

FCC TEST REPORT

Client Name : Anker Innovations Limited

Address : Room 1318-19, Hollywood Plaza, 610 Nathan Road,
Mongkok, Kowloon, Hong Kong

Product Name : PowerWave Sense Pad Alloy

Date : Apr. 14, 2020



Shenzhen Anbotek Compliance Laboratory Limited

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TEST REPORT

Applicant : Anker Innovations Limited
Manufacturer : Anker Innovations Limited
Product Name : PowerWave Sense Pad Alloy
Model No. : A2509
Trade Mark : ANKER
Rating(s) : Input: DC 9V/2A, DC 12V/1.5A, DC 15V/1.2A(via adapter input:
100-240V~0.7A 50-60Hz)
Wireless output: 11W Max

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. 10, 2020

Date of Test

Mar. 10-Apr. 09, 2020

Prepared By

Dolly mo

(Engineer / Dolly Mo)

Reviewer

Bibo Zhang

(Supervisor / Bibo Zhang)

Approved & Authorized Signer

Tom Chen

(Manager / Tom Chen)

1. General Information

1.1. Client Information

Applicant	:	Anker Innovations Limited
Address	:	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hong Kong
Manufacturer	:	Anker Innovations Limited
Address	:	Room 1318-19, Hollywood Plaza, 610 Nathan Road, Mongkok, Kowloon, Hongkong
Factory	:	Suzhou Lineprinting Wireless Communication Co.,Ltd
Address	:	8F, Building 39, No.18, Dongchang Road, SIP, Suzhou, China

1.2. Description of Device (EUT)

Product Name	:	PowerWave Sense Pad Alloy
Model No.	:	A2509
Trade Mark	:	ANKER
Test Power Supply	:	AC 120V, 60Hz for adapter
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Product Description	Operation Frequency:	111-205KHz
	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	:	Manufacturer: Anker Innovations Limited
		M/N: A2013
		Input: 100-240V~50-60Hz
		Output: 3.6-6.5V --- 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	Full load, wireless charger module

