FCC TEST REPORT

Shenzhen Wesion Technology Co., Ltd.

Tone2 Pro

Test Model: Tone2 Pro

Prepared for	:	Shenzhen Wesion Technology Co., Ltd.
Address	:	D#2101A, Caifugang Building, Baoyuan Road, Xixiang Street, Bao'an District, Shenzhen, China
Prepared by	:	Shenzhen LCS Compliance Testing Laboratory Ltd.
Address	:	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Shajing Street, Baoan District, Shenzhen, 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	:	December 29, 2020
Number of tested samples	:	1
Sample No.	:	201209114A
Serial number	:	Prototype
Date of Test	:	December 29, 2020 ~ January 04, 2021
Date of Report	:	January 30, 2021

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FCC TEST REPORT
FCC 47 CFR Part 15 Subpart B, Class B, ANSI C63.4 -2014

Report Reference No.	**:**	**LCS210120079AE**
Date Of Issue.....	:	January 30, 2021
Testing Laboratory Name	**:**	**Shenzhen LCS Compliance Testing Laboratory Ltd.**
Address	:	101, 201 Bldg A & 301 Bldg C, Juji Industrial Park Shajing Street, Baoan District, Shenzhen, China
Testing Location/ Procedure....	:	Full application of Harmonised standards ■ Partial application of Harmonised standards □ Other standard testing method □
Applicant's Name	**:**	**Shenzhen Wesion Technology Co., Ltd.**
Address	:	D#2101A, Caifugang Building, Baoyuan Road, Xixiang Street, Bao'an District, Shenzhen, China
Test Specification		
Standard.....	:	FCC 47 CFR Part 15 Subpart B, Class B, 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.	**:**	**Tone2 Pro**
Trade Mark	:	Khadas
Test Model.....	:	Tone2 Pro
Ratings	:	DC 5V, 500mA
Result	**:**	**Positive**

Compiled by:	**Supervised by:**	**Approved by:**
Jin Wang	Linda He	Gavin Liang
Jin Wang/ File administrator	Linda He/ Technique principal	Gavin Liang/ Manager

FCC -- TEST REPORT

Test Report No. : LCS210120079AE	January 30, 2021 Date of issue

Test Model.....	: Tone2 Pro
EUT.....	: Tone2 Pro
Applicant.....	**: Shenzhen Wesion Technology Co., Ltd.**
Address.....	: D#2101A, Caifugang Building, Baoyuan Road, Xixiang Street, Bao'an District, Shenzhen, China
Telephone.....	: /
Fax.....	: /
Manufacturer.....	**: Shenzhen Wesion Technology Co., Ltd.**
Address.....	: D#2101A, Caifugang Building, Baoyuan Road, Xixiang Street, Bao'an District, Shenzhen, China
Telephone.....	: /
Fax.....	: /
Factory.....	: **Shenzhen Wesion Technology Co., Ltd.**
Address.....	: D#2101A, Caifugang Building, Baoyuan Road, Xixiang Street, Bao'an District, Shenzhen, China
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	January 05, 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, ANSI C63.4 -2014	Class B	PASS
Radiated disturbance	FCC 47 CFR Part 15 Subpart B, Class B, ANSI C63.4 -2014	Class B	PASS
N/A is an abbreviation for Not Applicable.			

Test mode:		
Mode	Working	Record

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT : Tone2 Pro

Trade Mark : Khadas

Test Model : Tone2 Pro

Power Supply : DC 5V, 500mA

Highest internal frequency : Fx ≤ 108 MHz

Highest internal frequency (Fx)	Highest measured frequency
Fx ≤ 108 MHz	1 GHz
108 MHz < Fx ≤ 500 MHz	2 GHz
500 MHz < Fx ≤ 1 GHz	5 GHz
Fx > 1 GHz	5 × Fx 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. 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
PC	DELL	vostro15-7570	--
Adapter	DELL	ADLX65YCC3A	--

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 (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%.

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3. TEST RESULTS

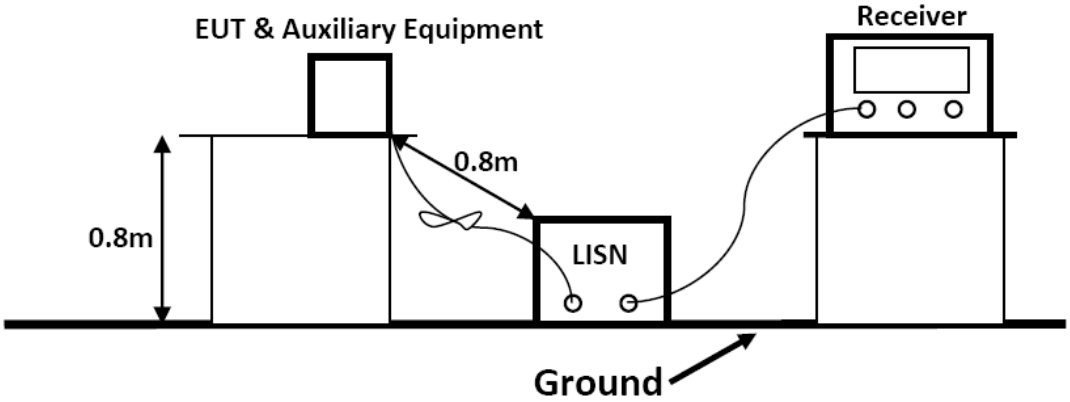
3.1. POWER LINE CONDUCTED EMISSION MEASUREMENT

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	Farad	EZ	/	N/A	N/A
2	EMI Test Receiver	R&S	ESPI	101840	2020-06-22	2021-06-21
3	Artificial Mains	R&S	ENV216	101288	2020-06-22	2021-06-21
4	10dB Attenuator	SCHWARZBECK	MTS-IMP-136	261115-001-0032	2020-06-22	2021-06-21
5	Impedance Stabilization Network	TESEQ	ISN T800	45130	2020-10-20	2021-10-19

3.1.2.Block Diagram of Test Setup



3.1.3.Test Standard

Power Line Conducted Emission Limits (Class B)

Frequency (MHz)			Limit (dBμV)	
			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 Lighting 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.

