

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 : 2-IN-1 Wireless Charging Station
Date : Oct. 23, 2020



Shenzhen Anbotek 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 : 2-IN-1 Wireless Charging Station
Model No. : EFC0030
Trade Mark : ESR
Rating(s) : Input: 5V/3A, 9V/2A
Wireless output: 5W, 7.5W, 10W
USB output: 5W
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

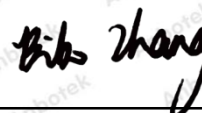
Sept. 23~Oct. 19, 2020

Prepared By



(Engineer / Yilia Zhong)

Reviewer



(Supervisor / Bibo Zhang)

Approved & Authorized Signer



(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	:	2-IN-1 Wireless Charging Station	
Model No.	:	EFC0030	
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 generated from EUT, the test system was pre-scanning tested based on the consideration of following EUT operation mode or test configuration mode which possibly 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

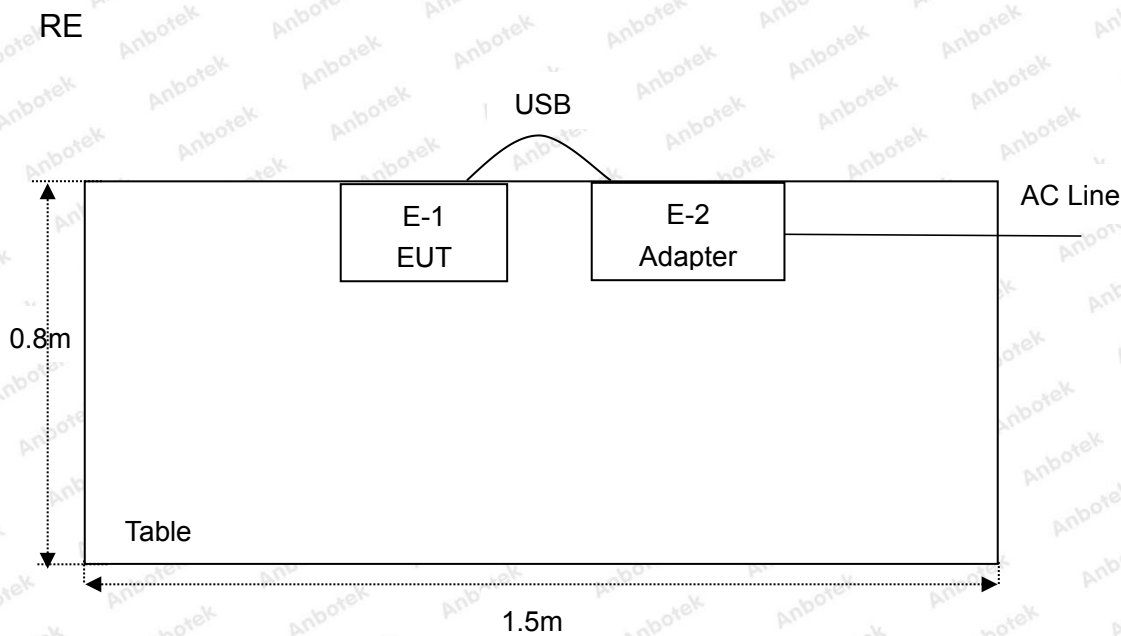
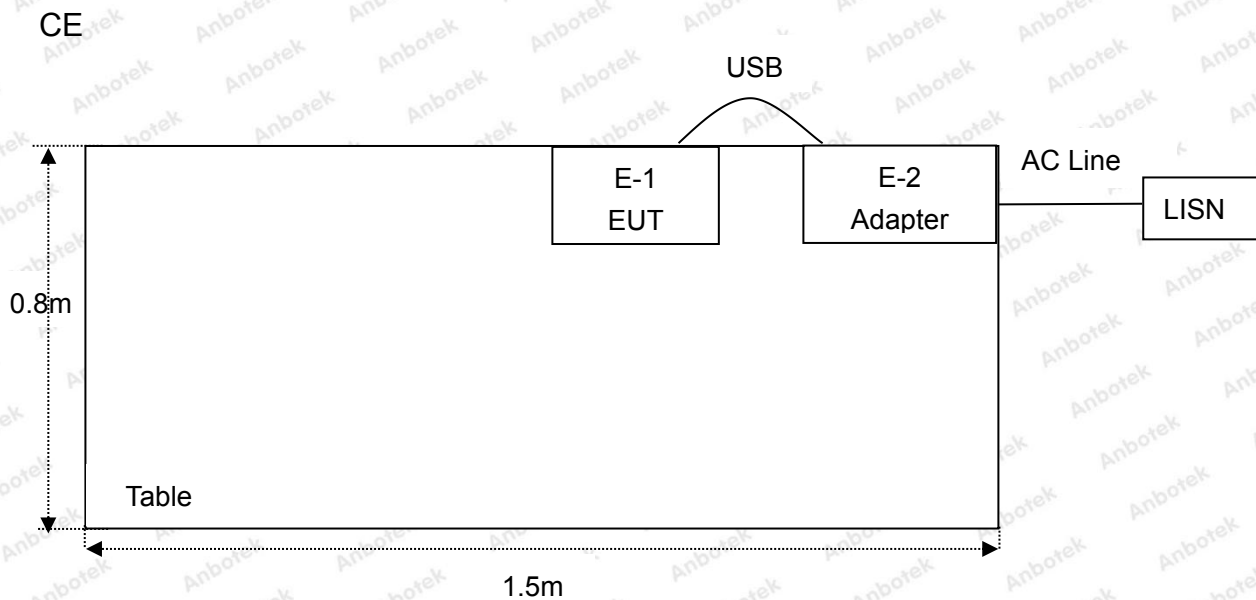
For Conducted Emission	
Final Test Mode	Description
Mode 1	Wireless Charging Mode

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

Note: (1) Test channel is 0.1281MHz.

