

# FCC TEST REPORT

Client Name : Shenzhen Lingyi Innovation Tech Co., Ltd.  
Address : 12 F, Block C, Central Avenue Building, Xixiang BLVD  
West, Baoan District, Shenzhen China  
Product Name : Wireless Power Bank  
Date : Jan. 13, 2021



**Shenzhen Anbotek Compliance Laboratory Limited**

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# TEST REPORT

Applicant : Shenzhen Lingyi Innovation Tech Co., Ltd.  
Manufacturer : Shenzhen Lingyi Innovation Tech Co., Ltd.  
Product Name : Wireless Power Bank  
Model No. : MJ2-01  
Trade Mark :  PITAKA  
Rating(s) : Type-C Input: DC 5V, 1.5A  
Type-C Output: DC 5V, 1.5A  
Wireless Output: 5W  
Battery: 3.7V / 2800mAh / 10.36Wh

**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

Dec. 24, 2020

Date of Test

Dec. 24, 2020~Jan. 06, 2021

Prepared By

*Yilia Zhong*

(Engineer / Yilia Zhong)

Reviewer

*Bibo Zhang*

(Supervisor / Bibo Zhang)

Approved & Authorized Signer

*Kingkong Jin*

(Manager / Kingkong Jin)




## 1. General Information

### 1.1. Client Information

Applicant	:	Shenzhen Lingyi Innovation Tech Co., Ltd.
Address	:	12 F, Block C, Central Avenue Building, Xixiang BLVD West, Baoan District, Shenzhen China
Manufacturer	:	Shenzhen Lingyi Innovation Tech Co., Ltd.
Address	:	12 F, Block C, Central Avenue Building, Xixiang BLVD West, Baoan District, Shenzhen China
Factory	:	Shenzhen Lingyi Innovation Tech Co., Ltd.
Address	:	12 F, Block C, Central Avenue Building, Xixiang BLVD West, Baoan District, Shenzhen China

### 1.2. Description of Device (EUT)

Product Name	:	Wireless Power Bank
Model No.	:	MJ2-01
Trade Mark	:	 PITAKA
Test Power Supply	:	AC 120V, 60Hz for adapter / AC 240V, 60Hz for adapter/ DC 3.7V battery inside
Test Sample No.	:	1-2-1(Normal Sample), 1-2-1(Engineering Sample)
Product Description	Operation Frequency:	110.1-205KHz
	Modulation Type:	QI
	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

N/A	:	
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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	Charge Mode&Wireless Charging Mode
Mode 2	FULL load Mode

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

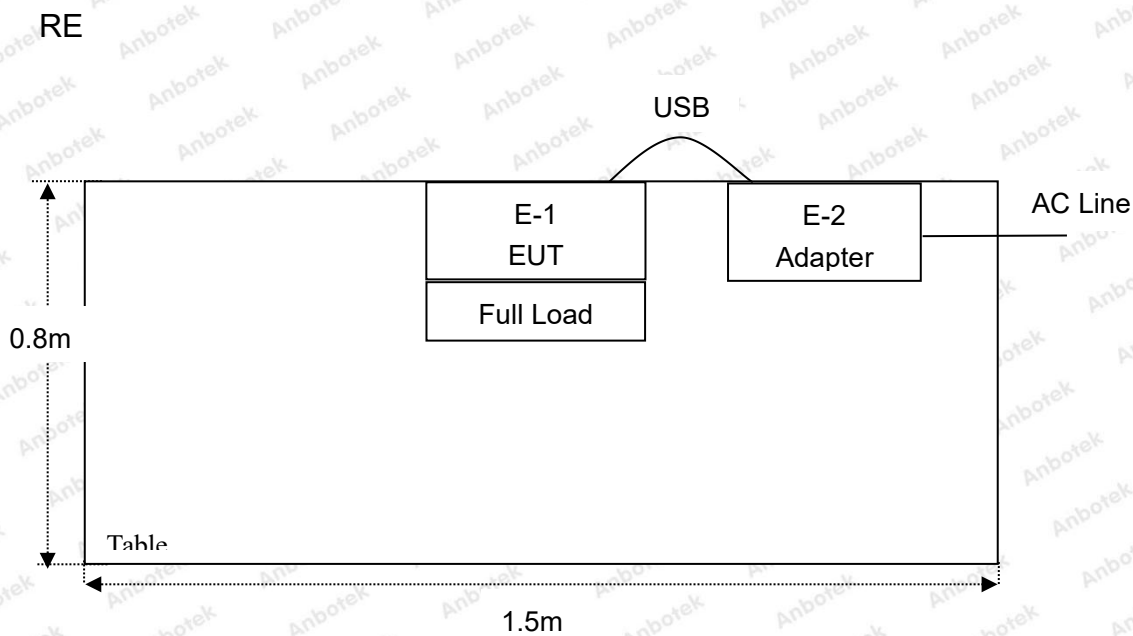
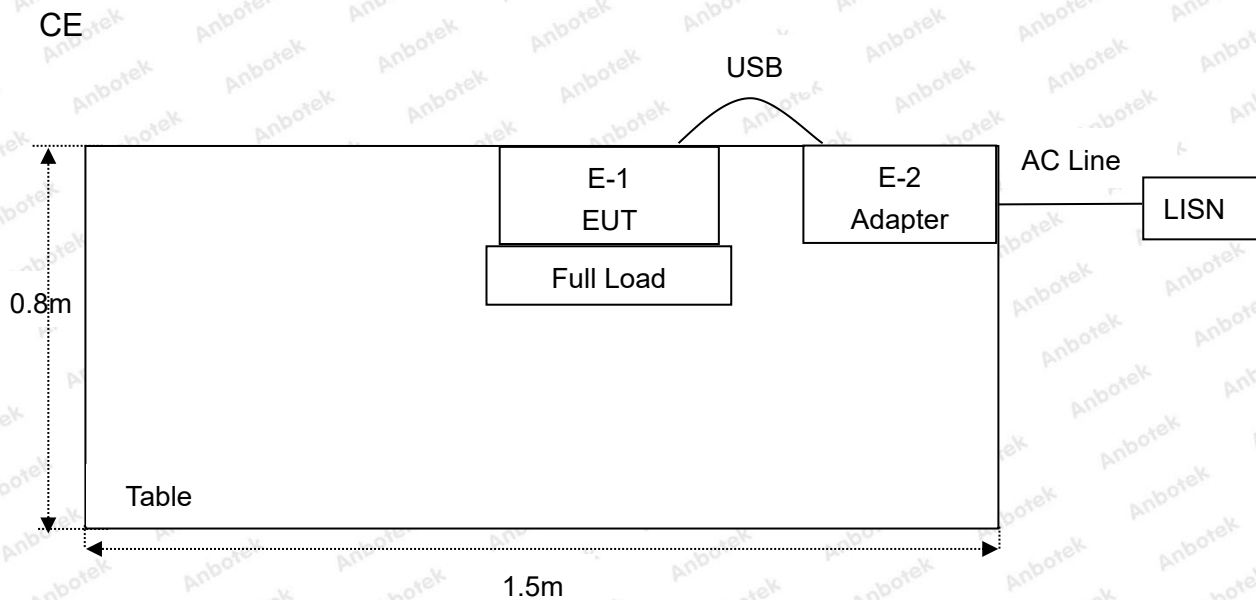
For Radiated Emission	
Final Test Mode	Description
Mode 1	Charge Mode&Wireless Charging Mode
Mode 2	FULL load Mode

