Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

RF Exposure evaluation

Report Reference No.....:	**GTS20210906007-1-6**
FCC ID. .....:	**2A27Y-OGW20**
Compiled by (position+printed name+signature) . :	File administrators Peter Xiao
Supervised by (position+printed name+signature) . :	Test Engineer Oliver Ou
Approved by (position+printed name+signature) . :	Manager Simon Hu
Date of issue .....:	Sep.14, 2021

Representative Laboratory Name.:	**Shenzhen Global Test Service Co.,Ltd.**
Address .....:	No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

Applicant's name.....:	**HUAIAN TAIZAN TRADEING CO., LTD.**
Address .....:	ROOM1701, WUYI MANSION,YANAN EAST ROAD, QINGJIANGPUDISTRICT, HUAIAN JANGSU CHINA.

Test specification.....**:**	
Standard.....:	**KDB publication 680106 D01 RF Exposure Wireless Charging Apps v03**
TRF Originator.....:	Shenzhen Global Test Service Co.,Ltd.
Master TRF .....:	Dated 2014-12

Test item description .....:	**Oongalee Gateway**
Trade Mark.....:	oongalee
Manufacturer .....:	Lvhua Ruisheng (Shenzhen) Industrial Technology Co.，Ltd.
Model/Type reference .....:	OGW 2.0
Listed Models .....:	OGW 2.0-C, OGW 2.0-U, OGW 2.0-E, OGW 2.0-S, OGW 2.0-CN, OGW 3.0-C, OGW 3.0-U, OGW 3.0-E, OGW 3.0-S, OGW 3.0-CN, OGW 3.0, OGW 4.0-C, OGW 4.0-U, OGW 4.0-E, OGW 4.0-S, OGW 4.0-CN, OGW 4.0
Hardware Version .....:	N/A
Software Version.....:	N/A
Rating .....:	DC 12.0V by Adapter
Result .....:	**PASS**

TEST REPORT

Test Report No. :	**GTS20210906007-1-6**	Sep.14, 2021 Date of issue

Equipment under Test	:	Oongalee Gateway
Model /Type	:	OGW 2.0
Listed model	:	OGW 2.0-C, OGW 2.0-U, OGW 2.0-E, OGW 2.0-S, OGW 2.0-CN, OGW 3.0-C, OGW 3.0-U, OGW 3.0-E, OGW 3.0-S, OGW 3.0-CN, OGW 3.0, OGW 4.0-C, OGW 4.0-U, OGW 4.0-E, OGW 4.0-S, OGW 4.0-CN, OGW 4.0
Applicant	:	**HUAIAN TAIZAN TRADEING CO., LTD.**
Address	:	ROOM1701, WUYI MANSION,YANAN EAST ROAD, QINGJIANGPUDISTRICT, HUAIAN JANGSU CHINA.
Manufacturer	:	**Lvhua Ruisheng (Shenzhen) Industrial Technology Co.，Ltd.**
Address	:	406A, Jiatian Industry and Trade Building, Dapu North Road, Houting Community, Shajing Street, Baoan District, Shenzhen, China

Test Result:	**PASS**

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.

Contents

1. SUMMARY

1.1 EUT configuration

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

● - supplied by the manufacturer

○ - supplied by the lab

●	/	Length (m) :	/
		Shield :	/
		Detachable :	/

1.2 Product Description

Product Name	Oongalee Gateway
Trade Mark	oongalee
Model/Type reference	OGW 2.0
List Models	OGW 2.0-C, OGW 2.0-U, OGW 2.0-E, OGW 2.0-S, OGW 2.0-CN, OGW 3.0-C, OGW 3.0-U, OGW 3.0-E, OGW 3.0-S, OGW 3.0-CN, OGW 3.0, OGW 4.0-C, OGW 4.0-U, OGW 4.0-E, OGW 4.0-S, OGW 4.0-CN, OGW 4.0
Model Declaration	PCB board, structure and internal of these model(s) are the same, Only the model name different , So no additional models were tested.
Power supply:	DC 12.0V by Adapter
Sample ID	GTS20210906007-1-1#&GTS20210906007-1-2#
Bluetooth	
Operation frequency	2402-2480MHz
Channel Number	79 channels for Bluetooth (DSS) 40 channels for Bluetooth (DTS)
Channel Spacing	1MHz for Bluetooth (DSS) 2MHz for Bluetooth (DTS)
Modulation Type	GFSK, π/4-DQPSK, 8DPSK for Bluetooth (DSS) GFSK for Bluetooth (DTS)
WIFI(2.4G Band)	
Frequency Range	2412MHz ~ 2462MHz
Channel Spacing	5MHz
Channel Number	11 Channel for 20MHz bandwidth(2412~2462MHz)
Modulation Type	802.11b: DSSS; 802.11g/n: OFDM
Antenna Description	Internal Antenna, 0dBi(Max.) for 2.4G Band
WPT	
Operation frequency	115-205KHz
Modulation Type	CW (Continuous Wave)
Load Sensing	Contact transmission
Antenna Type	Coil Antenna
Antenna Gain	0dBi

