	Detector	Line	PE
1.207500	47.50	9.9	60	12.5	AV	N	GND
1.261500	42.20	9.9	60	17.8	AV	N	GND
1.315500	46.80	9.9	60	13.2	AV	N	GND
1.423500	42.90	9.9	60	17.1	AV	N	GND
1.536000	43.50	9.9	60	16.5	AV	N	GND
1.864500	40.10	9.9	60	19.9	AV	N	GND

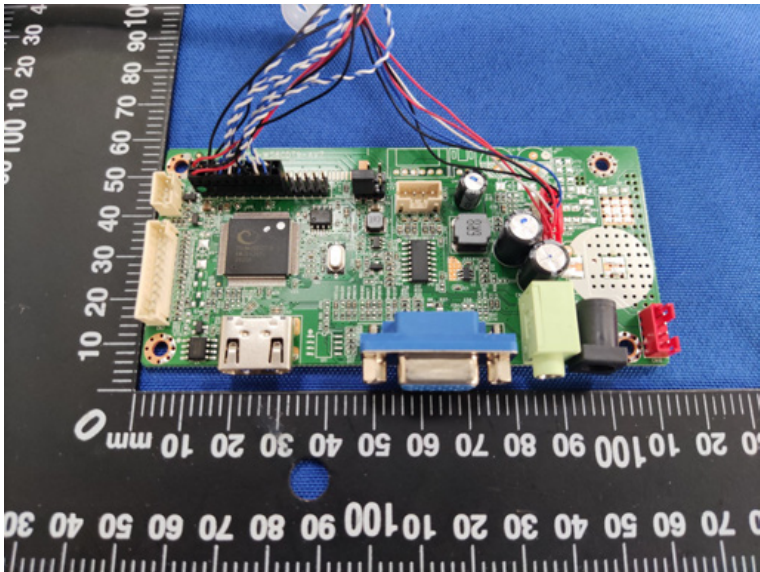
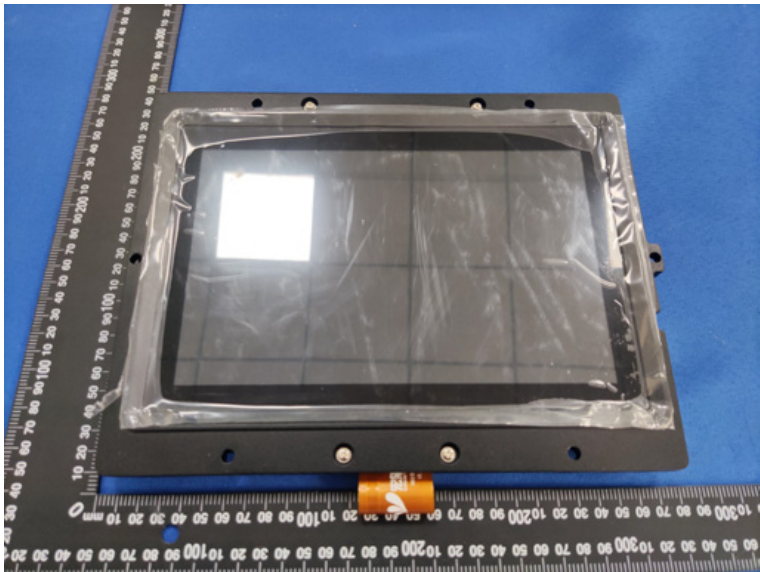
5. Test Set-up Photos of the EUT

