



FCC SDoC TEST REPORT

KHADAS TECHNOLOGY CO., LTD

Tone2 Hi-Fi USB DAC Audio Board

Test Model: Tone2 Maker Kit

Prepared for : KHADAS TECHNOLOGY CO., LTD
Address : 2709 QIANCHENG CENTER, HAICHENG ROAD,
XIXIANG STREET, BAO' AN DISTRICT, SHENZHEN,
CHINA. 518101

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
Fax : (+86)755-82591332
Web : www.LCS-cert.com
Mail : webmaster@LCS-cert.com

Date of receipt of test sample : September 08, 2022
Number of tested samples : 1
Sample No : A090722064
Date of Test : September 08, 2022~ September 13, 2022
Date of Report : September 14, 2022



**FCC SDoC TEST REPORT****FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014****Report Reference No. : LCSA090722064E****Date Of Issue : September 14, 2022****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 : KHADAS TECHNOLOGY CO., LTD****Address : 2709 QIANCHENG CENTER, HAICHENG ROAD, XIXIANG STREET, BAO'AN DISTRICT, SHENZHEN, CHINA. 518101****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****SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. All rights reserved.**

This publication may be reproduced in whole or in part for non-commercial purposes as long as the SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. is acknowledged as copyright owner and source of the material. SHENZHEN LCS COMPLIANCE TESTING LABORATORY LTD. takes no responsibility for and will not assume liability for damages resulting from the reader's interpretation of the reproduced material due to its placement and context.

Test Item Description. : Tone2 Hi-Fi USB DAC Audio Board**Trade Mark : KHADAS****Test Model : Tone2 Maker Kit****Ratings : Please Refer to Page 7****Result : Positive****Compiled by:***Coco Song***Supervised by:***Baron Wen***Approved by:***Gavin Liang*

Coco Song/ File administrators

Baron Wen/Technique principal

Gavin Liang/ Manager



Shenzhen LCS Compliance Testing Laboratory Ltd.

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

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity



FCC -- TEST REPORT

Test Report No. : LCSA090722064E**September 14, 2022**

Date of issue

Test Model..... : Tone2 Maker Kit

EUT..... : Tone2 Hi-Fi USB DAC Audio Board

Applicant..... : KHADAS TECHNOLOGY CO., LTDAddress..... : 2709 QIANCHENG CENTER, HAICHENG ROAD,
XIXIANG STREET, BAO' AN DISTRICT, SHENZHEN,
CHINA. 518101

Telephone..... : /

Fax..... : /

Manufacturer..... : KHADAS TECHNOLOGY CO., LTDAddress..... : 2709 QIANCHENG CENTER, HAICHENG ROAD,
XIXIANG STREET, BAO' AN DISTRICT, SHENZHEN,
CHINA. 518101

Telephone..... : /

Fax..... : /

Factory..... : KHADAS TECHNOLOGY CO., LTDAddress..... : 2709 QIANCHENG CENTER, HAICHENG ROAD,
XIXIANG STREET, BAO' AN DISTRICT, SHENZHEN,
CHINA. 518101

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.



Shenzhen LCS Compliance Testing Laboratory Ltd.

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

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity



Revision History

Revision	Issue Date	Revisions Content	Revised By
000	September 14, 2022	Initial Issue	--





TABLE OF CONTENTS

Test Report Description	Page
1. SUMMARY OF STANDARDS AND RESULTS	6
1.1. Description of Standards and Results	6
2. GENERAL INFORMATION	7
2.1. Description of Device (EUT)	7
2.2. Description of Test Facility	7
2.3. Statement of the Measurement Uncertainty	8
2.4. Measurement Uncertainty	8
3. TEST RESULTS	9
3.1. Radiated Emission Measurement	9
4. PHOTOGRAPHS OF TEST SETUP	14
5. EXTERNAL AND INTERNAL PHOTOS OF THE EUT	15





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	---	N/A
Radiated disturbance	FCC 47 CFR Part 15 Subpart B, Class B(SDoC), ANSI C63.4 -2014	---	PASS
N/A is an abbreviation for Not Applicable.			