1.3 Equipment Under Test

Power supply system utilised

Power supply voltage	:	○	230V / 50 Hz	○	120V / 60Hz
		●	12 V DC	○	24 V DC
		○	Other (specified in blank below)		

Description of the test mode

Operation Frequency each of channel	
Channel	Frequency
1	125.5KHz

Test Modes:		
TM1	AC/DC Adapter + EUT + Wireless load (Battery Status: <1%)	Record
TM2	AC/DC Adapter + EUT + Wireless load (Battery Status: <50%)	Pre-tested
TM3	AC/DC Adapter+ EUT + Wireless load (Battery Status: 100%)	Pre-tested
Note: All test modes were pre-tested, but we only recorded the worst case in this report.		

1.4 EUT Exercise Software

N/A

1.5 Special Accessories

Manufacturer	Description	Model	Serial Number	Certificate
Shenzhen Jihongda Power Co.,Ltd.	Adapter	JHD-AP024C-120200BA-A	--	SDOC

Note: The adapter is only used for auxiliary testing and is not shipped with the product.

1.6 External I/O Cable

I/O Port Description	Quantity	Cable
DC IN Port	1	1.0M, Unscreened Cable
USB Port	1	N/A
Type-C	2	N/A

1.7 Modifications

No modifications were implemented to meet testing criteria.

2. TEST ENVIRONMENT

2.1 Address of the test laboratory

Shenzhen Global Test Service Co.,Ltd.
No.7-101 and 8A-104, Building 7 and 8, DCC Cultural and Creative Garden, No.98, Pingxin North Road, Shangmugu Community, Pinghu Street, Longgang District, Shenzhen, Guangdong

2.2 Test Facility

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

CNAS (No. CNAS L8169)
Shenzhen Global Test Service Co., Ltd. has been assessed and proved to be in compliance with CNAS-CL01 Accreditation Criteria for Testing and Calibration Laboratories (identical to ISO/IEC 17025: 2019 General Requirements) for the Competence of Testing and Calibration Laboratories.
A2LA (Certificate No. 4758.01)
Shenzhen Global Test Service Co., Ltd. has been assessed by the American Association for Laboratory Accreditation (A2LA). Certificate No. 4758.01.
Industry Canada Registration Number. is 24189.
FCC Designation Number is CN1234.
FCC Registered Test Site Number is165725.

2.3 Environmental conditions

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

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

2.4 Statement of the measurement uncertainty

Measurement Uncertainty		
Radiated emission expanded uncertainty(9kHz-30MHz)	=	3.08dB, k=2
Radiated emission expanded uncertainty(30MHz-1000MHz)	=	4.42dB, k=2
Radiated emission expanded uncertainty(Above 1GHz)	=	4.06dB, k=2

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

2.5 Equipments Used during the Test

Description	Brand	Model No.	Serial no.	Calibrated Date	Calibrated Until
Exposure Level Tester	NARDA	ELT-400	N-0713	Apr. 02, 2021	Apr. 01, 2022
B-Field Probe	NARDA	ELT-400	M-1154	Apr. 10, 2021	Apr. 09, 2022

NOTE: 1. The calibration interval of the above test instruments is 12 months .

3. METHOD OF MEASUREMENT

3.1 Applicable Standard

According to §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.
According to §1.1310 and §2.1091 RF exposure is calculated.
ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.
FCC KDB publication 680106 D01 RF Exposure Wireless Charging Apps v03: RF Exposure Considerations for Low Power Consumer Wireless Power Transfer Applications

3.2 Requirement

Per KDB 680106 D01 Section 3. RF Exposure Requirements;
1. Consumer wireless power transfer devices approved under Part 18 in some cases have to demonstrate compliance with RF exposure requirements. The potential for exposure must be assessed according to the operating configurations of the wireless system and the exposure conditions of users and bystanders. RF exposure must be evaluated with the client device(s) being charged by the primary at maximum output power. The RF exposure requirements must be determined in conjunction with the device operating characteristics, according to the mobile and portable exposure requirements in Section 2.1091 and Section 2.1093 of the rules. SAR and MPE limits do not cover the frequency range for wireless power transfer applications which operate below 100 kHz and 300 kHz respectively; therefore, RF exposure compliance needs to be determined with respect to 1.1307 (c) and (d) of the FCC rules.