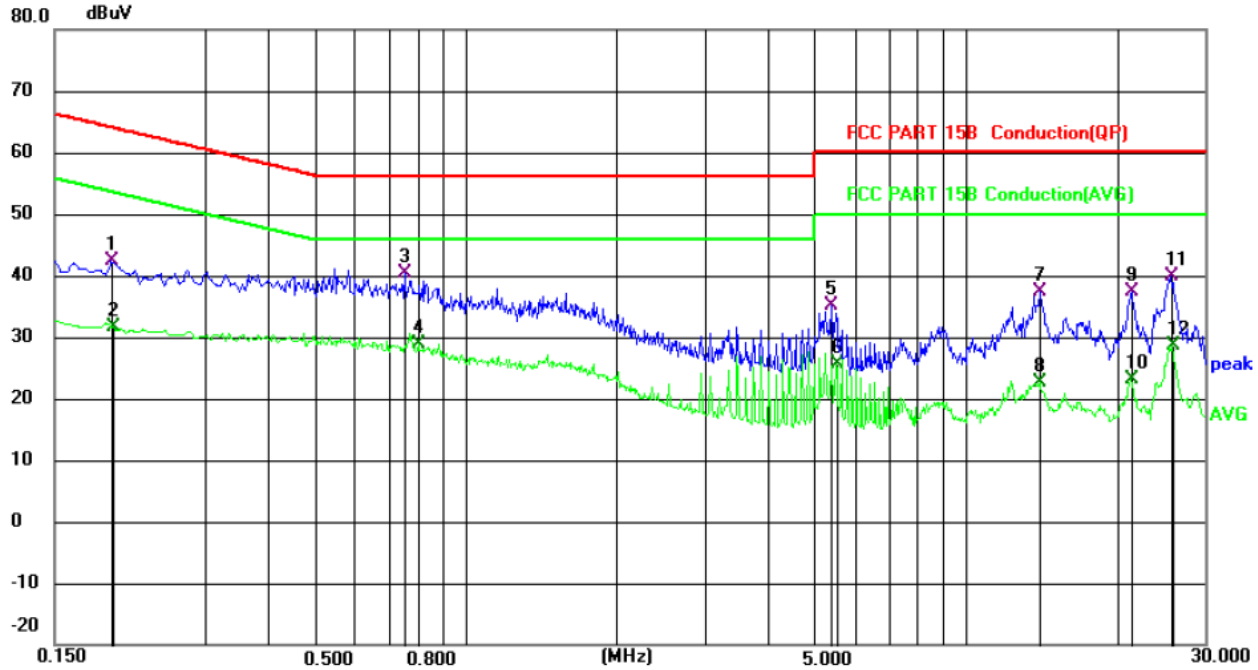
The frequency range from 150kHz to 30MHz is investigated

3.1.7.Test Results

PASS.

The test result please refer to the next page.

Test Model	FM-LU	Test Mode	Lighting
Environmental Conditions	22.3℃, 52.7% RH	Test Engineer	Jay Li
Pol	Line	Test Voltage	AC 120V/60Hz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.1951	21.49	20.84	42.33	63.82	-21.49	QP	
2		0.1955	10.86	20.83	31.69	53.80	-22.11	AVG	
3	*	0.7531	20.09	20.39	40.48	56.00	-15.52	QP	
4		0.8026	8.44	20.34	28.78	46.00	-17.22	AVG	
5		5.3745	15.60	19.51	35.11	60.00	-24.89	QP	
6		5.5051	6.09	19.52	25.61	50.00	-24.39	AVG	
7		14.0101	17.31	20.02	37.33	60.00	-22.67	QP	
8		14.0101	2.72	20.02	22.74	50.00	-27.26	AVG	
9		21.3901	17.06	20.29	37.35	60.00	-22.65	QP	
10		21.3901	2.83	20.29	23.12	50.00	-26.88	AVG	
11		25.6876	19.74	20.18	39.92	60.00	-20.08	QP	
12		25.7506	8.37	20.17	28.54	50.00	-21.46	AVG	

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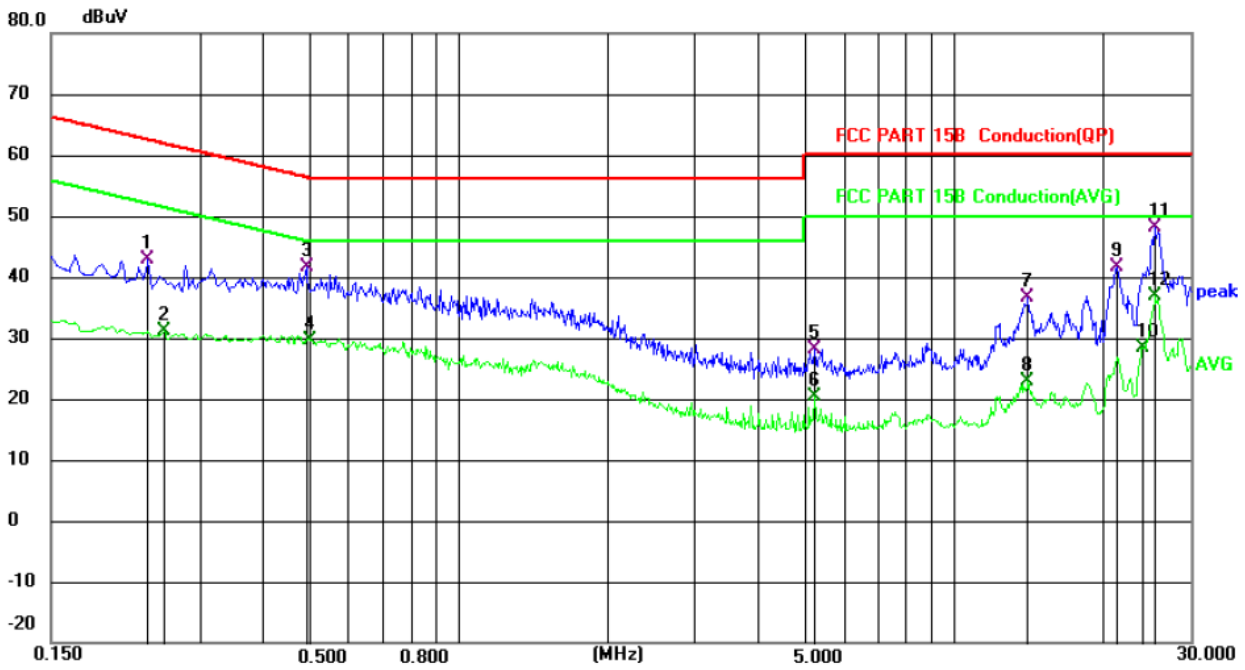
Test Model	FM-LU	Test Mode	Lighting
Environmental Conditions	22.3℃, 52.7% RH	Test Engineer	Jay Li
Pol	Neutral	Test Voltage	AC 120V/60Hz