Note: (1) Test channel is 0.1758MHz.

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

(3) Remark: All the conditions have been tested. It is found that Wireless Output(7.5W) work simultaneously is the worst mode, and the data in the report only reflects the worst mode.

## 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	Oct. 26, 2020	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Oct. 26, 2020	1 Year
3.	EMI Test Receiver	Rohde & Schwarz	ESR26	101481	Oct. 26, 2020	1 Year
4.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Oct. 26, 2020	1 Year
5.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 26, 2020	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30 D	KD17503	Oct. 26, 2020	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 02, 2020	2 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 02, 2020	2 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Nov. 02, 2020	2 Year
10.	Horn Antenna	A-INFO	LB-180400- KF	J211060628	Nov. 02, 2020	2 Year
11.	Pre-amplifier	SONOMA	310N	186860	Oct. 26, 2020	1 Year
12.	EMI Test Software EZ-EMC	SHURPLE	N/A	N/A	N/A	N/A
13.	RF Test Control System	YIHENG	YH3000	2017430	Oct. 26, 2020	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN045	Oct. 26, 2020	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN046	Oct. 26, 2020	1 Year
16.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Oct. 26, 2020	1 Year
17.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Oct. 26, 2020	1 Year
18.	Signal Generator	Agilent	E4421B	MY41000743	Oct. 26, 2020	1 Year
19.	DC Power Supply	IVYTECH	IV3605	1804D360510	Oct. 26, 2020	1 Year
20.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80 B	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.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