2. Based on the design and implementation of the power transfer application, it must be clearly identified if mobile or portable RF exposure conditions apply. Devices that are installed to provide separation of at least 20 cm from users and bystanders may qualify for mobile exposure conditions. For some conditions where users and bystanders may be exposed at closer than 20 cm, section 2.1091(d) (4) of the rules may apply.

3. For devices designed for typical desktop applications, such a wireless charging pads, RF exposure evaluation should be conducted assuming a user separation distance of 15 cm. E and H field strength measurements or numerical modeling may be used to demonstrate compliance. Measurements should be made from all sides and the top of the primary/client pair, with the 15 cm measured from the center of the probe(s) to the edge of the device. Emissions between 100 kHz to 300 kHz should be assessed versus the limits at 300 kHz in Table 1 of Section 1.1310: 614 V/m and 1.63 A/m. A KDB inquiry is required to determine the applicable exposure limits below 100 kHz.

4. Portable exposure conditions from 100 kHz to 6 GHz are determined with respect to SAR requirements. Existing SAR systems and test procedures are generally intended for measurements above 100 MHz. While numerical modeling can be an alternative, the constraints of substantial computational resources at low frequencies could introduce further limitations. Under these circumstances, including operations below 100 kHz, the Commission may consider a combination of analytical analysis, field strength, radiated and conducted power measurements, in conjunction with some limited numerical modeling to assess compliance.

5. Depending on the operating frequency, existing SAR and MPE measurement procedures may be adapted to evaluate wireless power transfer devices for compliance with respect to mobile or portable exposure conditions. If the grantee or its test lab have any questions regarding RF exposure evaluation they should contact the FCC Laboratory with sufficient system operating configuration details to determine if RF exposure evaluation is necessary and, if required, how to apply specific test procedures. Below 100 MHz, when SAR testing is required and the device is operating at close proximity to persons, information on device design, implementation, operating configurations, exposure conditions of users and bystanders are needed to determine the evaluation and testing requirements. In addition, the influence of nearby objects may also need consideration according to the wireless power transfer system implementation; for example, the effects of placing the device, its coils or radiating elements on or near metallic surfaces

6. According to April 2018 TCB Workshop, No need to report E-field measurements. Only H-field required.

7. According to April 2018 TCB Workshop,for inductive applications where the primary does not physically attach(clip,lock on) to the client, and it is intended for desktop use, the desktop guidance in KDB 680106 D01 may be applied.

3.3 Limit

Limits for Maximum Permissible Exposure (MPE)/Controlled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	6
3.0 – 30	1842/f	4.89/f	($900/f^2$)*	6
30 – 300	61.4	0.163	1.0	6
300 – 1500	/	/	f/300	6
1500 – 100,000	/	/	5	6

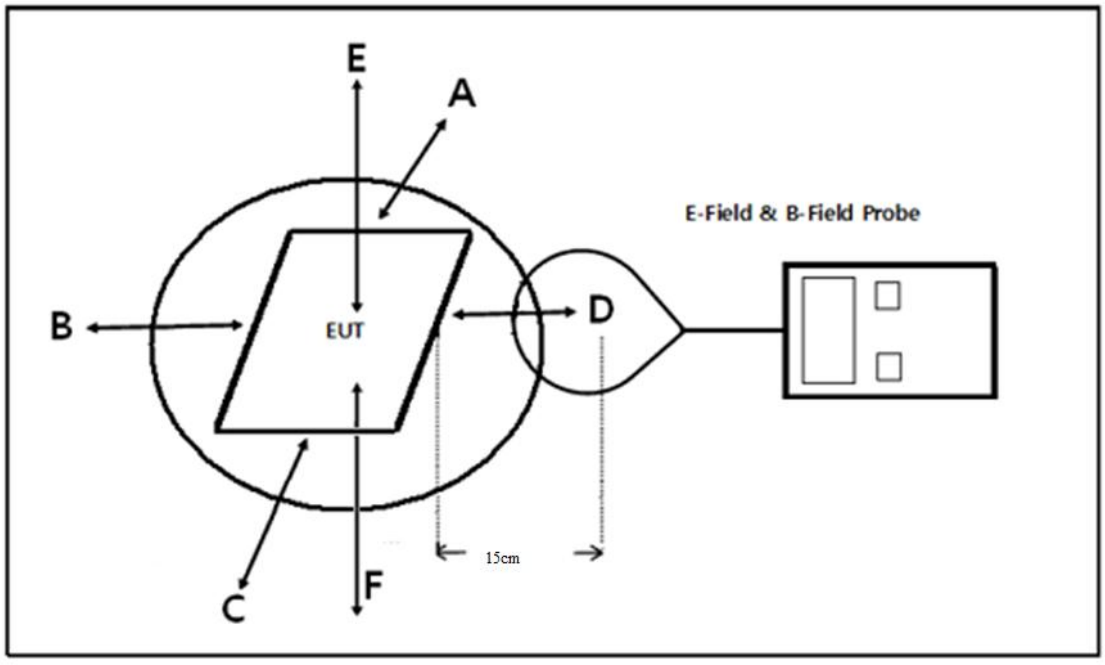
Limits for Maximum Permissible Exposure (MPE)/Uncontrolled Exposure

