FCC TEST REPORT

Client Name	:	Rubber Road Ltd
Address	:	Attimore Barn, Ridgeway, Welwyn Garden City, Herts, AL7 2AD (UK)
Product Name	:	Ghostbusters Charging Mat
Date	:	Apr. 28, 2021

Shenzhen Anbotek Compliance Laboratory Limited

Contents

1. General Information....4
1.1. Client Information....4
1.2. Description of Device (EUT)....4
1.3. Auxiliary Equipment Used During Test....5
1.4. Description of Test Modes....5
1.5. Description Of Test Setup....6
1.6. Test Equipment List....7
1.7. Measurement Uncertainty....8
1.8. Description of Test Facility....8
2. Summary of Test Results....9
3. Conducted Emission Test....10
3.1. Test Standard and Limit....10
3.2. Test Setup....10
3.3. Test Procedure....10
3.4. Test Data....10
4. Radiation Spurious Emission and Band Edge....15
4.1. Test Standard and Limit....15
4.2. Test Setup....15
4.3. Test Procedure....16
4.4. Test Data....17
5. Antenna Requirement....22
5.1. Test Standard and Requirement....22
5.2. Antenna Connected Construction....22
APPENDIX I -- TEST SETUP PHOTOGRAPH....23
APPENDIX II -- EXTERNAL PHOTOGRAPH....25
APPENDIX III -- INTERNAL PHOTOGRAPH....29

TEST REPORT

Applicant	:	Rubber Road Ltd
Manufacturer	:	Rubber Road Ltd
Product Name	:	Ghostbusters Charging Mat
Model No.	:	NS2627, NS2762
Trade Mark	:	N/A
Rating(s)	:	Input: 5V⎓2A, 9V⎓2A Output: 5W, 10W

Test Standard(s)	:	**FCC Part15 Subpart C 2019, Paragraph 15.209**
Test Method(s)	:	**ANSI C63.10: 2013**

The device described above is tested by Shenzhen Anbotek Compliance Laboratory Limited to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and Shenzhen Anbotek Compliance Laboratory Limited is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the FCC Part 15 Subpart C requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Shenzhen Anbotek Compliance Laboratory Limited.

Date of Receipt	Mar. 24, 2021
Date of Test	Mar. 24~Apr. 06, 2021
Prepared By	Ella Liang (Engineer / Ella Liang)
Reviewer	Bibo Zhang (Supervisor / Bibo Zhang)
Approved & Authorized Signer	Kingkong Jin (Manager / Kingkong Jin)

1. General Information

1.1. Client Information

Applicant	:	Rubber Road Ltd
Address	:	Attimore Barn, Ridgeway, Welwyn Garden City, Herts, AL7 2AD (UK)
Manufacturer	:	Rubber Road Ltd
Address	:	Attimore Barn, Ridgeway, Welwyn Garden City, Herts, AL7 2AD (UK)
Factory	:	Rubber Road Ltd
Address	:	Attimore Barn, Ridgeway, Welwyn Garden City, Herts, AL7 2AD (UK)

1.2. Description of Device (EUT)

Product Name	:	Ghostbusters Charging Mat	
Model No.	:	NS2627, NS2762 ((Note: All samples are the same except the model number and appearance color, so we prepare "NS2627" for test only.)	
Trade Mark	:	N/A	
Test Power Supply	:	AC 120V, 60Hz for adapter / AC 240V, 60Hz for adapter	
Test Sample No.	:	1-2-1(Normal Sample), 1-2-1(Engineering Sample)	
Product Description	:	Operation Frequency:	110.1-205KHz
		Modulation Type:	FSK
		Antenna Type:	Inductive loop coil Antenna
		Antenna Gain(Peak):	0 dBi
Remark: 1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.			

1.3. Auxiliary Equipment Used During Test

Adapter	:	M/N: A2013 Input: 100-240V-0.7A 50-60Hz Output: 3.6-5.5V⎓3A / 6.5-9V⎓2A / 9-12V⎓1.5A

1.4. Description of Test Modes

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Wireless charging Mode

For Conducted Emission	
Final Test Mode	Description
Mode 1	Wireless Charge Mode

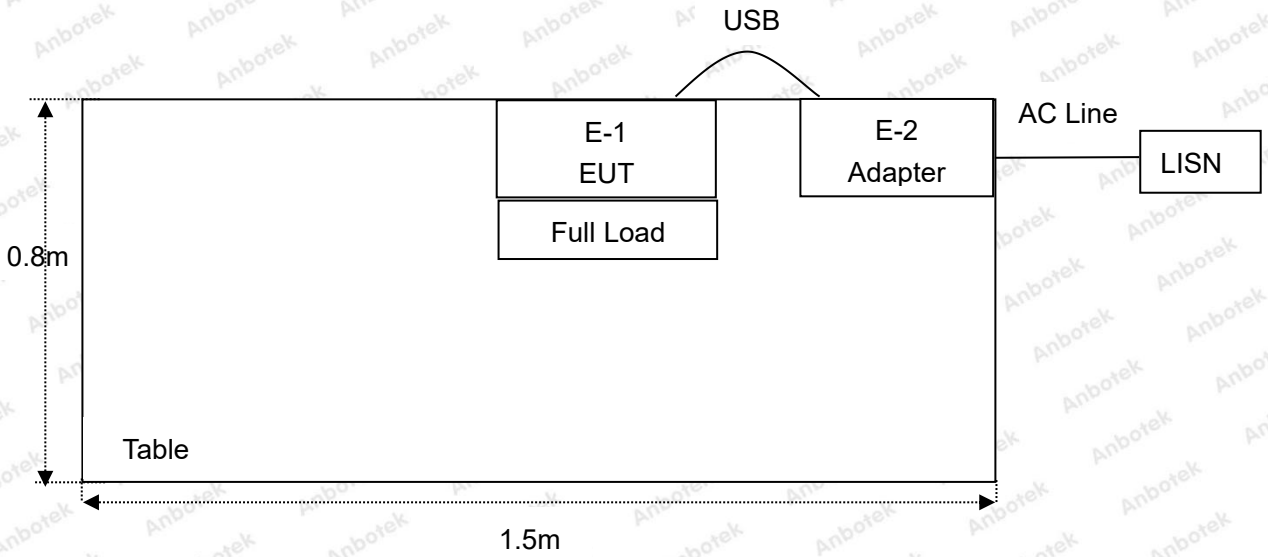
For Radiated Emission	
Final Test Mode	Description
Mode 1	Wireless charging Mode

Note: (1)Test channel is 0.1198MHz.

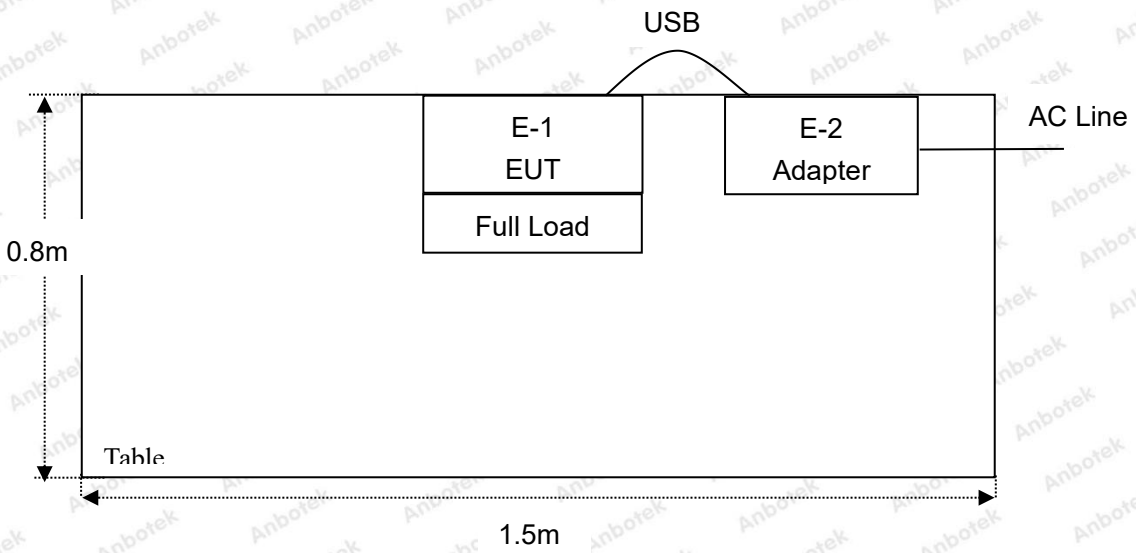
(2)All the situation(full load, half load and empty load) has been tested,only the worst situation (full load, Wireless Output: 10W) was recorded in the report.