Test mode:		
Mode	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 : Tone2 Hi-Fi USB DAC Audio Board

Trade Mark : KHADAS

Test Model : Tone2 Maker Kit

Power Supply : Input: 5V \pm 450mA, 2.25W

Highest internal freq. : $F_x \leq 108\text{MHz}$

Highest internal frequency (F_x)	Highest measured frequency
$F_x \leq 1.705\text{ MHz}$	30 MHz
$1.705\text{ MHz} < F_x \leq 108\text{ MHz}$	1 GHz
$108\text{ MHz} < F_x \leq 500\text{ MHz}$	2 GHz
$500\text{ MHz} < F_x \leq 1000\text{ MHz}$	5 GHz
$F_x > 1\text{ GHz}$	$5 \times F_x$ up to a maximum of 40 GHz

2.2. Description of Support Device

Name	Manufacturers	M/N	S/N
PC	Lenovo	WB0202140H	WB05067151

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

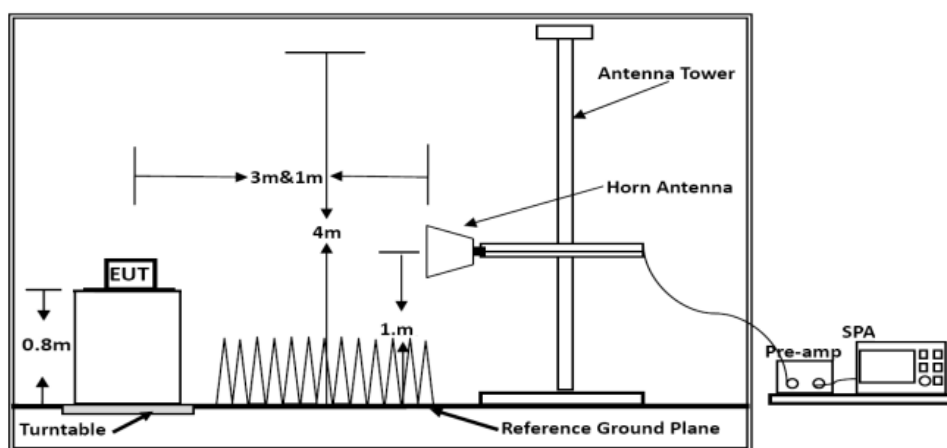
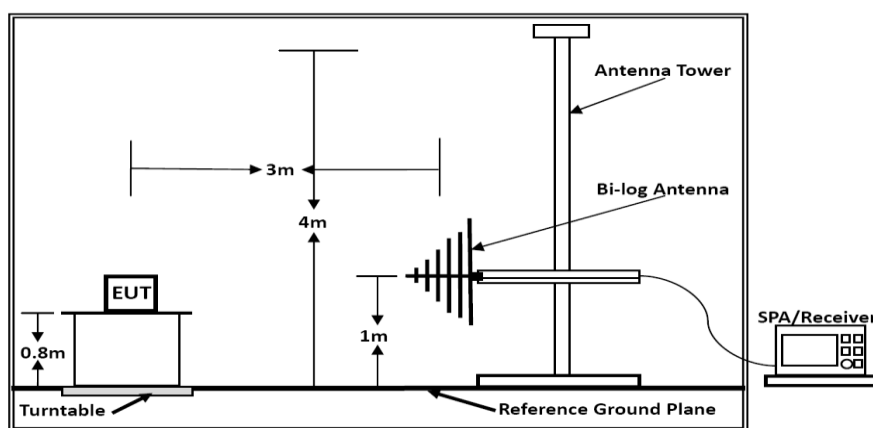
3.1. Radiated Emission Measurement

3.1.1. 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	AUDIX	E3	/	N/A	N/A
2	By-log Antenna	SCHWARZBECK	VULB9163	9163-470	2021-09-12	2024-09-11
3	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2021-09-05	2024-09-04
4	EMI Test Receiver	R&S	ESR3	102311	2022-08-17	2023-08-16
5	Broadband Preamplifier	/	BP-01M18G	P190501	2022-06-16	2023-06-15

3.1.2. Block Diagram of Test Setup





3.1.3. Radiated Emission Limit

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 $(\text{dB})\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$ (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.			

3.1.4. 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.

3.1.5. Operating Condition of EUT

3.5.1. Setup the EUT as shown in Section 3.2.

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

3.1.6. 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 C63.4-2009 on radiated emission measurement.





3.1.7. 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	10th 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.

3.1.8. Radiated Emission Noise Measurement Result

PASS.