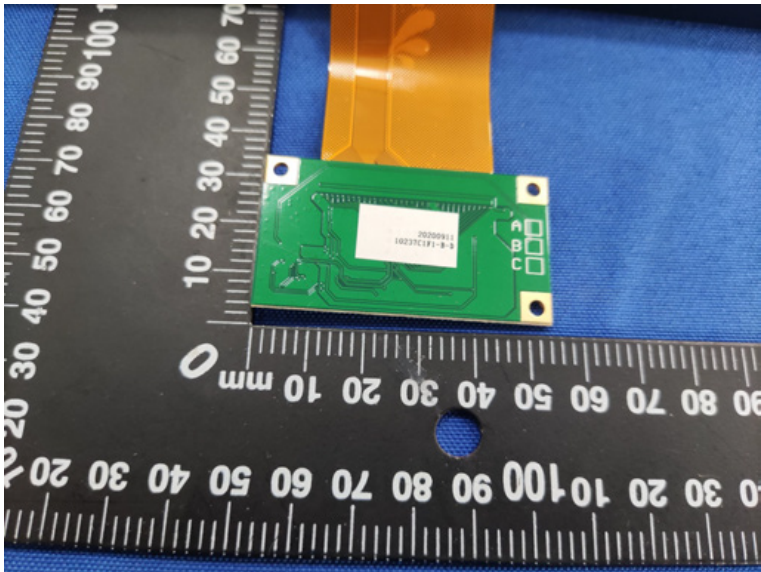
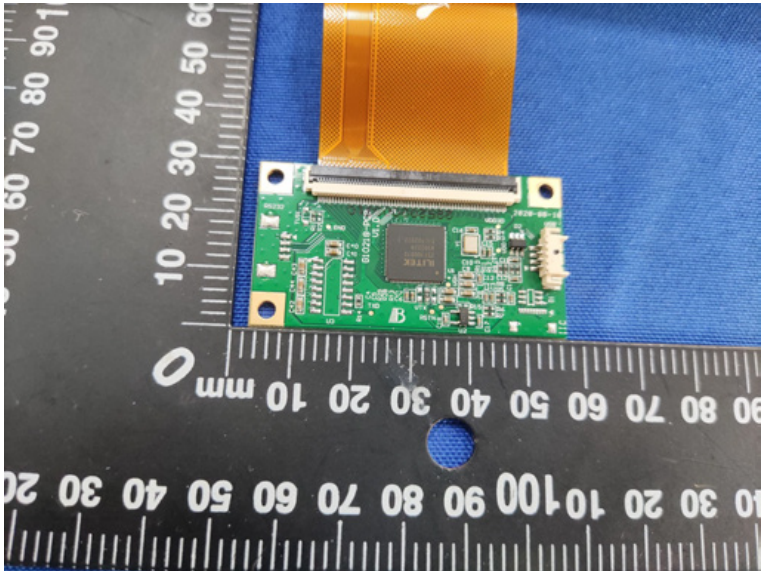


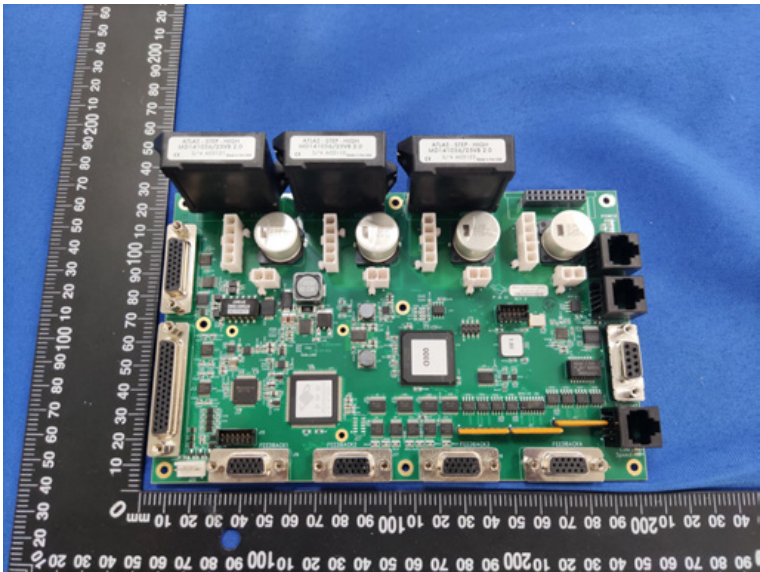
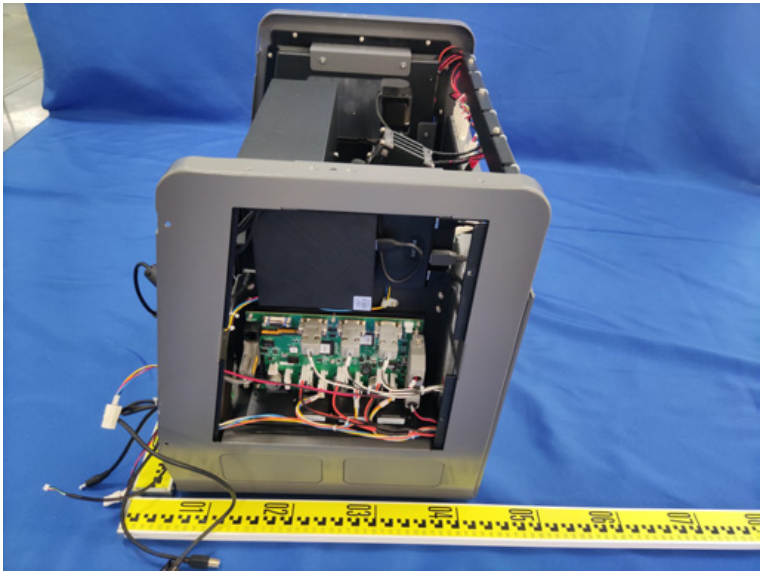