1.5. Description Of Test Setup

CE



RE



1.6. Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	L.I.S.N. Artificial Mains Network	Rohde & Schwarz	ENV216	100055	Oct. 26, 2020	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESPI3	101604	Oct. 26, 2020	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 26, 2020	1 Year
4.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 26, 2020	1 Year
5.	Preamplifier	SKET Electronic	BK1G18G30D	KD17503	Oct. 26, 2020	1 Year
6.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 02, 2020	2 Year
7.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 02, 2020	2 Year
8.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Nov. 02, 2020	2 Year
9.	Horn Antenna	A-INFO	LB-180400-KF	J211060628	Nov. 02, 2020	2 Year
10.	Pre-amplifier	SONOMA	310N	186860	Oct. 26, 2020	1 Year
11.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
12.	RF Test Control System	YIHENG	YH3000	2017430	Oct. 26, 2020	1 Year
13.	Power Sensor	DAER	RPR3006W	15I00041SN045	Oct. 26, 2020	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN046	Oct. 26, 2020	1 Year
15.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 26, 2020	1 Year
16.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 26, 2020	1 Year
17.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 26, 2020	1 Year
18.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 26, 2020	1 Year
19.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Oct. 26, 2020	1 Year

1.7. Measurement Uncertainty

Radiation Uncertainty	:	Ur = 3.9 dB (Horizontal)
		Ur = 3.8 dB (Vertical)
Conduction Uncertainty	:	Uc = 3.4 dB

1.8. Description of Test Facility

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

FCC-Registration No.: 184111

Shenzhen Anbotek Compliance Laboratory Limited, 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 our files. Registration No. 184111, September 30, 2020.

ISED-Registration No.: 8058A

Shenzhen Anbotek Compliance Laboratory Limited, EMC Laboratory has been registered and fully described in a report filed with the (ISED) Innovation, Science and Economic Development Canada. The acceptance letter from the ISED is maintained in our files. Registration 8058A, September 30, 2020.

Test Location

Shenzhen Anbotek Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518128

2. Summary of Test Results

Standard Section	Test Item	Result
FCC Part 15, Paragraph 15.207	Conducted Emission Test	PASS
FCC Part 15, Paragraph 15.209(a)(f)	Spurious Emission	PASS
Part 15.203	Antenna Requirement	PASS

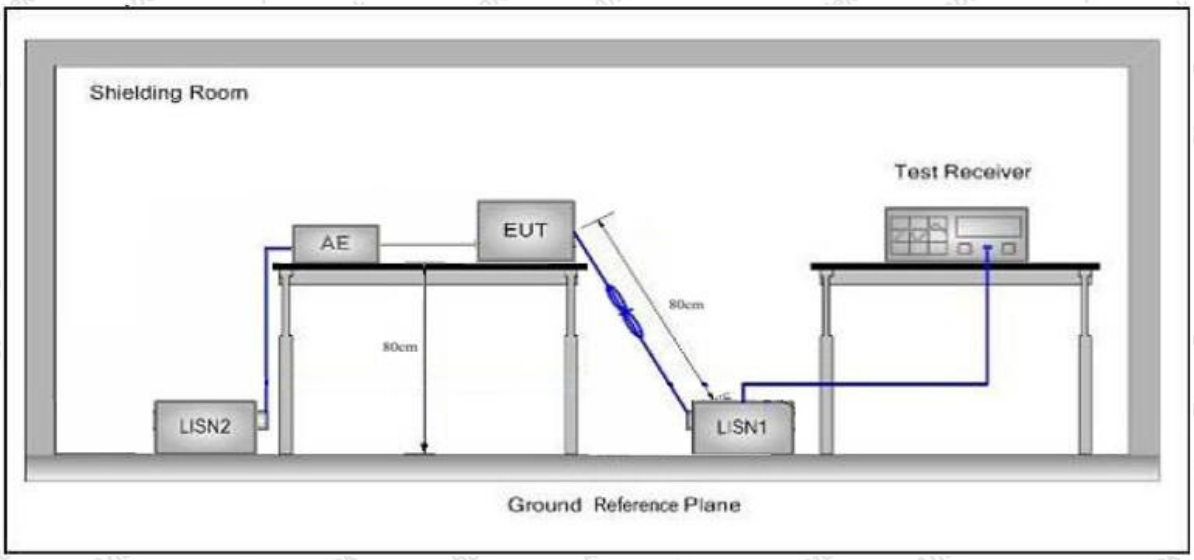
Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
Tel:(86) 755-26066440 Fax: (86) 755-26014772 Email: service@anbotek.com
Hotline 400-003-0500
www.anbotek.com

3. Conducted Emission Test

3.1. Test Standard and Limit

Test Standard	FCC Part15 Section 15.207		
Test Limit	Frequency	Maximum RF Line Voltage (dBuV)	
		Quasi-peak Level	Average Level
	150kHz~500kHz	66 ~ 56 *	56 ~ 46 *
	500kHz~5MHz	56	46
	5MHz~30MHz	60	50
Remark: (1) *Decreasing linearly with logarithm of the frequency. (2) The lower limit shall apply at the transition frequency.			

3.2. Test Setup



3.3. Test Procedure

The EUT system is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 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 C63.10-2013 on Conducted Emission Measurement.

The bandwidth of test receiver (ESCI) set at 9kHz.

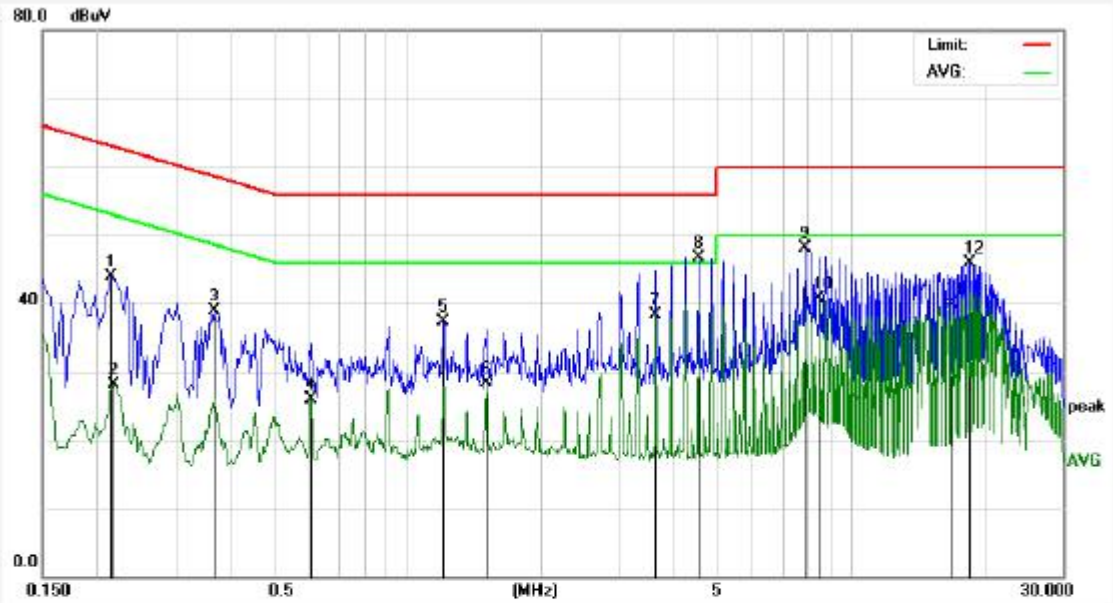
The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Please to see the following pages

