

# TEST REPORT

**Applicant:** XIAMEN COMFORT SCIENCE & TECHNOLOGY GROUP CO., LTD

**Address of Applicant:** (5/F) NO.168, QIANPU ROAD SIMING DISTRICT, XIAMEN, China

**Manufacturer:** Xiamen Healthcare Electronic Co., Ltd.

**Address of Manufacturer:** 65-66#, 62-63#Building, Siming Zone, Tongan Industrial District, Xiamen City, Fujian Province, P.R. China

**Equipment Under Test (EUT)**

Product Name: Massage Chair with Shoulder Massaging

Model No.: OP-Xrest 4D, EI-8701C

FCC ID: YMX-EI8701C

Applicable standards: FCC CFR Title 47 Part 15 Subpart C

Date of sample receipt: August 15, 2022

Date of Test: August 16-29, 2022

Date of report issued: August 29, 2022

Test Result : PASS \*

\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:



**Robinson Luo**  
**Laboratory Manager**

This results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.

## 2 Version

Version No.	Date	Description
00	August 29, 2022	Original

**Prepared By:** Tiger Chen **Date:** August 29, 2022  
**Project Engineer**

**Check By:** Robinson Lee **Date:** August 29, 2022  
**Reviewer**

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## 4 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Pass
AC Power Line Conducted Emission	15.207	Pass
Radiated Emission	15.209	Pass
20dB Bandwidth	15.215	Pass

*Pass: The EUT complies with the essential requirements in the standard.*

### 4.1 Measurement Uncertainty

Test Item	Frequency Range	Measurement Uncertainty	Notes
Radiated Emission	30MHz-200MHz	3.8039dB	(1)
Radiated Emission	200MHz-1GHz	3.9679dB	(1)
AC Power Line Conducted Emission	0.15MHz ~ 30MHz	3.44dB	(1)

Note (1): The measurement uncertainty is for coverage factor of k=2 and a level of confidence of 95%.

## 5 General Information

### 5.1 General Description of EUT

Product Name:	Massage Chair with Shoulder Massaging
Model No.:	OP-Xrest 4D, EI-8701C
Test Model No:	OP-Xrest 4D
Remark: All above models are identical in the same PCB layout, interior structure and electrical circuits. The only difference is model name for commercial purpose.	
Serial No.:	ESPLEI8701C001
Hardware Version:	V1.1
Software Version:	V1.0
Test sample(s) ID:	GTS202208000157-1
Sample(s) Status	Engineer sample
Operation Frequency:	110kHz~205kHz
Modulation type:	FSK
Antenna Type:	A11
Antenna gain:	-1.39dBi (Max)
Rated output power	Output: 10W max

## 5.2 Test mode

Wireless charging mode	Keep the EUT in wireless charging status. Wireless output 10W mode is worse case and reported.
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## 5.3 Description of Support Units

Manufacturer	Description	Model	S/N
YBZ	Intelligent wireless charging full function test module	001	N/A

## 5.4 Deviation from Standards

None.
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## 5.5 Abnormalities from Standard Conditions

None.
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## 5.6 Test Facility

<p>The test facility is recognized, certified, or accredited by the following organizations:</p> <ul style="list-style-type: none"> <li>● <b>FCC—Registration No.: 381383</b> Designation Number: CN5029 Global United Technology Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in files.</li> <li>● <b>IC —Registration No.: 9079A</b> CAB identifier: CN0091 The 3m Semi-anechoic chamber of Global United Technology Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing</li> <li>● <b>NVLAP (LAB CODE:600179-0)</b> Global United Technology Services Co., Ltd., is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).</li> </ul>
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## 5.7 Test Location

All tests were performed at:
<p>Global United Technology Services Co., Ltd. No. 123-128, Tower A, Jinyuan Business Building, No.2, Laodong Industrial Zone, Xixiang Road, Baoan District, Shenzhen, Guangdong, China 518102 Tel: 0755-27798480 Fax: 0755-27798960</p>