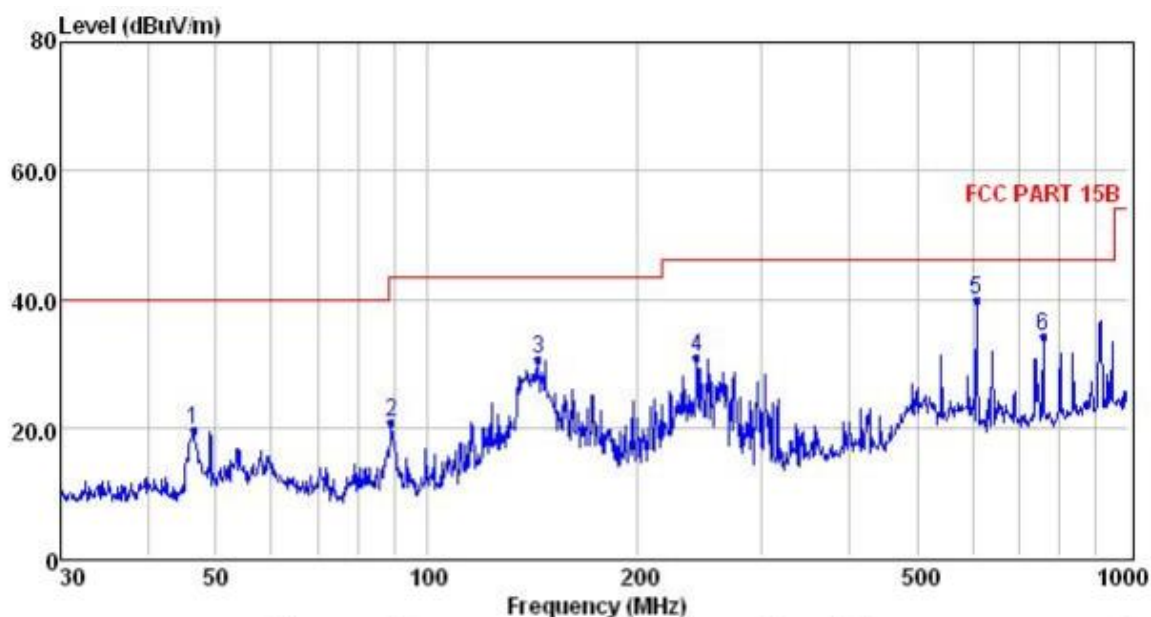
The scanning waveforms please refer to the next page.





Environmental Conditions:	22.3℃, 53.1%RH
Test Voltage:	DC
Test Model:	Tone2 Maker Kit
Test Mode:	Working
Test Engineer:	Zero Qi
Pol:	Vertical

Detailed results are shown below



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	46.50	7.33	0.57	11.77	19.67	40.00	-20.33	QP
2	88.96	10.58	0.77	9.53	20.88	43.50	-22.62	QP
3	144.33	20.94	1.01	8.59	30.54	43.50	-12.96	QP
4	242.53	17.52	1.26	12.26	31.04	46.00	-14.96	QP
5	607.79	19.17	1.53	19.19	39.89	46.00	-6.11	QP
6	758.04	12.45	1.92	19.72	34.09	46.00	-11.91	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



Shenzhen LCS Compliance Testing Laboratory Ltd.