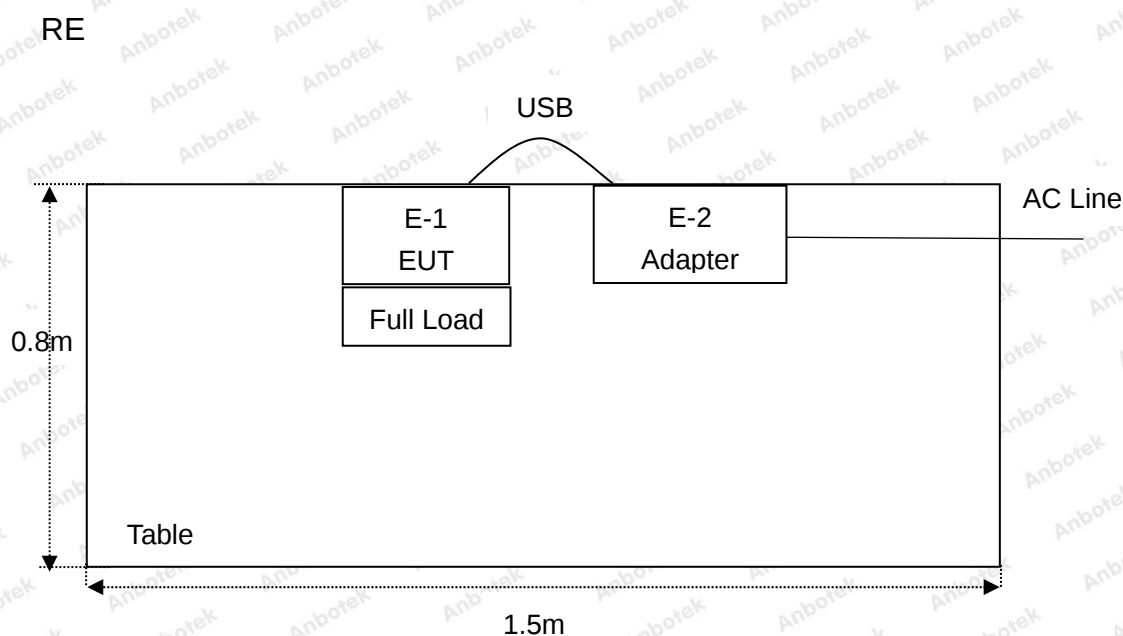
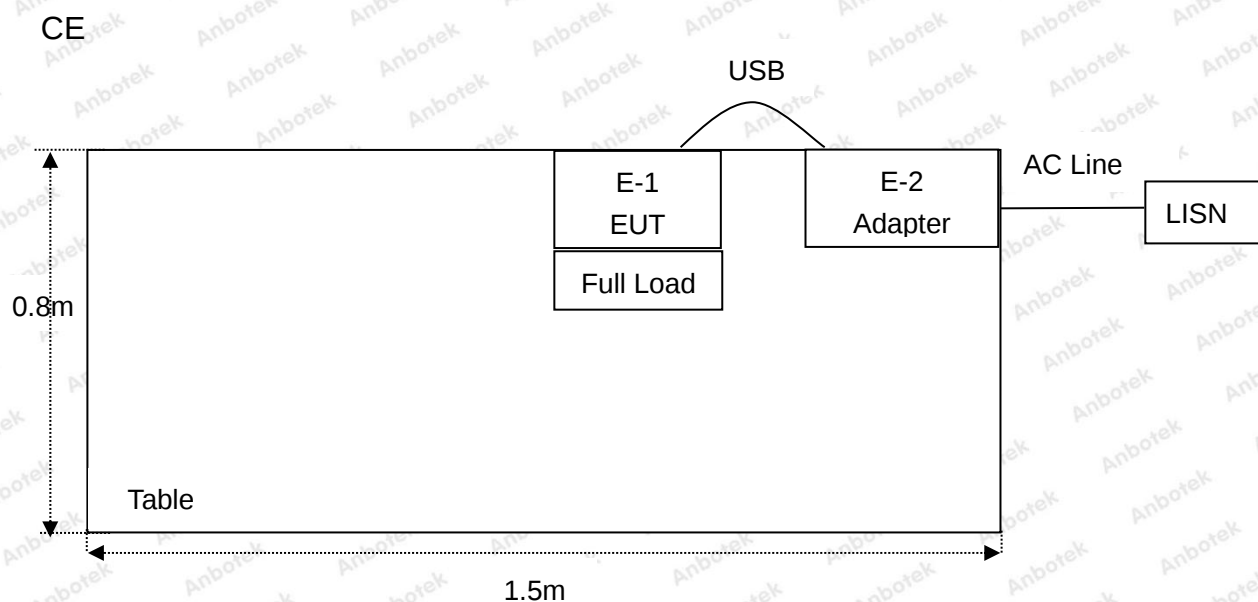
For Conducted Emission	
Final Test Mode	Description
Mode 1	Full load, wireless charger module

For Radiated Emission	
Final Test Mode	Description
Mode 1	Full load, wireless charger module

Note: (1)Test channel is 0.1199MHz.

(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.

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 27, 2019.

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, March 07, 2019.

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

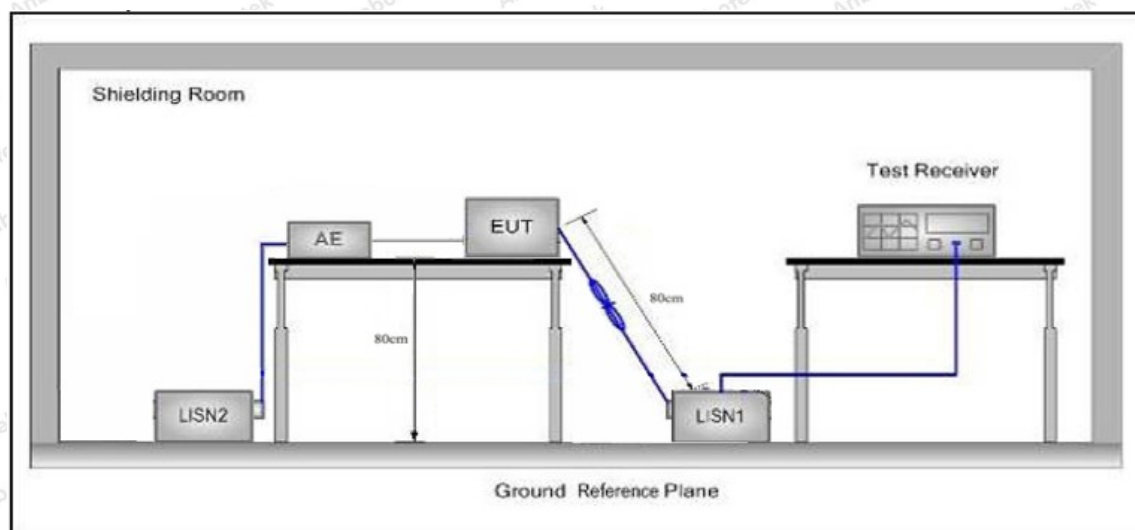
3. Conducted Emission Test

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.