## 5.8 Other Information Requested by the Customer

None.
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## 6 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS250	July 02, 2020	July 01, 2025
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS251	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	April 22, 2022	April 21, 2023
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9168	GTS640	March 21, 2022	March 20, 2023
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D	GTS208	June 12, 2022	June 11, 2023
6	Horn Antenna	ETS-LINDGREN	3160	GTS217	June 23, 2022	June 22, 2023
7	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
8	Coaxial Cable	GTS	N/A	GTS213	April 22, 2022	April 21, 2023
9	Coaxial Cable	GTS	N/A	GTS211	April 22, 2022	April 21, 2023
10	Coaxial cable	GTS	N/A	GTS210	April 22, 2022	April 21, 2023
11	Coaxial Cable	GTS	N/A	GTS212	April 22, 2022	April 21, 2023
12	Amplifier(100kHz-3GHz)	HP	8347A	GTS204	April 22, 2022	April 21, 2023
13	Amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	GTS218	June 23, 2022	June 22, 2023
14	Band filter	Amindeon	82346	GTS219	June 23, 2022	June 22, 2023
15	Power Meter	Anritsu	ML2495A	GTS540	June 23, 2022	June 22, 2023
16	Power Sensor	Anritsu	MA2411B	GTS541	June 23, 2022	June 22, 2023
17	Wideband Radio Communication Tester	Rohde & Schwarz	CMW500	GTS575	April 22, 2022	April 21, 2023
18	Splitter	Agilent	11636B	GTS237	June 23, 2022	June 22, 2023
19	Loop Antenna	ZHINAN	ZN30900A	GTS534	Nov. 30, 2021	Nov. 29, 2022
20	Broadband Preamplifier	SCHWARZBECK	BBV9718	GTS535	April 22, 2022	April 21, 2023
21	Breitband hornantenna	SCHWARZBECK	BBHA 9170	GTS579	Oct. 17, 2021	Oct. 16, 2022
22	Amplifier	TDK	PA-02-02	GTS574	Oct. 17, 2021	Oct. 16, 2022
23	Amplifier	TDK	PA-02-03	GTS576	Oct. 17, 2021	Oct. 16, 2022
24	PSA Series Spectrum Analyzer	Rohde & Schwarz	FSP	GTS578	June 23, 2022	June 22, 2023
25	Amplifier(1GHz-26.5GHz)	HP	8449B	GTS601	April 22, 2022	April 21, 2023

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Shielding Room	ZhongYu Electron	7.3(L)x3.1(W)x2.9(H)	GTS252	May 14, 2022	May 13, 2025
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 24, 2022	April 23, 2023
3	Coaxial Switch	ANRITSU CORP	MP59B	GTS225	June 23, 2022	June 22, 2023
4	ENV216 2-L-V-NETZNACHB.DE	ROHDE&SCHWARZ	ENV216	GTS226	April 22, 2022	April 21, 2023
5	Coaxial Cable	GTS	N/A	GTS227	N/A	N/A
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Thermo meter	JINCHUANG	GSP-8A	GTS639	April 28, 2022	April 27, 2023
8	Absorbing clamp	Elektronik-Feinmechanik	MDS21	GTS229	April 15, 2022	April 14, 2023
9	ISN	SCHWARZBECK	NTFM 8158	GTS565	April 22, 2022	April 21, 2023
10	High voltage probe	SCHWARZBECK	TK9420	GTS537	April 22, 2022	April 21, 2023

RF Conducted Test:						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	MXA Signal Analyzer	Agilent	N9020A	GTS566	April 22, 2022	April 21, 2023
2	EMI Test Receiver	R&S	ESCI 7	GTS552	April 22, 2022	April 21, 2023
3	Spectrum Analyzer	Agilent	E4440A	GTS536	April 22, 2022	April 21, 2023
4	MXG vector Signal Generator	Agilent	N5182A	GTS567	April 22, 2022	April 21, 2023
5	ESG Analog Signal Generator	Agilent	E4428C	GTS568	April 22, 2022	April 21, 2023
6	USB RF Power Sensor	DARE	RPR3006W	GTS569	April 22, 2022	April 21, 2023
7	RF Switch Box	Shongyi	RFSW3003328	GTS571	April 22, 2022	April 21, 2023
8	Programmable Constant Temp & Humi Test Chamber	WEWON	WHTH-150L-40-880	GTS572	April 22, 2022	April 21, 2023

General used equipment:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (mm-dd-yy)	Cal.Due date (mm-dd-yy)
1	Humidity/ Temperature Indicator	KTJ	TA328	GTS243	April 25, 2022	April 24, 2023
2	Barometer	KUMAO	SF132	GTS647	July 26, 2022	July 25, 2023