Frequency Range(MHz)	Electric Field Strength(V/m)	Magnetic Field Strength(A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for Occupational/Controlled Exposure				
0.3 – 3.0	614	1.63	(100) *	30
3.0 – 30	824/f	2.19/f	($180/f^2$)*	30
30 – 300	27.5	0.073	0.2	30
300 – 1500	/	/	f/1500	30
1500 – 100,000	/	/	1.0	30

F=frequency in MHz
*=Plane-wave equivalent power density
According to FCC KDB 680106 D01 Section 3. RF Exposure Requirements clause 3 the Emission-Limits in the frequency range from 100 KHz to 300 KHz should be assessed versus the limits at 300 KHz in Table 1 of CFR 47 – Section1.310 as following (measured distance shall be 0cm from the edge of the probe to the edge of the device):

	E-Field	*/*	B-Field
Frequency	V/m	A/m	uT
0.3 MHz – 3.0 MHz	614	1.613	2.0
3.0 MHz – 30 MHz	824/f (=27.530MHz)	2.19/f (=0.07330MHz)	--

3.4 Test Setup Diagram



For mobile RF exposure condition, due to installation limitations no tests from the underside of the charging device are required.

3.5 Measurement Procedure

a) The RF exposure test was performed on 360 degree turn table in anechoic chamber.
b) The measurement probe was placed at test distance (15cm and 20cm) which is between the edges of the charger and the geometric center of probe.
The measurement probe was placed at test distance (15cm) which is between the edge of the charger and the edge of probe.
c) The turn table was rotated 360d degree to search of highest strength.
d) The highest emission level was recorded and compared with limit as soon as measurement of each points (A, B, C, D, E) were completed.
e) The EUT were measured according to the dictates of KDB 680106D01v03.

3.6 Equipment Approval Considerations

The EUT does comply with item 5.2 of KDB 680106 D01v03 as follows table;

Requirements of KDB 680106 D01	Yes / No	Description
Power transfer frequency is less than 1 MHz	Yes	The device operate in the frequency range 115.0 KHz - 205 KHz
Output power from each primary coil is less than or equal to 15 watts.	Yes	The maximum output power of the primary coil is 15W
The transfer system includes only single primary and secondary coils. This includes charging systems that may have multiple primary coils and clients that are able to detect and allow coupling only between individual pairs of coils.	Yes	The transfer system includes one primary coils.
Client device is placed directly in contact with the transmitter.	Yes	Client device is placed directly in contact with the transmitter.
Mobile exposure conditions only (portable exposure conditions are not covered by this exclusion).	Yes	Mobile exposure conditions only
The aggregate H-field strengths at 0 cm and 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.	Yes	The EUT H-field strengths at 15 cm surrounding the device and 20 cm above the top surface from all simultaneous transmitting coils are demonstrated to be less than 50% of the MPE limit.

In all other cases, unless excluded above, an RF exposure evaluation report must be reviewed and accepted through a KDB or PBA inquiry to enable authorization of the equipment. When evaluation is required to show compliance; for example, using field strength, power density, SAR measurements or computational modeling etc., the specific authorization requirements will be determined based on the results of the RF exposure evaluation.

3.7 Symbols

For the purpose of the present document, the following symbols apply;
B: Magnetic flux
E: Filed strength
H: Magnetic field strength
EAVG = Spatial average of Filed strength
HAVG = Spatial average of Magnetic field strength
B1: Magnetic flux of wireless charge port 1 (Wireless load)
E1: Filed Strength of wireless charge port 1 (Wireless load)
H1: Magnetic field strength of wireless charge port 1 (Wireless load)

3.8 Test Results

The three charge ports are same for rated power, tested at charge together and measure each five points;
Test mode: Normal Operation (Charging mode)

B-filed Strength at 15 cm from the edges surrounding the EUT and 15 cm above the top surface

Charge Port	Charging Battery Level	Frequency Range (MHz)	Measured B-filed Strength Values (uT)					FCC B-Field Strength 50% Limits (uT)	FCC B-Field Strength Limits (uT)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E		
B1	1%	0.1255	0.040	0.053	0.054	0.054	0.044	-	-
	50%	0.1255	0.049	0.054	0.054	0.051	0.037	-	-
	99%	0.1255	0.035	0.055	0.045	0.046	0.046	-	-

E-Filed Strength at 15 cm from the edges surrounding the EUT and 15 cm above the top surface

