FCC TEST REPORT

For

Roo Inc.

Keypad Siren

Model No.: SIREN, SIREN1, SIREN2, SIREN3, SIREN4,SIREN5, SIREN6, SIREN7, SIREN8, SIREN9

Prepared For	:	Roo Inc.
Address	:	41 E 11th Street 10th Floor, New York City, New York, United States, 10003
Prepared By	:	Shenzhen Anbotek Compliance Laboratory Limited
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Date of Test	:	Dec. 20, 2018~Jan. 08, 2019
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TEST REPORT

Applicant	:	Roo Inc.
Manufacturer	:	Roo Inc.
Product Name	:	Keypad Siren
Model No.	:	SIREN, SIREN1, SIREN2, SIREN3, SIREN4,SIREN5, SIREN6, SIREN7, SIREN8, SIREN9
Trade Mark	:	Kangaroo
Rating(s)	:	Input: DC 5V, 2.4A(via adapter input: AC 100~240V, 50/60Hz, 0.4A)

Test Standard(s)	**:**	**FCC Part15 Subpart C 2018, Section 15.225**
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 Test: Dec. 20, 2018~Jan. 08, 2019

Prepared By: Oliay Yang

(Engineer / Oliay Yang)

Reviewer: Snowy Meng

(Supervisor / Snowy Meng)

Approved & Authorized Signer: Sally Zhang

(Manager / Sally Zhang)

1. General Information

1.1. Client Information

Applicant	:	Roo Inc.
Address	:	41 E 11th Street 10th Floor, New York City, New York, United States, 10003
Manufacturer	:	Roo Inc.
Address	:	41 E 11th Street 10th Floor, New York City, New York, United States, 10003
Factory	:	Roo Inc.
Address	:	41 E 11th Street 10th Floor, New York City, New York, United States, 10003

1.2. Description of Device (EUT)

Product Name	:	Keypad Siren	
Model No.	:	SIREN, SIREN1, SIREN2, SIREN3, SIREN4,SIREN5, SIREN6, SIREN7, SIREN8, SIREN9 (Note: All samples are the same except the name, so we prepare "SIREN" for test only.)	
Trade Mark	:	Kangaroo	
Test Power Supply	:	AC 120V, 60Hz for adapter / AC 240V, 60Hz for adapter	
Test Sample No.	:	S1(Normal Sample), S2(Engineering Sample)	
Product Description	:	Operation Frequency:	13.56MHz
		Number of Channel:	1 Channels
		Modulation Type:	RFID
		Antenna Type:	PCB 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. 2)This report is for NFC module.			

1.3. Auxiliary Equipment Used During Test

Adapter	:	Model: A122-0502400UB INPUT: 100-240V~50/60Hz 0.4A Max OUTPUT: DC 5V, 2400mA

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	CH01

1.5. List of channels

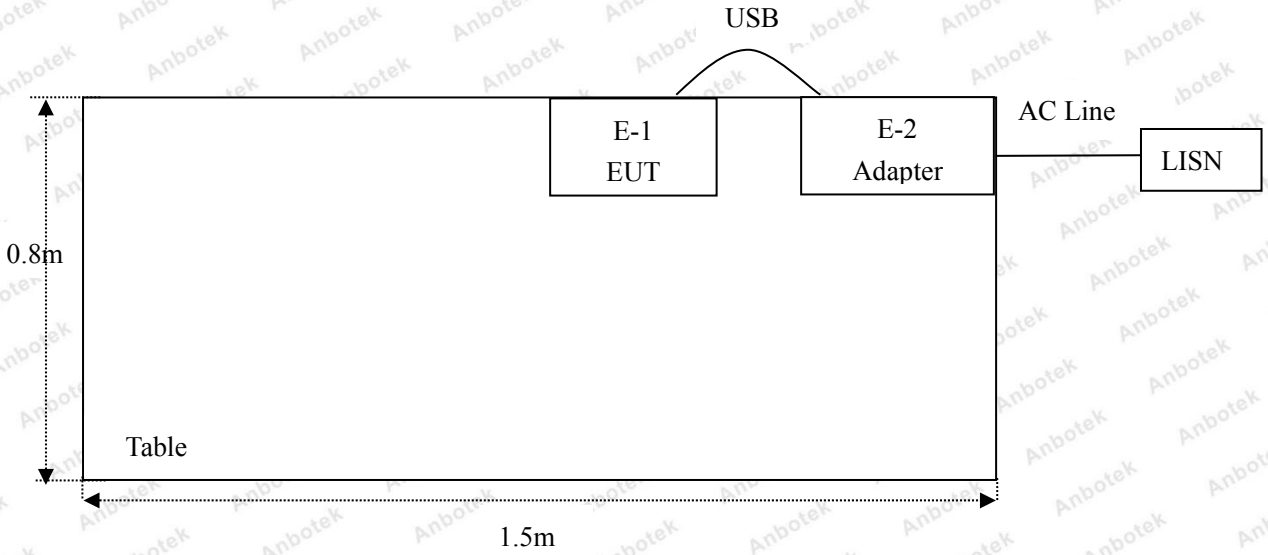
Channel	Freq. (MHz)
01	13.56

Note:

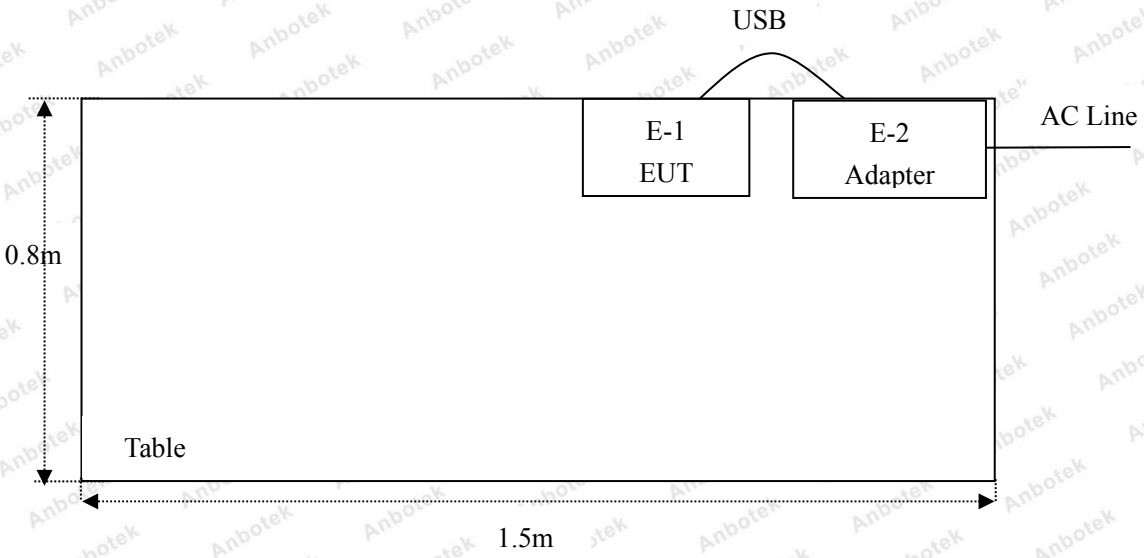
1. The engineering test program was provided and the EUT was programmed to be in continuously transmitting mode.

1.6. Description Of Test Setup

CE



RE



1.7. 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. 05, 2018	1 Year
2.	EMI Test Receiver	Rohde & Schwarz	ESPI3	101604	Nov. 05, 2018	1 Year
3.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 05, 2018	1 Year
4.	Spectrum Analysis	Agilent	E4407B	US39390582	Nov. 05, 2018	1 Year
5.	MAX Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
6.	Preamplifier	SKET Electronic	BK1G18G30D	KD17503	Nov. 05, 2018	1 Year
7.	Double Ridged Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 20, 2018	1 Year
8.	Bilog Broadband Antenna	Schwarzbeck	VULB9163	VULB 9163-289	Nov. 19, 2018	1 Year
9.	Loop Antenna	Schwarzbeck	FMZB1519B	00053	Nov. 20, 2018	1 Year
10.	Horn Antenna	A-INFO	LB-180400-KF	J211060628	Nov. 20, 2018	1 Year
11.	Pre-amplifier	SONOMA	310N	186860	Nov. 05, 2018	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	Nov. 05, 2018	1 Year
14.	Power Sensor	DAER	RPR3006W	15I00041SN045	Nov. 05, 2018	1 Year
15.	Power Sensor	DAER	RPR3006W	15I00041SN046	Nov. 05, 2018	1 Year
16.	MXA Spectrum Analysis	Agilent	N9020A	MY51170037	Nov. 05, 2018	1 Year
17.	MXG RF Vector Signal Generator	Agilent	N5182A	MY48180656	Nov. 05, 2018	1 Year
18.	Signal Generator	Agilent	E4421B	MY41000743	Nov. 05, 2018	1 Year
19.	DC Power Supply	IVYTECH	IV3605	1804D360510	Apr. 02, 2018	1 Year
20.	Constant Temperature Humidity Chamber	ZHONGJIAN	ZJ-KHWS80B	N/A	Nov. 01, 2018	1 Year

1.8. Measurement Uncertainty

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

1.9. 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 registed 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, July 31, 2017.