## 7 Test results and Measurement Data

### 7.1 Antenna requirement:

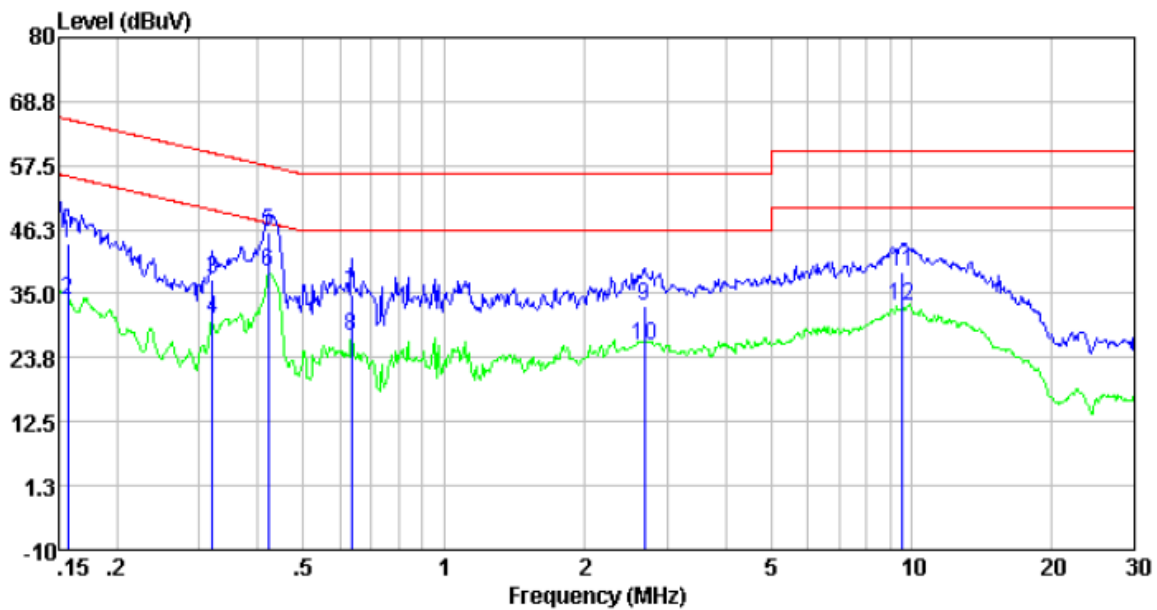
<b>Standard requirement:</b>	FCC Part15 C Section 15.203
<b>15.203 requirement:</b> An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.	
<b>EUT Antenna:</b>	
The ant is A11 antenna, reference to the appendix II for details.	

## 7.2 Conducted Emissions

Test Requirement:	FCC Part15 C Section 15.207					
Test Method:	ANSI C63.10					
Test Frequency Range:	150KHz to 30MHz					
Class / Severity:	Class B					
Receiver setup:	RBW=9KHz, VBW=30KHz, Sweep time=auto					
Limit:	Frequency range (MHz)		Limit (dBuV)			
			Quasi-peak		Average	
	0.15-0.5		66 to 56*		56 to 46*	
	0.5-5		56		46	
	5-30		60		50	
* Decreases with the logarithm of the frequency.						
Test setup:	<p>Remark  E.U.T: Equipment Under Test  LISN: Line Impedance Stabilization Network</p>					
Test procedure:	<ol style="list-style-type: none"> <li>1. The E.U.T and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment.</li> <li>2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs).</li> <li>3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10 on conducted measurement.</li> </ol>					
Test Instruments:	Refer to section 6.0 for details					
Test mode:	Refer to section 5.2 for details. Only show the worst cas (Charging with 5W wireless charging load).					
Test environment:	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Test voltage:	AC 120V, 60Hz					
Test results:	Pass					

