

FCC TEST REPORT

Client Name : Electronic Silk Road (Shenzhen) Tech Co., Ltd
Address : 7th F,Building 10B,Taihua Wutong Industrial Park,Gushu
Development Zones, Xixiang Street,Bao'an Area,
Shenzhen, China
Product Name : 15W Wireless Charger
Date : Oct. 23, 2020



Shenzhen Anbotech Compliance Laboratory Limited

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TEST REPORT

Applicant : Electronic Silk Road (Shenzhen) Tech Co., Ltd
Manufacturer : Electronic Silk Road (Shenzhen) Tech Co., Ltd
Product Name : 15W Wireless Charger
Model No. : EFC0020
Trade Mark : ESR
Rating(s) : Input: 5V/3A, 9V/2A
Wireless output: 5W, 7.5W, 10W, 15W
Test Standard(s) : **FCC Part15 Subpart C, 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

Sept. 23, 2020

Date of Test

Sept. 23~Oct. 19, 2020

Prepared By

Yilia Zhong

(Engineer / Yilia Zhong)

Reviewer

Bibo Zhang

(Supervisor / Bibo Zhang)

Approved & Authorized Signer

King Kong Jin

(Manager / Kingkong Jin)



1. General Information

1.1. Client Information

Applicant	:	Electronic Silk Road (Shenzhen) Tech Co., Ltd
Address	:	7th F,Building 10B,Taihua Wutong Industrial Park,Gushu Development Zones, Xixiang Street,Bao'an Area, Shenzhen, China
Manufacturer	:	Electronic Silk Road (Shenzhen) Tech Co., Ltd
Address	:	7th F,Building 10B,Taihua Wutong Industrial Park,Gushu Development Zones, Xixiang Street,Bao'an Area, Shenzhen, China
Factory	:	Electronic Silk Road (Shenzhen) Tech Co., Ltd
Address	:	7th F,Building 10B,Taihua Wutong Industrial Park,Gushu Development Zones, Xixiang Street,Bao'an Area, Shenzhen, China

1.2. Description of Device (EUT)

Product Name	:	15W Wireless Charger
Model No.	:	EFC0020
Trade Mark	:	ESR
Test Power Supply	:	AC 120V, 60Hz for adapter / AC 240V, 60Hz for adapter
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(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 50-60Hz 0.7A Output: 3.6-5.5V 3A / 6.5-9V 2A / 9-12V 1.5A
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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

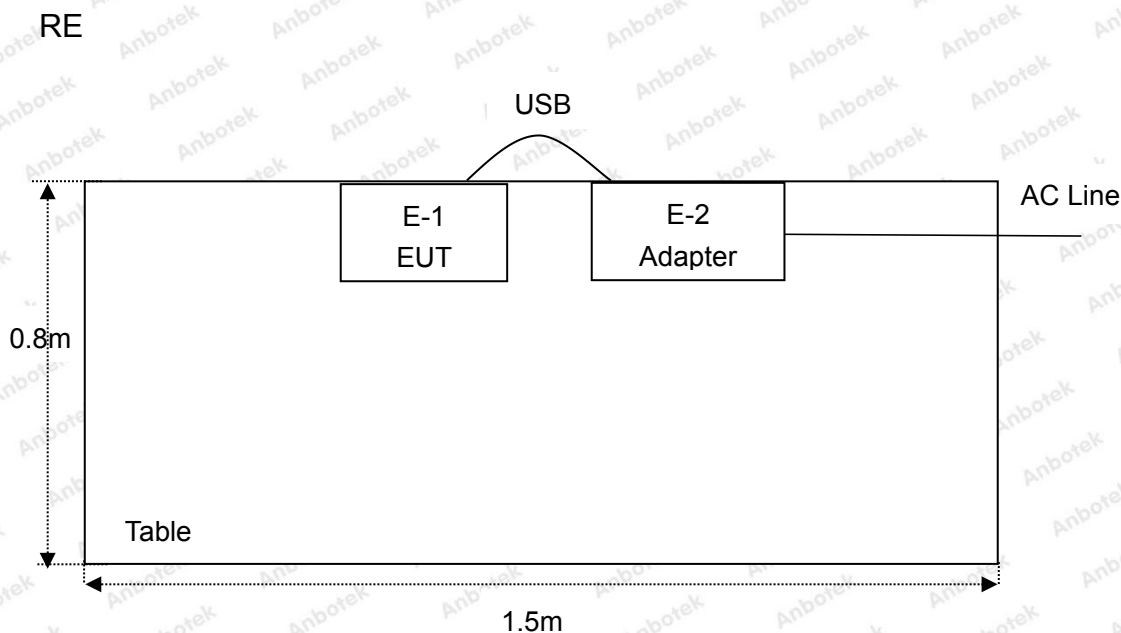
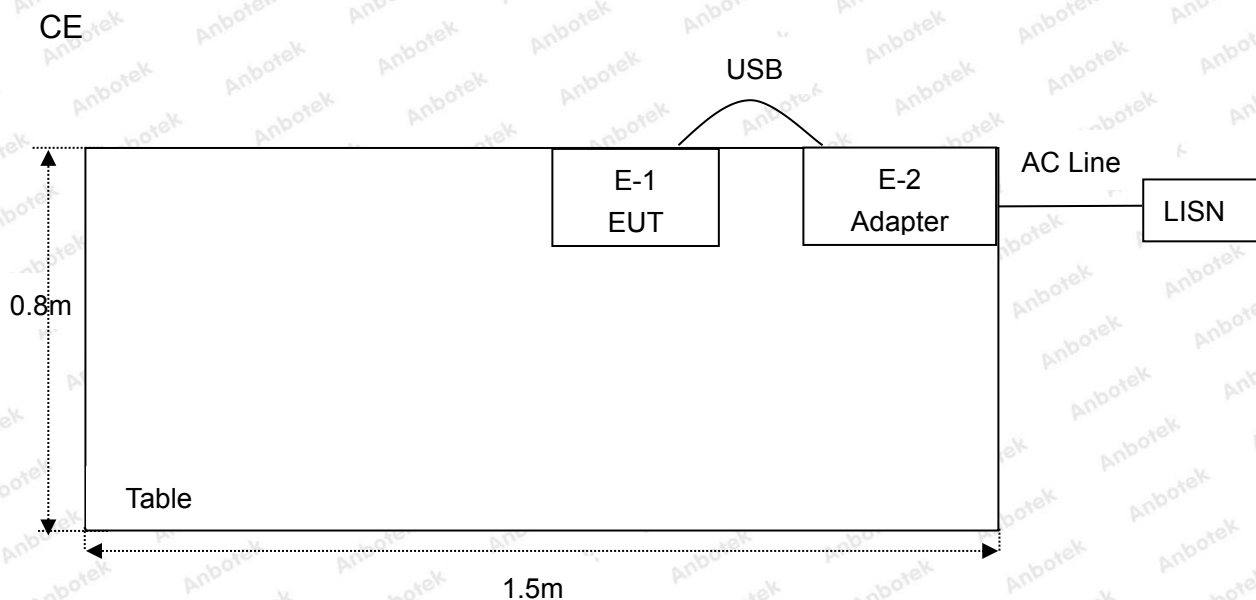
For Conducted Emission	
Final Test Mode	Description
Mode 1	Wireless Charging Mode