ISED-Registration No.: 8058A-1

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-1, June 13, 2016.

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. Test Procedure

GENERAL: This report shall NOT be reproduced except in full without the written approval of Shenzhen Anbotek Compliance Laboratory Limited. The EUT was transmitting a test signal during the testing.

RADIATION INTERFERENCE: The test procedure used was ANSI STANDARD C63.10-2013 using a spectrum analyzer with a pre-selector. The analyzer was calibrated in dB above a microvolt at the output of the antenna. The resolution bandwidth was 100KHz and the video bandwidth was 300KHz up to 1.0GHz and 1.0MHz with a video BW of 3.0MHz above 1.0GHz. The ambient temperature of the EUT was 74.3oF with a humidity of 69%.

FORMULA OF CONVERSION FACTORS: The Field Strength at 3m was established by adding the meter reading of the spectrum analyzer (which is set to read in units of dBuV) to the antenna correction factor supplied by the antenna manufacturer. The antenna correction factors are stated in terms of dB. The gain of the Preselector was accounted for in the Spectrum Analyzer Meter Reading.

Example:
Freq (MHz) METER READING + ACF = FS
33 20 dBuV + 10.36 dB = 30.36 dBuV/m @ 3m

ANSI STANDARD C63.10-2013 10.1.7 MEASUREMENT PROCEDURES: The EUT was placed on a table 80 cm high and with dimensions of 1m by 1.5m. The EUT was placed in the center of the table (1.5m side). The table used for radiated measurements is capable of continuous rotation.
When an emission was found, the table was rotated to produce the maximum signal strength. At this point, the antenna was raised and lowered from 1m to 4m. The antenna was placed in both the horizontal and vertical planes.

3. Summary of Test Results

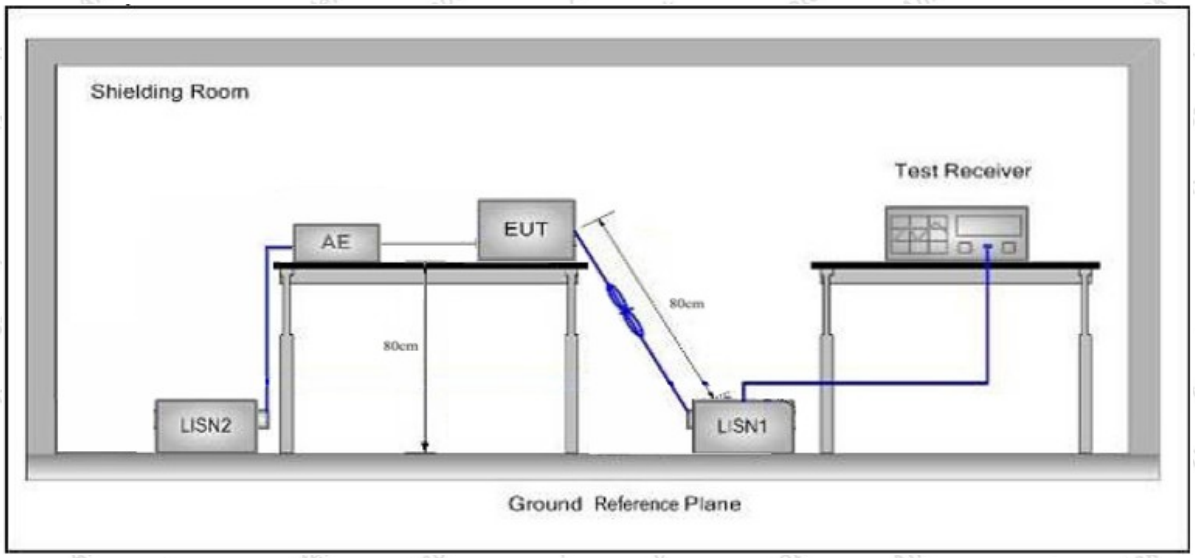
Standard Section	Test Item	Result
15.203/15.247(c)	Antenna Requirement	PASS
15.207	Conducted Emission	PASS
15.205/15.209	Spurious Emission	PASS
	Frequency Tolerance	PASS
15.215 (c)	20dB Occupied Bandwidth	PASS
Remark: "N/A" is an abbreviation for Not Applicable.		

4. Conducted Emission Test

4.1. 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.			

4.2. Test Setup



4.3. 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.