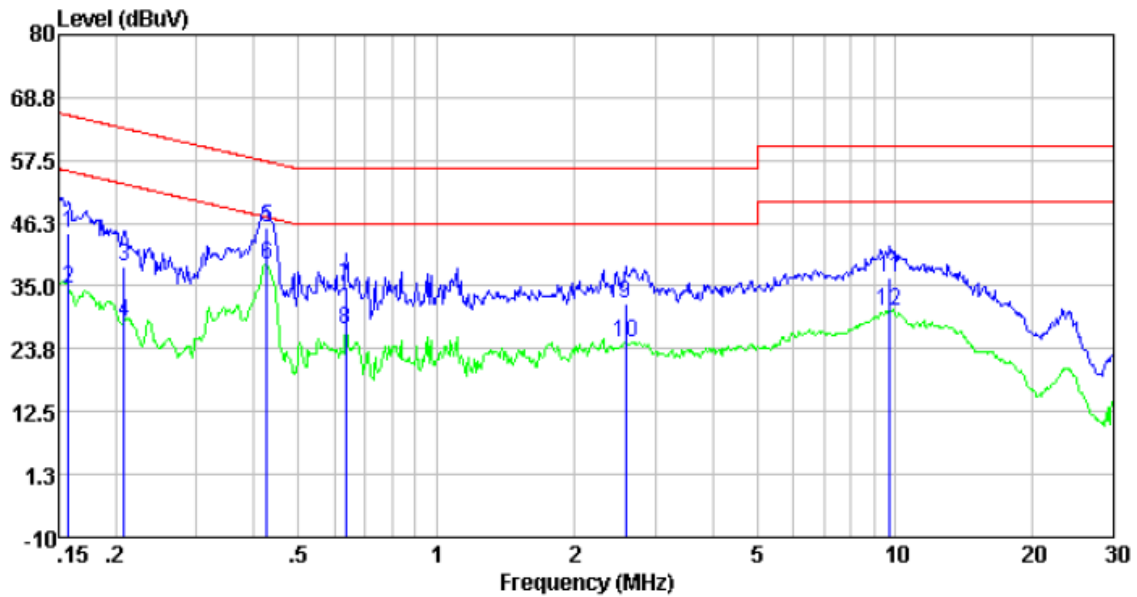
Measurement data:

Line:



Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.16	33.46	10.40	0.01	43.87	65.65	-21.78	QP
0.16	23.52	10.40	0.01	33.93	55.65	-21.72	Average
0.32	27.25	10.39	0.01	37.65	59.71	-22.06	QP
0.32	20.12	10.39	0.01	30.52	49.71	-19.19	Average
0.42	35.61	10.34	0.01	45.96	57.42	-11.46	QP
0.42	28.51	10.34	0.01	38.86	47.42	-8.56	Average
0.63	24.69	10.28	0.02	34.99	56.00	-21.01	QP
0.63	17.22	10.28	0.02	27.52	46.00	-18.48	Average
2.68	22.66	10.20	0.05	32.91	56.00	-23.09	QP
2.68	15.77	10.20	0.05	26.02	46.00	-19.98	Average
9.55	28.56	10.20	0.11	38.87	60.00	-21.13	QP
9.55	22.52	10.20	0.11	32.83	50.00	-17.17	Average

**Neutral:**



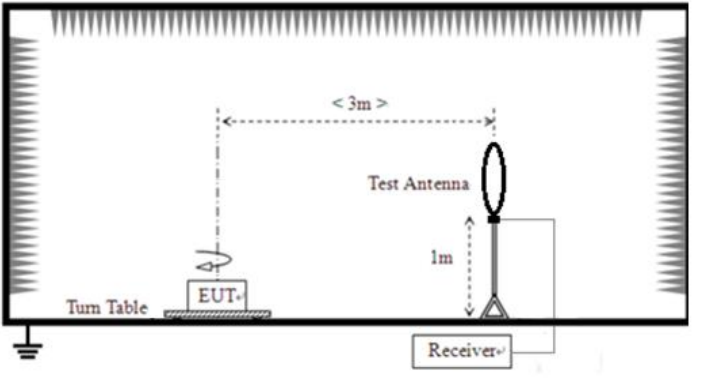
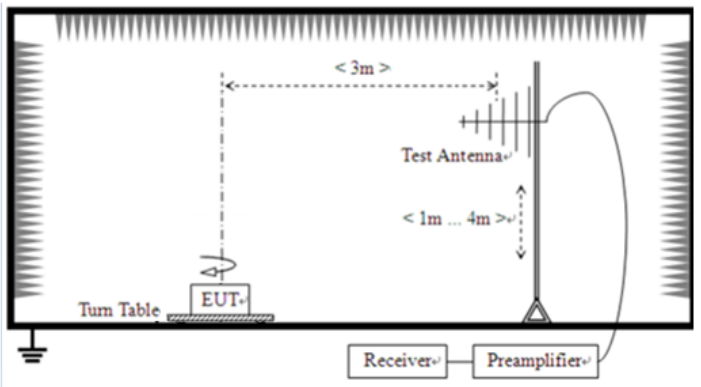
Freq	Reading level	LISN/ISN factor	Cable loss	Level	Limit level	Over limit	Remark
MHz	dBuV	dB	dB	dBuV	dBuV	dB	
0.16	33.90	10.40	0.01	44.31	65.60	-21.29	QP
0.16	24.22	10.40	0.01	34.63	55.60	-20.97	Average
0.21	28.07	10.40	0.01	38.48	63.27	-24.79	QP
0.21	18.14	10.40	0.01	28.55	53.27	-24.72	Average
0.43	34.96	10.34	0.01	45.31	57.33	-12.02	QP
0.43	28.41	10.34	0.01	38.76	47.33	-8.57	Average
0.63	24.59	10.28	0.02	34.89	56.00	-21.11	QP
0.63	16.73	10.28	0.02	27.03	46.00	-18.97	Average
2.58	21.47	10.20	0.05	31.72	56.00	-24.28	QP
2.58	14.48	10.20	0.05	24.73	46.00	-21.27	Average
9.76	26.27	10.20	0.11	36.58	60.00	-23.42	QP
9.76	20.13	10.20	0.11	30.44	50.00	-19.56	Average