Conducted Emission Test Data

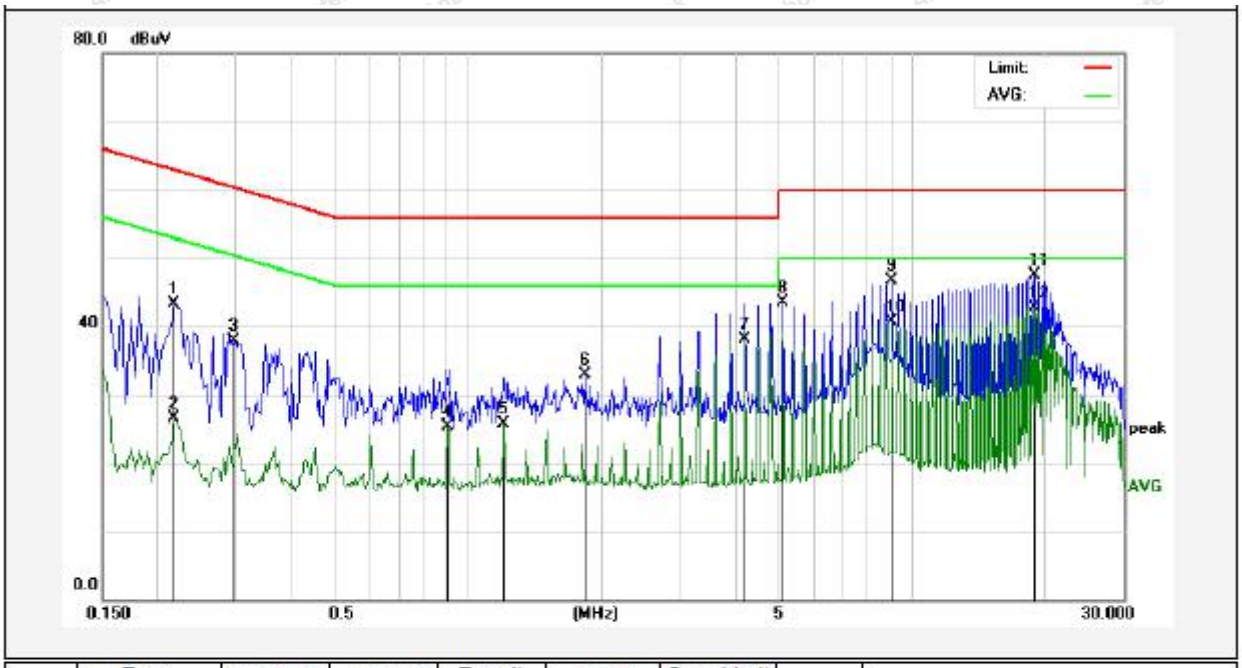
Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.: 23.6℃ Hum.: 51%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.2140	24.07	19.90	43.97	63.04	-19.07	QP	
2	0.2180	8.30	19.90	28.20	52.89	-24.69	AVG	
3	0.3660	19.02	19.92	38.94	58.59	-19.65	QP	
4	0.6060	5.92	20.01	25.93	46.00	-20.07	AVG	
5	1.2020	17.15	20.12	37.27	56.00	-18.73	QP	
6	1.5060	8.16	20.13	28.29	46.00	-17.71	AVG	
7	3.6300	18.09	20.17	38.26	46.00	-7.74	AVG	
8	4.5379	26.56	20.19	46.75	56.00	-9.25	QP	
9	7.8659	27.73	20.28	48.01	60.00	-11.99	QP	
10	8.4699	20.48	20.30	40.78	50.00	-9.22	AVG	
11	16.7899	19.58	20.29	39.87	50.00	-10.13	AVG	
12	18.6059	25.63	20.32	45.95	60.00	-14.05	QP	

Conducted Emission Test Data

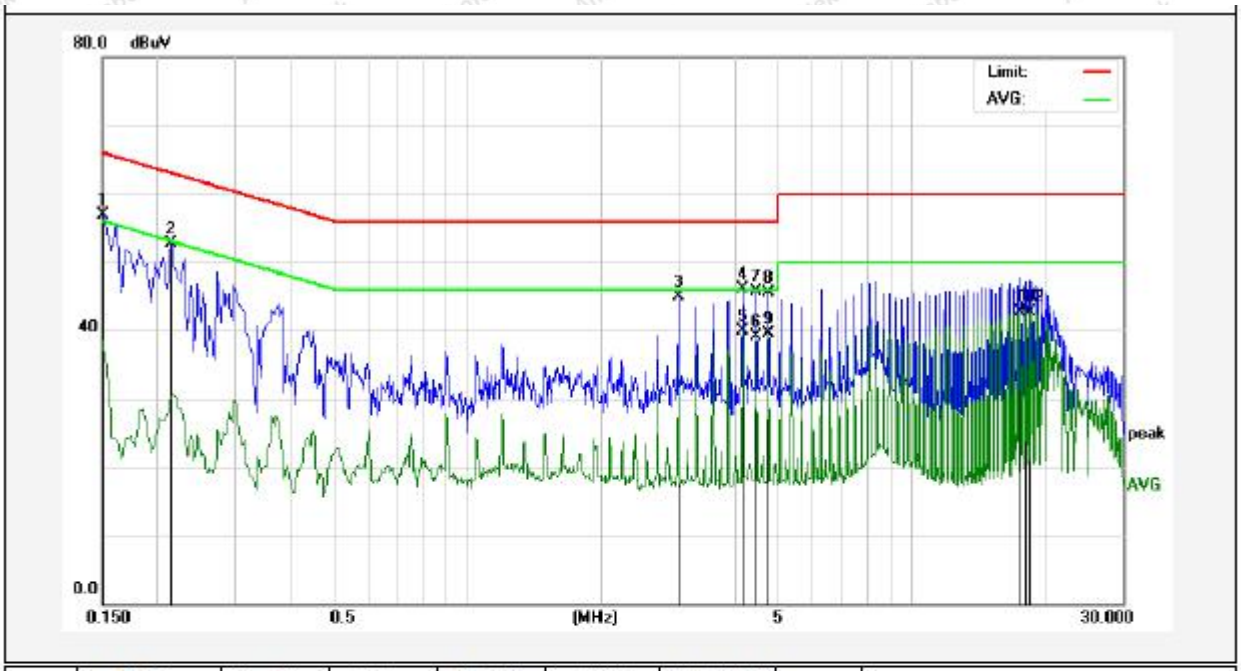
Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
Tem.: 23.6℃ Hum.: 51%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.2180	23.45	19.90	43.35	62.89	-19.54	QP	
2	0.2180	6.62	19.90	26.52	52.89	-26.37	AVG	
3	0.2980	18.10	19.89	37.99	60.30	-22.31	QP	
4	0.9020	5.18	20.09	25.27	46.00	-20.73	AVG	
5	1.2059	5.62	20.12	25.74	46.00	-20.26	AVG	
6	1.8340	12.71	20.14	32.85	56.00	-23.15	QP	
7	4.2140	17.93	20.19	38.12	46.00	-7.88	AVG	
8	5.1180	23.30	20.21	43.51	60.00	-16.49	QP	
9	9.0340	26.34	20.31	46.65	60.00	-13.35	QP	
10	9.0340	20.45	20.31	40.76	50.00	-9.24	AVG	
11	18.9700	27.14	20.32	47.46	60.00	-12.54	QP	
12	18.9700	22.42	20.32	42.74	50.00	-7.26	AVG	