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

Note: (1)Test channel is 0.150MHz.

(2) All the situation(full load, half load and empty load) has been tested,only the worst situation (full load 15W) was recorded in the report.

1.5. Description Of Test Setup



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	Nov. 04, 2019	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESPI3	101604	Nov. 04, 2019	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 04, 2019	1 Year
4.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 04, 2019	1 Year
5.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	Nov. 04, 2019	1 Year
6.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 01, 2019	1 Year
7.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 01, 2019	1 Year
8.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Nov. 01, 2019	1 Year
9.	Horn Antenna	A-INFO	LB-180400-K F	J211060628	Nov. 01, 2019	1 Year
10.	Pre-amplifier	SONOMA	310N	186860	Nov. 04, 2019	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	Nov. 04, 2019	1 Year
13.	Power Sensor	DAER	RPR3006W	15I00041SN045	Nov. 04, 2019	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN046	Nov. 04, 2019	1 Year
15.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 04, 2019	1 Year
16.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 04, 2019	1 Year
17.	Signal Generator	Agilent	E4421B	MY41000743	Nov. 04, 2019	1 Year
18.	DC Power Supply	LW	TPR-6420D	374470	Nov. 04, 2019	1 Year
19.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80 B	N/A	Nov. 04, 2019	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 Anbotech 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 Anbotech 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 Anbotech Compliance Laboratory Limited.

1/F, Building D, Sogood Science and Technology Park, Sanwei community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.518102



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



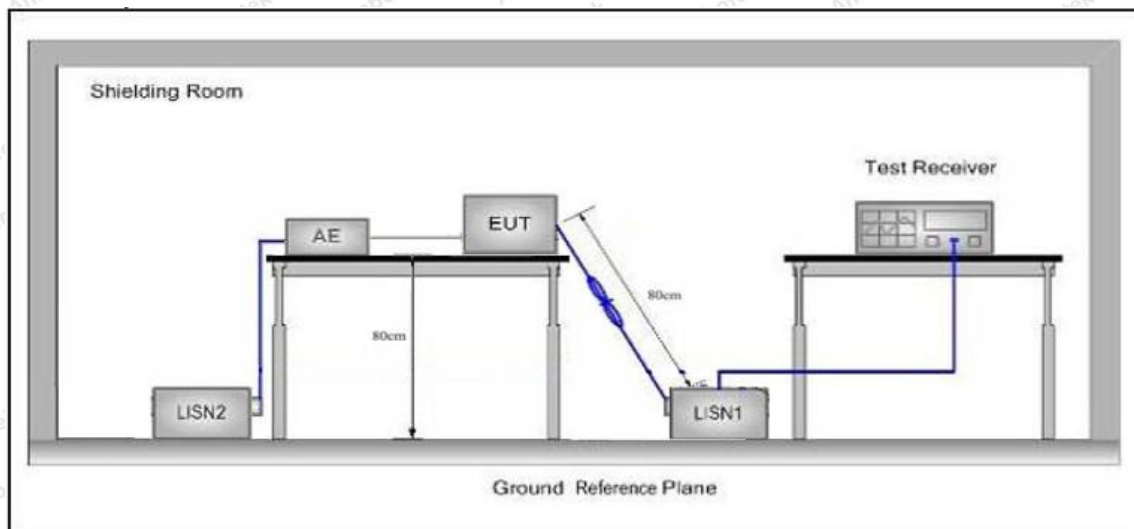
3. Conducted Emission Test

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.