**Notes:**

1. An initial pre-scan was performed on the line and neutral lines with peak detector.
2. Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.
3. Final Level = Receiver Read level + LISN Factor + Cable Loss
4. If the average limit is met when using a quasi-peak detector receiver, the EUT shall be deemed to meet both limits and measurement with the average detector receiver is unnecessary.

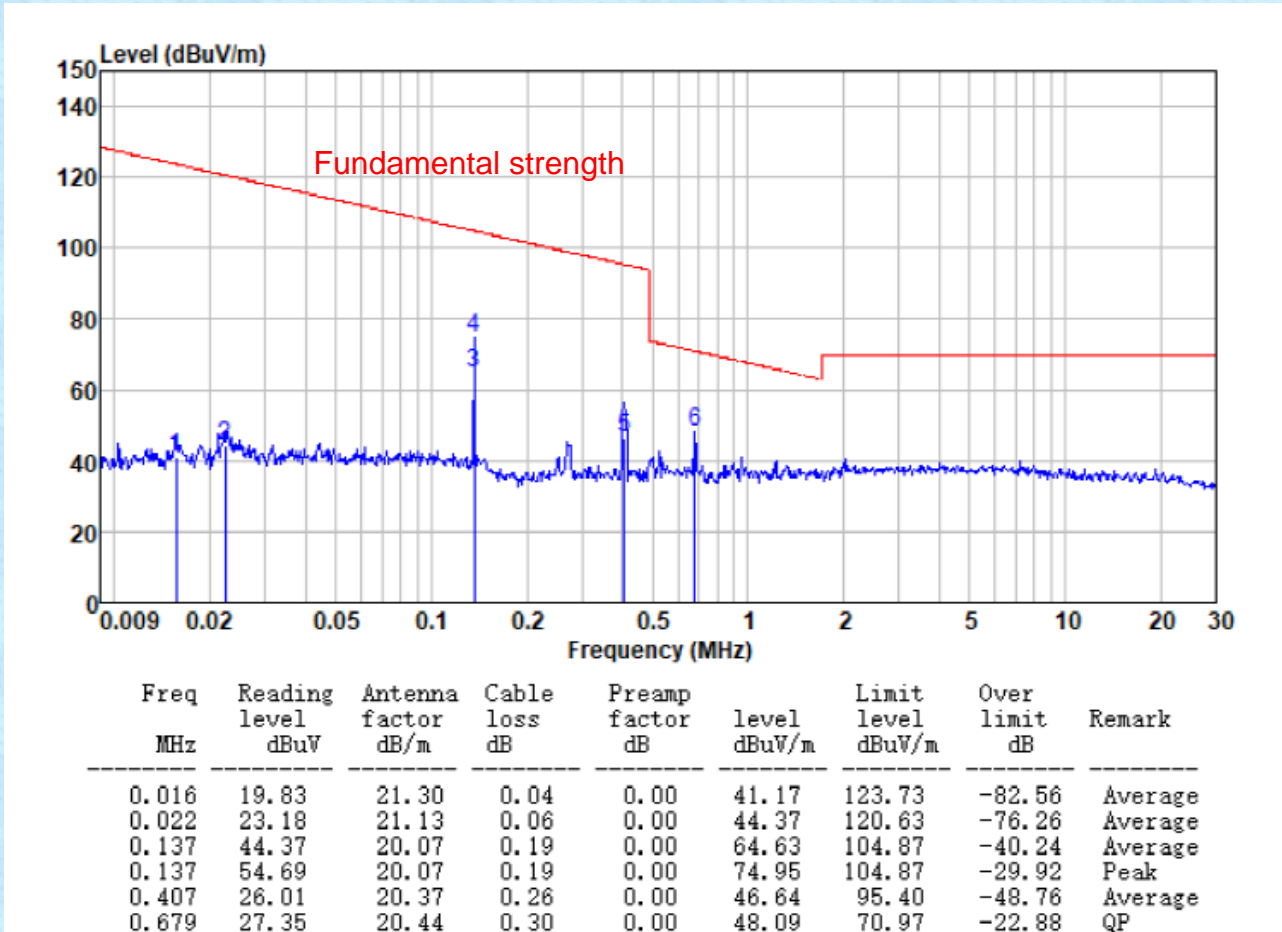
## 7.3 Radiated Emission Method

Test Requirement:	FCC Part15 C Section 15.209				
Test Method:	ANSI C63.10				
Test Frequency Range:	9kHz to 1GHz				
Test site:	Measurement Distance: 3m				
Receiver setup:	Frequency	Detector	RBW	VBW	Remark
	9kHz - 30MHz	Quasi-peak	10kHz	30kHz	Quasi-peak Value
	30MHz-1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		AV	1MHz	10Hz	Average Value
Remark: For the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission test in these three bands are based on measurements employing an average detector.					
Limit: (Spurious Emissions)	<b>Limits for frequency below 30MHz</b>				
	Frequency	Limit (uV/m)	Measurement Distance(m)	Remark	
	0.009-0.490	2400/F(kHz)	300	Quasi-peak Value	
	0.490-1.705	24000/F(kHz)	30	Quasi-peak Value	
	1.705-30	30	30	Quasi-peak Value	
	<b>Limits for frequency Above 30MHz</b>				
	Frequency	Limit (dBuV/m @3m)	Remark		
	30MHz-88MHz	40.00	Quasi-peak Value		
	88MHz-216MHz	43.50	Quasi-peak Value		
	216MHz-960MHz	46.00	Quasi-peak Value		
960MHz-1GHz	54.00	Quasi-peak Value			
Above 1GHz	54.00	Average Value			
	74.00	Peak Value			