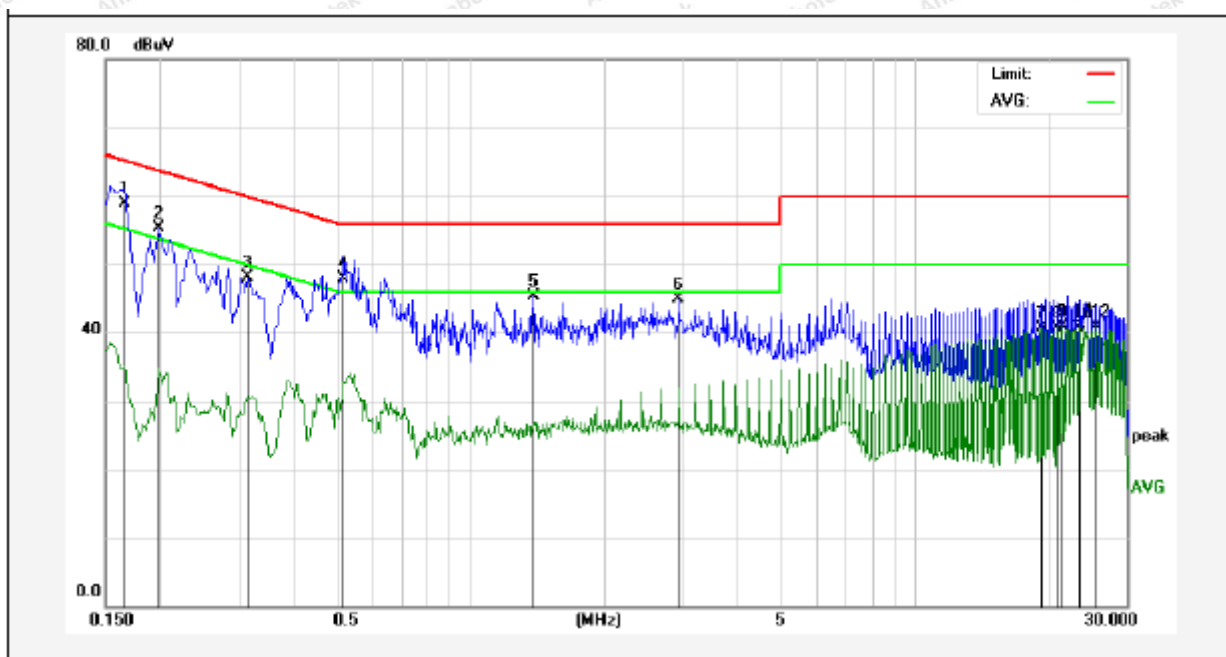
The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Please to see the following pages