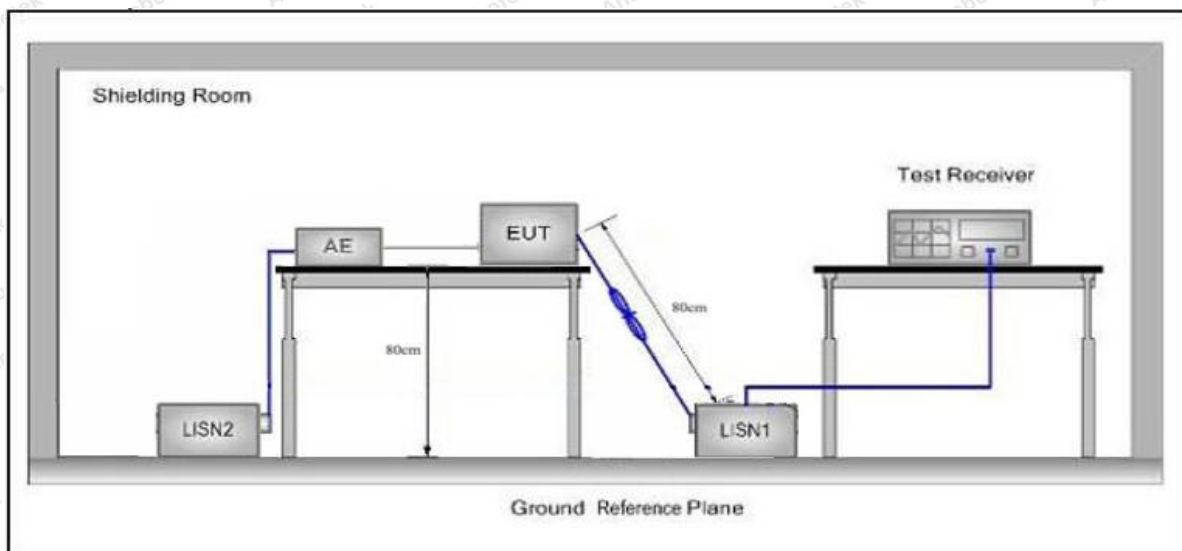
## 3. Conducted Emission Test

### 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.

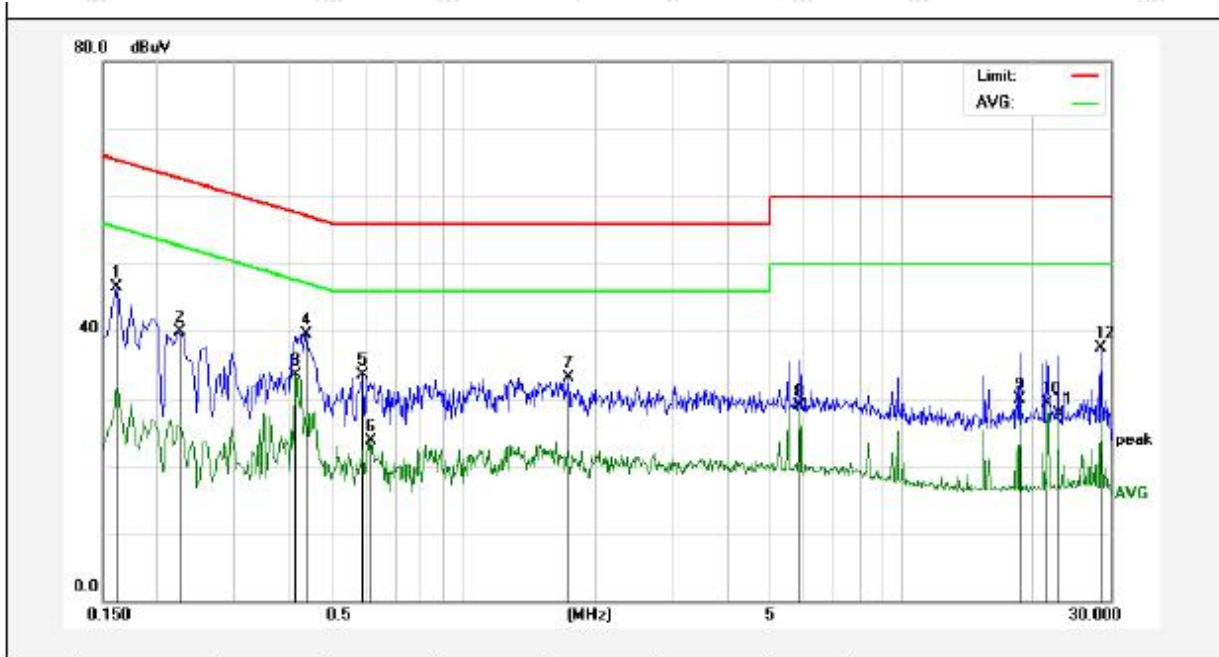
The frequency range from 150kHz to 30MHz is checked.