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Margin		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.2356	22.31	20.57	42.88	62.25	-19.37	QP	
2		0.2536	10.60	20.48	31.08	51.64	-20.56	AVG	
3		0.4921	20.58	20.94	41.52	56.13	-14.61	QP	
4		0.5011	8.81	20.90	29.71	46.00	-16.29	AVG	
5		5.2396	8.63	19.50	28.13	60.00	-31.87	QP	
6		5.2396	0.85	19.50	20.35	50.00	-29.65	AVG	
7		14.1001	16.52	20.04	36.56	60.00	-23.44	QP	
8		14.1001	2.72	20.04	22.76	50.00	-27.24	AVG	
9		21.3496	21.55	20.07	41.62	60.00	-18.38	QP	
10		24.0541	8.40	20.10	28.50	50.00	-21.50	AVG	
11	*	25.3905	28.00	20.11	48.11	60.00	-11.89	QP	
12		25.4940	16.69	20.11	36.80	50.00	-13.20	AVG	

Note: Result = Reading + Correct, Margin = Result – Limit.

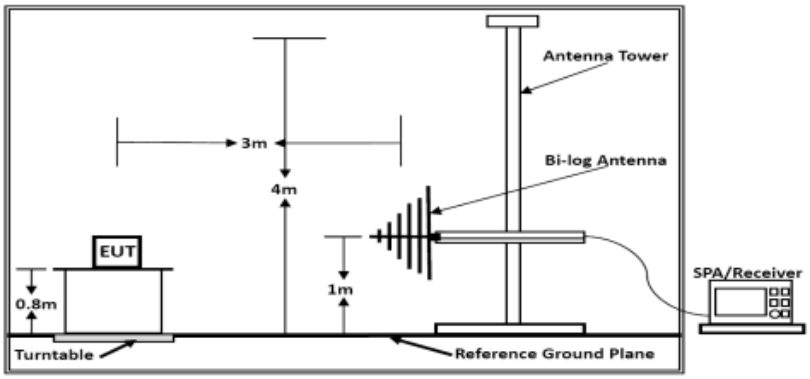
3.2. Radiated Emission Measurement

3.2.1. Test Equipment

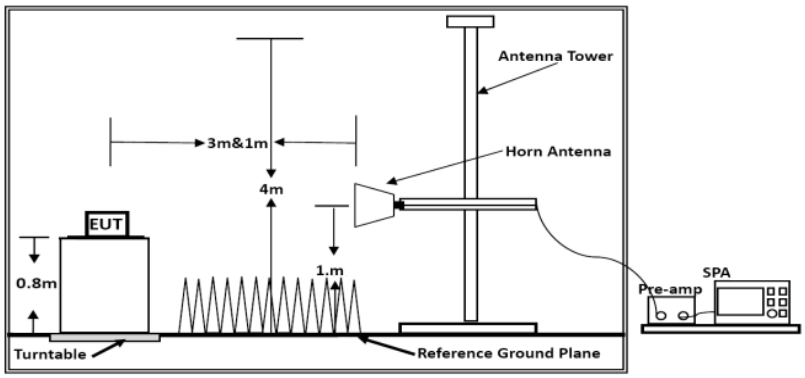
The following test equipment are used during the radiated emission measurement:

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	2018-07-26	2021-07-25
3	Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1925	2018-07-02	2021-07-01
4	EMI Test Receiver	R&S	ESR 7	101181	2020-06-22	2021-06-21
5	Broadband Preamplifier	/	BP-01M18G	P190501	2020-06-22	2021-06-21

3.2.2. Block Diagram of Test Setup



Below 1GHz



Above 1GHz

3.2.3. Radiated Emission Limit (Class B)

Limits for Radiated Disturbance Below 1GHz

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/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 (dB)μV = 20 log Emission level μV/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 (dBμV/m)	Average Limit (dBμV/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

Setup the EUT as shown in Section 3.2.2.
Let the EUT work in test Mode 1 and measure it.