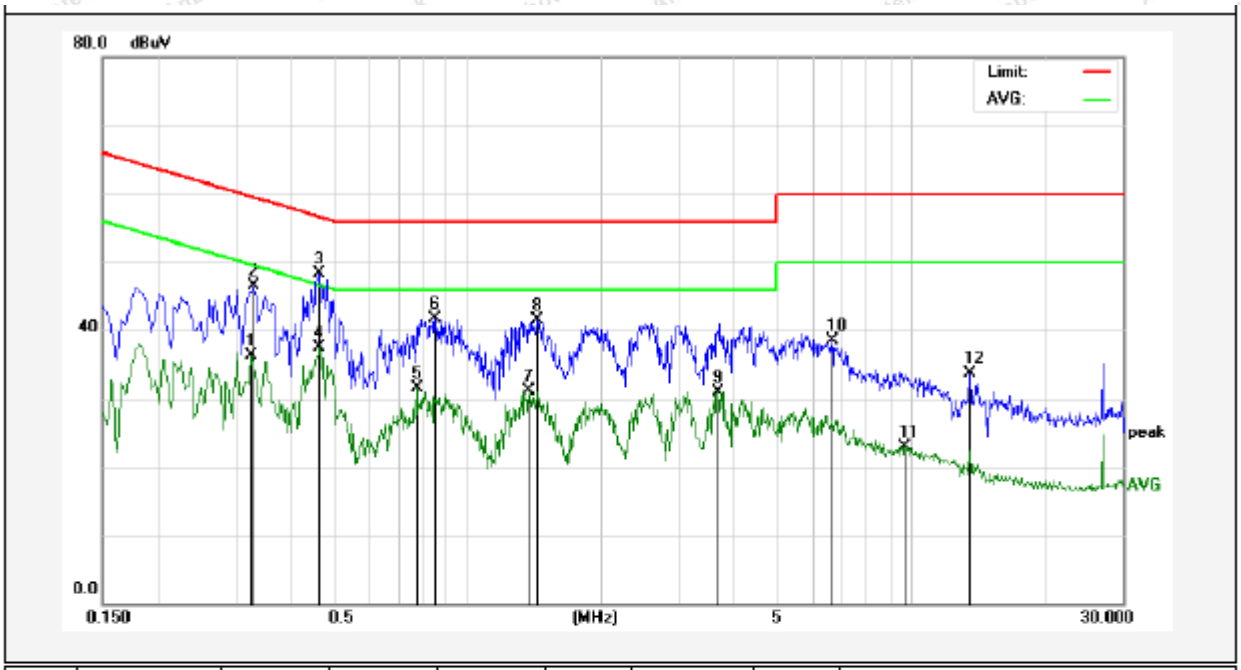
The frequency range from 150kHz to 30MHz is checked.

4.4. Test Data

Please to see the following pages.