Remark: The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.					
Test Procedure:	<ol style="list-style-type: none"> <li>1. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter camber. The table was rotated 360 degrees to determine the position of the highest radiation.</li> <li>2. The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.</li> <li>3. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.</li> <li>4. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rota table was turned from 0 degrees to 360 degrees to find the maximum reading.</li> <li>5. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.</li> <li>6. If the emission level of the EUT in peak mode was 10dB lower than the</li> </ol>				

	<p>limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.</p> <p>7. The radiation measurements are performed in X, Y, Z axis positioning. And found the Y axis positioning which it is worse case, only the test worst case mode is recorded in the report.</p>						
<p>Test setup:</p>	<p>Below 30MHz</p>  <p>30MHz ~ 1000MHz</p> 						
<p>Test Instruments:</p>	<p>Refer to section 6.0 for details</p>						
<p>Test mode:</p>	<p>Refer to section 5.2 for details. Only show the worst cas (Charging with 5W wireless charging load).</p>						
<p>Test environment:</p>	<table border="1"> <tr> <td>Temp.:</td> <td>25 °C</td> <td>Humid.:</td> <td>52%</td> <td>Press.:</td> <td>1012mbar</td> </tr> </table>	Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar
Temp.:	25 °C	Humid.:	52%	Press.:	1012mbar		
<p>Test voltage:</p>	<p>AC 120V, 60Hz</p>						
<p>Test results:</p>	<p>Pass</p>						