Conducted Emission Test Data

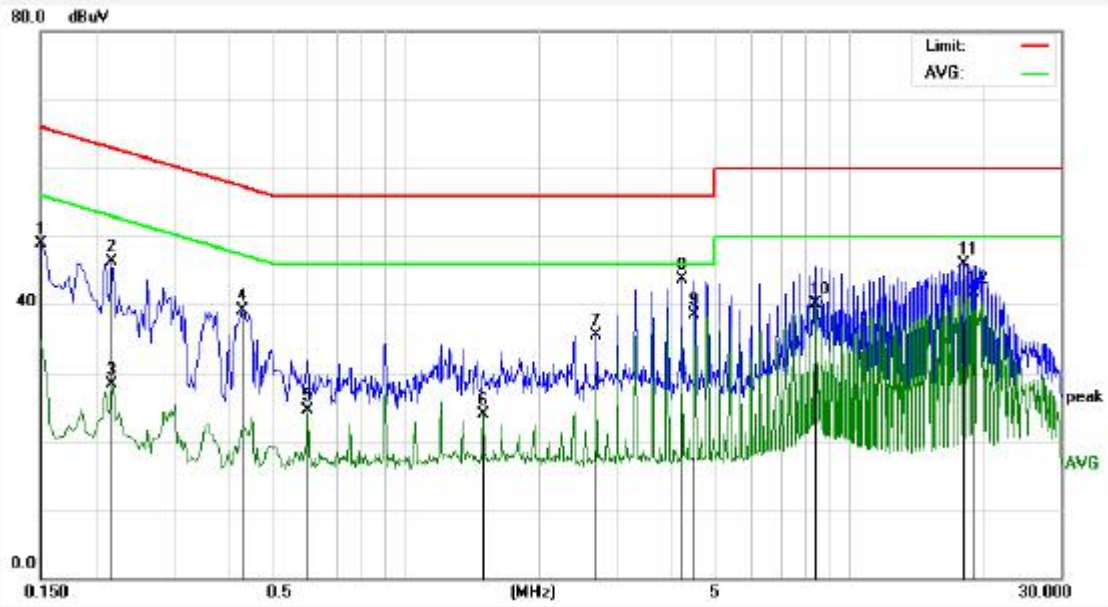
Test Site:	1# Shielded Room
Operating Condition:	Mode 1
Test Specification:	AC 240V, 60Hz for adapter
Comment:	Live Line
	Tem.: 23.6℃ Hum.: 51%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1500	37.07	19.90	56.97	65.99	-9.02	QP	
2	0.2140	32.87	19.90	52.77	63.04	-10.27	QP	
3	2.9820	24.76	20.16	44.92	56.00	-11.08	QP	
4	4.1779	25.98	20.18	46.16	56.00	-9.84	QP	
5	4.1779	19.66	20.18	39.84	46.00	-6.16	AVG	
6	4.4740	18.93	20.19	39.12	46.00	-6.88	AVG	
7	4.4780	25.44	20.19	45.63	56.00	-10.37	QP	
8	4.7740	25.39	20.20	45.59	56.00	-10.41	QP	
9	4.7740	19.36	20.20	39.56	46.00	-6.44	AVG	
10	17.6060	22.40	20.30	42.70	50.00	-7.30	AVG	
11	18.2060	22.62	20.31	42.93	50.00	-7.07	AVG	
12	18.5060	22.32	20.32	42.64	50.00	-7.36	AVG	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 240V, 60Hz for adapter
Comment: Neutral Line
Tem.: 23.6℃ Hum.: 51%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1499	29.00	19.90	48.90	66.00	-17.10	QP	
2	0.2180	26.47	19.90	46.37	62.89	-16.52	QP	
3	0.2180	8.42	19.90	28.32	52.89	-24.57	AVG	
4	0.4300	19.06	19.95	39.01	57.25	-18.24	QP	
5	0.6020	4.46	20.01	24.47	46.00	-21.53	AVG	
6	1.4980	3.79	20.13	23.92	46.00	-22.08	AVG	
7	2.6980	15.40	20.15	35.55	56.00	-20.45	QP	
8	4.1979	23.56	20.19	43.75	56.00	-12.25	QP	
9	4.4979	18.27	20.19	38.46	46.00	-7.54	AVG	
10	8.3939	19.78	20.30	40.08	50.00	-9.92	AVG	
11	18.1379	25.61	20.31	45.92	60.00	-14.08	QP	
12	19.0379	21.46	20.32	41.78	50.00	-8.22	AVG	

4. Radiation Spurious Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209 and 15.205				
Test Limit	Frequency (MHz)	Field strength (microvolt/meter)	Limit (dBuV/m)	Remark	Measurement distance (m)
	0.009MHz~0.490MHz	2400/F(kHz)	-	-	300
	0.490MHz-1.705MHz	24000/F(kHz)	-	-	30
	1.705MHz-30MHz	30	-	-	30
	30MHz~88MHz	100	40.0	Quasi-peak	3
	88MHz~216MHz	150	43.5	Quasi-peak	3
	216MHz~960MHz	200	46.0	Quasi-peak	3
	960MHz~1000MHz	500	54.0	Quasi-peak	3
	Above 1000MHz	500	54.0	Average	3
		-	74.0	Peak	3

Remark:
(1)The lower limit shall apply at the transition frequency.
(2) 15.35(b), Unless otherwise specified, the limit on peak radio frequency emissions is 20dB above the maximum permitted average emission limit applicable to the equipment under test. This peak limit applies to the total peak emission level radiated by the device.