3.2.6. Test Procedure

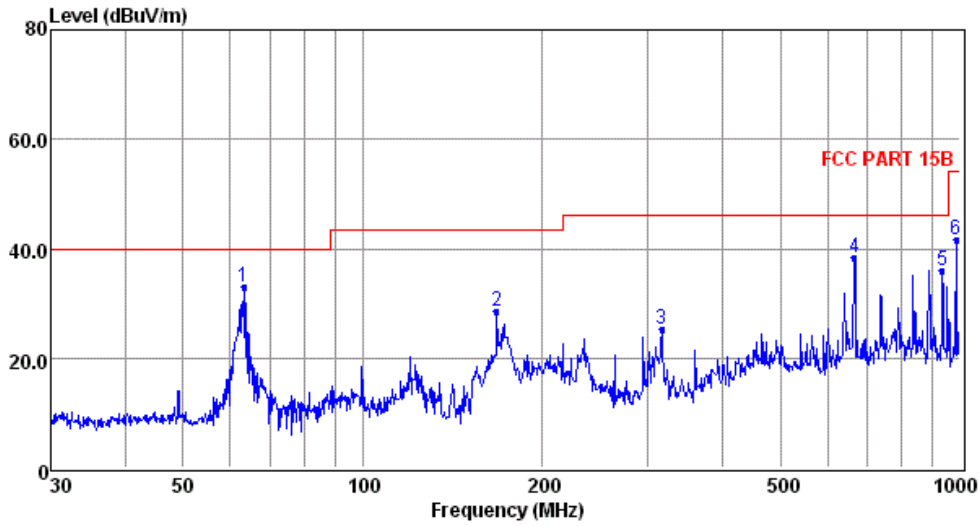
EUT and its simulators are placed on a turntable, which is 0.8 meter high above ground. The turntable can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3.0 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up 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 C63.4-2009 on radiated emission measurement.

The bandwidth of the Receiver is set at RBW/VNW 120KHz/300KHz.
The frequency range from 30MHz to 1000MHz is investigated.
The bandwidth of the Receiver is set at RBW/VNW 1MHz/3MHz.
The frequency range from 1000MHz to 6000MHz is investigated.

3.2.7. Test Results

PASS.
The test result please refers to the next page.

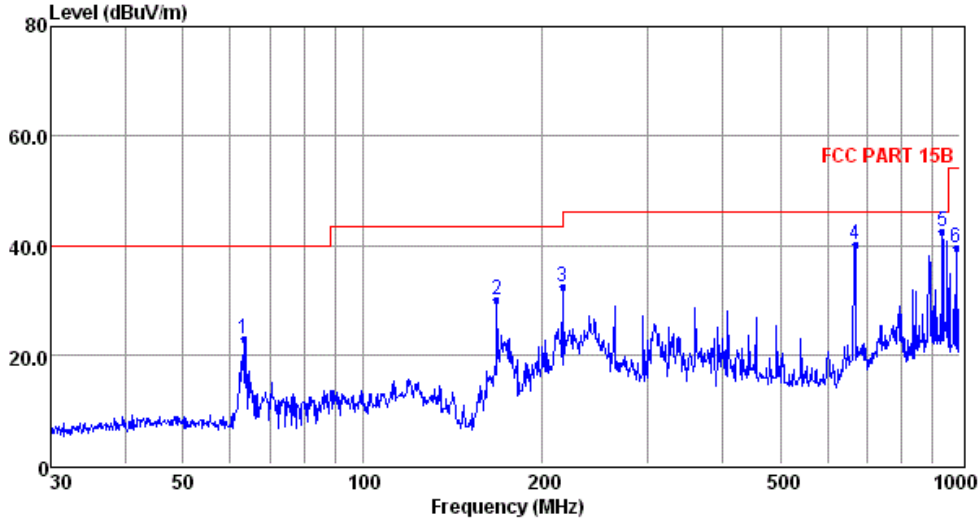
Test Model	Tone2 Pro	**Test Mode**	Working
Environmental Conditions	22.2℃, 53.3% RH	**Detector Function**	Quasi-peak
Pol	Vertical	**Distance**	3m
Test Engineer	Daiwei Dai	**Test Voltage**	DC 5V



	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	63.09	51.05	0.48	11.47	32.95	40.00	-7.05	QP
2	167.82	49.12	0.77	8.90	28.50	43.50	-15.00	QP
3	316.59	41.43	1.09	13.28	25.24	46.00	-20.76	QP
4	665.80	49.10	1.55	18.69	38.24	46.00	-7.76	QP
5	935.55	44.23	1.93	21.32	36.10	46.00	-9.90	QP
6	986.07	49.50	1.97	21.65	41.65	54.00	-12.35	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	Tone2 Pro	**Test Mode**	Working
Environmental Conditions	22.2℃, 53.3% RH	**Detector Function**	Quasi-peak
Pol	Horizontal	**Distance**	3m
Test Engineer	Daiwei Dai	**Test Voltage**	DC 5V