**Measurement data:**

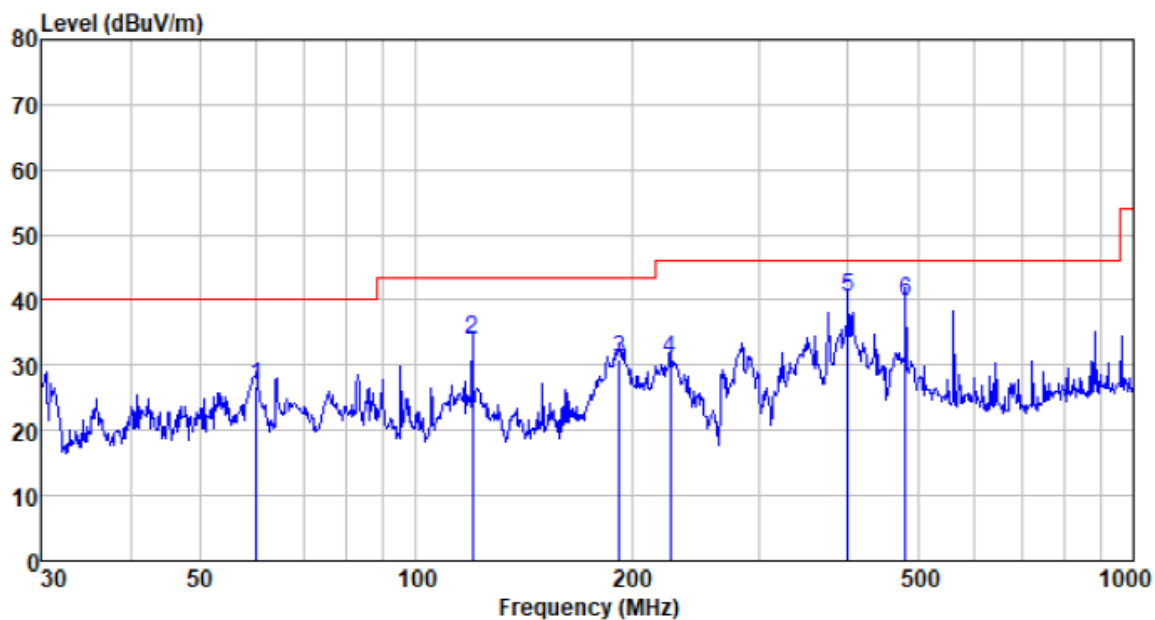
**Below 30MHz**



Note: Coplaner and Coaxial polarity all have been tested , only worse case is reported .