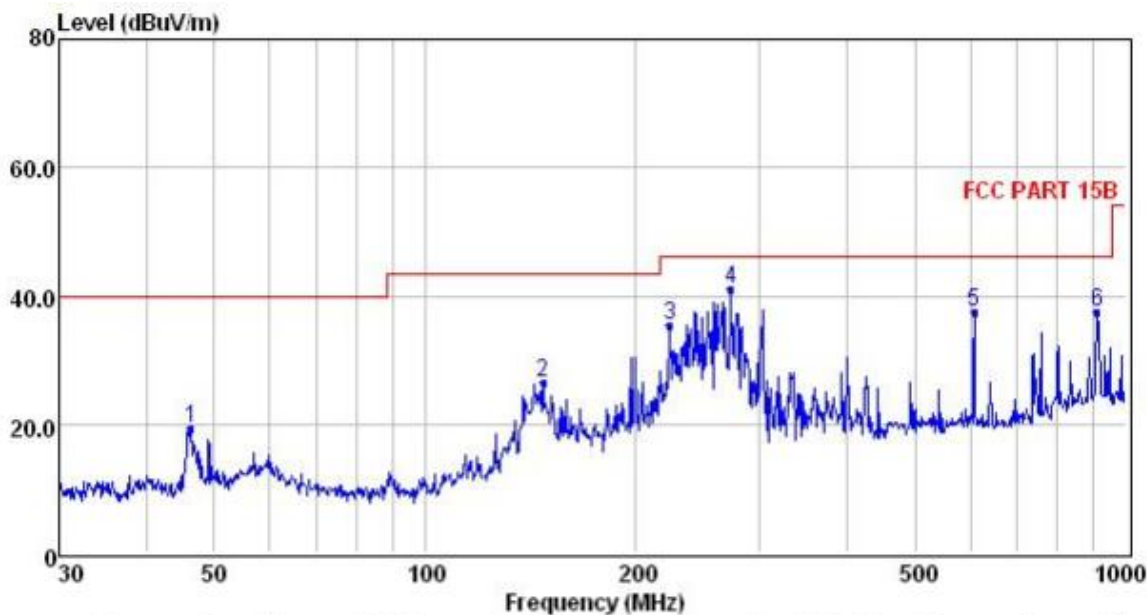
Add: Room 101, 201, Building A and Room 301, Building C, Juji Industrial Park, Yabianxueziwei, Shajing Street, Bao'an District, Shenzhen, Guangdong, China

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity



Environmental Conditions:	22.3°C, 53.1%RH
Test Voltage:	DC
Test Model:	Tone2 Maker Kit
Test Mode:	Working
Test Engineer:	Zero Qi
Pol:	Horizontal
Detailed results are shown below	



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	46.34	6.90	0.57	11.73	19.20	40.00	-20.80	QP
2	147.40	16.77	1.02	8.65	26.44	43.50	-17.06	QP
3	223.73	22.20	1.23	11.85	35.28	46.00	-10.72	QP
4	273.23	26.64	1.29	13.15	41.08	46.00	-4.92	QP
5	607.79	16.86	1.53	19.19	37.58	46.00	-8.42	QP
6	912.86	13.88	2.11	21.56	37.55	46.00	-8.45	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





4 . PHOTOGRAPHS OF TEST SETUP

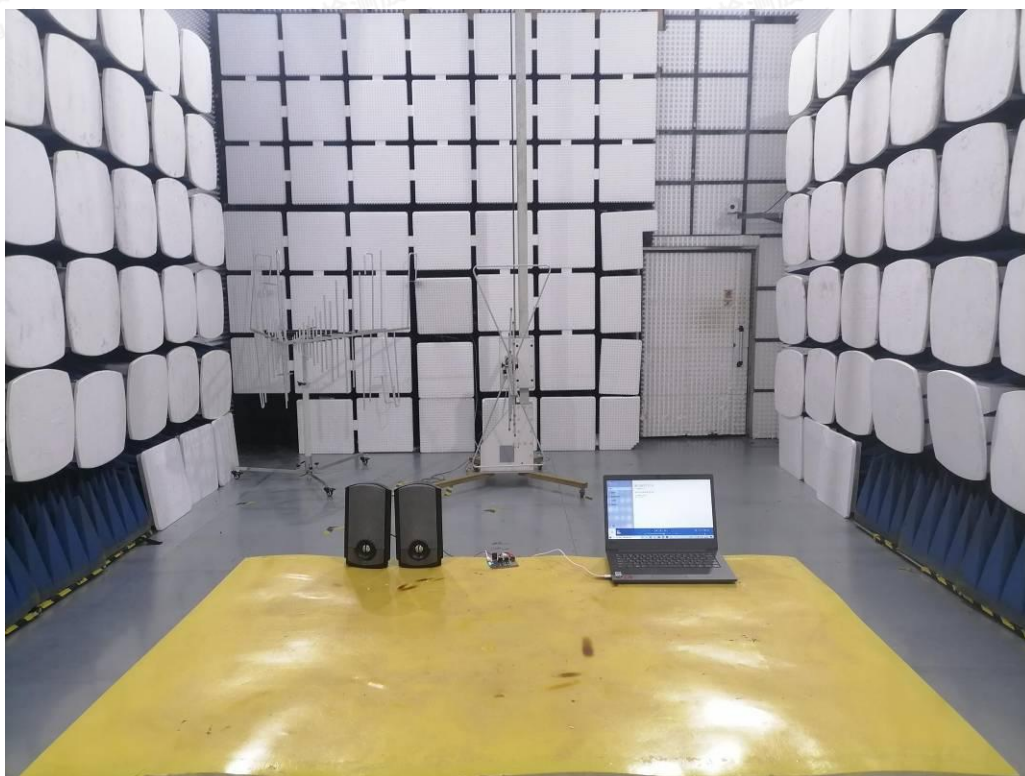


Photo of Radiated Measurement(30-1000MHz)





5. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

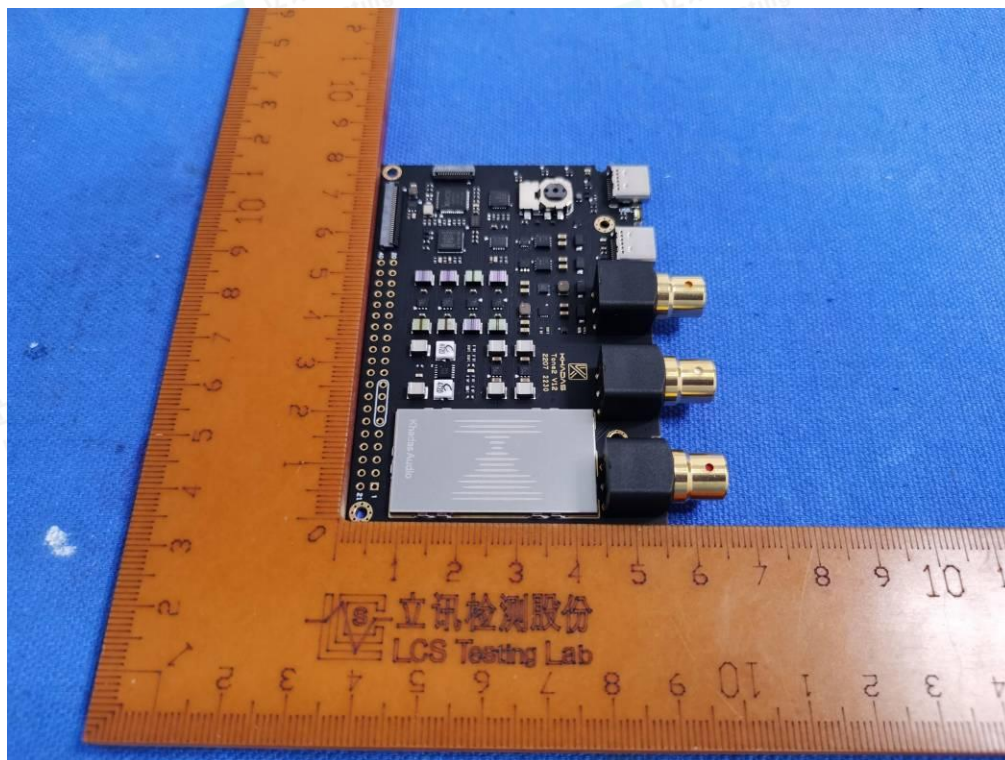


Fig. 1

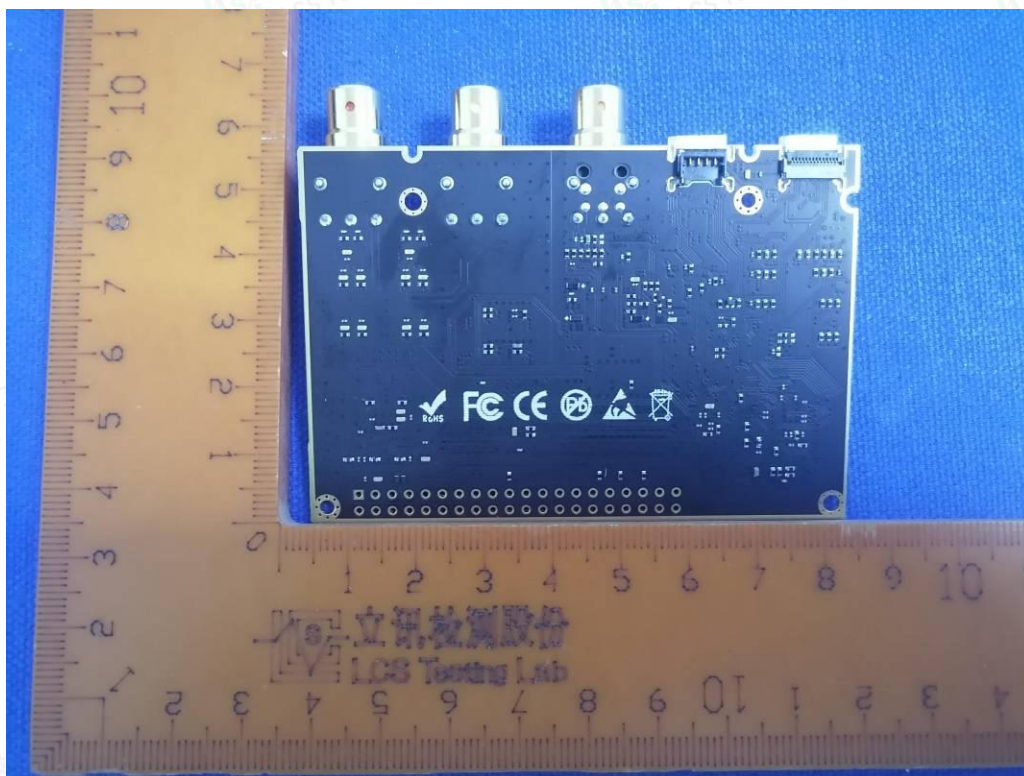


Fig. 2



Shenzhen LCS Compliance Testing Laboratory Ltd.

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