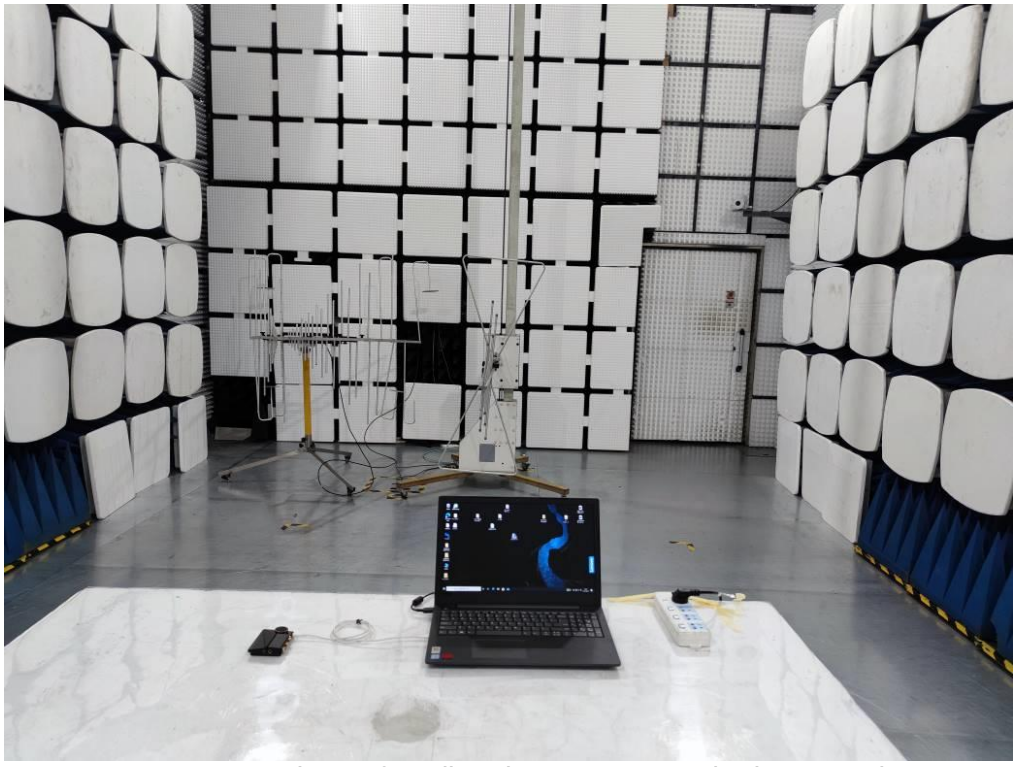
	Freq	Reading	CabLos	Antfac	Measured	Limit	Over	Remark
	MHz	dBuV	dB	dB/m	dBuV/m	dBuV/m	dB	
1	63.09	41.03	0.48	11.47	22.93	40.00	-17.07	QP
2	167.82	50.75	0.77	8.90	30.13	43.50	-13.37	QP
3	216.02	50.70	0.88	11.07	32.27	46.00	-13.73	QP
4	668.14	50.98	1.71	18.70	40.29	46.00	-5.71	QP
5	935.55	50.73	1.93	21.32	42.60	46.00	-3.40	QP
6	986.07	47.44	1.97	21.65	39.59	54.00	-14.41	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 modes, Thus record worse case mode result in this report.

4. PHOTOGRAPHS OF TEST SETUP

Photo of Power Line Conducted Measurement



Test Setup Photo of Radiated Measurement (Below 1GHz)