### 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.: 20.4°C Hum.: 55%

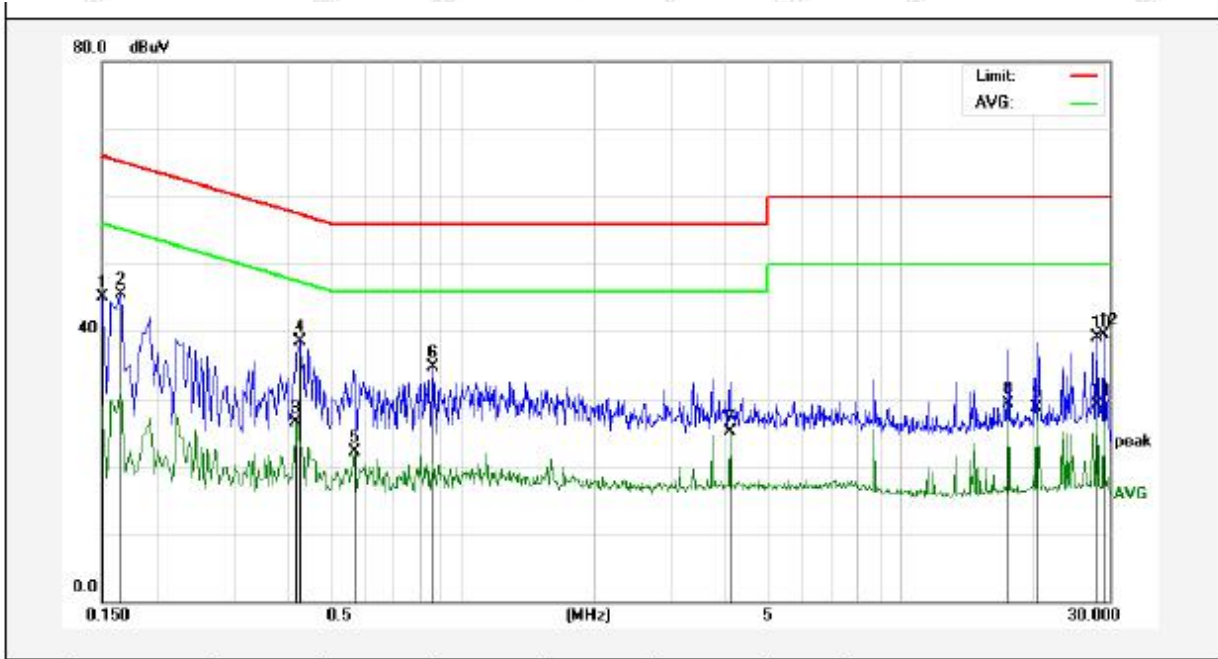


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1620	26.67	19.90	46.57	65.36	-18.79	QP	
2	0.2260	19.93	19.89	39.82	62.59	-22.77	QP	
3	0.4140	13.59	19.94	33.53	47.57	-14.04	AVG	
4	0.4380	19.65	19.95	39.60	57.10	-17.50	QP	
5	0.5899	13.54	20.01	33.55	56.00	-22.45	QP	
6	0.6140	3.60	20.01	23.61	46.00	-22.39	AVG	
7	1.7420	12.92	20.13	33.05	56.00	-22.95	QP	
8	5.8659	8.74	20.23	28.97	50.00	-21.03	AVG	
9	18.6500	9.64	20.32	29.96	50.00	-20.04	AVG	
10	21.4940	9.01	20.32	29.33	50.00	-20.67	AVG	
11	22.7820	7.37	20.31	27.68	50.00	-22.32	AVG	
12	28.5980	17.16	20.27	37.43	60.00	-22.57	QP	



### Conducted Emission Test Data

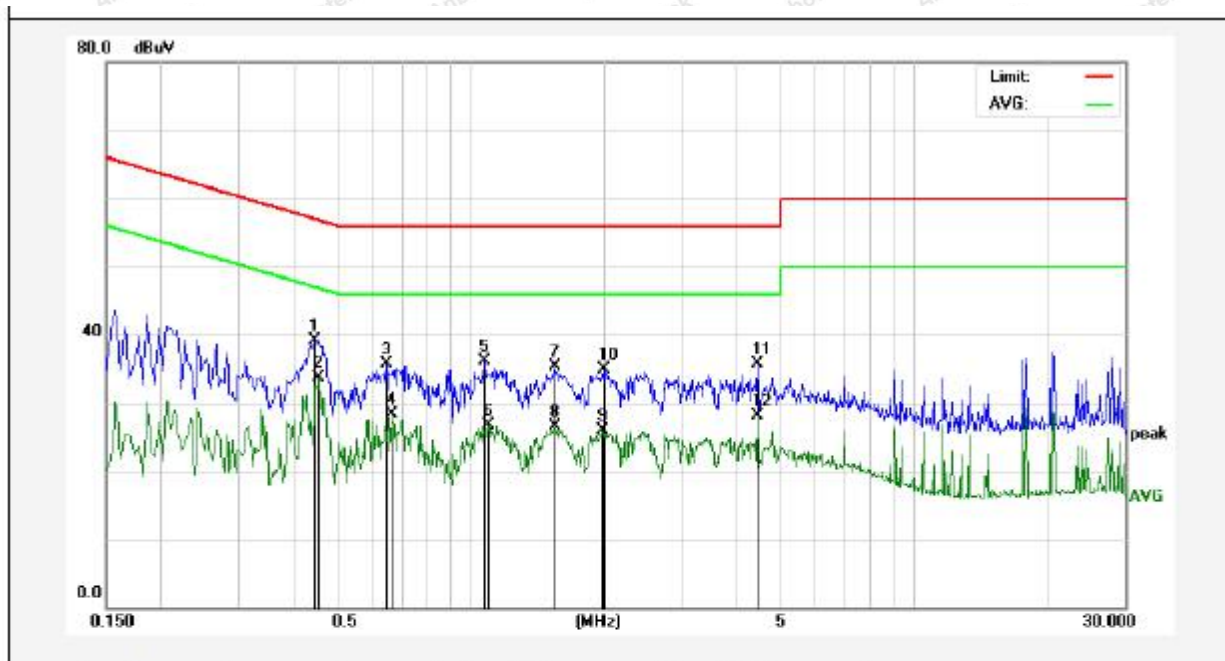
Test Site: 1# Shielded Room  
 Operating Condition: Mode 1  
 Test Specification: AC 120V, 60Hz for adapter  
 Comment: Neutral Line  
 Tem.: 20.4°C Hum.: 55%