(2) All the situation (full load, half load and empty load) has been tested, only the worst situation (full load 10W) 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 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.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

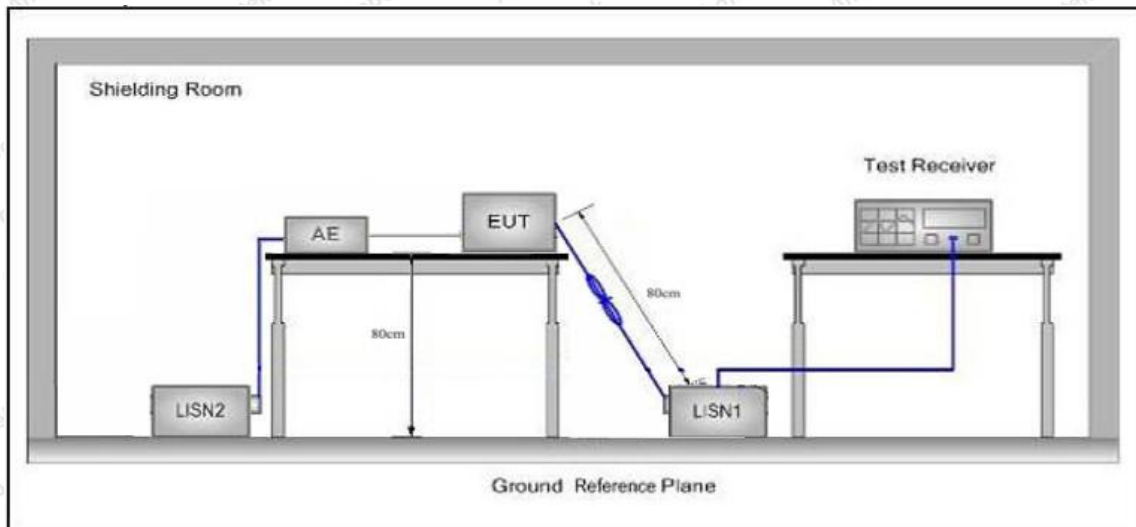
3. Conducted Emission Test

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.

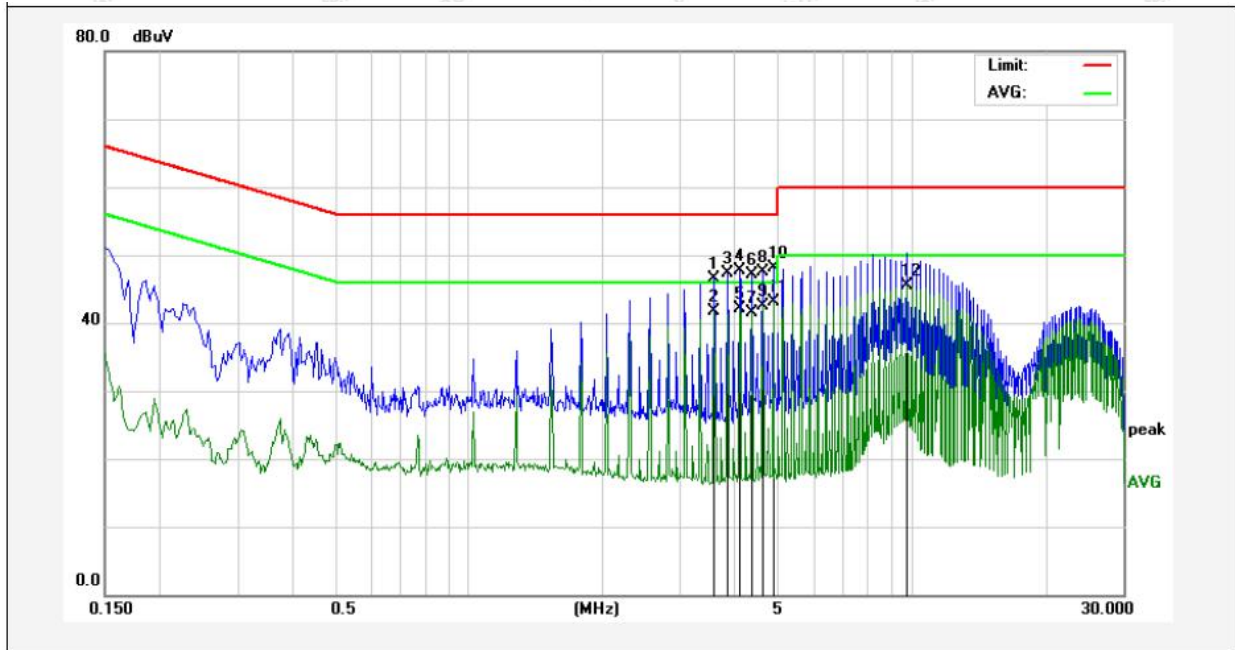
The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Please to see the following pages