4.2. Test Setup

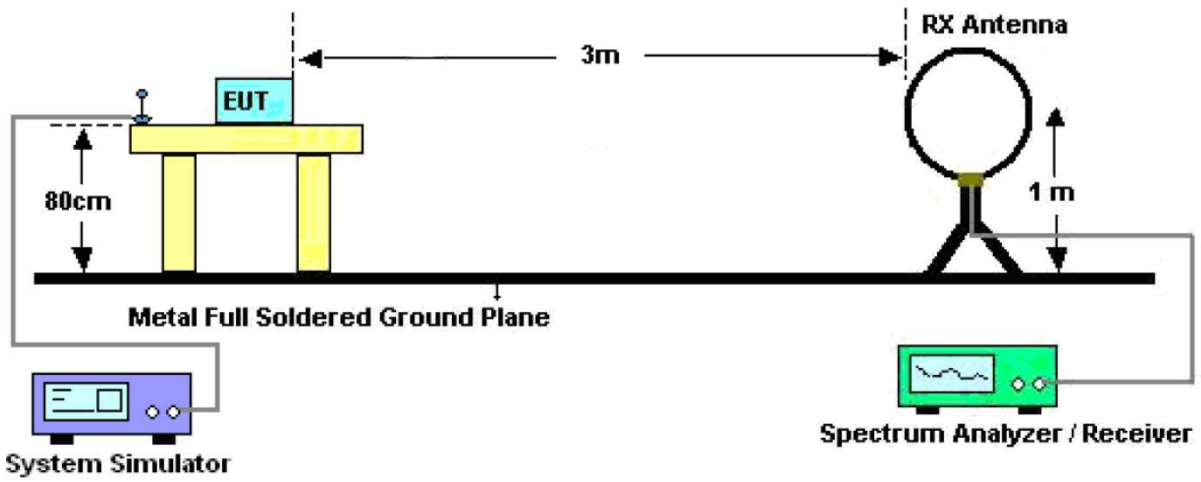


Figure 1. Below 30MHz

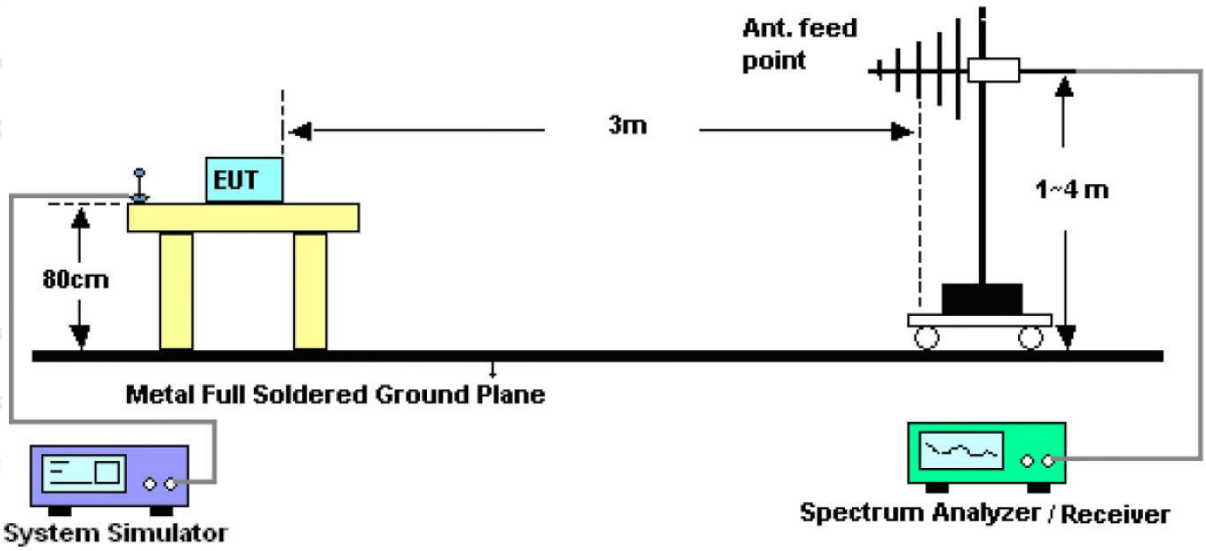


Figure 2. 30MHz to 1GHz

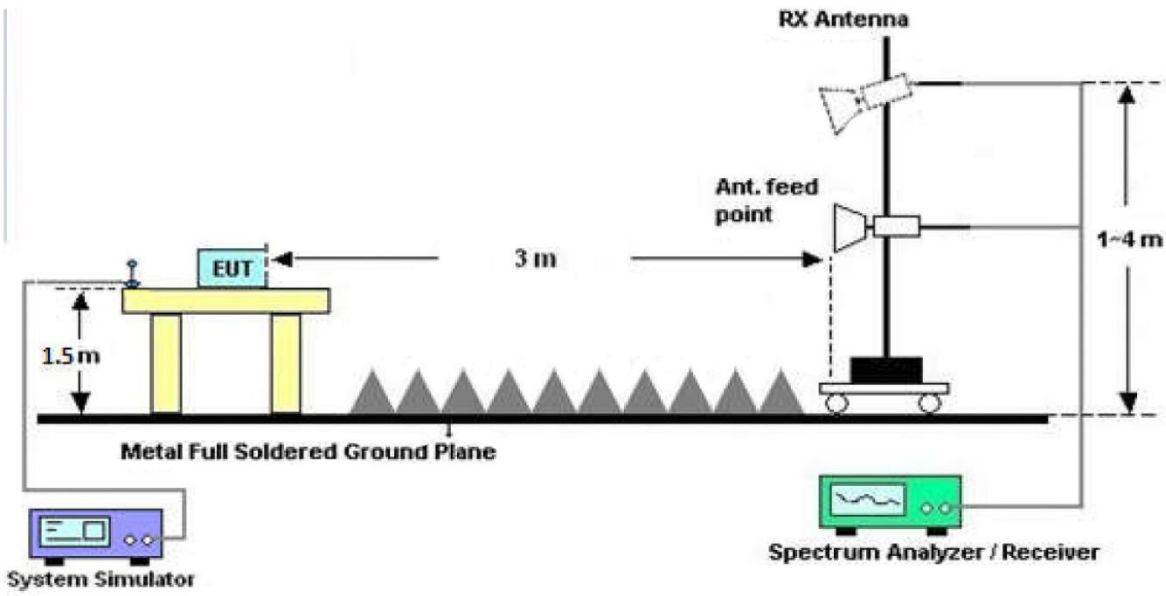


Figure 3. Above 1 GHz

4.3. Test Procedure

For below 1GHz: The EUT is placed on a turntable, which is 0.8m above the ground plane.
For above 1GHz: The EUT is placed on a turntable, which is 1.5m above the ground plane.
The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Rotated the EUT through three orthogonal axes to determine the maximum emissions, both horizontal and vertical polarization of the antenna are set on test. The EUT is tested in 9*6*6 Chamber. The device is evaluated in xyz orientation.

For 9kHz to 150kHz, Set the spectrum analyzer as:
RBW = 200Hz, VBW =1kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 150kHz to 30MHz, Set the spectrum analyzer as:
RBW = 9KHz, VBW =30kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

For 30MHz to 1000MHz, Set the spectrum analyzer as:
RBW = 100kHz, VBW =300kHz, Detector= Quasi-Peak, Trace mode= Max hold, Sweep- auto couple.

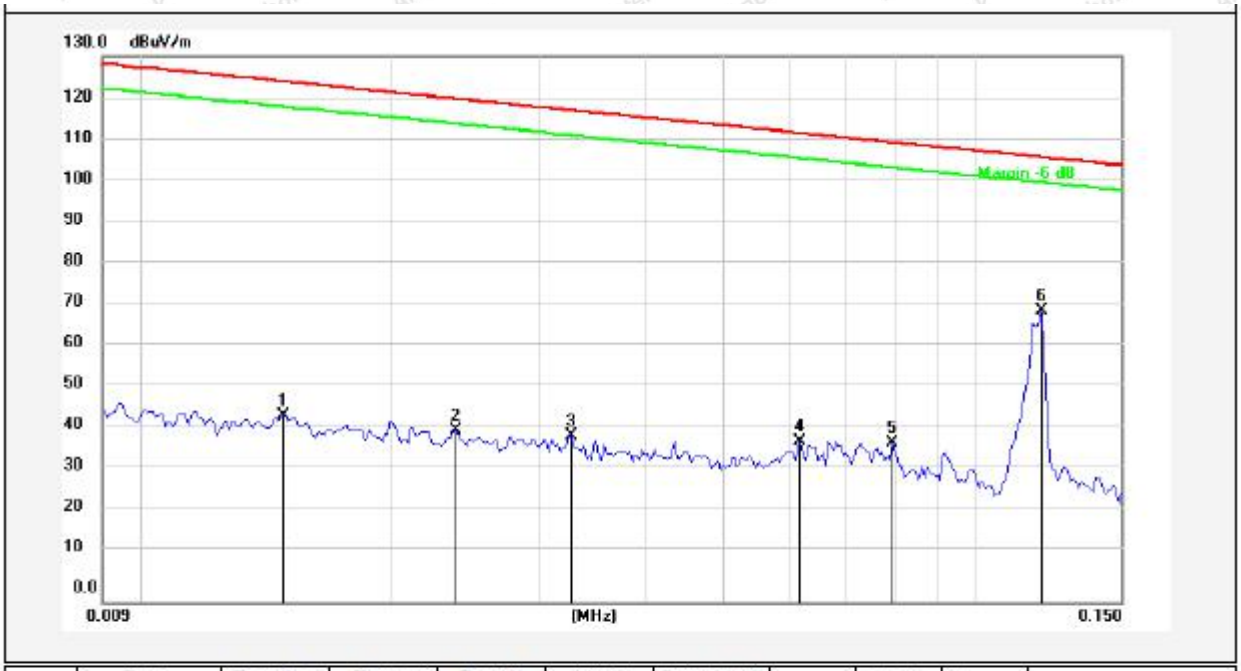
4.4. Test Data

PASS

Note: The data is in TX mode, and this is the worst mode.

Test Results (9K~0.15MHz)

Test Mode:	Mode 1
Power Source:	AC 120V, 60Hz for adapter
Temp.(℃)/Hum.(%RH):	22℃/50%RH
Distance:	3m