Charge Port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (V/m)					FCC E-Field Strength 50% Limits (V/m)	FCC E-Field Strength Limits (V/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E		
E1	1%	0.1255	11.921	15.885	16.271	16.094	13.193	307.0	614.0
	50%	0.1255	14.699	16.233	16.350	15.337	11.271	307.0	614.0
	99%	0.1255	10.535	16.455	13.486	13.852	13.870	307.0	614.0

H-Filed Strength at 15 cm from the edges surrounding the EUT and 15 cm above the top surface

Charge Port	Charging Battery Level	Frequency Range (MHz)	Measured H-Field Strength Values (A/m)					FCC H-Field Strength 50% Limits (A/m)	FCC H-Field Strength Limits (A/m)
			Test Position A	Test Position B	Test Position C	Test Position D	Test Position E		
H1	1%	0.1255	0.032	0.042	0.043	0.043	0.035	0.815	1.63
	50%	0.1255	0.039	0.043	0.044	0.041	0.030	0.815	1.63
	99%	0.1255	0.028	0.044	0.036	0.037	0.037	0.815	1.63

B-filed Strength at 20cm from the top surface of the EUT

Charge Port	Charging Battery Level	Frequency Range (MHz)	Measured B-filed Strength Values (uT)	FCC B-Field Strength 50% Limits (uT)	FCC B-Field Strength Limits (uT)
			Test Position E		
B1	1%	0.1255	0.053	-	-
	50%	0.1255	0.045	-	-
	99%	0.1255	0.052	-	-

E-Field Strength at 20cm from the top surface of the EUT

Charge Port	Charging Battery Level	Frequency Range (MHz)	Measured E-Field Strength Values (V/m)	FCC E-Field Strength 50% Limits (V/m)	FCC E-Field Strength Limits (V/m)
			Test Position E		
E1	1%	0.1255	16.067	307.0	614.0
	50%	0.1255	13.849	307.0	614.0
	99%	0.1255	15.657	307.0	614.0

H-Field Strength at 20cm from the top surface of the EUT

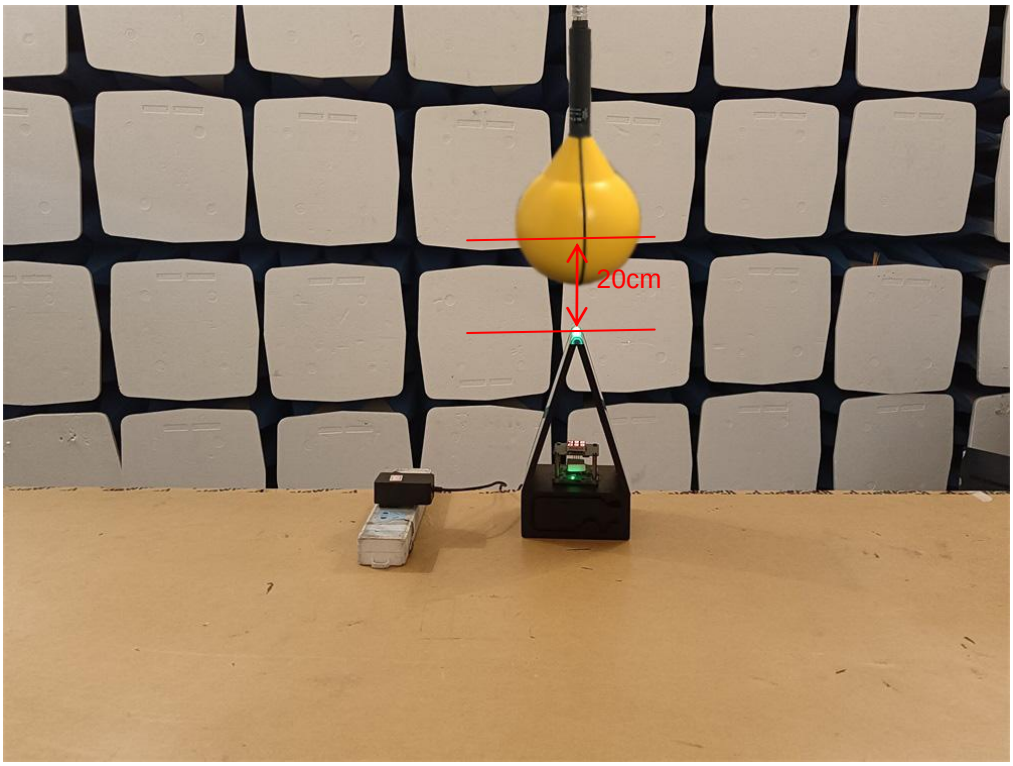
Charge Port	Charging Battery Level	Frequency Range (MHz)	Measured H-Field Strength Values (A/m)	FCC H-Field Strength 50% Limits (A/m)	FCC H-Field Strength Limits (A/m)
			Test Position E		
H1	1%	0.1255	0.043	0.815	1.63
	50%	0.1255	0.036	0.815	1.63
	99%	0.1255	0.042	0.815	1.63