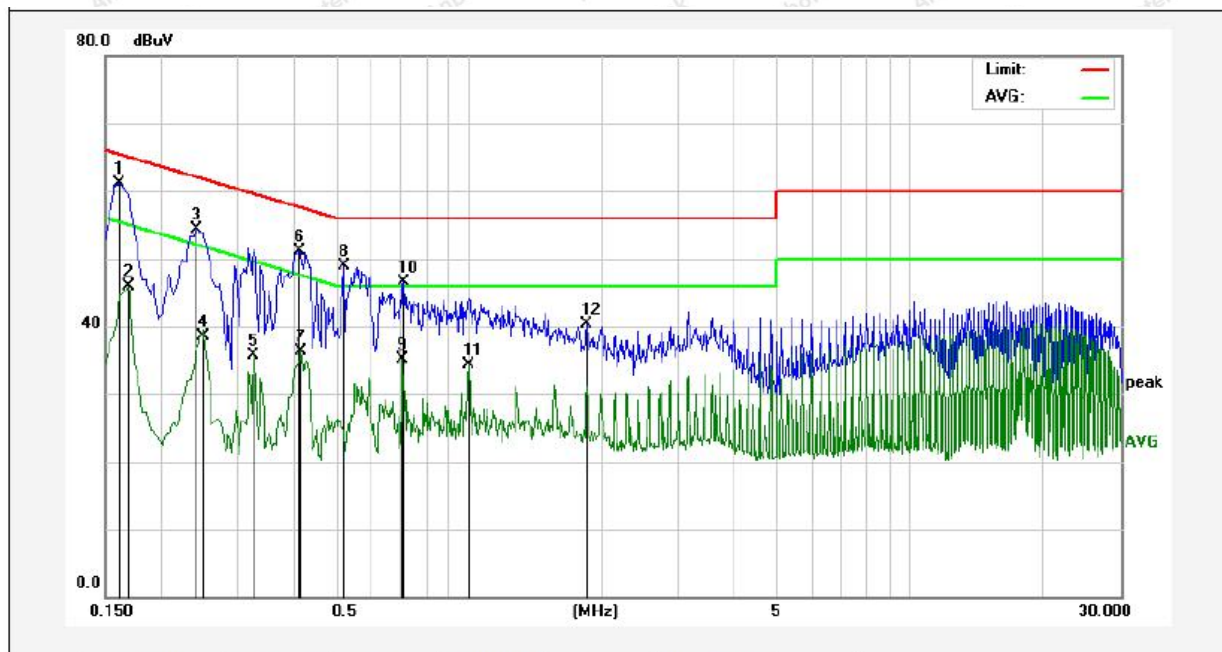
The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Please to see the following pages

Conducted Emission Test Data

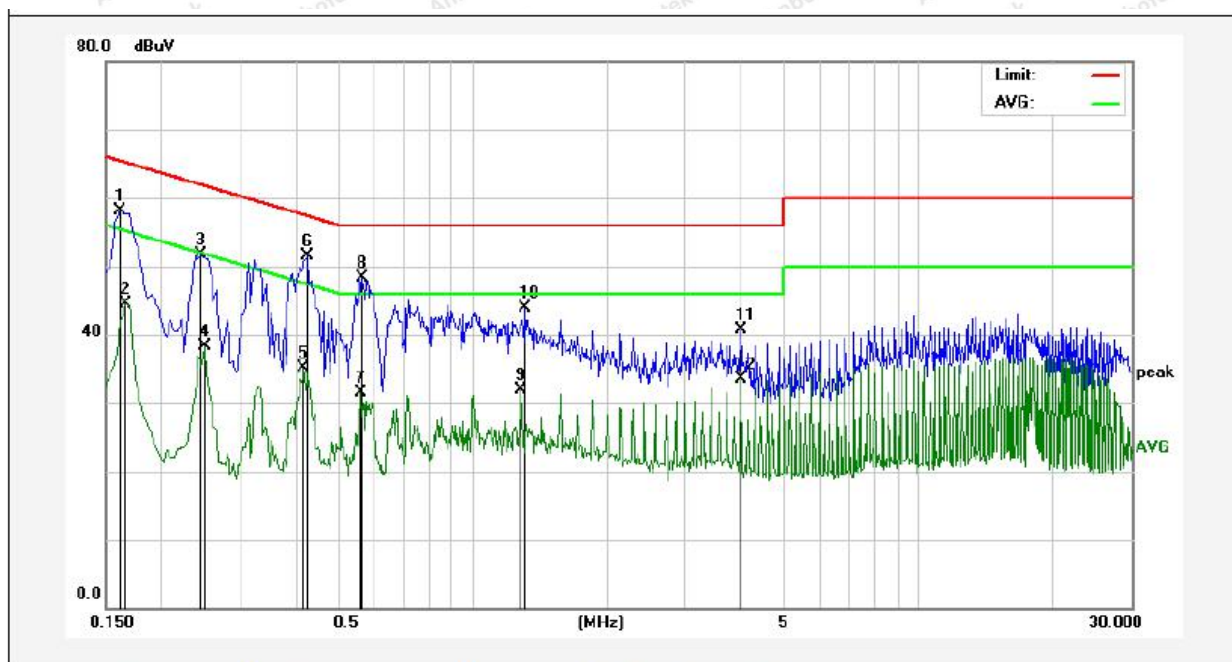
Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.: 22.7°C Hum.: 57%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1620	41.20	19.90	61.10	65.36	-4.26	peak	
2	0.1700	25.91	19.90	45.81	54.96	-9.15	AVG	
3	0.2420	34.47	19.89	54.36	62.02	-7.66	peak	
4	0.2508	18.71	19.89	38.60	51.73	-13.13	AVG	
5	0.3260	15.84	19.90	35.74	49.55	-13.81	AVG	
6	0.4140	31.19	19.94	51.13	57.57	-6.44	peak	
7	0.4180	16.46	19.94	36.40	47.49	-11.09	AVG	
8	0.5220	28.98	19.99	48.97	56.00	-7.03	peak	
9	0.7100	15.08	20.04	35.12	46.00	-10.88	AVG	
10	0.7140	26.56	20.04	46.60	56.00	-9.40	peak	
11	1.0020	14.23	20.12	34.35	46.00	-11.65	AVG	
12	1.8580	20.26	20.14	40.40	56.00	-15.60	peak	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
Tem.: 22.7°C Hum.: 57%