Conducted Emission Test Data

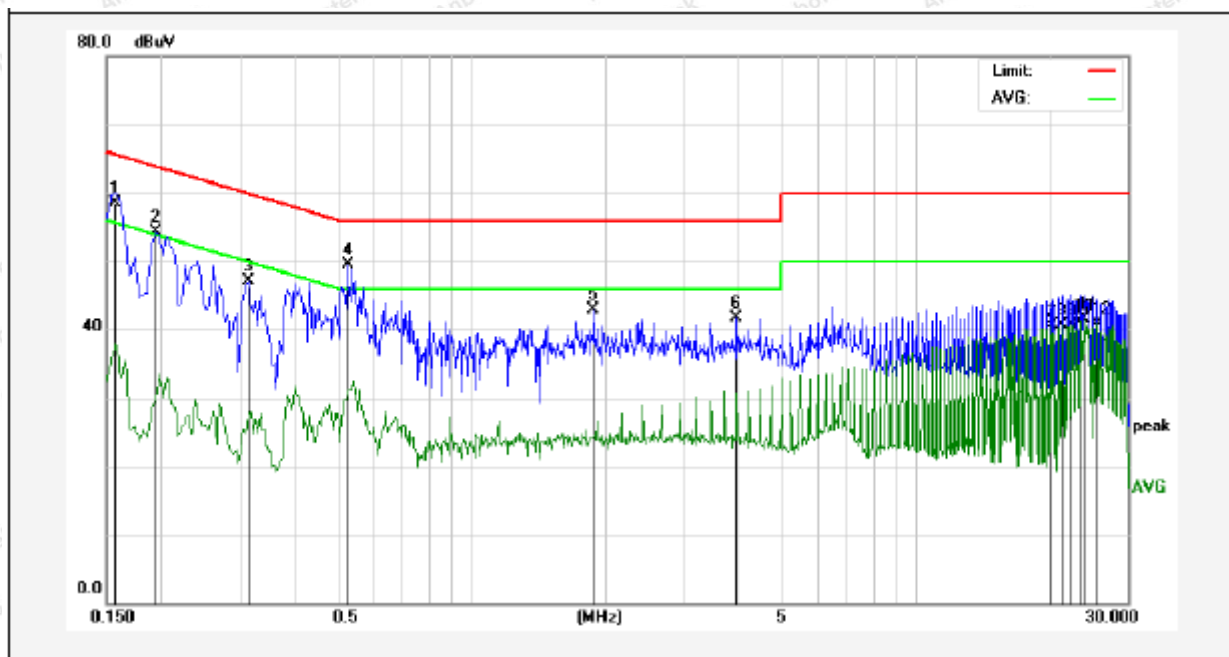
Test Site: 1# Shielded Room
Operating Condition: Mode 1
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.: 26.0°C Hum.: 53%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1660	39.06	19.90	58.96	65.15	-6.19	QP	
2	0.1980	35.39	19.90	55.29	63.69	-8.40	QP	
3	0.3140	28.20	19.90	48.10	59.86	-11.76	QP	
4	0.5180	27.85	19.99	47.84	56.00	-8.16	QP	
5	1.3820	25.09	20.13	45.22	56.00	-10.78	QP	
6	2.9380	24.65	20.16	44.81	56.00	-11.19	QP	
7	19.2900	20.40	20.33	40.73	50.00	-9.27	AVG	
8	20.8220	20.47	20.33	40.80	50.00	-9.20	AVG	
9	21.5900	20.66	20.32	40.98	50.00	-9.02	AVG	
10	23.3779	20.36	20.30	40.66	50.00	-9.34	AVG	
11	23.6340	20.72	20.30	41.02	50.00	-8.98	AVG	
12	25.6780	20.53	20.28	40.81	50.00	-9.19	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.: 26.0°C Hum.: 53%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1580	38.69	19.90	58.59	65.56	-6.97	QP	
2	0.1940	34.45	19.90	54.35	63.86	-9.51	QP	
3	0.3140	27.12	19.90	47.02	59.86	-12.84	QP	
4	0.5260	29.58	19.99	49.57	56.00	-6.43	QP	
5	1.8780	22.76	20.14	42.90	56.00	-13.10	QP	
6	3.9580	21.55	20.18	41.73	56.00	-14.27	QP	
7	20.0580	20.17	20.34	40.51	50.00	-9.49	AVG	
8	21.3340	20.30	20.32	40.62	50.00	-9.38	AVG	
9	22.3580	20.37	20.31	40.68	50.00	-9.32	AVG	
10	23.3779	20.93	20.30	41.23	50.00	-8.77	AVG	
11	23.8900	21.12	20.29	41.41	50.00	-8.59	AVG	
12	25.6780	20.67	20.28	40.95	50.00	-9.05	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