No.	Freq. (MHz)	Reading (dBUV)	Factor (dB)	Result (dBUV)	Limit (dBUV)	Over Limit (dB)	Detector	Remark
1	0.1500	25.23	19.90	45.13	65.99	-20.86	QP	
2	0.1660	25.62	19.90	45.52	65.15	-19.63	QP	
3	0.4180	6.65	19.94	26.59	47.49	-20.90	AVG	
4	0.4260	18.60	19.95	38.55	57.33	-18.78	QP	
5	0.5700	2.14	20.00	22.14	46.00	-23.86	AVG	
6	0.8580	14.67	20.08	34.75	56.00	-21.25	QP	
7	4.0860	5.02	20.18	25.20	46.00	-20.80	AVG	
8	17.5900	9.02	20.30	29.32	50.00	-20.68	AVG	
9	20.4340	8.46	20.33	28.79	50.00	-21.21	AVG	
10	28.0540	18.81	20.27	39.08	60.00	-20.92	QP	
11	28.0540	8.83	20.27	29.10	50.00	-20.90	AVG	
12	29.1860	19.31	20.27	39.58	60.00	-20.42	QP	

## Conducted Emission Test Data

Test Site: 1# Shielded Room  
 Operating Condition: Mode 1  
 Test Specification: AC 240V, 60Hz for adapter  
 Comment: Live Line  
 Tem.: 20.4°C Hum.: 55%

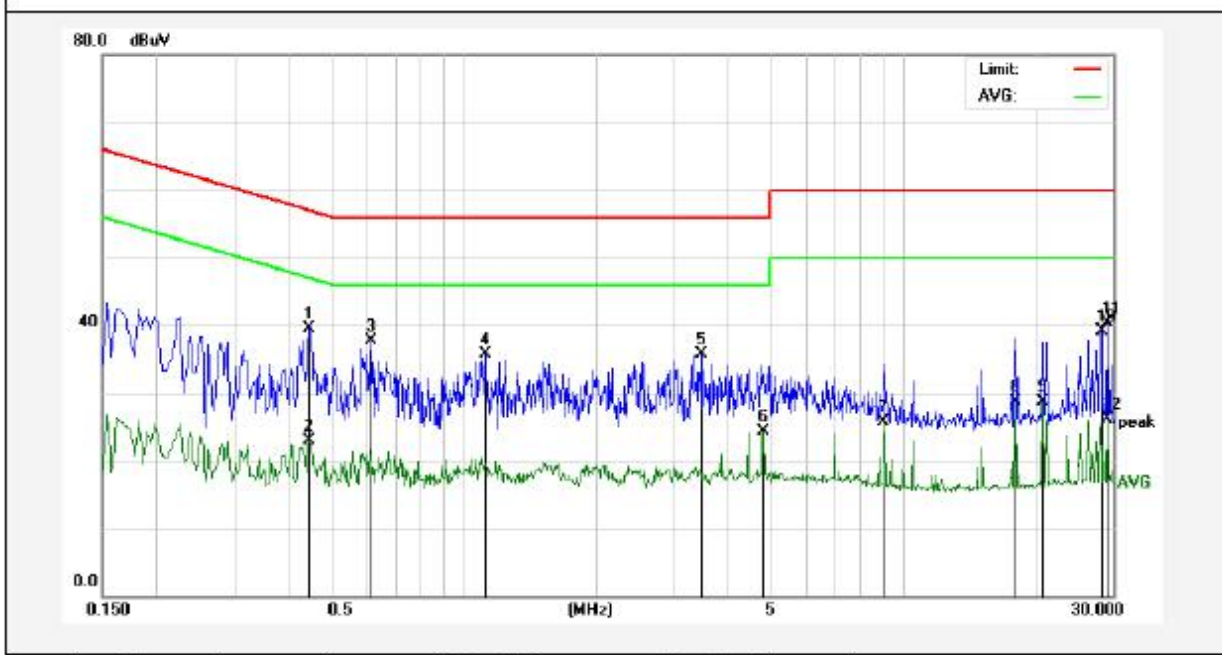


No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.4460	19.20	19.96	39.16	56.95	-17.79	QP	
2	0.4540	13.75	19.96	33.71	46.80	-13.09	AVG	
3	0.6460	15.60	20.02	35.62	56.00	-20.38	QP	
4	0.6620	8.28	20.03	28.31	46.00	-17.69	AVG	
5	1.0740	15.96	20.12	36.08	56.00	-19.92	QP	
6	1.0940	6.55	20.12	26.67	46.00	-19.33	AVG	
7	1.5500	15.27	20.13	35.40	56.00	-20.60	QP	
8	1.5580	6.36	20.13	26.49	46.00	-19.51	AVG	
9	1.9900	5.73	20.14	25.87	46.00	-20.13	AVG	
10	1.9940	14.69	20.14	34.83	56.00	-21.17	QP	
11	4.4420	15.46	20.19	35.65	56.00	-20.35	QP	
12	4.4420	7.87	20.19	28.06	46.00	-17.94	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.: 20.4°C Hum.: 55%



No.	Freq. (MHz)	Reading (dBUV)	Factor (dB)	Result (dBUV)	Limit (dBUV)	Over Limit (dB)	Detector	Remark
1	0.4460	19.60	19.96	39.56	56.95	-17.39	QP	
2	0.4460	2.95	19.96	22.91	46.95	-24.04	AVG	
3	0.6140	17.65	20.01	37.66	56.00	-18.34	QP	
4	1.1220	15.50	20.12	35.62	56.00	-20.38	QP	
5	3.4700	15.60	20.17	35.77	56.00	-20.23	QP	
6	4.7980	4.08	20.20	24.28	46.00	-21.72	AVG	
7	9.0580	5.32	20.31	25.63	50.00	-24.37	AVG	
8	17.9460	8.35	20.31	28.66	50.00	-21.34	AVG	
9	20.7860	8.30	20.33	28.63	50.00	-21.37	AVG	
10	28.2540	18.89	20.27	39.16	60.00	-20.84	QP	
11	29.1740	20.04	20.27	40.31	60.00	-19.69	QP	
12	29.1740	5.82	20.27	26.09	50.00	-23.91	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