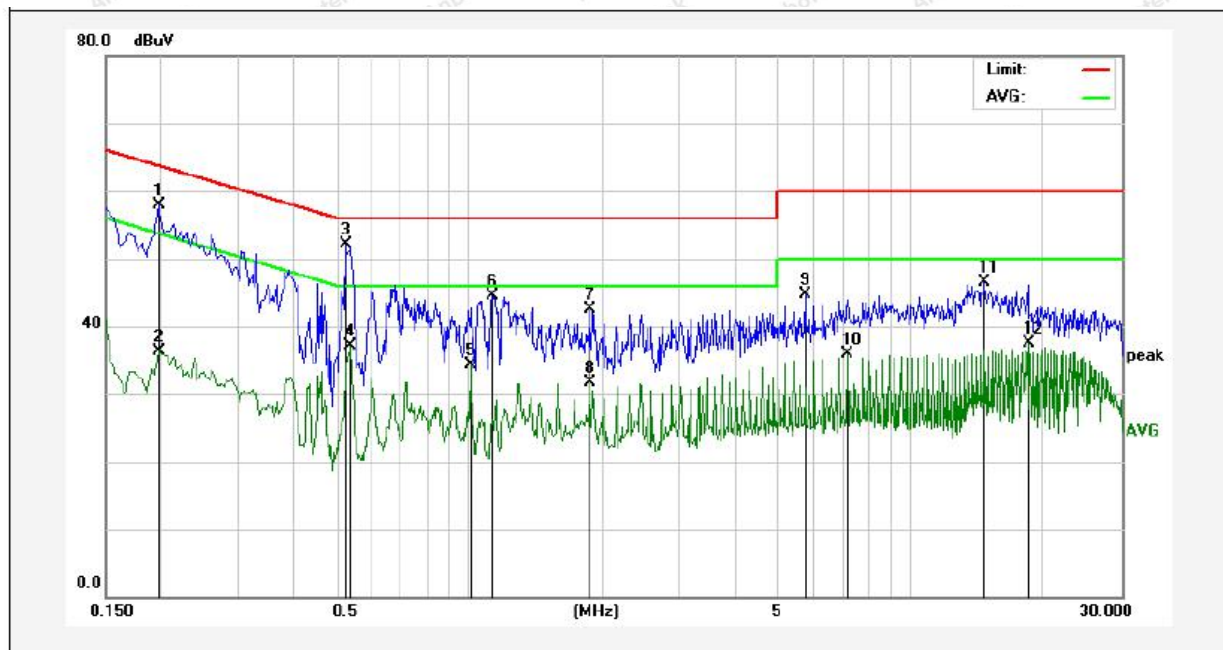


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1620	38.23	19.90	58.13	65.36	-7.23	peak	
2	0.1660	24.58	19.90	44.48	55.15	-10.67	AVG	
3	0.2460	31.81	19.89	51.70	61.89	-10.19	peak	
4	0.2500	18.33	19.89	38.22	51.75	-13.53	AVG	
5	0.4180	15.09	19.94	35.03	47.49	-12.46	AVG	
6	0.4260	31.46	19.95	51.41	57.33	-5.92	peak	
7	0.5620	11.41	20.00	31.41	46.00	-14.59	AVG	
8	0.5660	28.27	20.00	48.27	56.00	-7.73	peak	
9	1.2860	11.86	20.13	31.99	46.00	-14.01	AVG	
10	1.3099	23.75	20.13	43.88	56.00	-12.12	peak	
11	4.0020	20.43	20.18	40.61	56.00	-15.39	peak	
12	4.0020	13.40	20.18	33.58	46.00	-12.42	AVG	