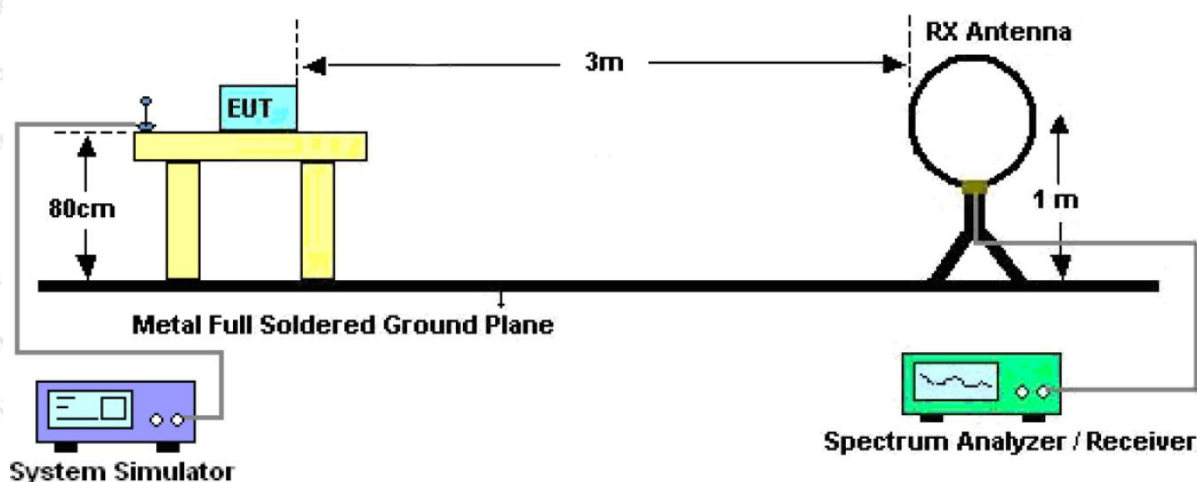


Figure 1. Below 30MHz

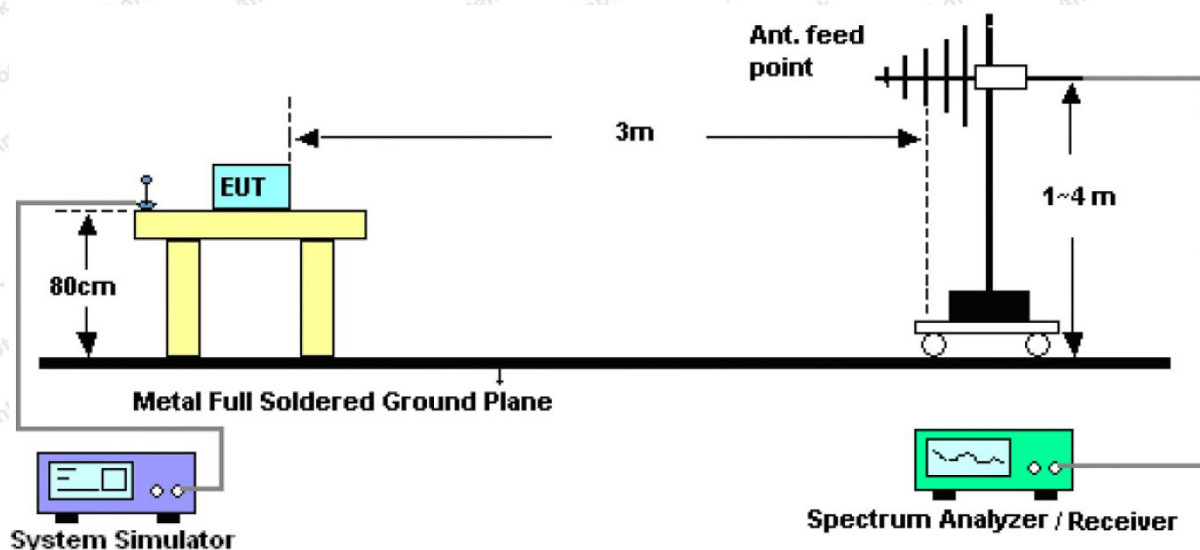


Figure 2. 30MHz to 1GHz

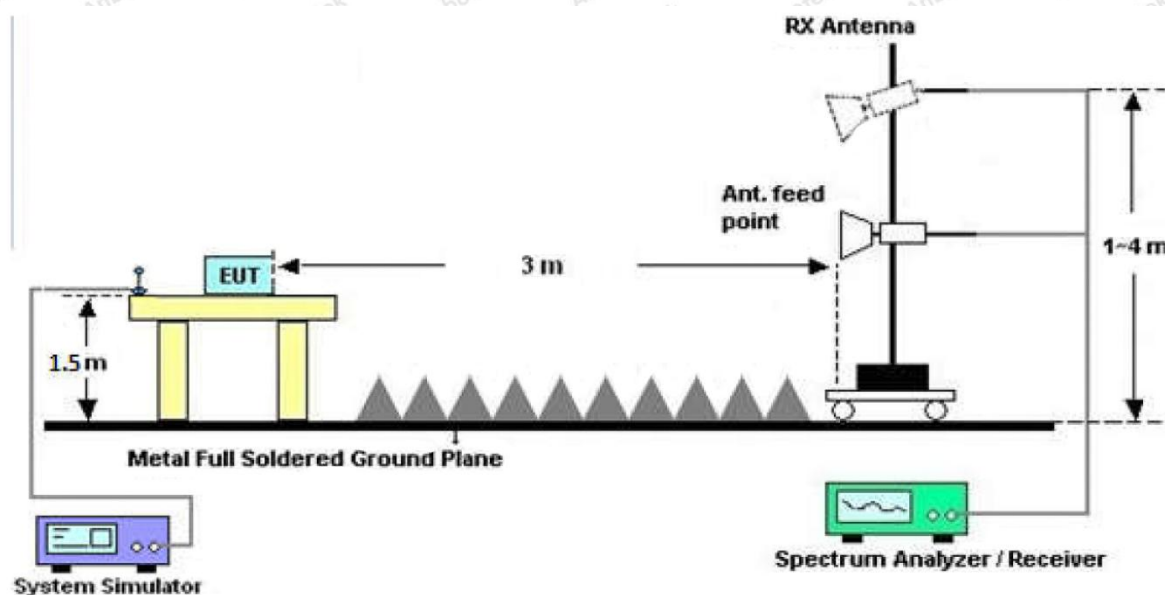


Figure 3. Above 1 GHz