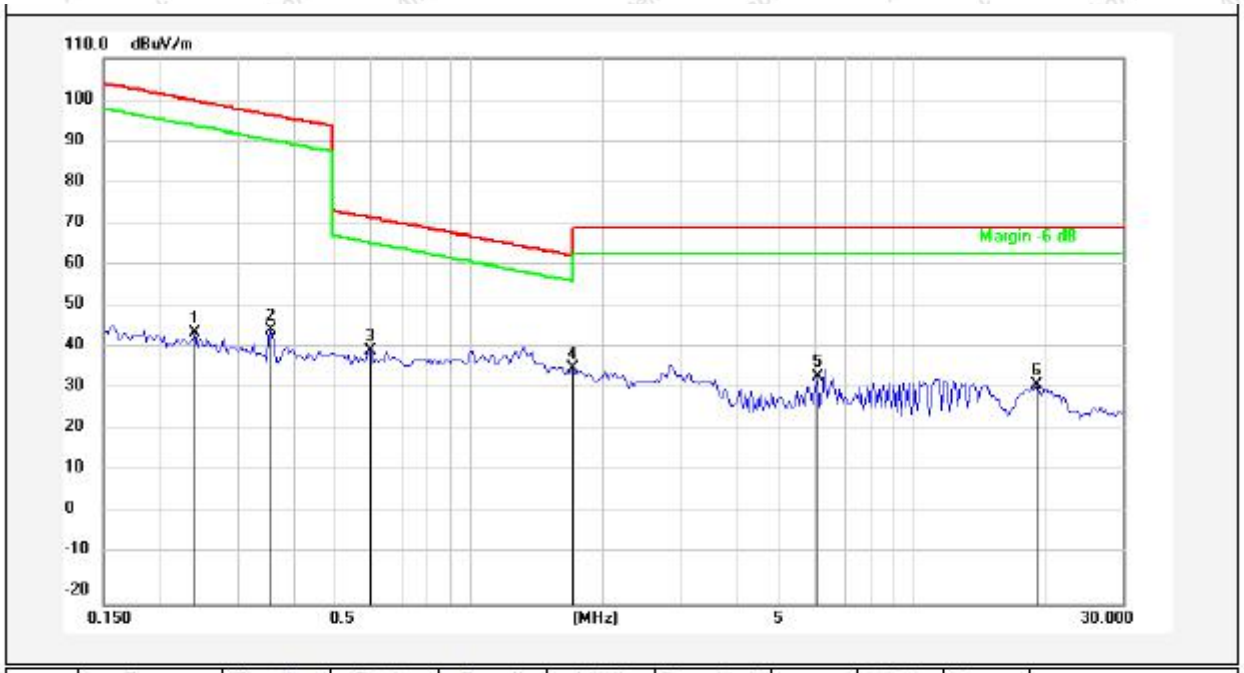


No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	0.0148	24.07	20.28	44.35	124.01	-79.66	peak			
2	0.0238	20.39	20.38	40.77	119.91	-79.14	peak			
3	0.0328	19.03	20.56	39.59	117.14	-77.55	peak			
4	0.0618	17.83	20.37	38.20	111.67	-73.47	peak			
5	0.0796	17.45	20.36	37.81	109.49	-71.68	peak			
6	0.1198	48.92	20.34	69.26	105.96	-36.70	peak			

Remark： According to FCC PART 15.209 (d), the emission limits 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 Results (0.15~30MHz)

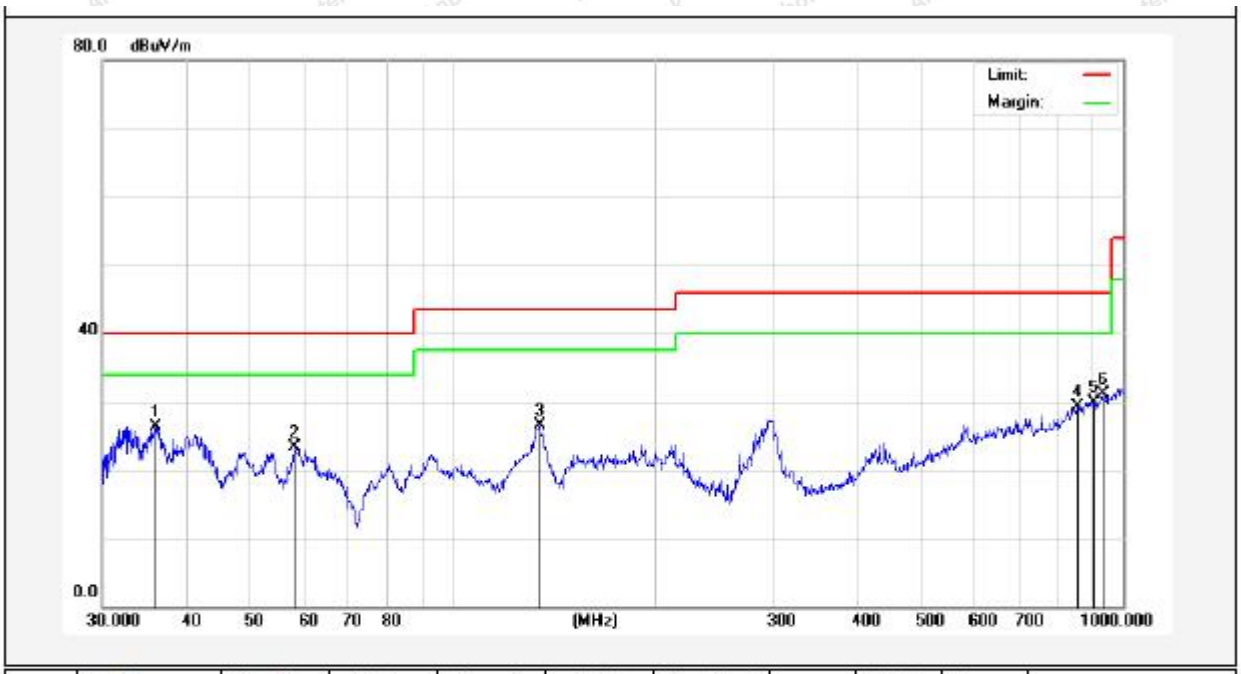
Test Mode:	Mode 1
Power Source:	AC 120V, 60Hz for adapter
Temp.(℃)/Hum.(%RH):	22℃/50%RH
Distance:	3m



No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	0.2416	24.16	20.30	44.46	99.90	-55.44	peak			
2	0.3594	24.81	20.28	45.09	96.48	-51.39	peak			
3	0.6027	20.13	20.27	40.40	72.01	-31.61	peak			
4	1.7160	15.85	20.27	36.12	69.50	-33.38	peak			
5	6.1208	13.83	20.39	34.22	69.50	-35.28	peak			
6	19.1219	11.51	20.58	32.09	69.50	-37.41	peak			

Test Results (30~1000MHz)

Test Mode:	Mode 1
Power Source:	AC 120V, 60Hz for adapter
Polarization:	Vertical
Temp.(℃)/Hum.(%RH):	22℃/50%RH
Distance:	3m



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	36.0007	42.06	-15.74	26.32	40.00	-13.68	QP	100	360	
2	58.2030	39.59	-16.32	23.27	40.00	-16.73	QP	100	0	
3	134.5592	46.17	-19.71	26.46	43.50	-17.04	QP	100	360	
4	854.0247	32.31	-3.06	29.25	46.00	-16.75	QP	100	0	
5	903.3093	31.63	-1.65	29.98	46.00	-16.02	QP	100	360	
6	932.2713	32.26	-1.14	31.12	46.00	-14.88	QP	100	0	

Test Results (30~1000MHz)

Test Mode:	Mode 1
Power Source:	AC 120V, 60Hz for adapter
Polarization:	Horizontal
Temp.(℃)/Hum.(%RH):	22℃/50%RH
Distance:	3m

No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	190.4050	47.79	-20.33	27.46	43.50	-16.04	QP	100	0	
2	299.3158	47.63	-14.37	33.26	46.00	-12.74	QP	100	360	
3	337.2155	44.02	-13.33	30.69	46.00	-15.31	QP	100	0	
4	857.0247	33.03	-2.96	30.07	46.00	-15.93	QP	100	360	
5	906.4824	32.88	-1.59	31.29	46.00	-14.71	QP	100	0	
6	935.5463	32.97	-1.09	31.88	46.00	-14.12	QP	100	360	

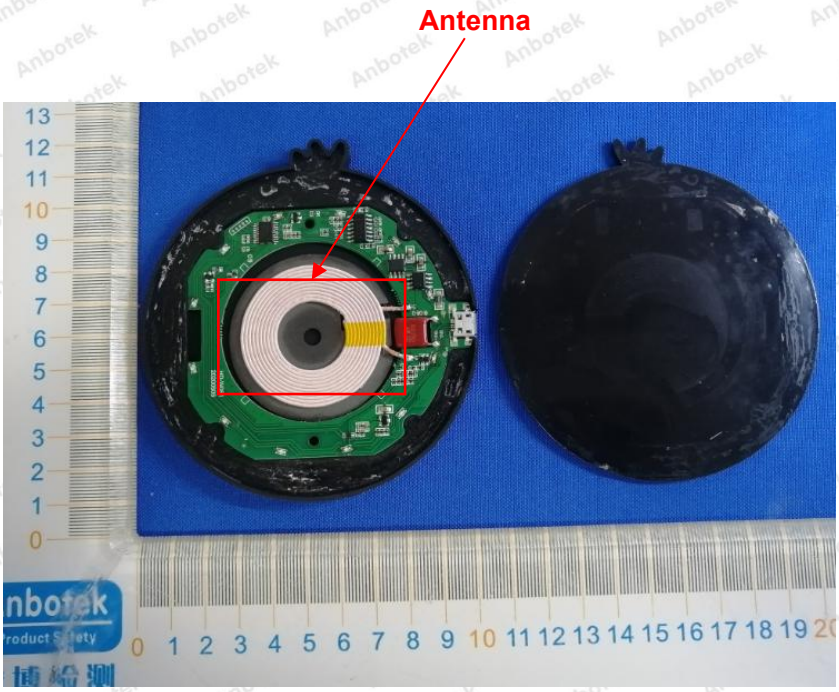
5. Antenna Requirement

5.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203
Requirement	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.