Conducted Emission Test Data

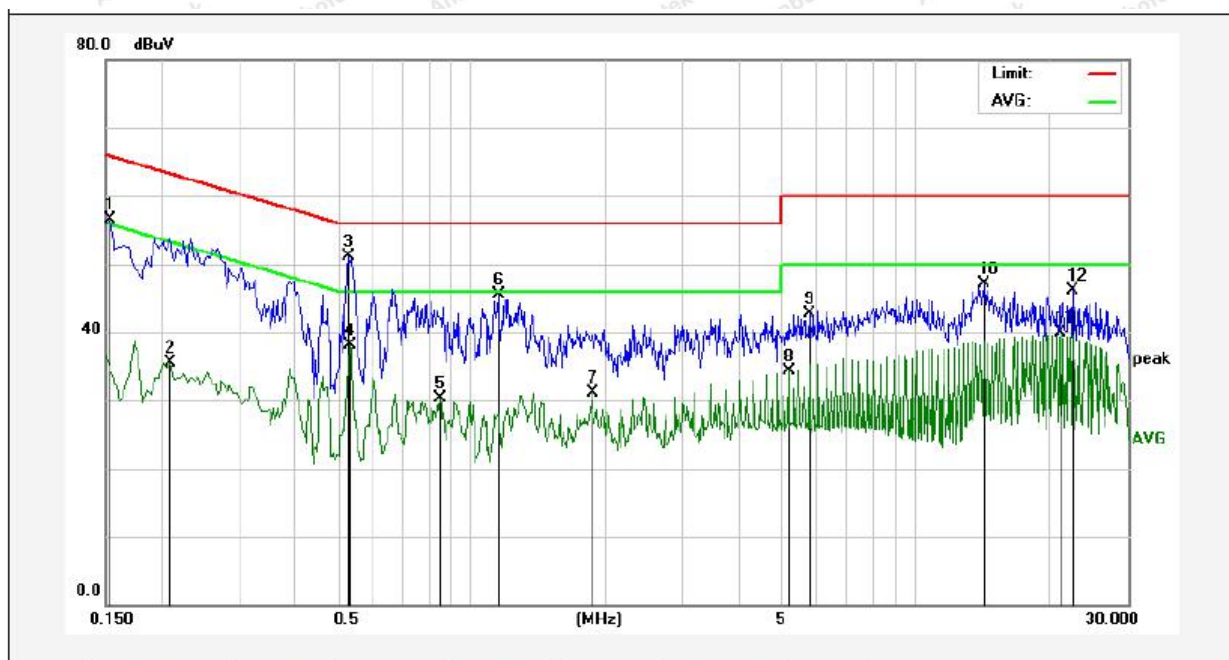
Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 240V, 60Hz for adapter
Comment: Live Line
Tem.: 22.7°C Hum.: 57%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1980	38.06	19.90	57.96	63.69	-5.73	peak	
2	0.1980	16.39	19.90	36.29	53.69	-17.40	AVG	
3	0.5260	32.03	19.99	52.02	56.00	-3.98	peak	
4	0.5380	17.06	19.99	37.05	46.00	-8.95	AVG	
5	1.0060	14.28	20.12	34.40	46.00	-11.60	AVG	
6	1.1260	24.40	20.12	44.52	56.00	-11.48	peak	
7	1.8700	22.36	20.14	42.50	56.00	-13.50	peak	
8	1.8700	11.55	20.14	31.69	46.00	-14.31	AVG	
9	5.7580	24.42	20.23	44.65	60.00	-15.35	peak	
10	7.1980	15.61	20.27	35.88	50.00	-14.12	AVG	
11	14.6820	26.28	20.27	46.55	60.00	-13.45	peak	
12	18.4260	17.21	20.31	37.52	50.00	-12.48	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.: 22.7°C Hum.: 57%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1539	36.56	19.90	56.46	65.78	-9.32	peak	
2	0.2100	15.64	19.90	35.54	53.20	-17.66	AVG	
3	0.5299	31.18	19.99	51.17	56.00	-4.83	peak	
4	0.5340	18.12	19.99	38.11	46.00	-7.89	AVG	
5	0.8500	10.29	20.08	30.37	46.00	-15.63	AVG	
6	1.1500	25.37	20.12	45.49	56.00	-10.51	peak	
7	1.8700	10.89	20.14	31.03	46.00	-14.97	AVG	
8	5.1820	14.13	20.21	34.34	50.00	-15.66	AVG	
9	5.7580	22.41	20.23	42.64	60.00	-17.36	peak	
10	14.2780	26.91	20.27	47.18	60.00	-12.82	peak	
11	21.2460	19.62	20.32	39.94	50.00	-10.06	AVG	
12	22.5940	25.84	20.31	46.15	60.00	-13.85	peak	