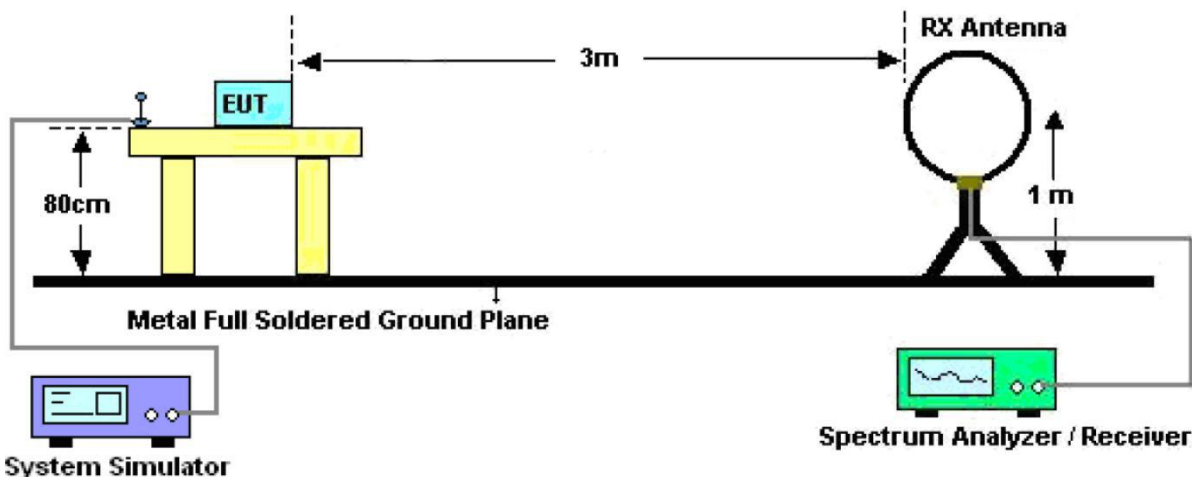


Figure 1. Below 30MHz

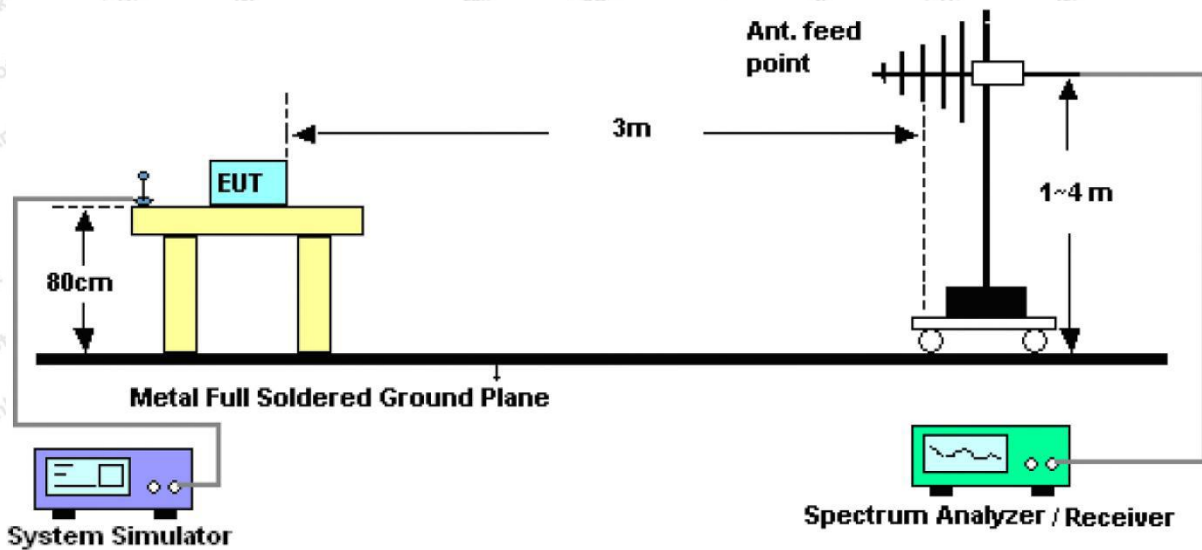


Figure 2. 30MHz to 1GHz

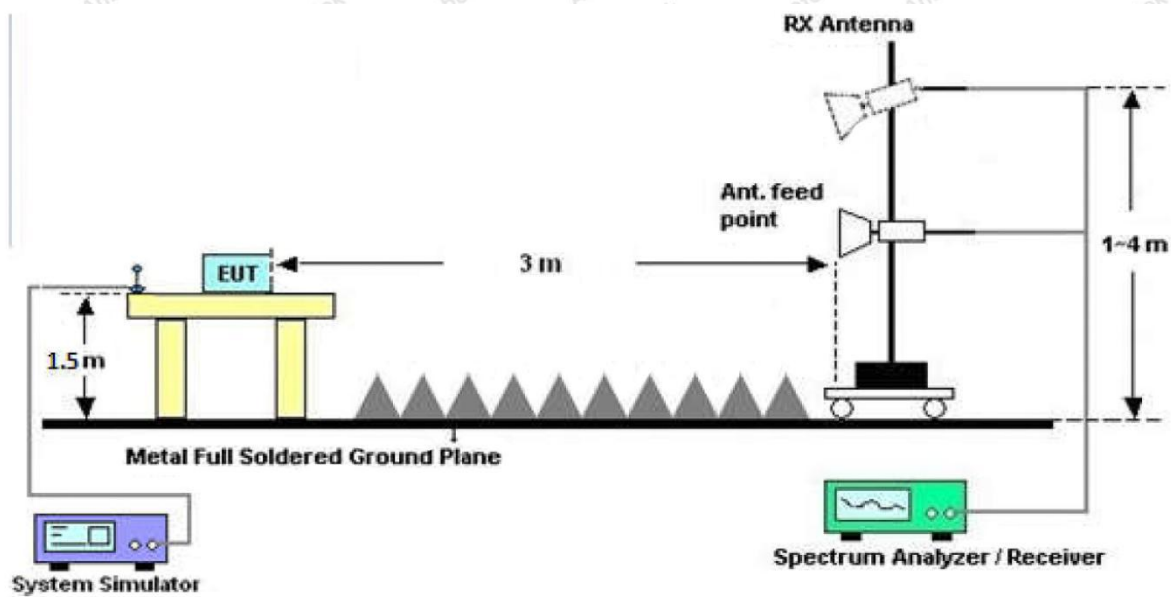


Figure 3. Above 1 GHz

### 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.

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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