Tel: +(86) 0755-82591330 | E-mail: webmaster@lcs-cert.com | Web: www.lcs-cert.com

Scan code to check authenticity

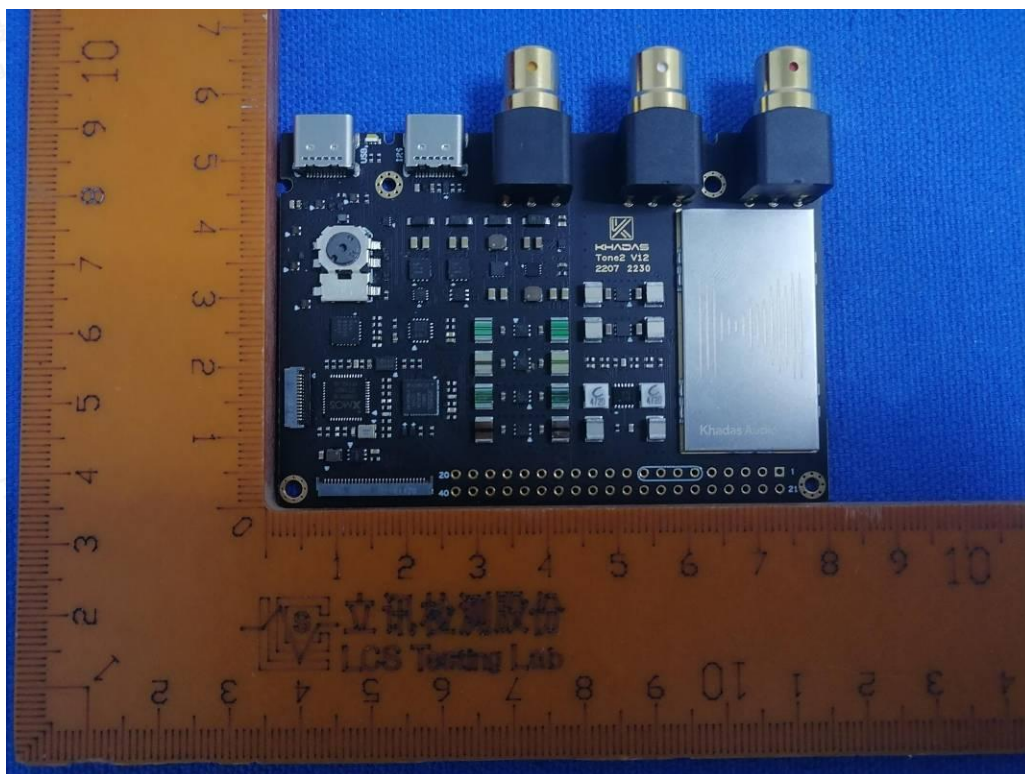


Fig. 3

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