5.2. Antenna Connected Construction

The antenna is a Inductive loop coil Antenna which permanently attached, and the best case gain of the antenna is 0 dBi. It complies with the standard requirement.

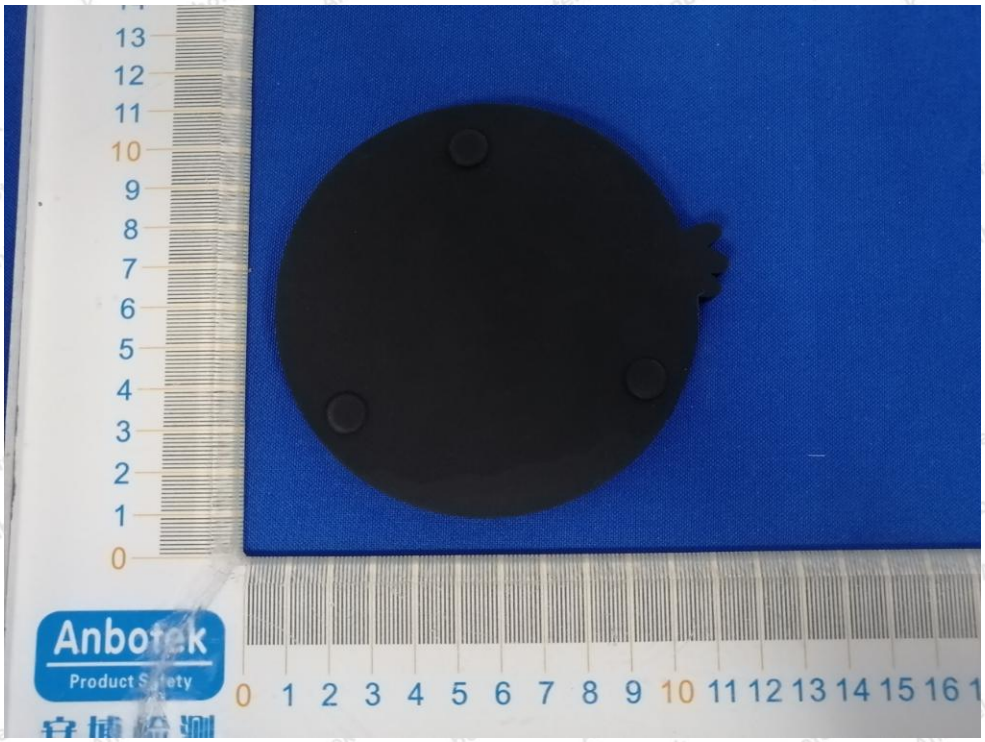


APPENDIX I -- TEST SETUP PHOTOGRAPH

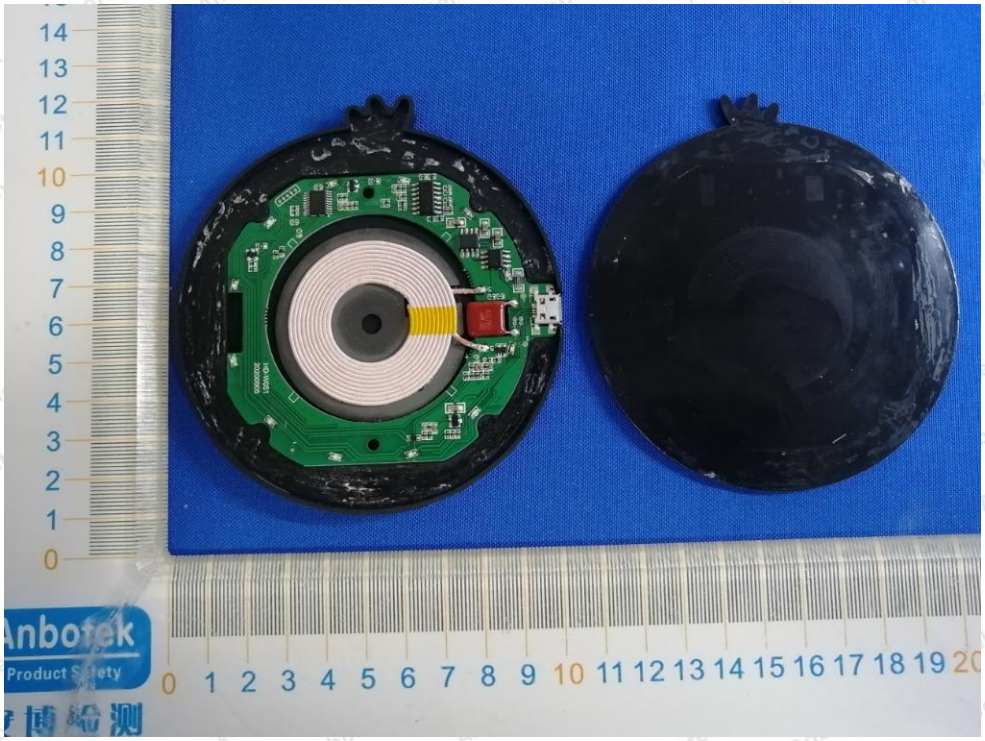
Photo of Conducted Emission Measurement