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

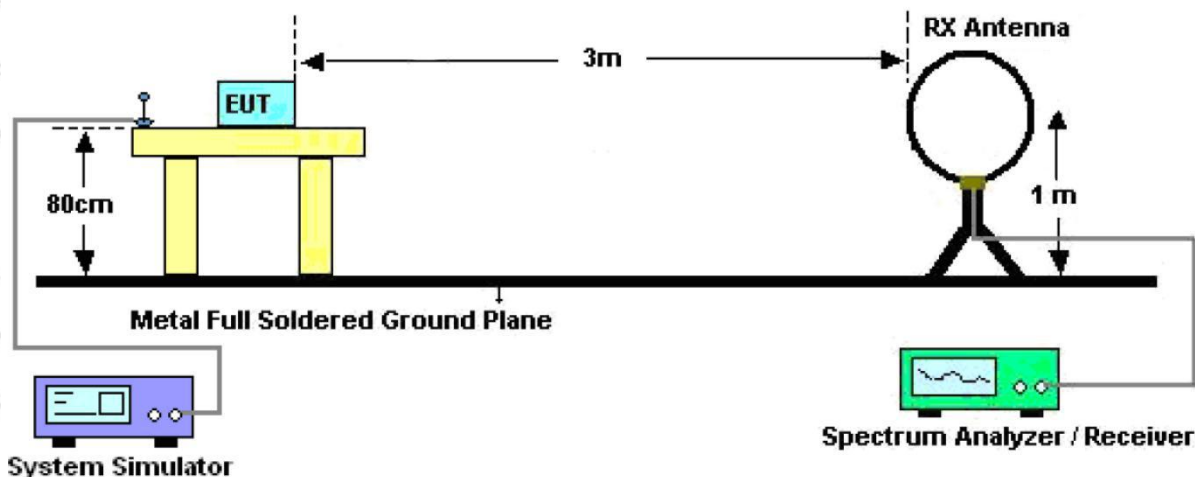


Figure 1. Below 30MHz

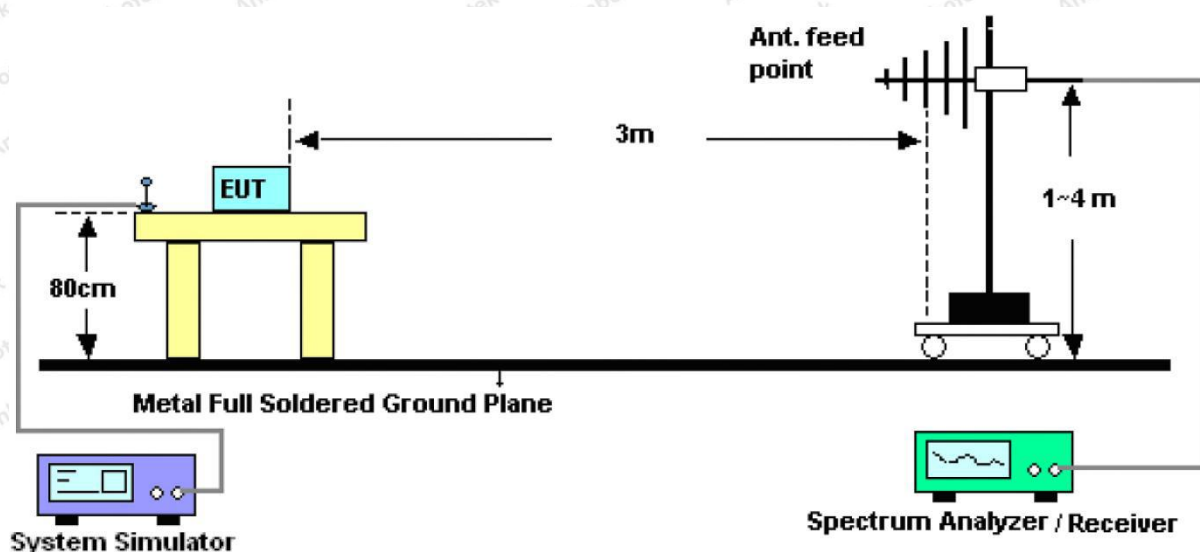


Figure 2. 30MHz to 1GHz

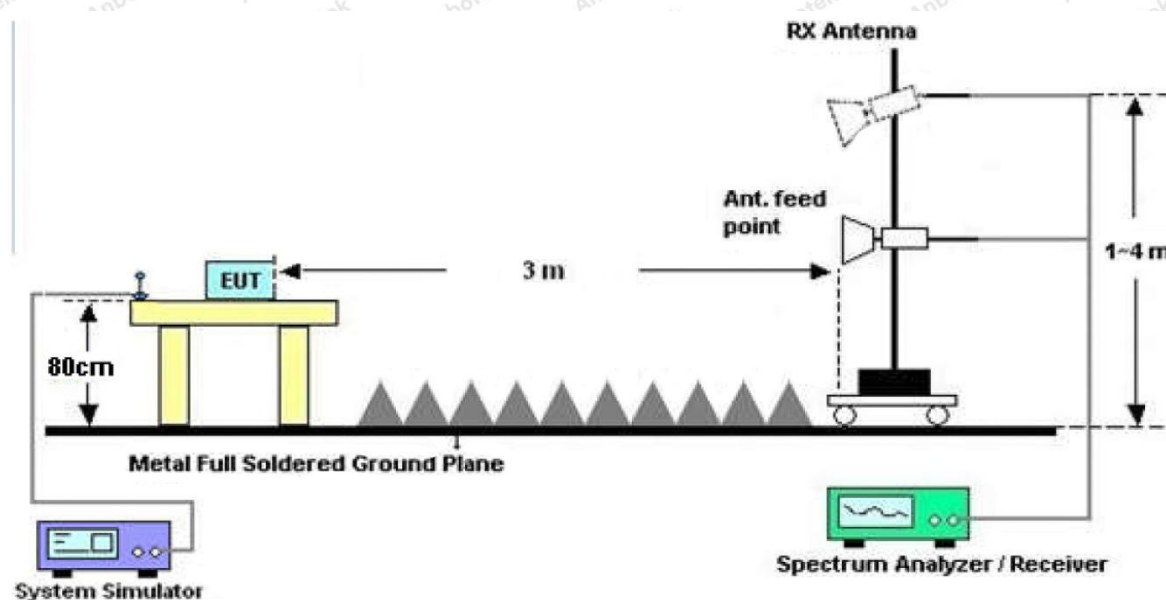


Figure 3. Above 1 GHz

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

(Between 9KHz – 30MHz)