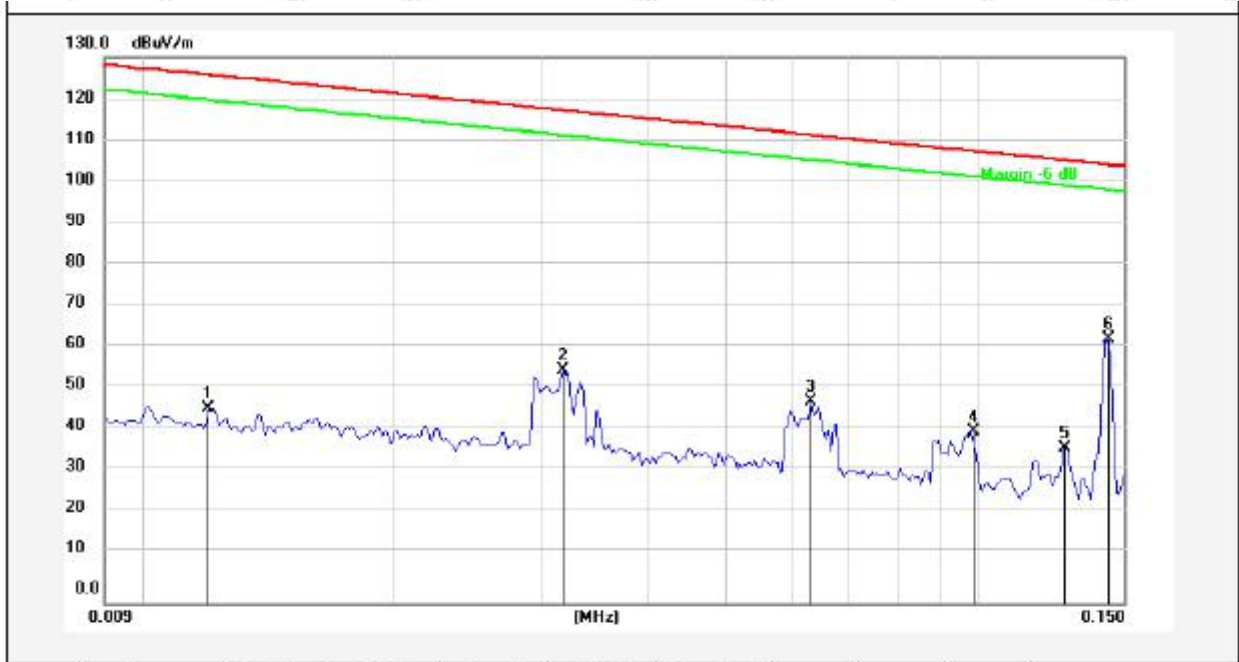
**PASS**

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



**Test Results (9K~15MHz)**

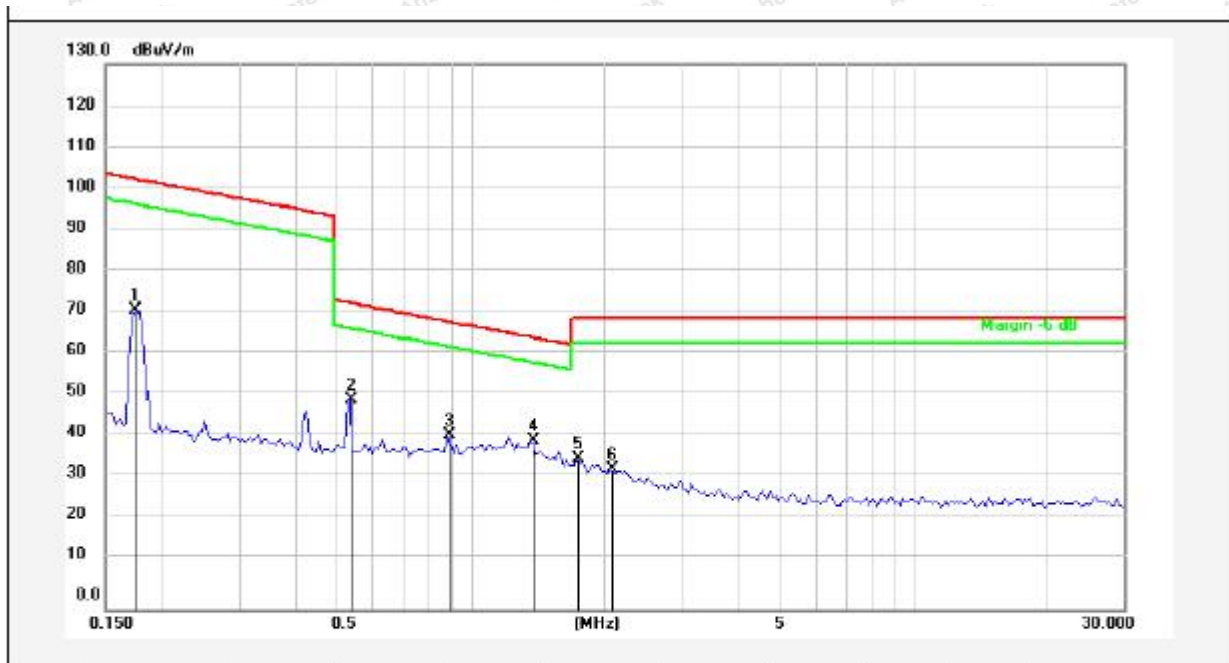
Test Mode: Mode 1  
 Power Source: AC 120V, 60Hz for adapter  
 Temp.(°C)/Hum.(%RH): 22°C/45%RH  
 Distance: 3m



No.	Freq. (MHz)	Reading (dBuV)	Factor ( )	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	0.0120	26.18	20.11	46.29	125.82	-79.53	peak			
2	0.0318	34.98	20.56	55.54	117.41	-61.87	peak			
3	0.0631	27.70	20.38	48.08	111.49	-63.41	peak			
4	0.0984	20.36	20.29	40.65	107.66	-67.01	peak			
5	0.1275	16.65	20.34	36.99	105.42	-68.43	peak			
6	0.1428	42.50	20.33	62.83	104.44	-41.61	peak			

### Test Results (15~30MHz)

Test Mode: Mode 1  
 Power Source: AC 120V, 60Hz for adapter  
 Temp.(°C)/Hum.(%RH): 22°C/45%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	0.1758	50.99	20.32	71.31	102.65	-31.34	peak			
2	0.5350	29.78	20.27	50.05	73.04	-22.99	peak			
3	0.8850	21.13	20.26	41.39	68.68	-27.29	peak			
4	1.3702	19.85	20.26	40.11	64.89	-24.78	peak			
5	1.7391	15.76	20.27	36.03	69.50	-33.47	peak			
6	2.0659	13.13	20.28	33.41	69.50	-36.09	peak			

**Test Results (30~1000MHz)**

Test Mode: Mode 1  
 Power Source: AC 120V, 60Hz for adapter  
 Polarization: Vertical  