Conducted Emission Test Data

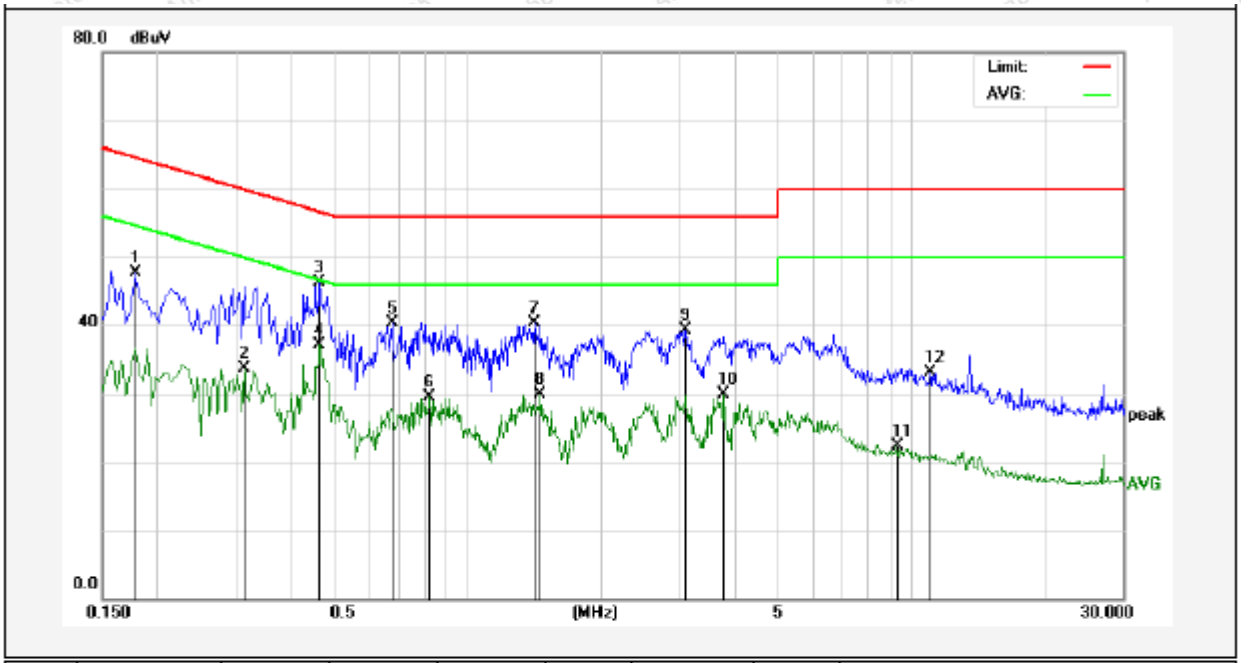
Test Site: 1# Shielded Room
Operating Condition: CH01
Test Specification: AC 240V, 60Hz for adapter
Comment: Live Line
Tem.: 22.6℃ Hum.: 42%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.3260	16.31	19.90	36.21	49.55	-13.34	AVG	
2	0.3300	26.64	19.90	46.54	59.45	-12.91	QP	
3	0.4620	28.41	19.96	48.37	56.66	-8.29	QP	
4	0.4660	17.48	19.96	37.44	46.58	-9.14	AVG	
5	0.7700	11.50	20.06	31.56	46.00	-14.44	AVG	
6	0.8460	21.56	20.08	41.64	56.00	-14.36	QP	
7	1.3779	11.07	20.13	31.20	46.00	-14.80	AVG	
8	1.4340	21.36	20.13	41.49	56.00	-14.51	QP	
9	3.6500	10.78	20.17	30.95	46.00	-15.05	AVG	
10	6.6338	18.31	20.25	38.56	60.00	-21.44	QP	
11	9.6138	2.63	20.33	22.96	50.00	-27.04	AVG	
12	13.5618	13.38	20.28	33.66	60.00	-26.34	QP	

Conducted Emission Test Data

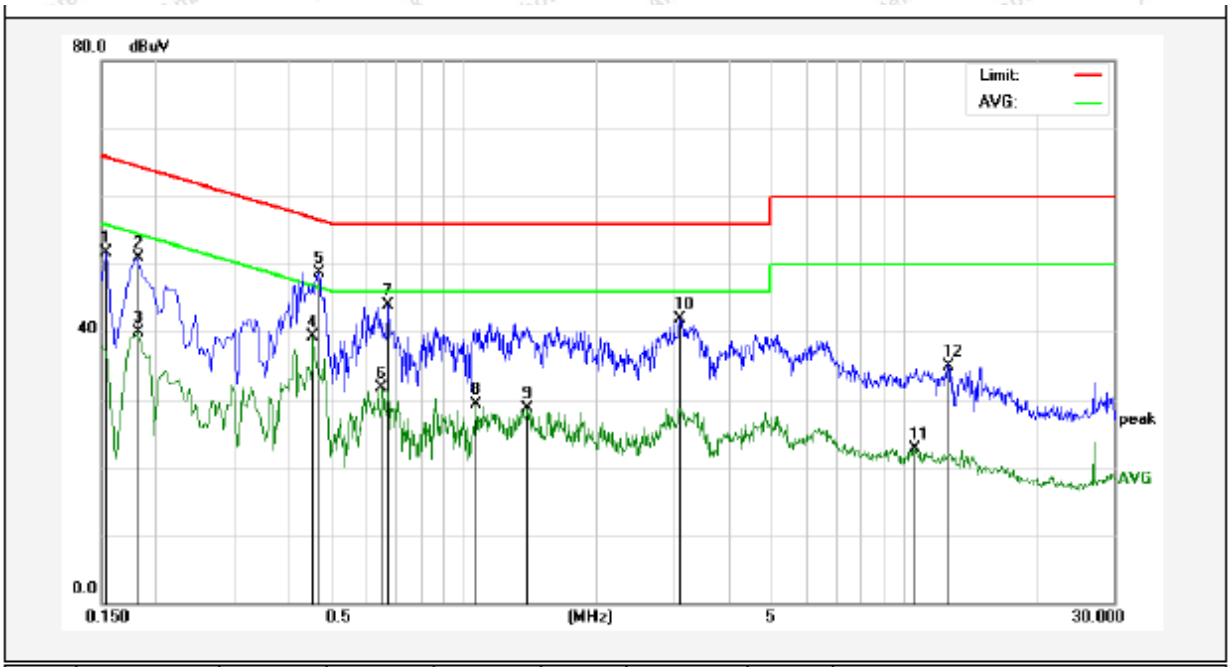
Test Site: 1# Shielded Room
Operating Condition: CH01
Test Specification: AC 240V, 60Hz for adapter
Comment: Neutral Line
Tem.: 22.6℃ Hum.: 42%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1780	27.74	19.90	47.64	64.57	-16.93	QP	
2	0.3140	13.84	19.90	33.74	49.86	-16.12	AVG	
3	0.4660	26.40	19.96	46.36	56.58	-10.22	QP	
4	0.4660	17.18	19.96	37.14	46.58	-9.44	AVG	
5	0.6780	20.31	20.03	40.34	56.00	-15.66	QP	
6	0.8260	9.40	20.07	29.47	46.00	-16.53	AVG	
7	1.4180	20.10	20.13	40.23	56.00	-15.77	QP	
8	1.4620	9.76	20.13	29.89	46.00	-16.11	AVG	
9	3.1020	19.18	20.16	39.34	56.00	-16.66	QP	
10	3.7820	9.75	20.18	29.93	46.00	-16.07	AVG	
11	9.2577	1.94	20.32	22.26	50.00	-27.74	AVG	
12	11.0616	12.74	20.32	33.06	60.00	-26.94	QP	