Note:

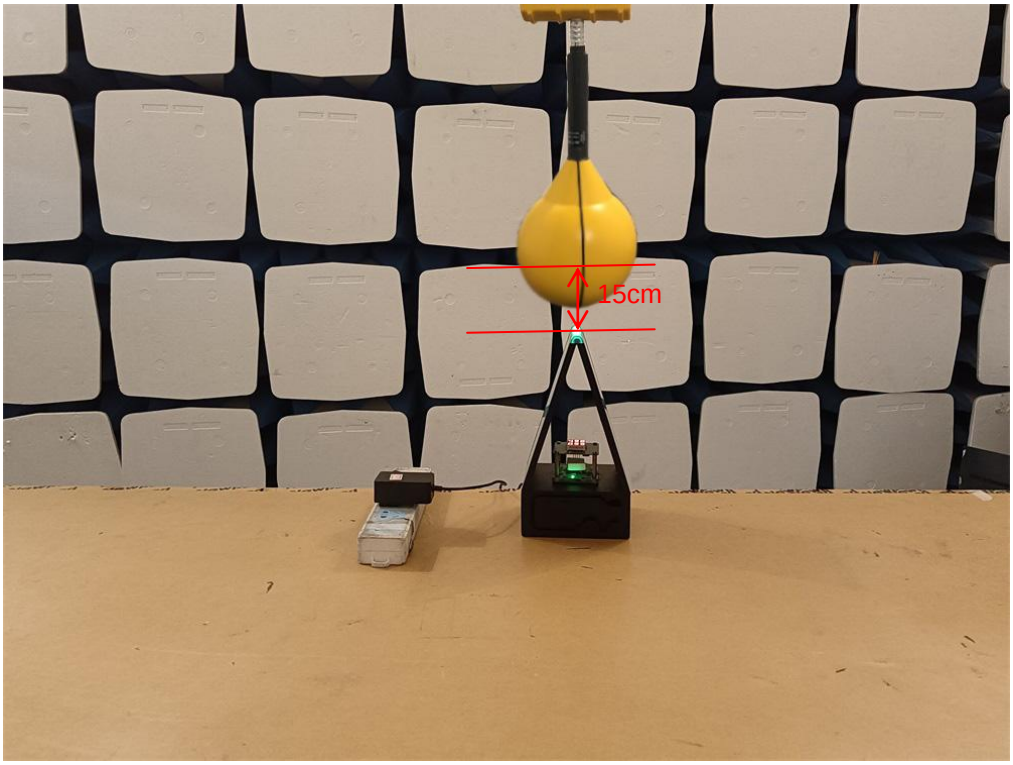
$V/m=10^{(((dBuV/m)-120)/20}=10^{((((dBuA/m+51.5)-120)/20}=10^{((((20lg(A/m*10^6)+51.5)-120)/20}$