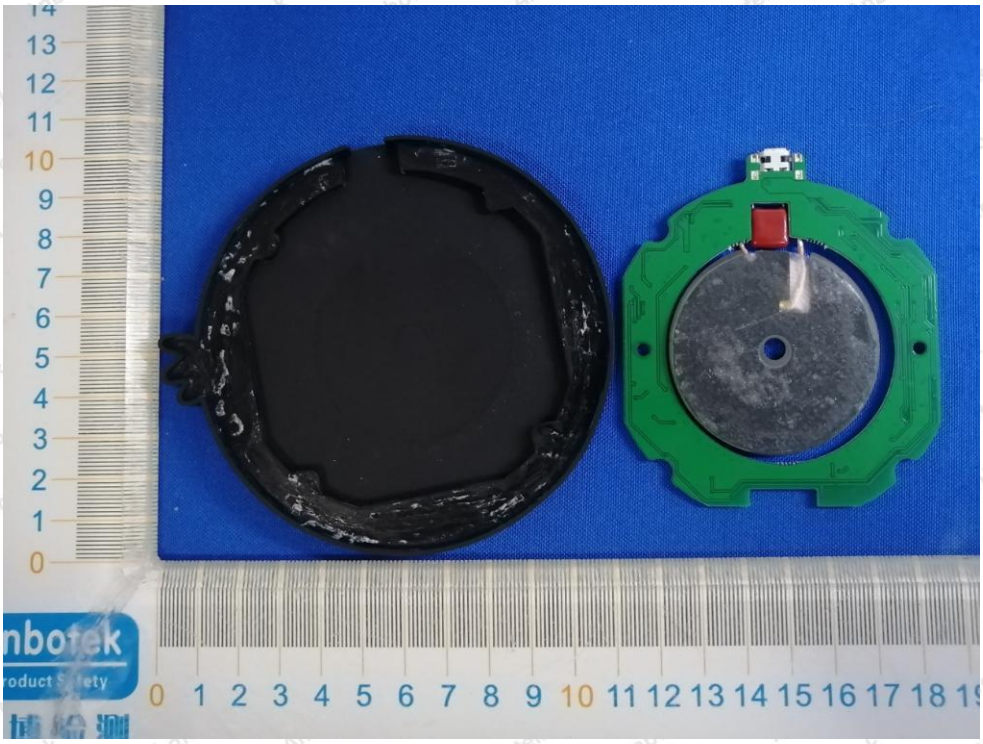
Photo of Radiation Emission Test

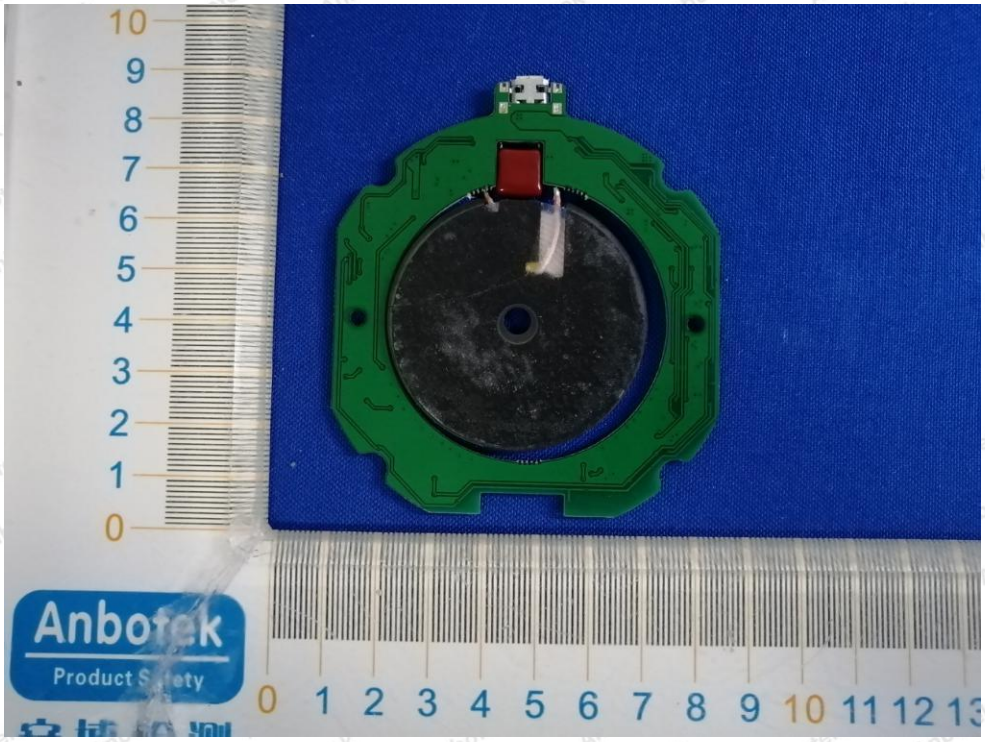
APPENDIX II -- EXTERNAL PHOTOGRAPH

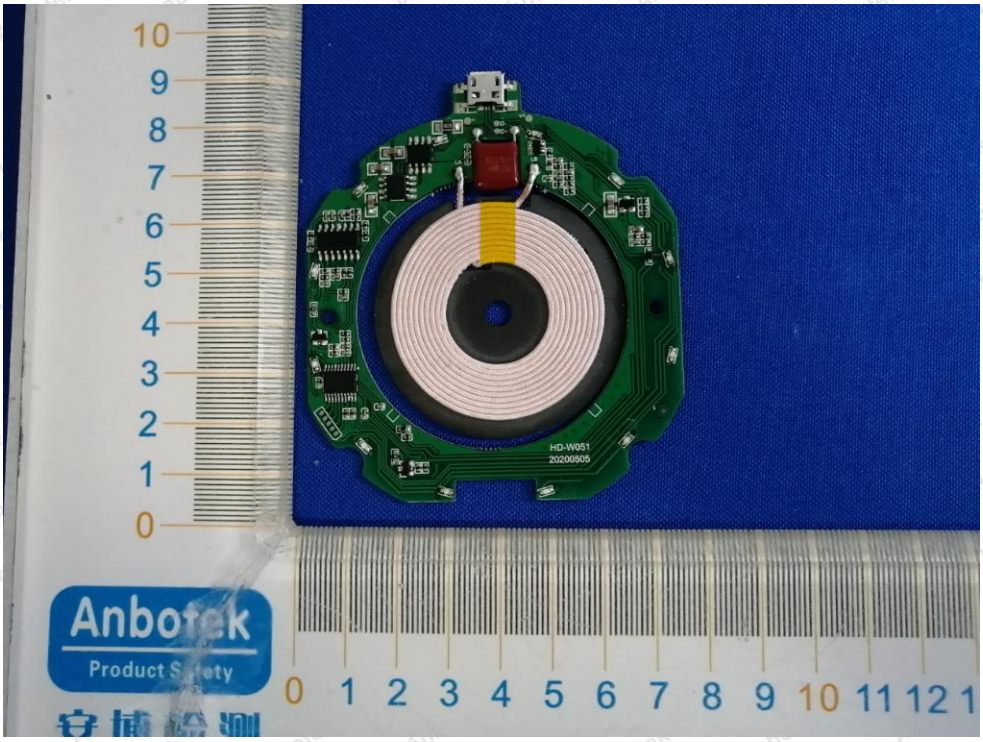


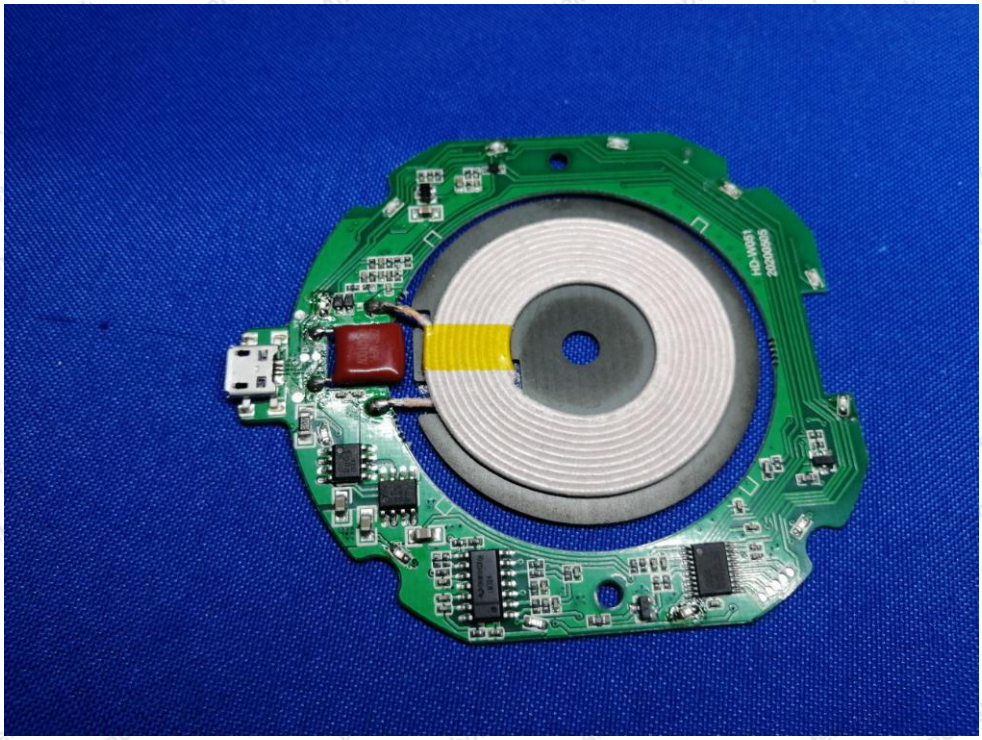
APPENDIX III -- INTERNAL PHOTOGRAPH








HD-W051
20200505



---------- End of Report ----------