Conducted Emission Test Data

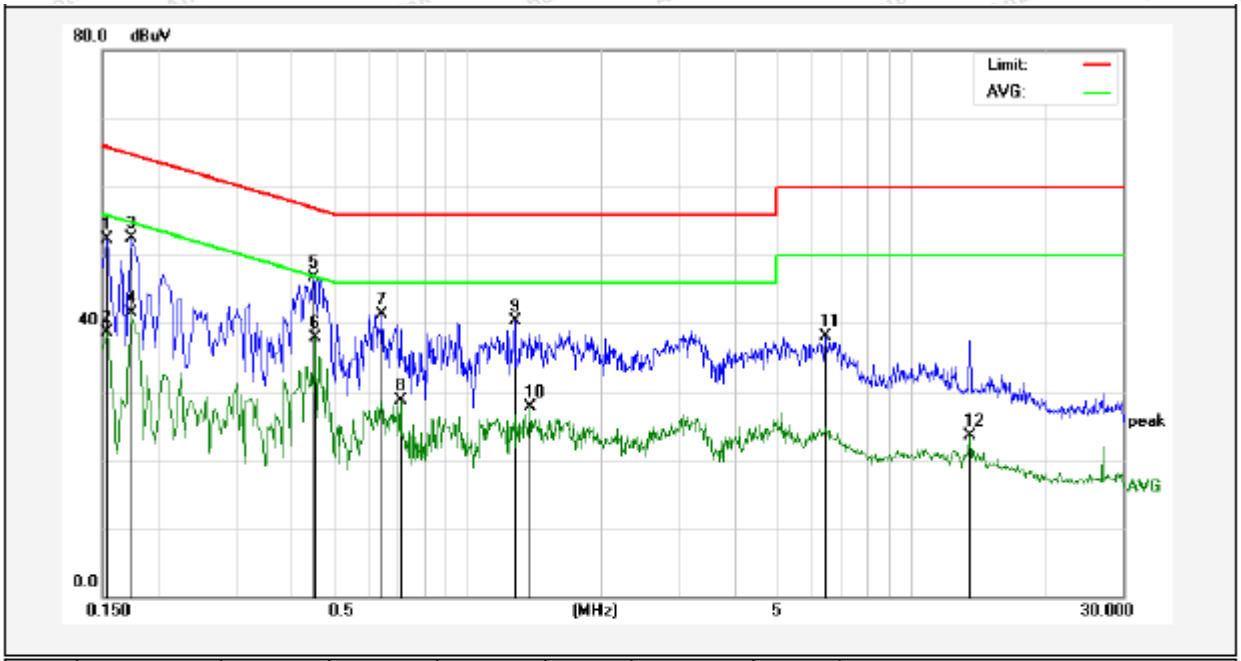
Test Site: 1# Shielded Room
Operating Condition: CH01
Test Specification: AC 120V, 60Hz for adapter
Comment: Live Line
Tem.: 22.6℃ Hum.: 42%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1539	31.89	19.90	51.79	65.78	-13.99	QP	
2	0.1819	30.96	19.90	50.86	64.39	-13.53	QP	
3	0.1819	20.02	19.90	39.92	54.39	-14.47	AVG	
4	0.4540	19.42	19.96	39.38	46.80	-7.42	AVG	
5	0.4700	28.65	19.97	48.62	56.51	-7.89	QP	
6	0.6540	11.59	20.03	31.62	46.00	-14.38	AVG	
7	0.6740	23.90	20.03	43.93	56.00	-12.07	QP	
8	1.0700	9.24	20.12	29.36	46.00	-16.64	AVG	
9	1.4020	8.64	20.13	28.77	46.00	-17.23	AVG	
10	3.0940	21.69	20.16	41.85	56.00	-14.15	QP	
11	10.5458	2.40	20.33	22.73	50.00	-27.27	AVG	
12	12.7058	14.64	20.30	34.94	60.00	-25.06	QP	