Job No.: 18220WC001402**Standard:** FCC PART15 C_3m**Power Source:**

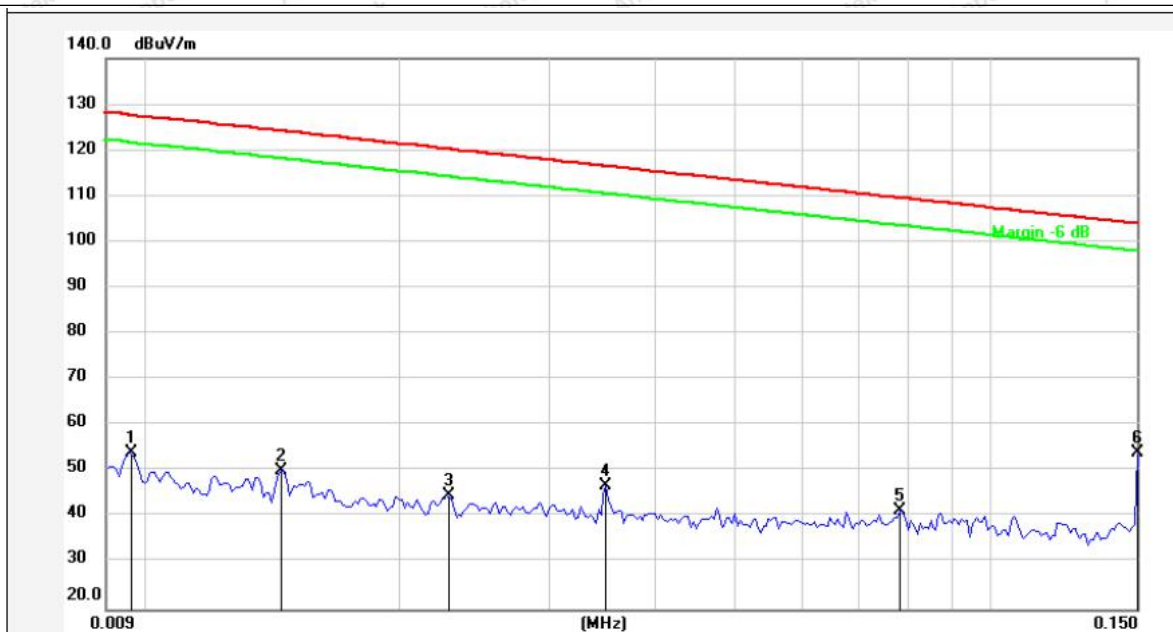
AC 120V, 60Hz for adapter

Test item: Radiation Test**Temp.(C)/Hum.(%RH):**

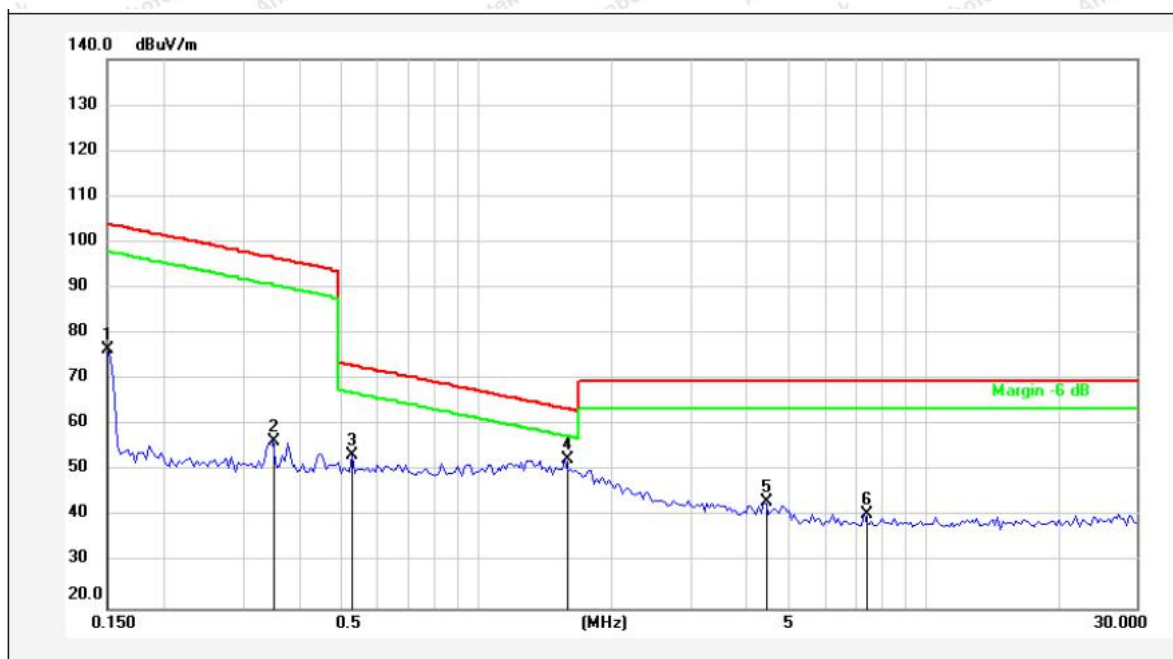
24.8°C/60%RH

Test Mode: Mode 1**Distance:**

3m



No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	0.0096	33.83	20.10	53.93	127.75	-73.82	AV			
2	0.0145	30.06	20.24	50.30	124.19	-73.89	AV			
3	0.0228	24.26	20.36	44.62	120.28	-75.66	AV			
4	0.0352	26.44	20.48	46.92	116.53	-69.61	AV			
5	0.0785	21.18	20.36	41.54	109.61	-68.07	AV			
6	0.1500	33.70	20.33	54.03	104.02	-49.99	AV			