A/m= uT/1.25

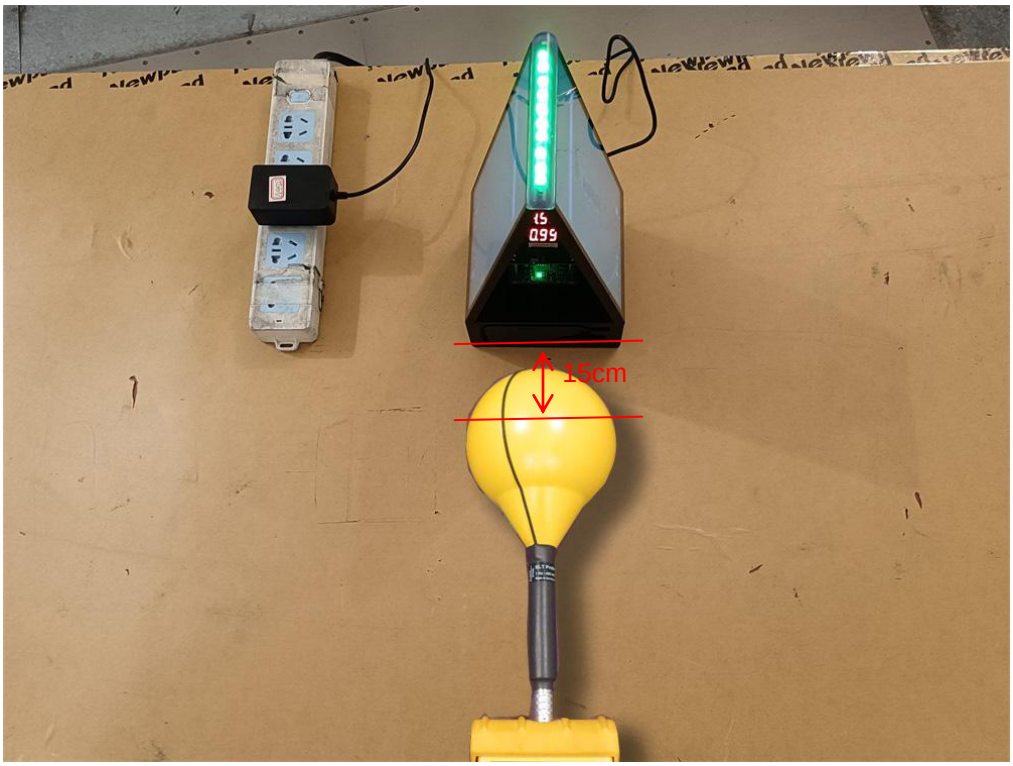
4. Test Setup Photos of the EUT



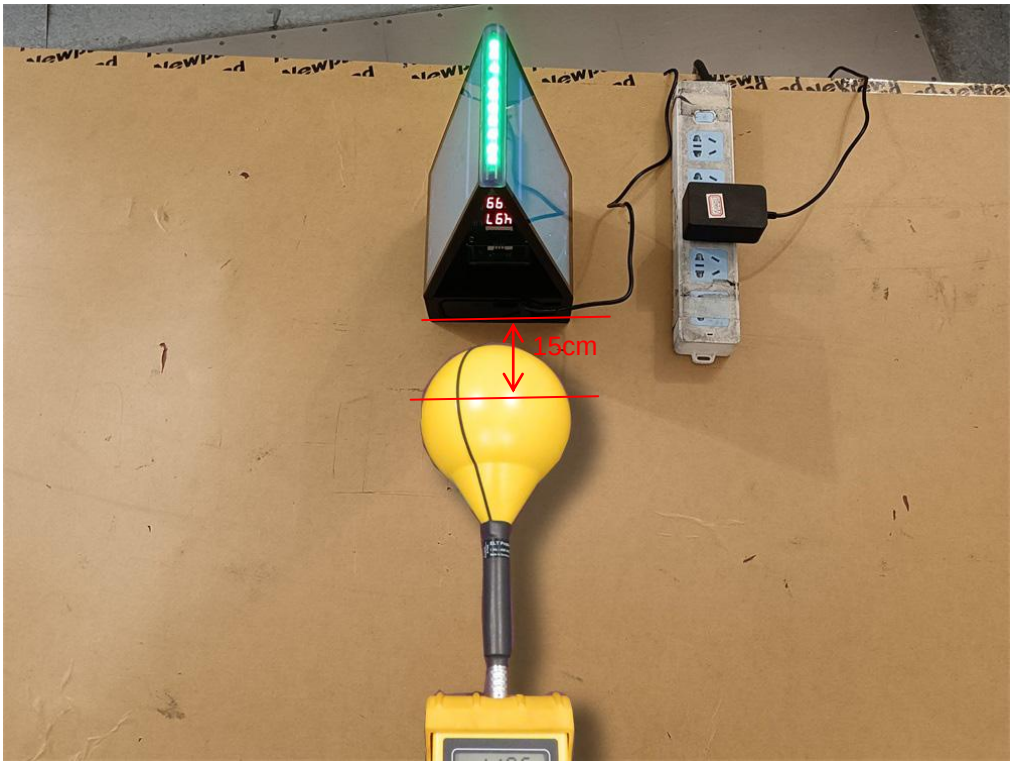
Test Position E - Exposure photo from top surface (20cm)