Conducted Emission Test Data

Test Site: 1# Shielded Room
Operating Condition: CH01
Test Specification: AC 120V, 60Hz for adapter
Comment: Neutral Line
Tem.: 22.6℃ Hum.: 42%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit dBuV	Over Limit (dB)	Detector	Remark
1	0.1539	32.38	19.90	52.28	65.78	-13.50	QP	
2	0.1539	18.73	19.90	38.63	55.78	-17.15	AVG	
3	0.1740	32.61	19.90	52.51	64.76	-12.25	QP	
4	0.1740	21.65	19.90	41.55	54.76	-13.21	AVG	
5	0.4500	26.76	19.96	46.72	56.87	-10.15	QP	
6	0.4540	18.02	19.96	37.98	46.80	-8.82	AVG	
7	0.6419	21.33	20.02	41.35	56.00	-14.65	QP	
8	0.7060	8.59	20.04	28.63	46.00	-17.37	AVG	
9	1.2820	20.08	20.13	40.21	56.00	-15.79	QP	
10	1.3860	7.61	20.13	27.74	46.00	-18.26	AVG	
11	6.4179	17.80	20.24	38.04	60.00	-21.96	QP	
12	13.5579	3.24	20.28	23.52	50.00	-26.48	AVG	

5. Radiation Spurious Emission

5.1. 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.