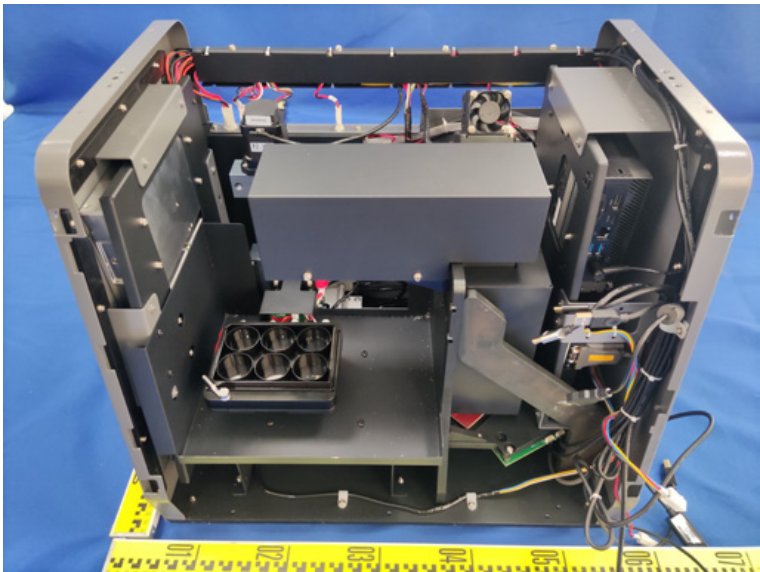
6. External and Internal Photos of the EUT

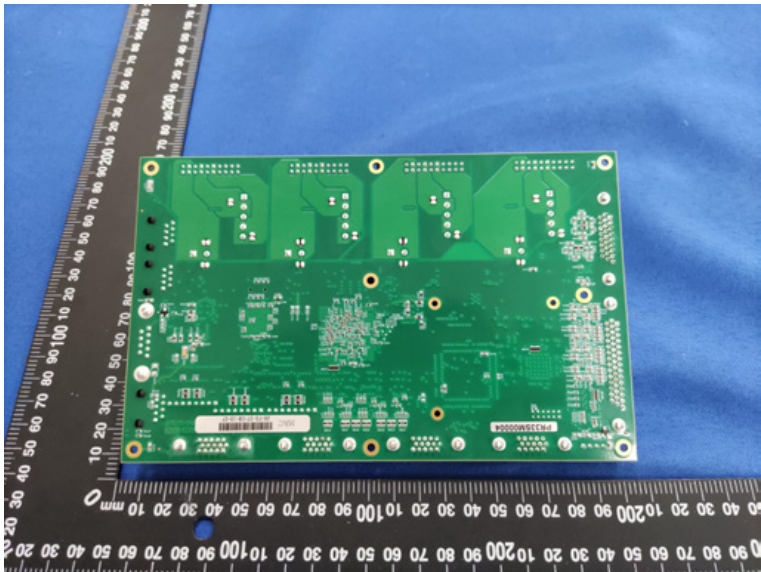


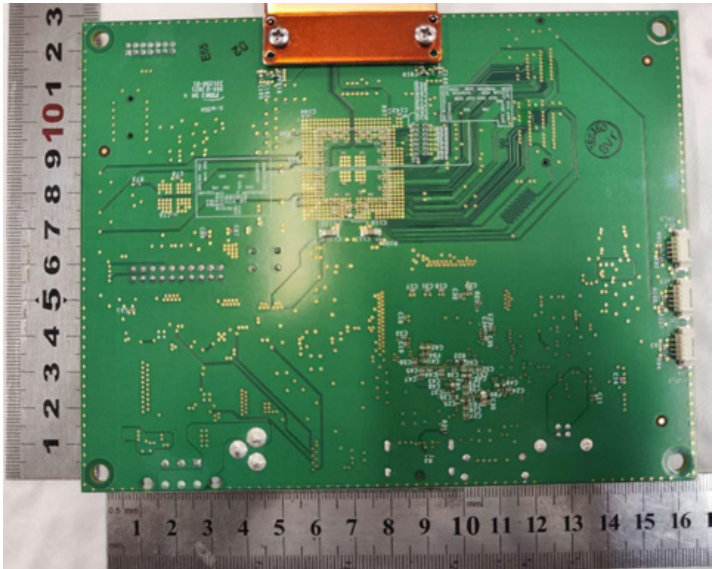