Conducted Emission Test Data

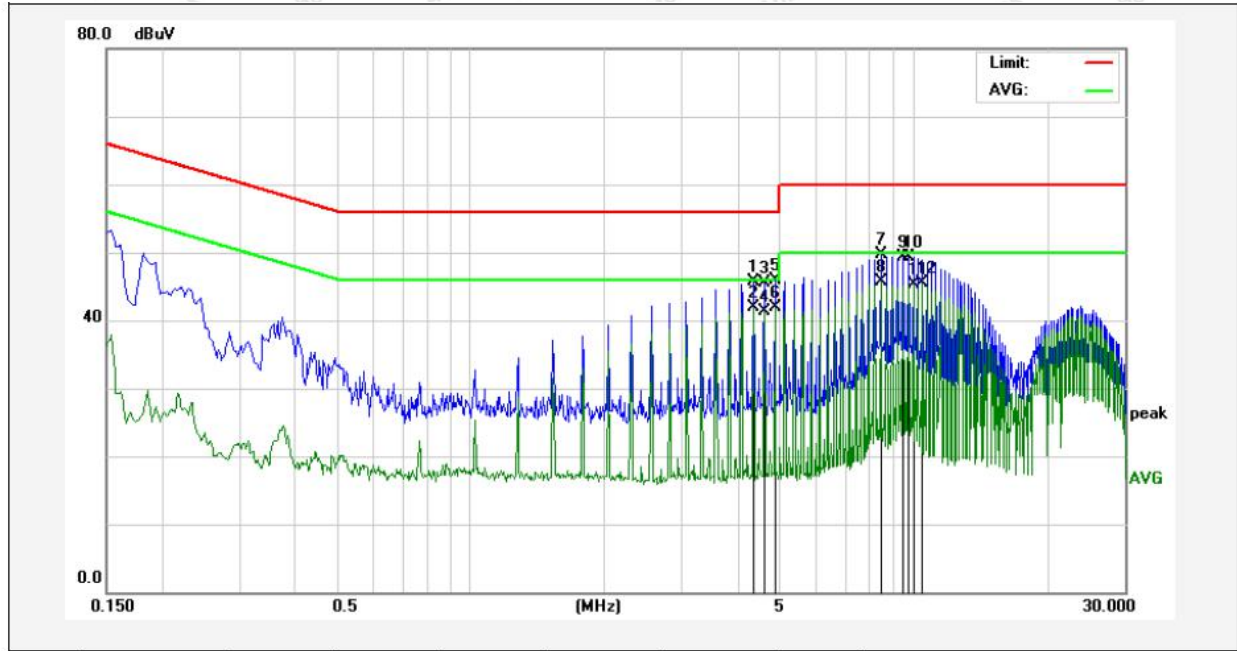
Test Site: 1# Shielded Room
 Operating Condition: Mode 1
 Test Specification: AC 120V, 60Hz for adapter
 Comment: Live Line
 Tem.: 22.7°C Hum.: 57%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	3.5780	26.43	20.17	46.60	56.00	-9.40	QP	
2	3.5780	21.54	20.17	41.71	46.00	-4.29	AVG	
3	3.8340	27.13	20.18	47.31	56.00	-8.69	QP	
4	4.0900	27.50	20.18	47.68	56.00	-8.32	QP	
5	4.0900	22.01	20.18	42.19	46.00	-3.81	AVG	
6	4.3460	26.98	20.19	47.17	56.00	-8.83	QP	
7	4.3460	21.35	20.19	41.54	46.00	-4.46	AVG	
8	4.6020	27.39	20.20	47.59	56.00	-8.41	QP	
9	4.6020	22.36	20.20	42.56	46.00	-3.44	AVG	
10	4.8580	27.87	20.20	48.07	56.00	-7.93	QP	
11	4.8580	22.89	20.20	43.09	46.00	-2.91	AVG	
12	9.7140	25.12	20.33	45.45	50.00	-4.55	AVG	

Conducted Emission Test Data

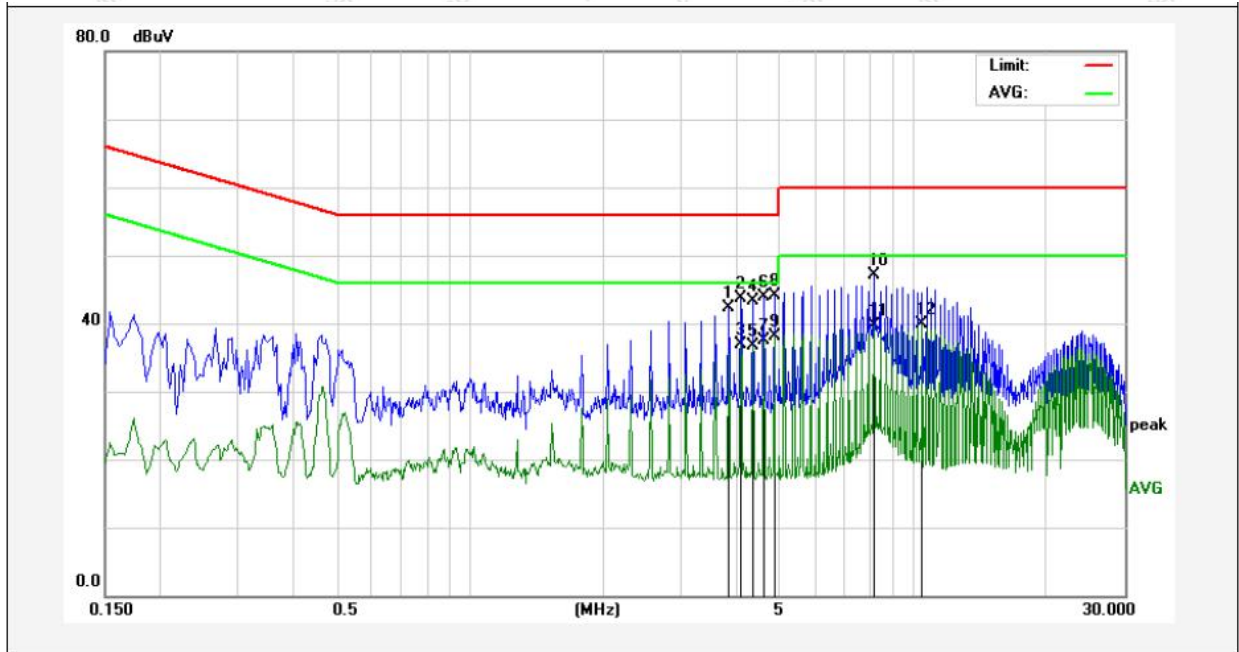
Test Site: 1# Shielded Room
 Operating Condition: Mode 1
 Test Specification: AC 120V, 60Hz for adapter
 Comment: Neutral Line
 Tem.: 22.7°C Hum.: 57%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	4.3460	25.47	20.19	45.66	56.00	-10.34	QP	
2	4.3460	21.62	20.19	41.81	46.00	-4.19	AVG	
3	4.6020	25.35	20.20	45.55	56.00	-10.45	QP	
4	4.6020	21.12	20.20	41.32	46.00	-4.68	AVG	
5	4.8580	25.67	20.20	45.87	56.00	-10.13	QP	
6	4.8580	21.61	20.20	41.81	46.00	-4.19	AVG	
7	8.4379	29.43	20.30	49.73	60.00	-10.27	QP	
8	8.4379	25.34	20.30	45.64	50.00	-4.36	AVG	
9	9.4580	29.03	20.33	49.36	60.00	-10.64	QP	
10	9.7140	29.02	20.33	49.35	60.00	-10.65	QP	
11	9.9700	25.04	20.34	45.38	50.00	-4.62	AVG	
12	10.4819	25.12	20.33	45.45	50.00	-4.55	AVG	