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.

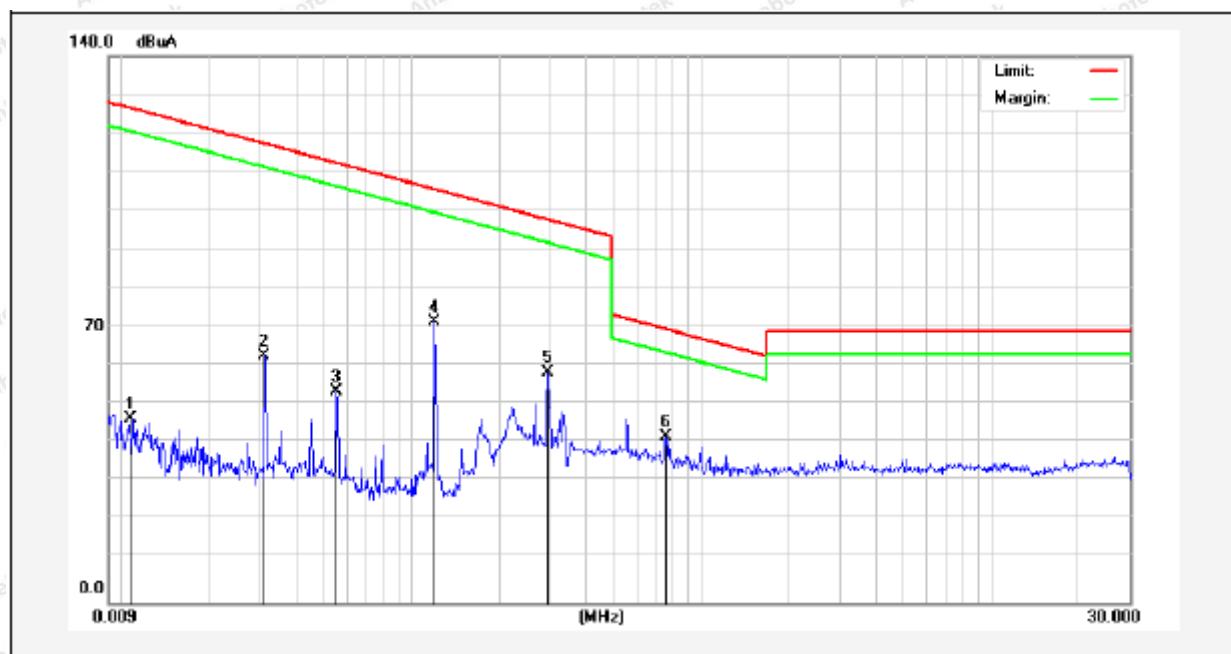
4.4. Test Data

PASS

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

Test Results (9K~30MHz)