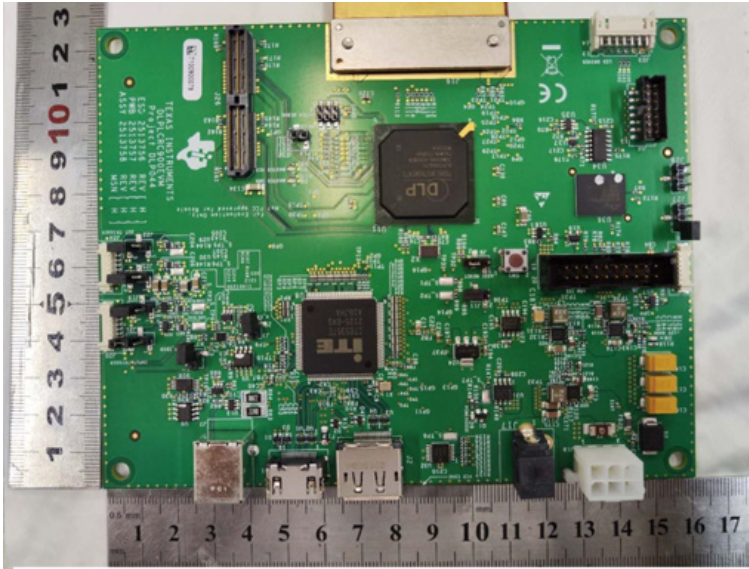
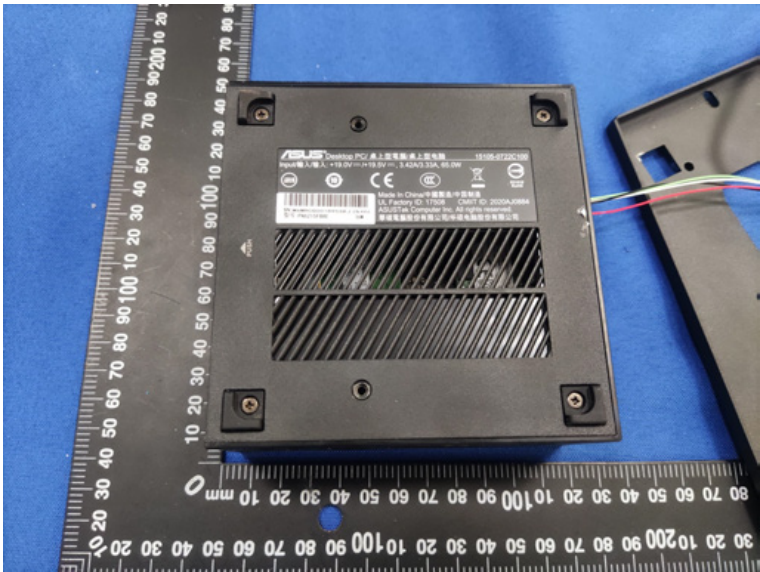


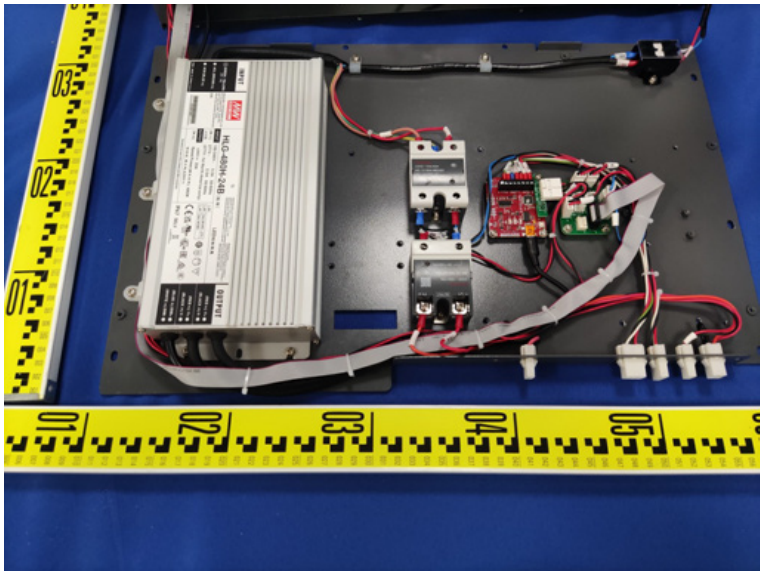
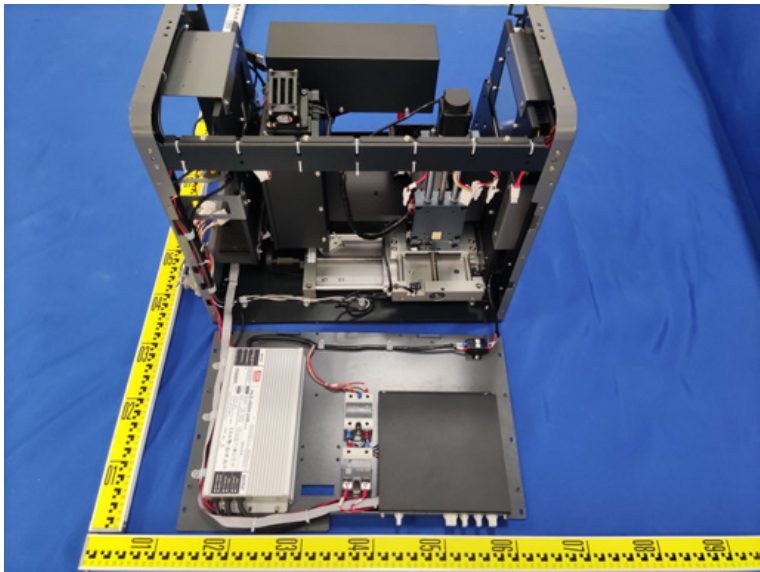


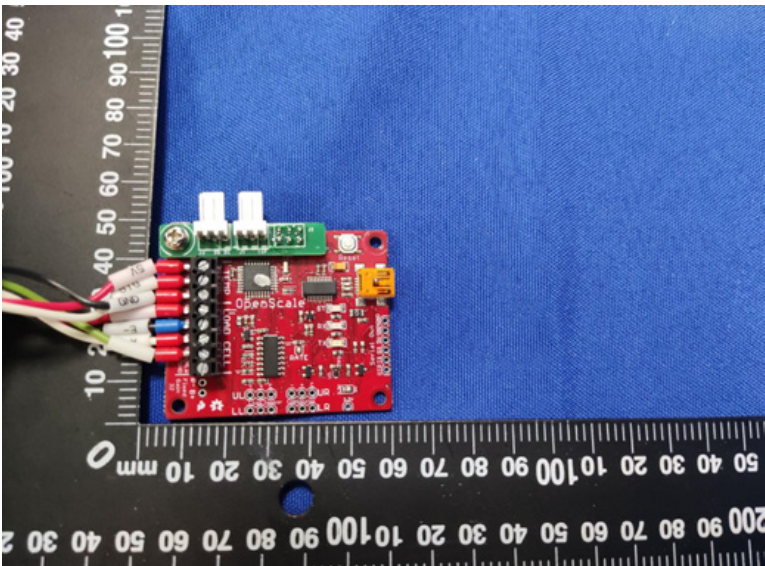