5. EXTERNAL AND INTERNAL PHOTOS OF THE EUT

Fig. 1

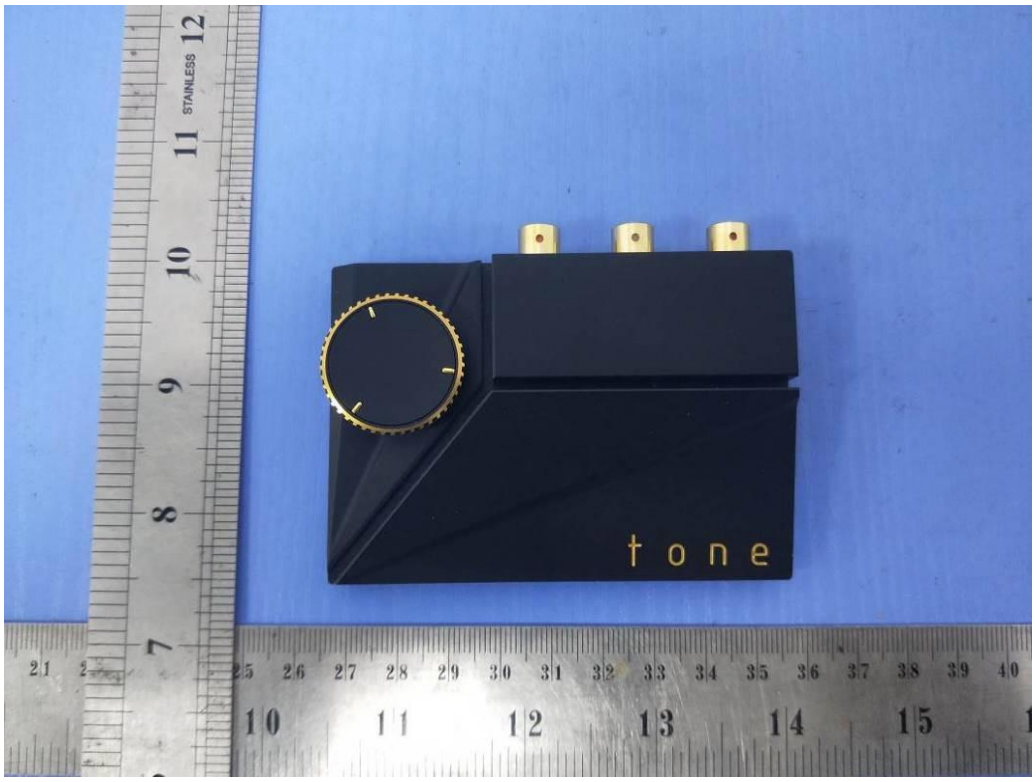


Fig. 2

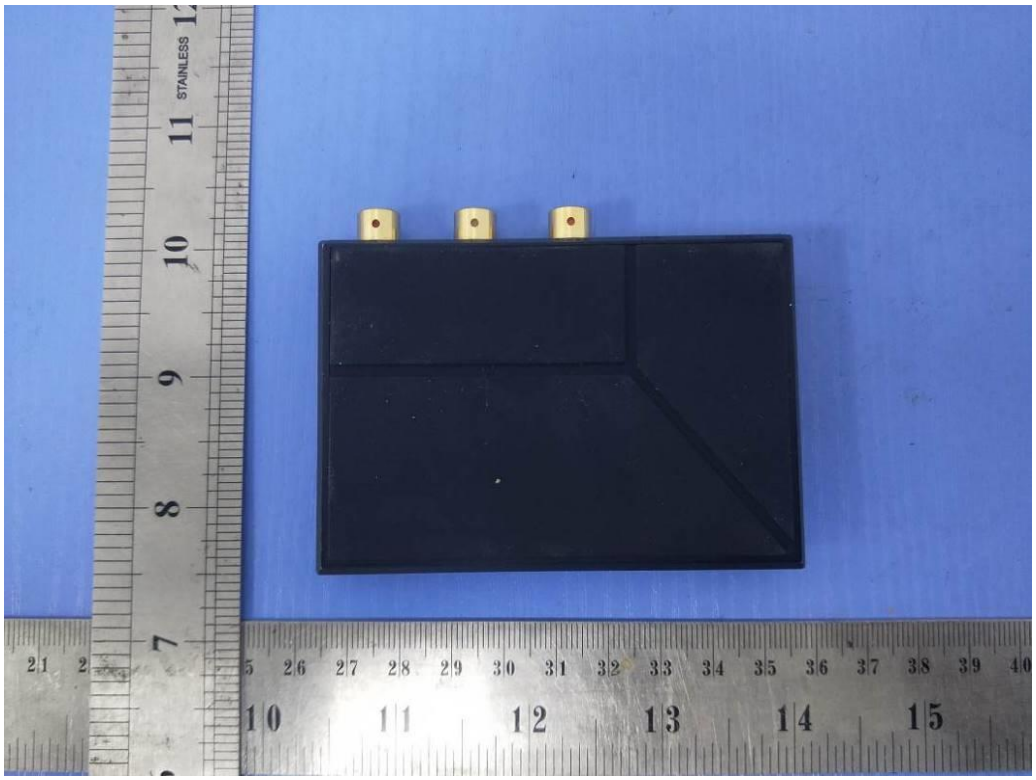


Fig. 3

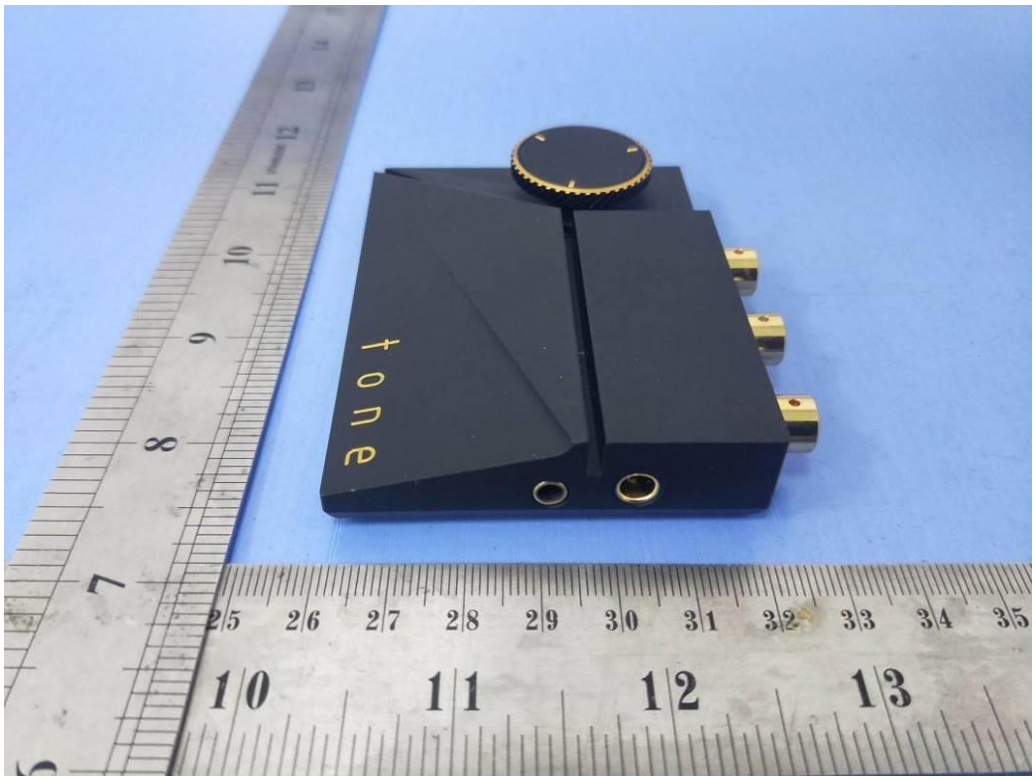