Test Mode: Mode 1
 Power Source: AC 120V, 60Hz for adapter
 Temp.(°C)/Hum.(%RH): 23°C/56%RH
 Distance: 3m



Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	degree (dgc)
0.0108	33.82	19.28	2.53	0	55.63	146.75	-91.12	Peak	268
0.0108	25.34	19.28	2.53	0	47.15	126.75	-79.60	AV	268
0.0313	50.51	19.30	2.54	0	72.35	137.56	-65.21	Peak	64
0.0313	41.46	19.30	2.54	0	63.30	117.56	-54.26	AV	64
0.0553	41.45	19.30	2.54	0	63.29	132.64	-69.35	Peak	301
0.0553	32.33	19.30	2.54	0	54.17	112.64	-58.47	AV	301
0.1199	58.52	19.53	2.59	0	80.64	125.96	-45.32	Peak	129
0.1199	49.79	19.53	2.59	0	71.91	105.96	-34.05	AV	129
0.2943	46.50	19.53	2.59	0	68.62	118.20	-49.58	Peak	185
0.2943	36.92	19.53	2.59	0	59.04	98.20	-39.16	AV	185
0.7580	20.34	19.53	2.59	0	42.46	70.01	-27.55	QP	27

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.

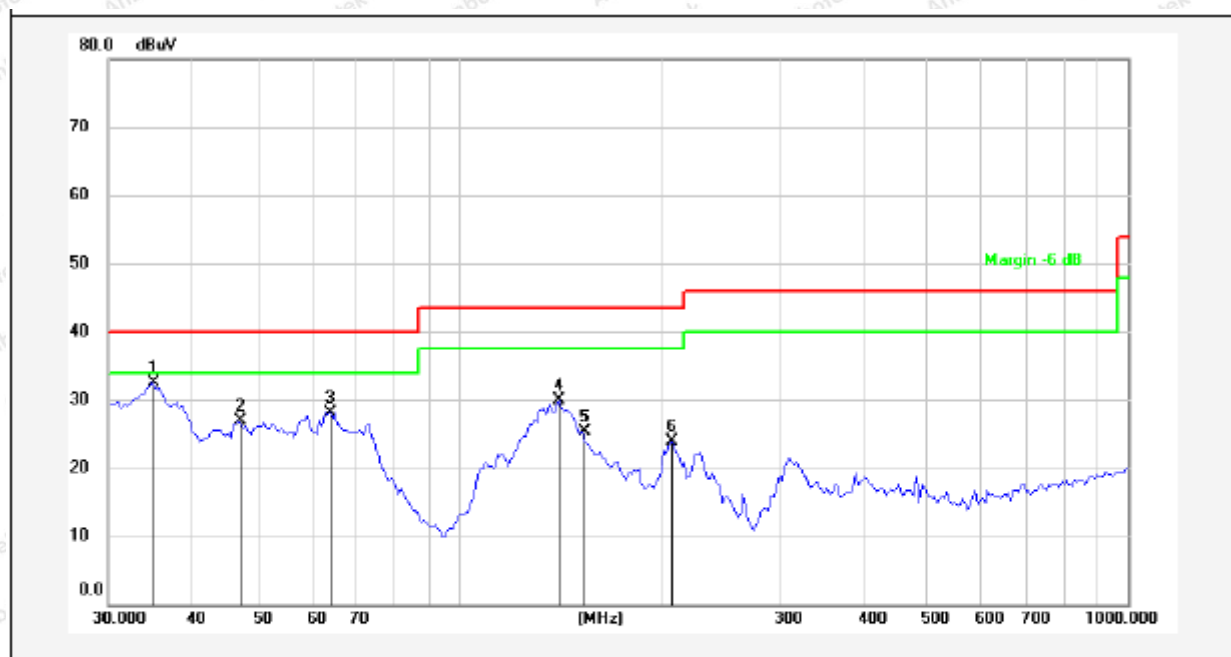
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Test Results (30~1000MHz)