Conducted Emission Test Data

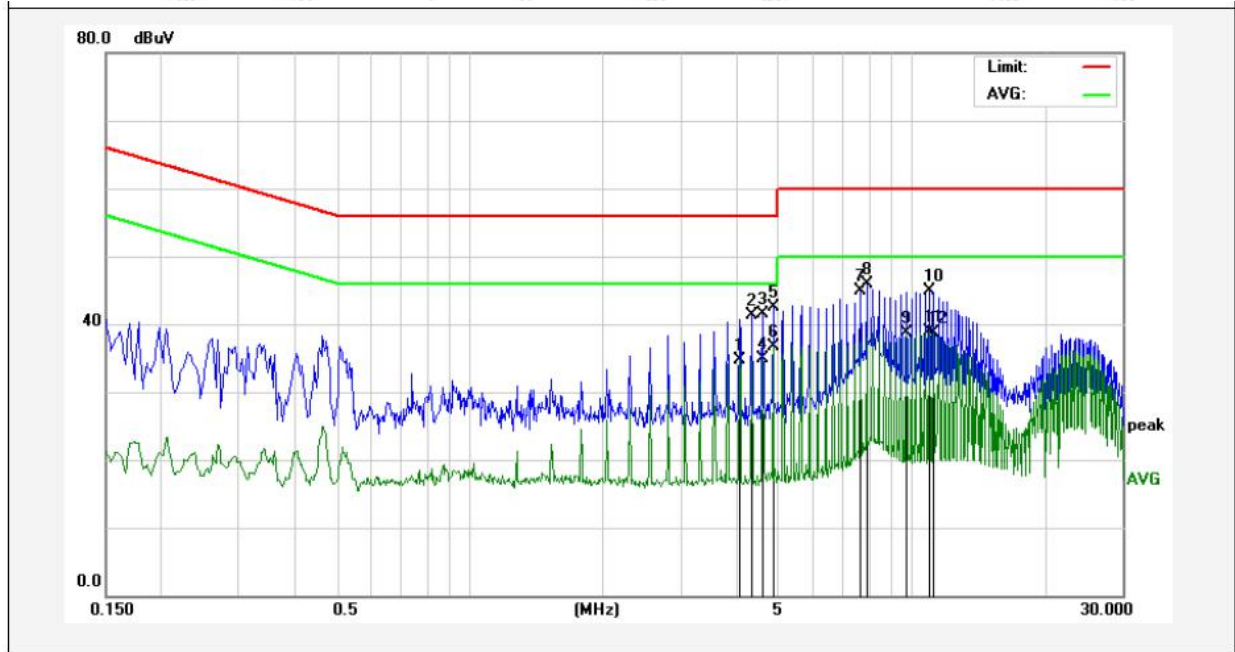
Test Site: 1# Shielded Room
 Operating Condition: Mode 1
 Test Specification: AC 240V, 60Hz for adapter
 Comment: Live Line
 Tem.: 22.7°C Hum.: 57%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	3.8340	22.20	20.18	42.38	56.00	-13.62	QP	
2	4.0900	23.51	20.18	43.69	56.00	-12.31	QP	
3	4.0900	16.65	20.18	36.83	46.00	-9.17	AVG	
4	4.3460	23.03	20.19	43.22	56.00	-12.78	QP	
5	4.3460	16.61	20.19	36.80	46.00	-9.20	AVG	
6	4.6020	23.73	20.20	43.93	56.00	-12.07	QP	
7	4.6020	17.21	20.20	37.41	46.00	-8.59	AVG	
8	4.8580	23.90	20.20	44.10	56.00	-11.90	QP	
9	4.8580	17.83	20.20	38.03	46.00	-7.97	AVG	
10	8.1820	26.80	20.29	47.09	60.00	-12.91	QP	
11	8.1820	19.38	20.29	39.67	50.00	-10.33	AVG	
12	10.4819	19.54	20.33	39.87	50.00	-10.13	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	4.0900	14.57	20.18	34.75	46.00	-11.25	AVG	
2	4.3460	21.10	20.19	41.29	56.00	-14.71	QP	
3	4.6020	21.30	20.20	41.50	56.00	-14.50	QP	
4	4.6020	14.74	20.20	34.94	46.00	-11.06	AVG	
5	4.8580	22.21	20.20	42.41	56.00	-13.59	QP	
6	4.8580	16.42	20.20	36.62	46.00	-9.38	AVG	
7	7.6700	24.61	20.28	44.89	60.00	-15.11	QP	
8	7.9260	25.53	20.28	45.81	60.00	-14.19	QP	
9	9.7140	18.41	20.33	38.74	50.00	-11.26	AVG	
10	10.9940	24.59	20.32	44.91	60.00	-15.09	QP	
11	10.9940	18.52	20.32	38.84	50.00	-11.16	AVG	
12	11.2500	18.42	20.32	38.74	50.00	-11.26	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
	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