Fig. 4

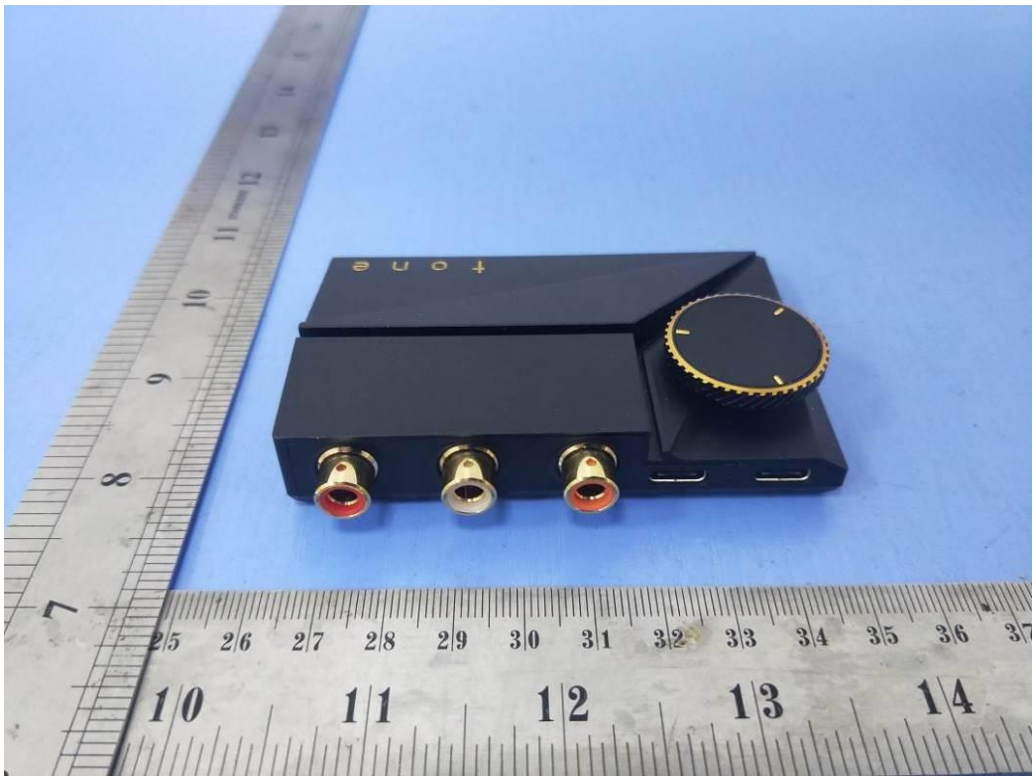


Fig. 5

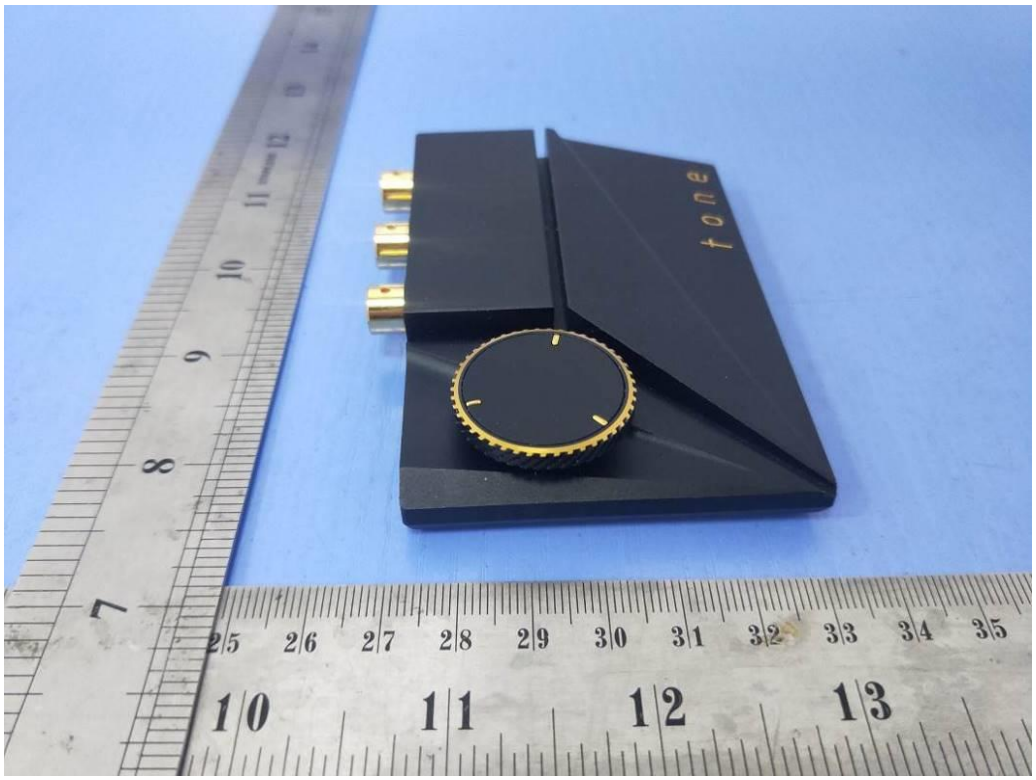


Fig. 6

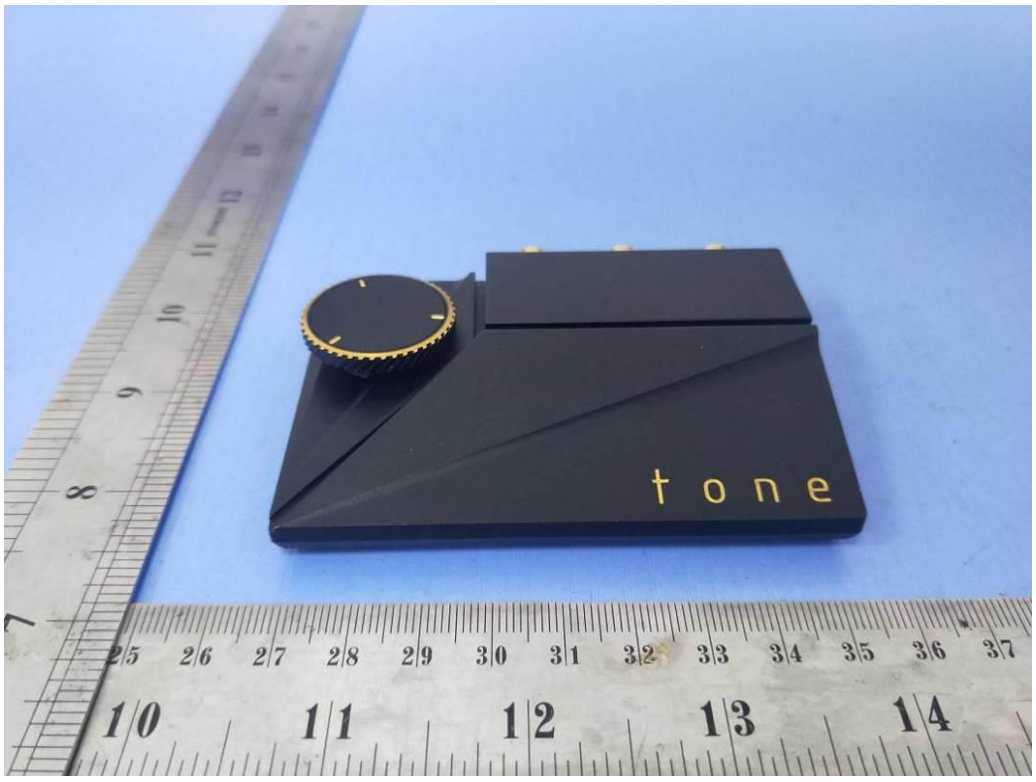


Fig. 7

Fig. 8