## 30MHz ~ 1GHz

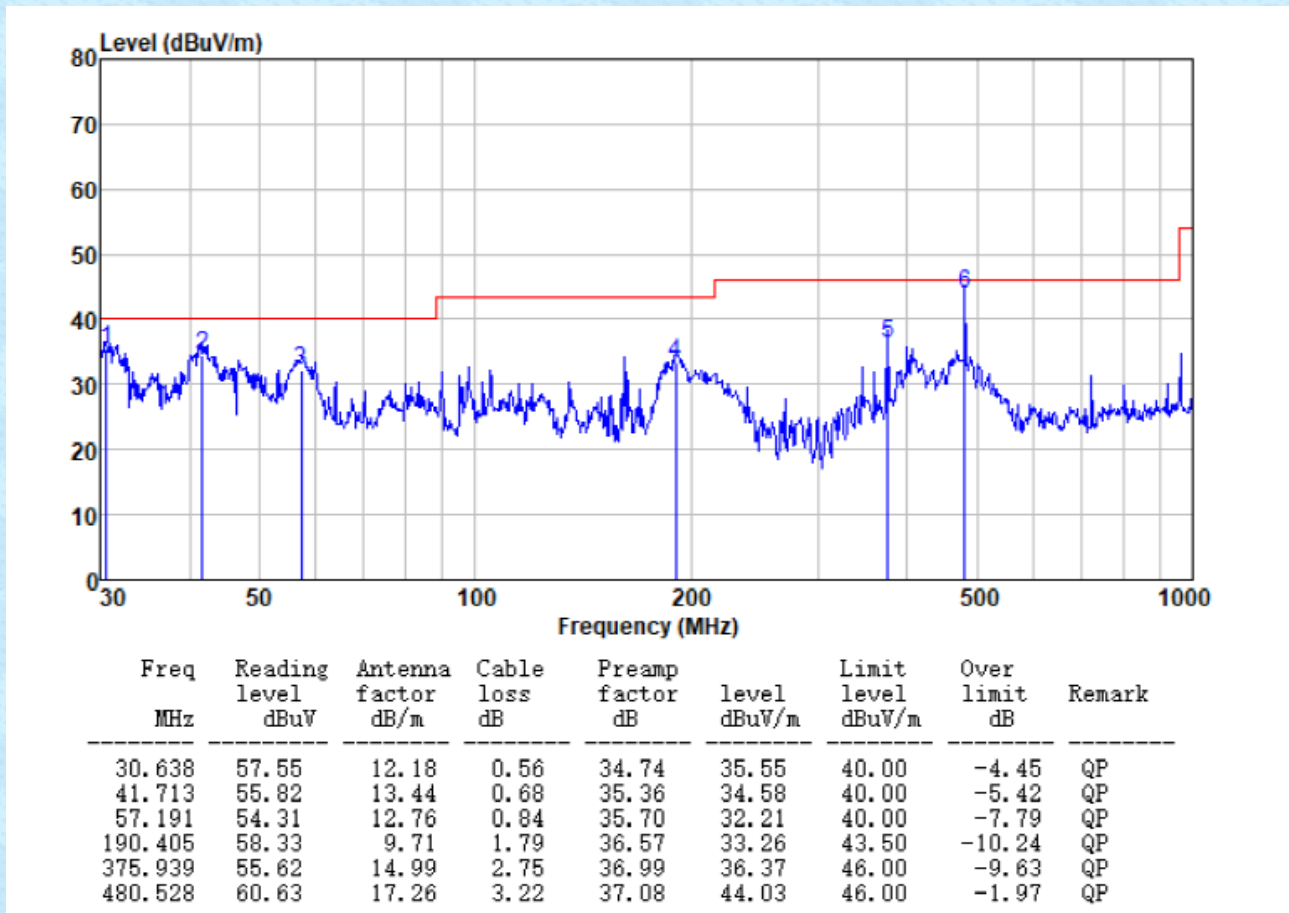
Horizontal



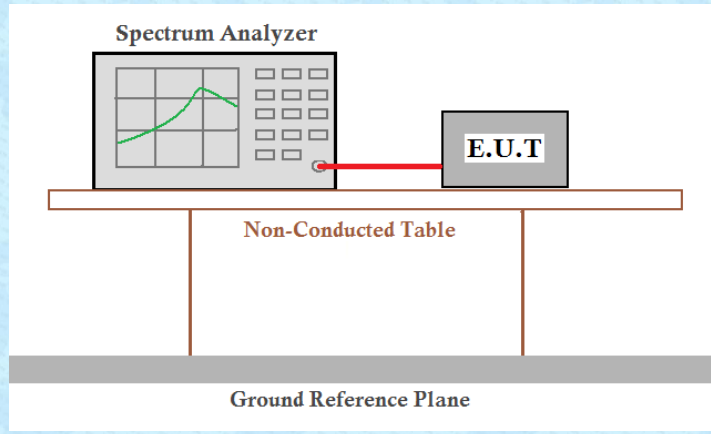
Freq MHz	Reading level dBuV	Antenna factor dB/m	Cable loss dB	Preamp factor dB	level dBuV/m	Limit level dBuV/m	Over limit dB	Remark
59.859	49.04	12.61	0.86	35.73	26.78	40.00	-13.22	QP
119.856	57.69	11.19	1.36	36.23	34.01	43.50	-9.49	QP
191.745	56.11	9.64	1.80	36.57	30.98	43.50	-12.52	QP
226.099	55.11	10.71	1.99	36.69	31.12	46.00	-14.88	QP
400.432	58.82	15.71	2.85	37.01	40.37	46.00	-5.63	QP
480.528	56.38	17.26	3.22	37.08	39.78	46.00	-6.22	QP



Vertical



## 7.4 20dB Occupy Bandwidth

Test Requirement:	FCC Part15 C Section 15.215
Test Method:	ANSI C63.10
Test setup:	
Test Instruments:	Refer to section 6.0 for details
Test mode:	Refer to section 5.2 for details
Test results:	Pass

### Measurement Data

Test frequency(kHz)	20dB bandwidth(kHz)	Result
136.988	0.378	Pass

### Test plot as follows:



## **8 Test Setup Photo**

Reference to the **appendix I** for details.

## **9 EUT Constructional Details**

Reference to the **appendix II** for details.

-----End-----