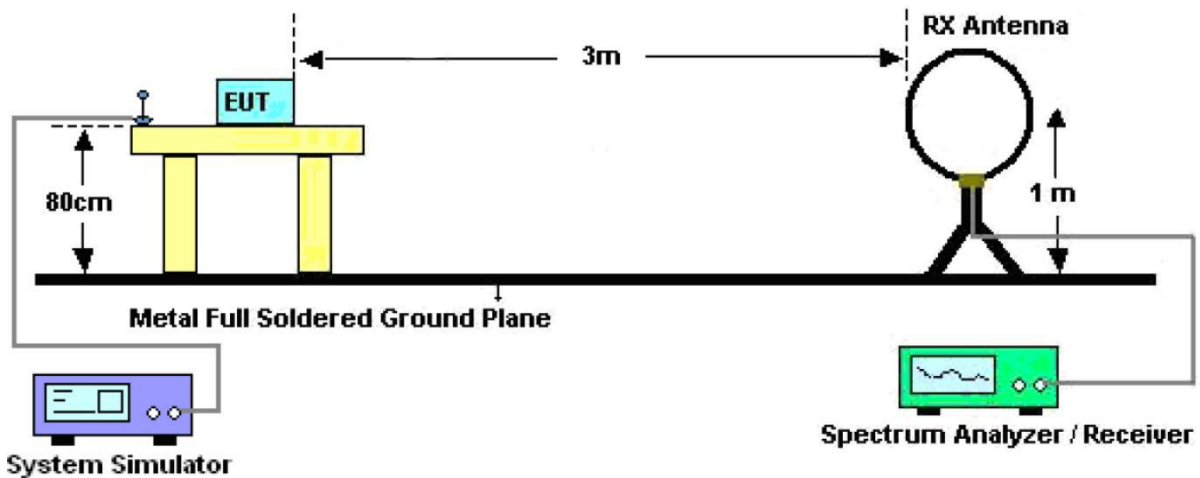


Figure 1. Below 30MHz

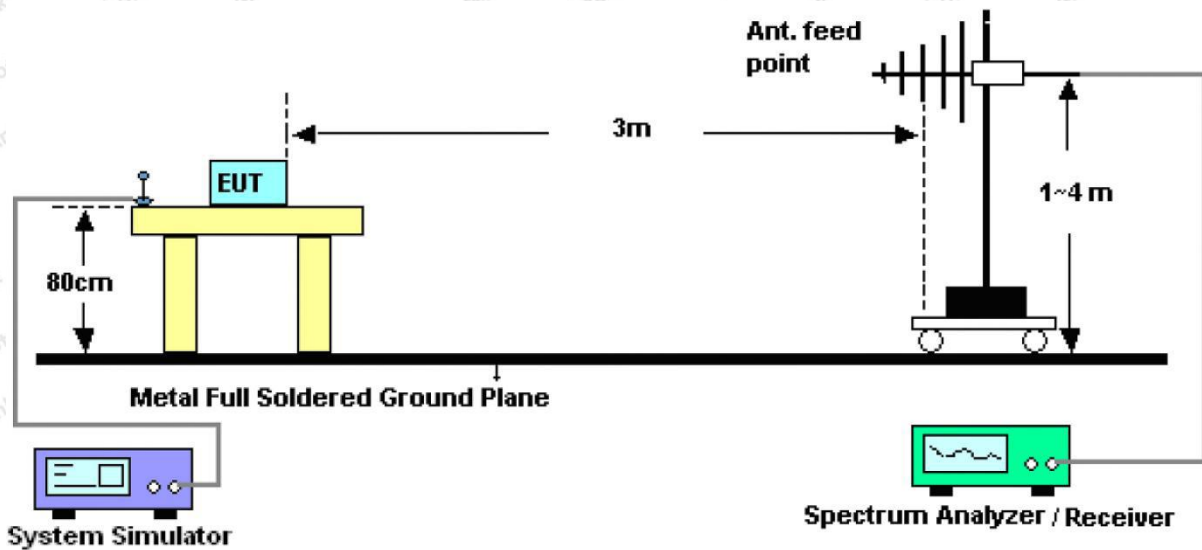


Figure 2. 30MHz to 1GHz

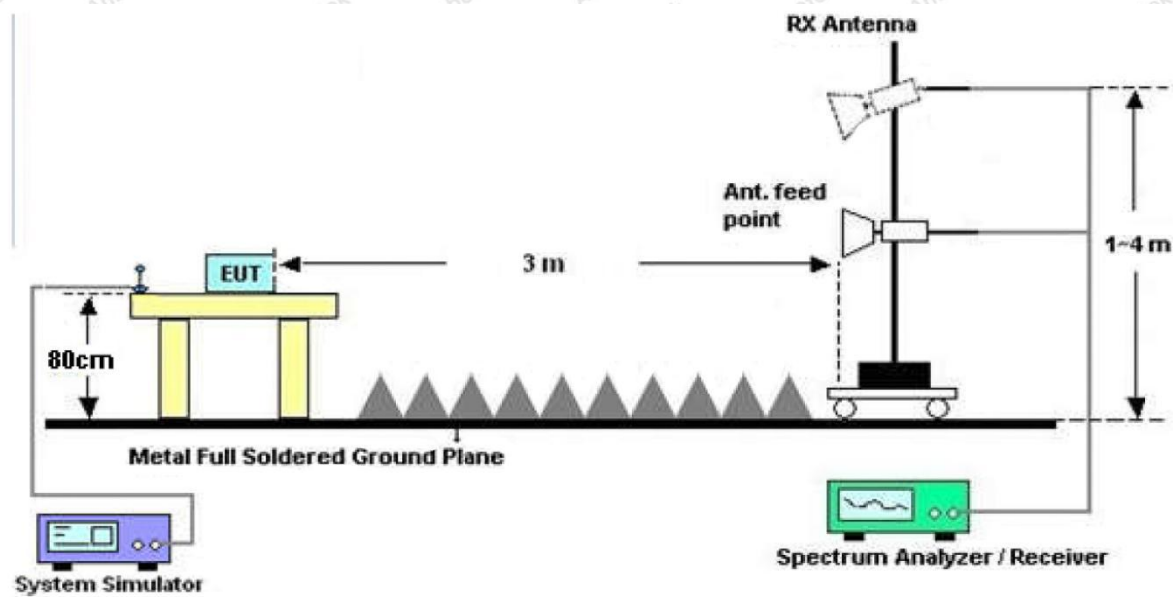


Figure 3. Above 1 GHz

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.: 18220WC001405

Standard: FCC PART15 C_3m

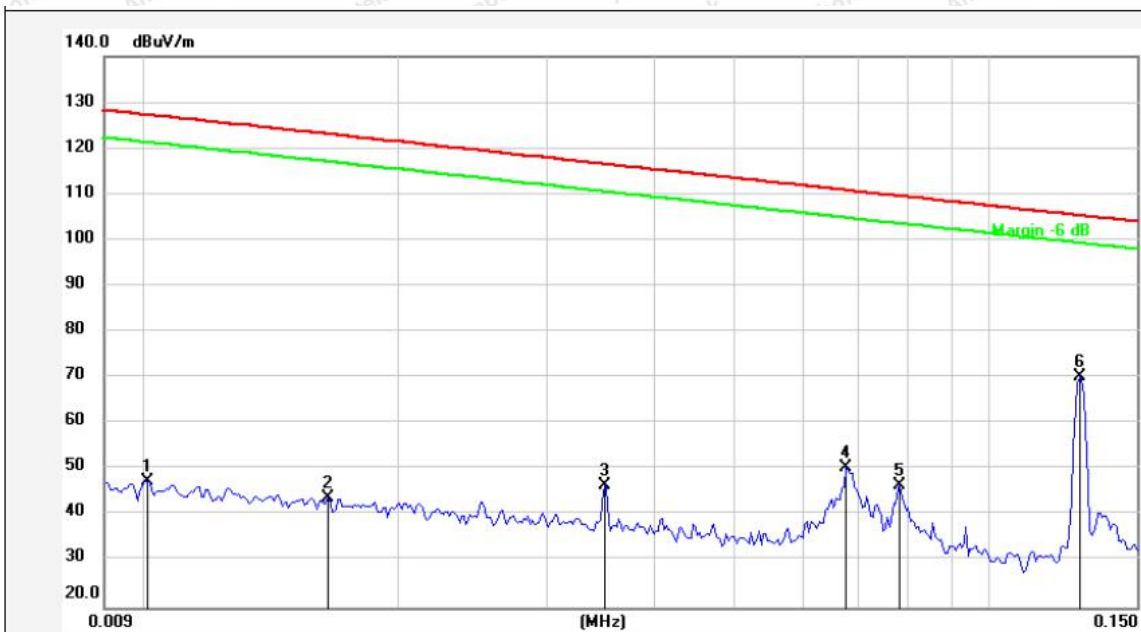
Power Source: AC 120V, 60Hz for adapter

Test item: Radiation Test

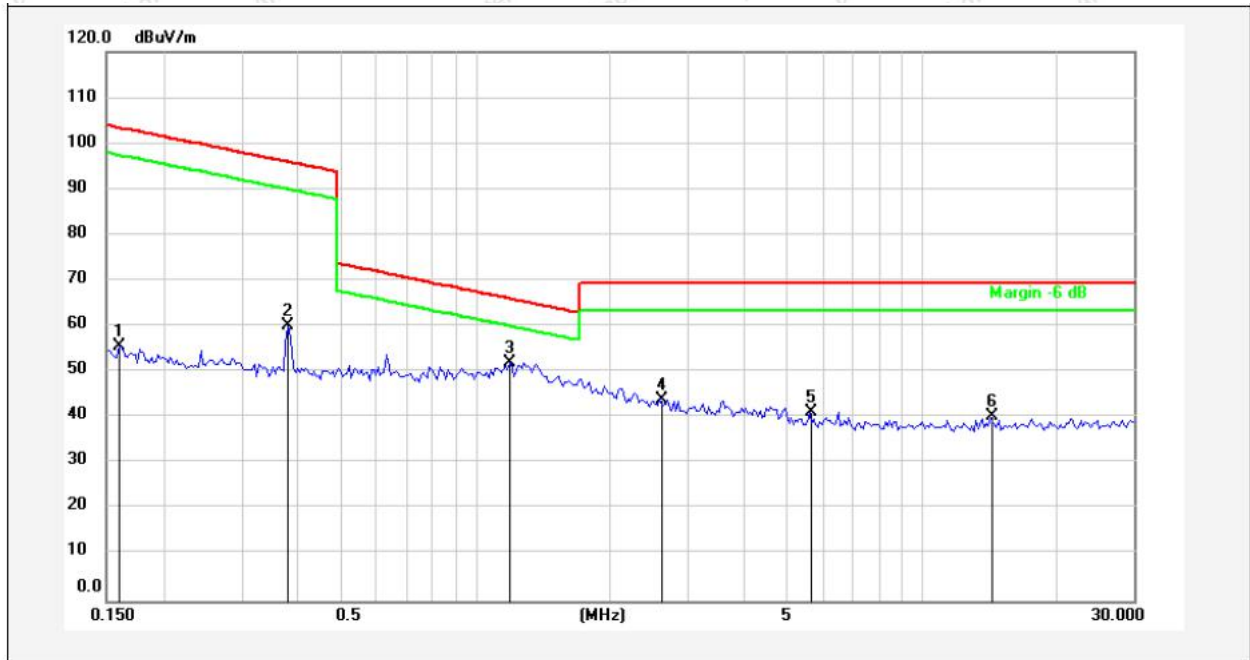