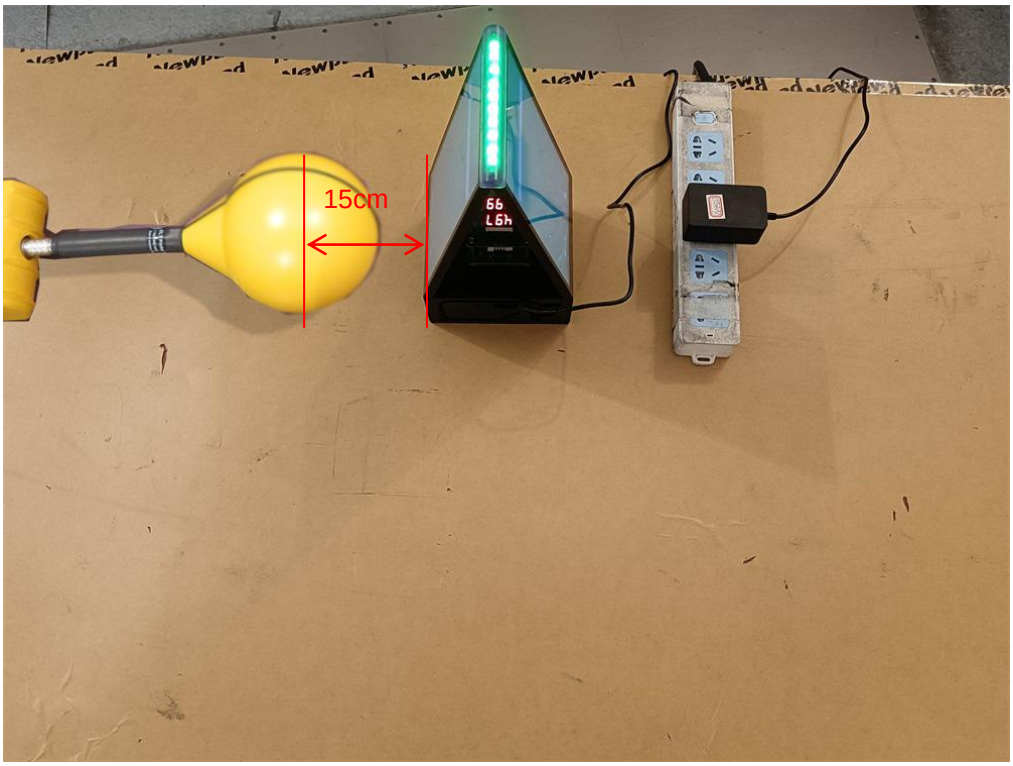
Test Position E - Exposure photo from top surface (15cm)



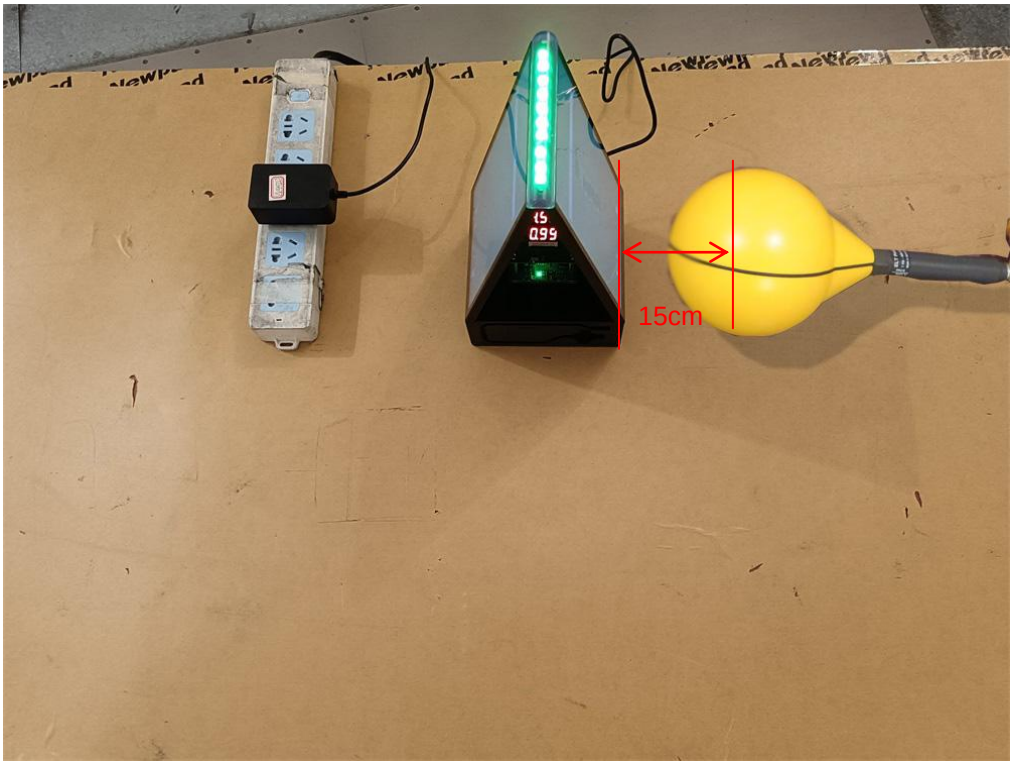
Test Position B - Exposure photo from side edge surface-Left(15cm)



Test Position D - Exposure photo from side edge surface-Right(15cm)



Test Position C - Exposure photo from side edge surface-Front(15cm)



Test Position A - Exposure photo from side edge surface-Rear(15cm)

5. Conclusion

A minimum safety distance of at 15 cm surrounding the device and 20 cm above the top surface of the device is required when the device is charging a smart phone. The detected emissions with a distance of 15 cm surrounding the device and 20 cm above the top surface of the device are below the limitations according to FCC KDB 680106 D01 Section 3. RF Exposure Requirement Clause 3.

.....End of Report.....