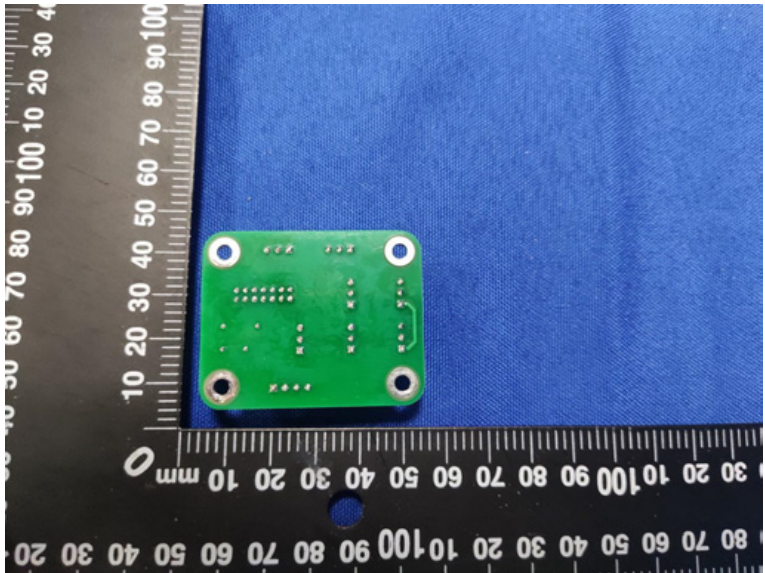
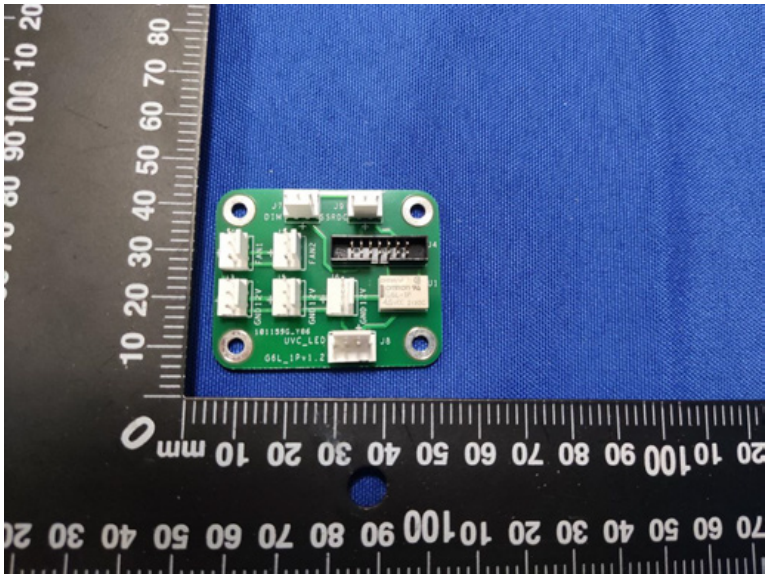


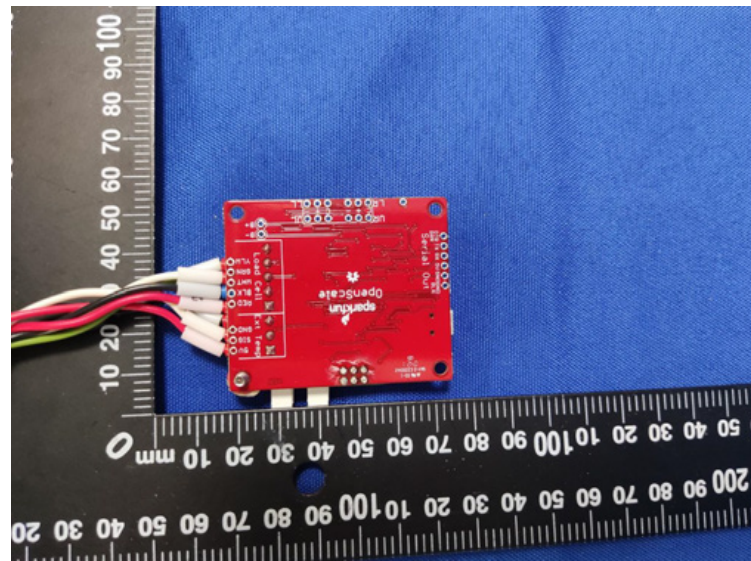












***** End of Report *****