Temp.(C)/Hum.(%RH): 24.2°C/59%RH

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	0.0101	27.47	20.09	47.56	127.31	-79.75	AV			
2	0.0165	23.66	20.22	43.88	123.07	-79.19	AV			
3	0.0351	26.20	20.49	46.69	116.56	-69.87	AV			
4	0.0678	30.01	20.37	50.38	110.87	-60.49	AV			
5	0.0785	26.09	20.36	46.45	109.61	-63.16	AV			
6	0.1281	49.91	20.34	70.25	105.38	-35.13	AV			

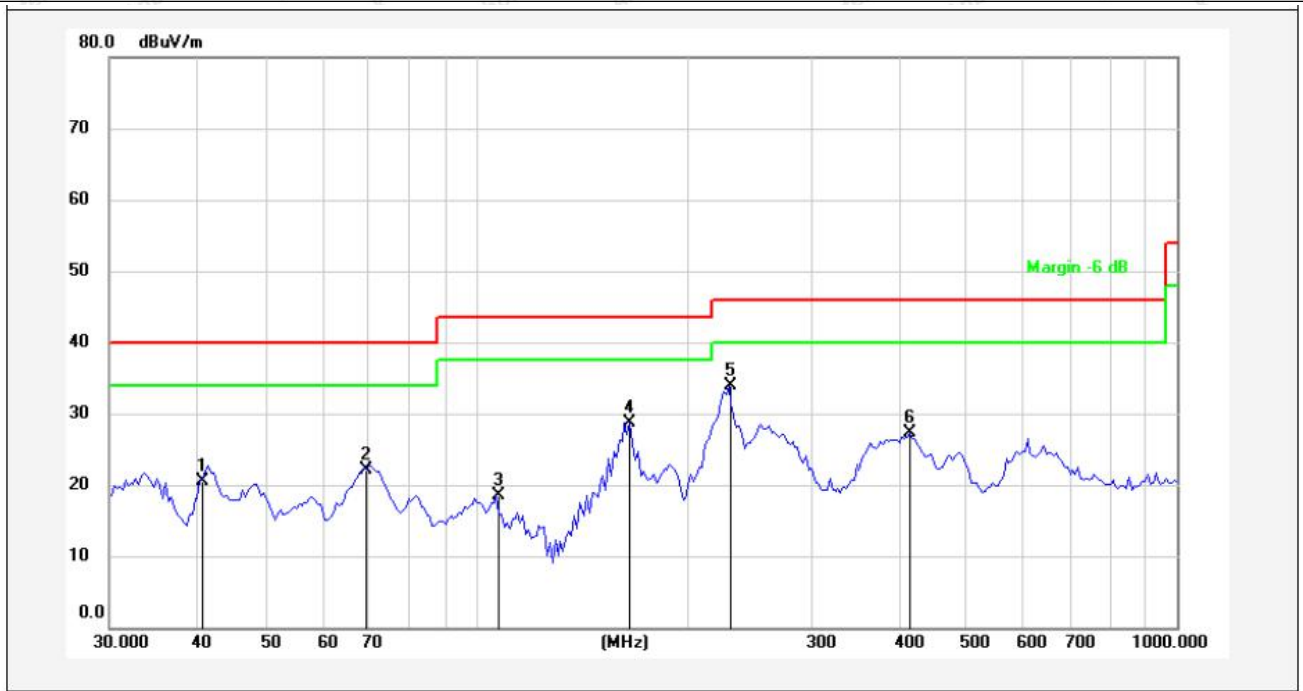


No.	Freq. (MHz)	Reading (dBUV)	Factor ()	Result (dBUV/m)	Limit (dBUV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	0.1598	35.41	20.33	55.74	103.47	-47.73	AV			
2	0.3811	39.90	20.28	60.18	95.97	-35.79	AV			
3	1.1970	31.78	20.26	52.04	66.06	-14.02	QP			
4	2.5945	23.81	20.29	44.10	69.50	-25.40	QP			
5	5.6234	20.92	20.38	41.30	69.50	-28.20	QP			
6	14.2882	19.66	20.54	40.20	69.50	-29.30	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.