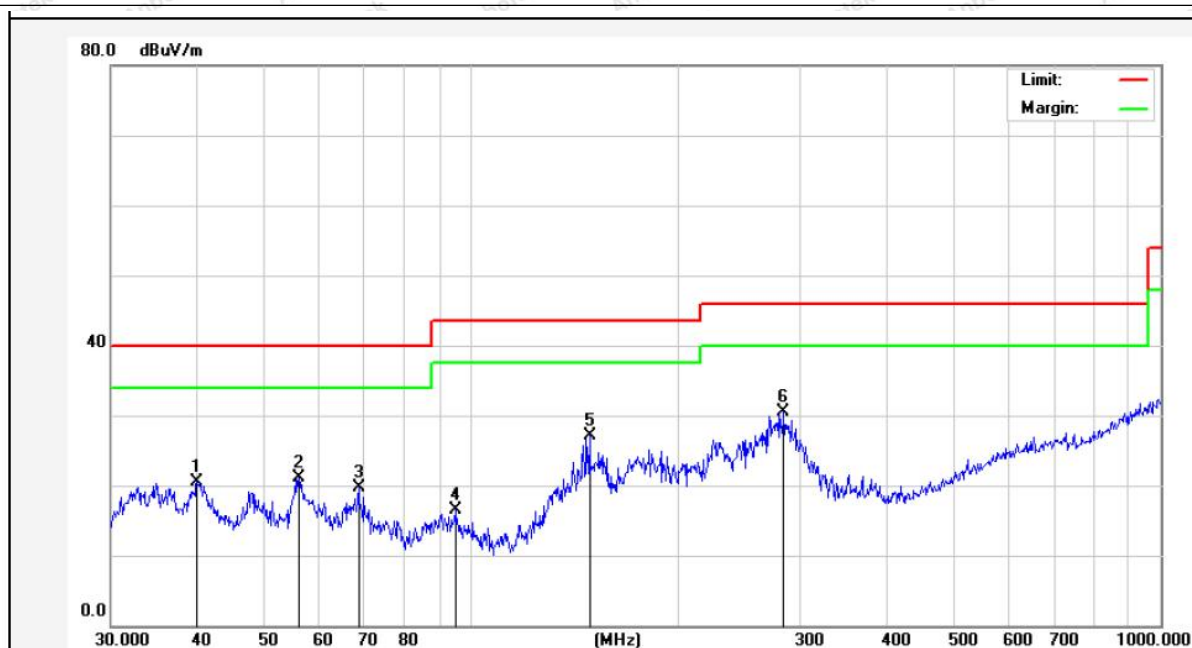


No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	0.1500	56.26	20.33	76.59	104.02	-27.43	AV			
2	0.3502	36.17	20.28	56.45	96.70	-40.25	AV			
3	0.5279	33.32	20.27	53.59	73.15	-19.56	QP			
4	1.5851	32.18	20.26	52.44	63.63	-11.19	QP			
5	4.3954	22.91	20.39	43.30	69.50	-26.20	QP			
6	7.3680	19.96	20.48	40.44	69.50	-29.06	QP			

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.

(Between 30MHz –1000 MHz)

Job No.:	18220WC001402	Polarization:	Horizontal
Standard:	FCC PART15 C_3m	Power Source:	AC 120V, 60Hz for adapter
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.1℃/49%RH
Test Mode:	Mode 1	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	39.9942	35.49	-15.05	20.44	40.00	-19.56	QP	100	0	
2	56.1974	37.48	-16.46	21.02	40.00	-18.98	QP	100	360	
3	68.6310	39.76	-20.06	19.70	40.00	-20.30	QP	100	0	
4	94.7601	36.46	-19.90	16.56	43.50	-26.94	QP	100	360	
5	148.4410	47.78	-20.71	27.07	43.50	-16.43	QP	100	0	
6	283.9791	46.27	-15.75	30.52	46.00	-15.48	QP	100	360	



Job No.: 18220WC001402 **Polarization:** Vertical
Standard: FCC PART15 C_3m **Power Source:** AC 120V, 60Hz for adapter
Test item: Radiation Test **Temp.(C)/Hum.(%RH):** 24.1°C/49%RH
Test Mode: Mode 1 **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	32.7486	46.57	-16.69	29.88	40.00	-10.12	QP	100	0	
2	35.8746	46.03	-15.80	30.23	40.00	-9.77	QP	100	360	
3	40.1347	43.25	-13.59	29.66	40.00	-10.34	QP	100	0	
4	53.5052	40.98	-16.02	24.96	40.00	-15.04	QP	100	360	
5	79.2426	35.39	-17.79	17.60	40.00	-22.40	QP	100	0	
6	158.1123	49.62	-19.51	30.11	43.50	-13.39	QP	100	360	

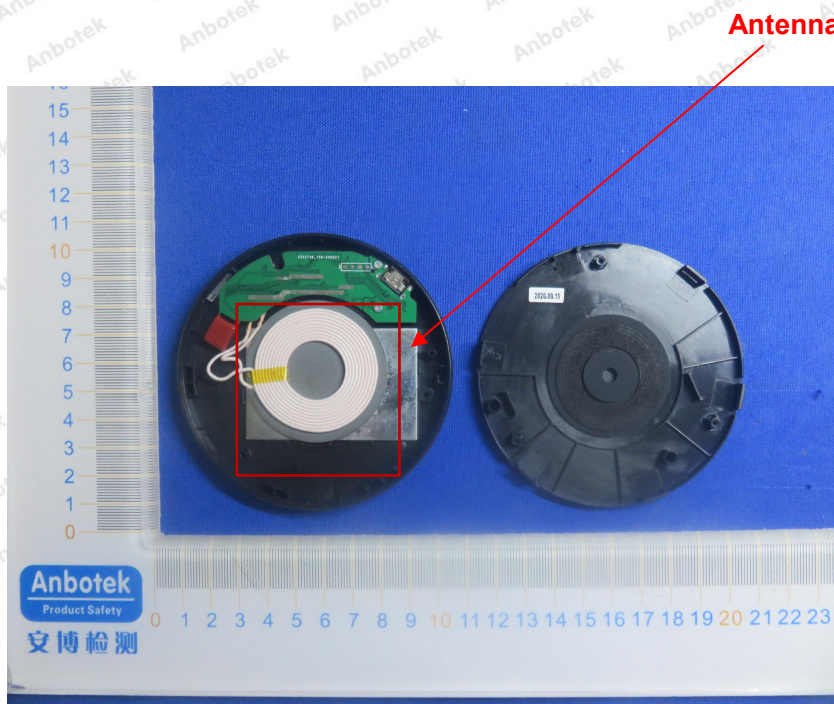
5. Antenna Requirement

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.



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