 Temp.(°C)/Hum.(%RH): 22°C/45%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	31.0705	53.40	-17.00	36.40	40.00	-3.60	QP	100	0	
2	40.2757	48.92	-13.61	35.31	40.00	-4.69	QP	100	360	
3	92.1388	46.75	-15.60	31.15	43.50	-12.35	QP	100	0	
4	155.3643	50.73	-19.65	31.08	43.50	-12.42	QP	100	360	
5	174.4241	50.85	-18.57	32.28	43.50	-11.22	QP	100	0	
6	178.1326	54.13	-18.36	35.77	43.50	-7.73	QP	100	360	



**Test Results (30~1000MHz)**

Test Mode: Mode 1  
 Power Source: AC 120V, 60Hz for adapter  
 Polarization: Horizontal  
 Temp.(°C)/Hum.(%RH): 22°C/45%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	159.2251	56.38	-21.71	34.67	43.50	-8.83	QP	100	360	
2	175.6516	57.68	-21.03	36.65	43.50	-6.85	QP	100	0	
3	202.8104	55.61	-19.82	35.79	43.50	-7.71	QP	100	360	
4	272.2776	54.06	-16.81	37.25	46.00	-8.75	QP	100	0	
5	287.9904	52.29	-15.39	36.90	46.00	-9.10	QP	100	360	
6	301.4224	46.81	-14.25	32.56	46.00	-13.44	QP	100	0	

## 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

### 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**

Please refer to separated files for Test Setup Photos of the EUT.

## **APPENDIX II -- EXTERNAL PHOTOGRAPH**

Please refer to separated files for External Photos of the EUT.

## **APPENDIX III -- INTERNAL PHOTOGRAPH**

Please refer to separated files for Internal Photos of the EUT.

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