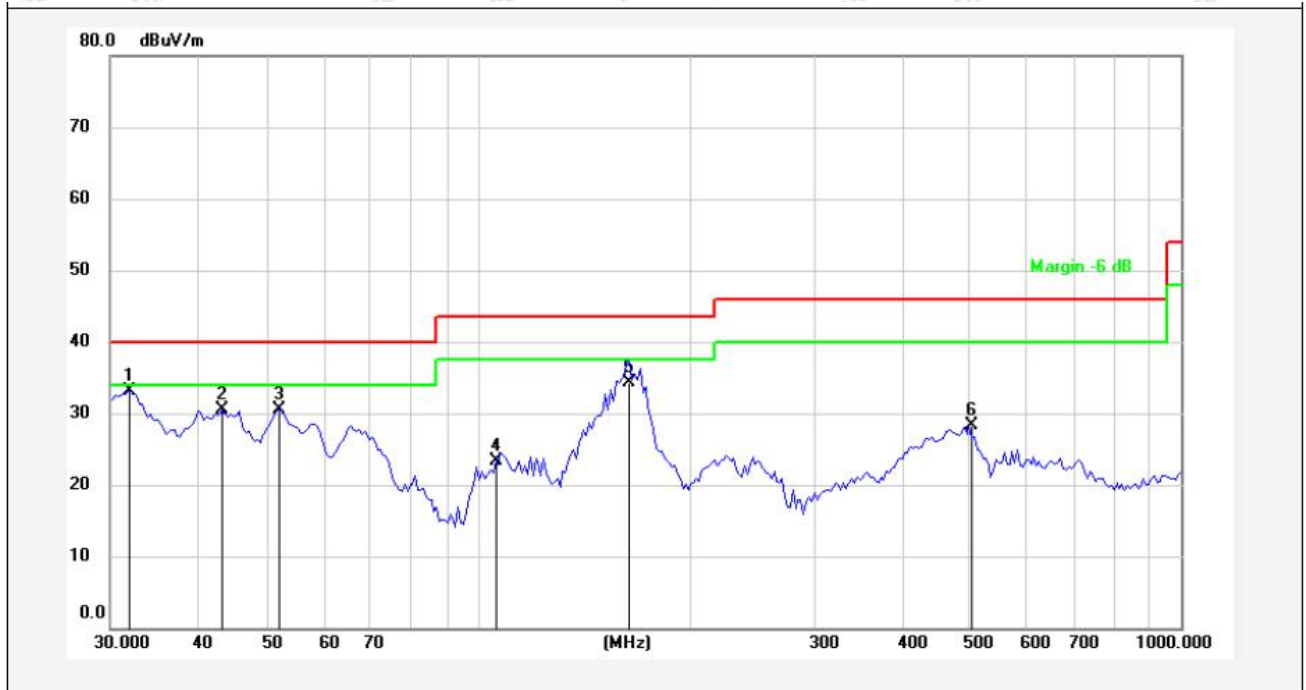
(Between 30MHz –1000 MHz)

Job No.:	18220WC001405	Polarization:	Horizontal
Standard:	FCC PART15 C_3m	Power Source:	AC 120V, 60Hz for adapter
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.2°C/59%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	40.4172	35.99	-15.57	20.42	40.00	-19.58	QP	100	360	
2	68.9930	42.02	-20.00	22.02	40.00	-17.98	QP	100	0	
3	106.9461	34.88	-16.29	18.59	43.50	-24.91	QP	100	360	
4	165.7771	48.47	-19.70	28.77	43.50	-14.73	QP	100	0	
5	229.2931	50.63	-16.70	33.93	46.00	-12.07	QP	100	360	
6	416.1791	41.88	-14.52	27.36	46.00	-18.64	QP	100	0	

Job No.:	18220WC001405	Polarization:	Vertical
Standard:	FCC PART15 C_3m	Power Source:	AC 120V, 60Hz for adapter
Test item:	Radiation Test	Temp.(C)/Hum.(%RH):	24.2°C/59%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	31.8986	49.84	-16.82	33.02	40.00	-6.98	QP	100	0	
2	43.3534	46.05	-15.59	30.46	40.00	-9.54	QP	100	360	
3	52.1164	46.58	-16.01	30.57	40.00	-9.43	QP	100	0	
4	106.0126	39.50	-16.21	23.29	43.50	-20.21	QP	100	360	
5	164.3301	54.00	-19.75	34.25	43.50	-9.25	QP	100	0	
6	500.3011	42.66	-14.27	28.39	46.00	-17.61	QP	100	360	

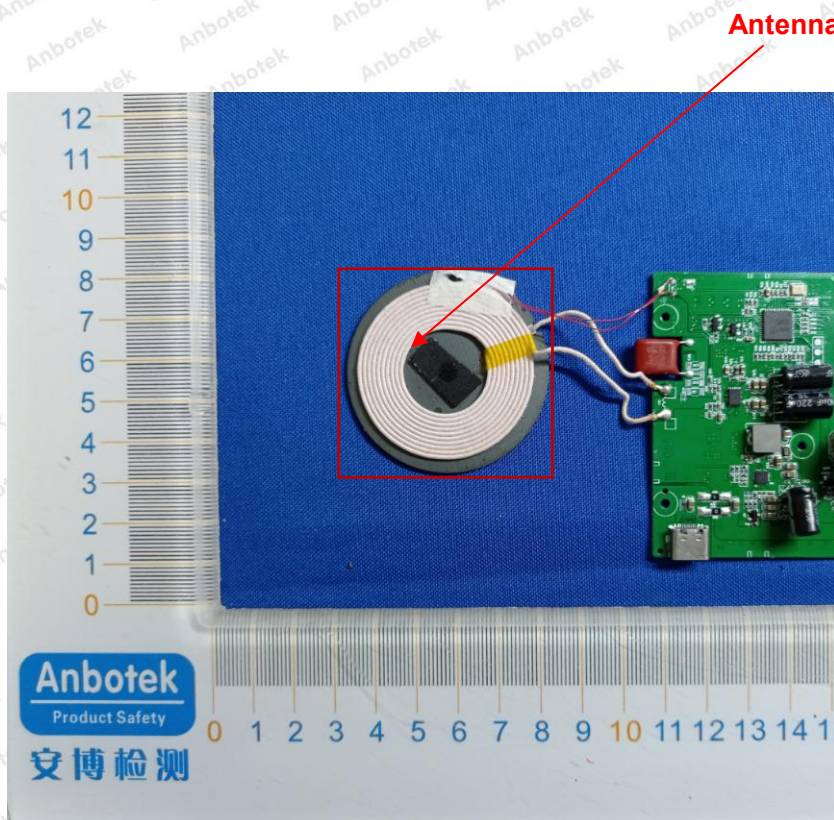
5. Antenna Requirement

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 -----