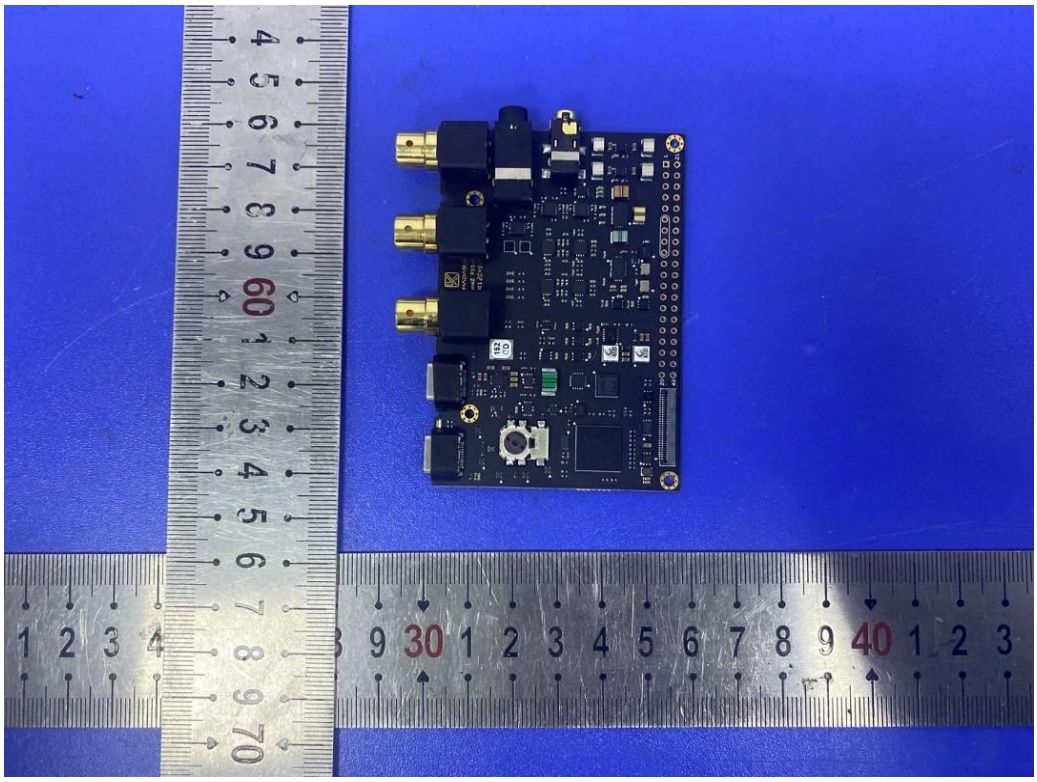


Fig. 9

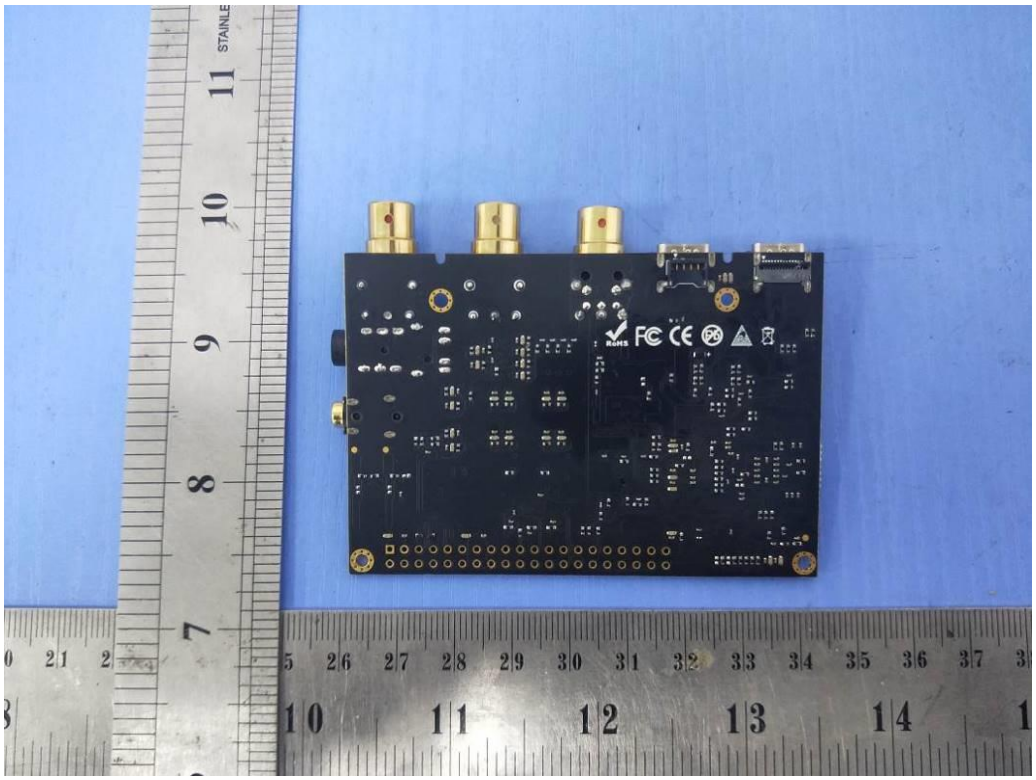


Fig. 10

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

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