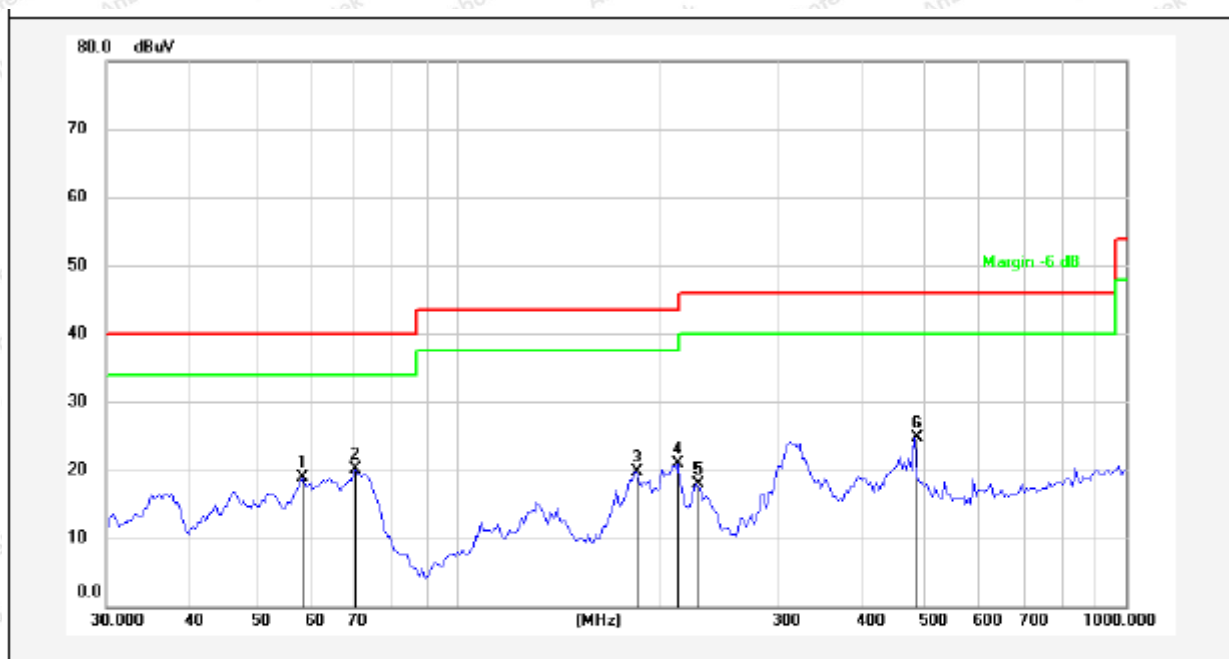
Test Mode: Mode 1
Power Source: AC 120V, 60Hz for adapter
Polarization: Vertical
Temp.(°C)/Hum.(%RH): 23°C/56%RH
Distance: 3m



No.	Freq. (MHz)	Reading (dBuV)	Factor ()	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	34.8212	49.31	-16.85	32.46	40.00	-7.54	QP	100	0	
2	46.9125	42.62	-15.72	26.90	40.00	-13.10	QP	100	360	
3	64.3202	46.25	-18.10	28.15	40.00	-11.85	QP	100	0	
4	141.5777	50.37	-20.45	29.92	43.50	-13.58	QP	100	360	
5	153.2004	45.53	-20.21	25.32	43.50	-18.18	QP	100	0	
6	208.2148	41.38	-17.53	23.85	43.50	-19.65	QP	100	360	

Test Results (30~1000MHz)

Test Mode: Mode 1
Power Source: AC 120V, 60Hz for adapter
Polarization: Horizontal
Temp.(°C)/Hum.(%RH): 23°C/56%RH
Distance: 3m



No.	Freq. (MHz)	Reading (dBuV)	Factor (°)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	58.9217	36.16	-17.35	18.81	40.00	-21.19	QP	100	0	
2	70.8315	41.55	-21.54	20.01	40.00	-19.99	QP	100	360	
3	184.1667	42.53	-22.82	19.71	43.50	-23.79	QP	100	0	
4	213.7634	42.94	-22.03	20.91	43.50	-22.59	QP	100	360	
5	227.2918	39.27	-21.43	17.84	46.00	-28.16	QP	100	0	
6	483.0618	39.34	-14.73	24.61	46.00	-21.39	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 -----