5.2. Test Setup

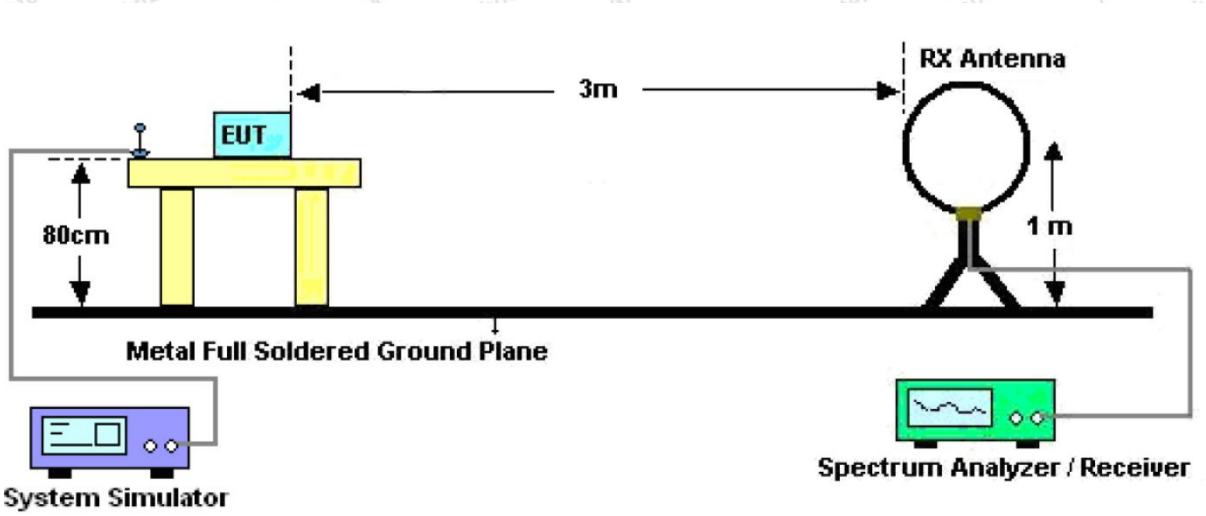


Figure 1. Below 30MHz

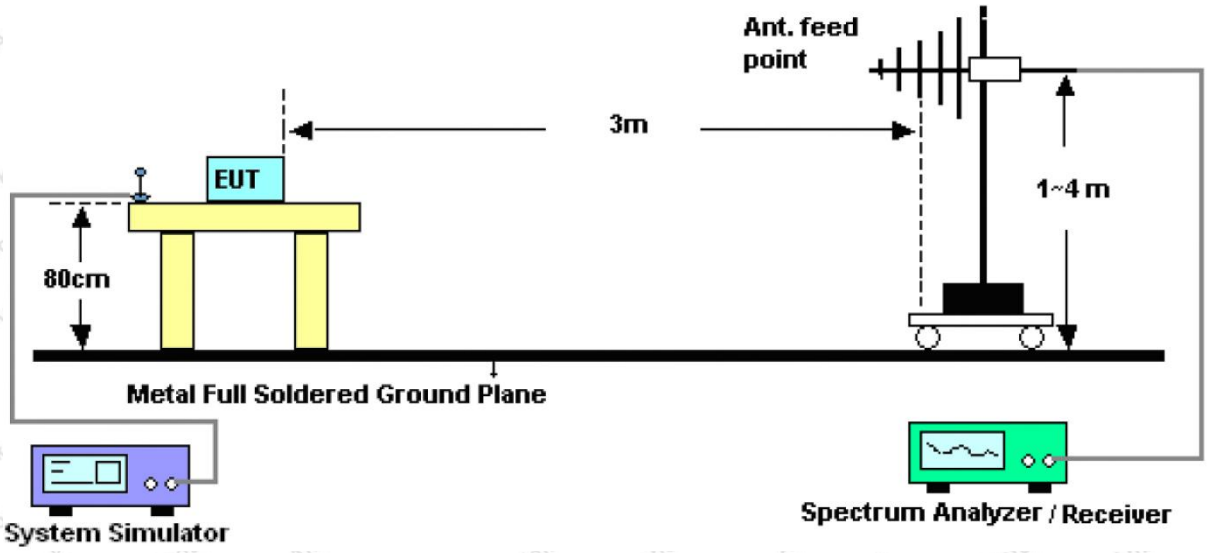


Figure 2. 30MHz to 1GHz

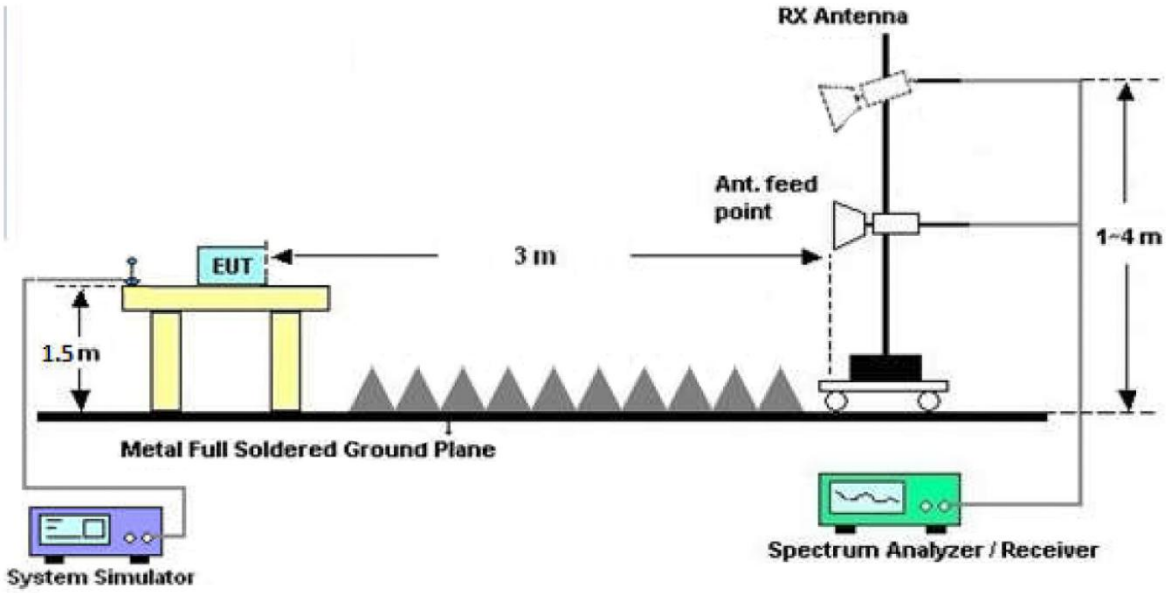


Figure 3. Above 1 GHz

5.3. 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 the radiated emission test above 1GHz:
Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying

aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

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.

For above 1GHz,Set the spectrum analyzer as:
RBW =1MHz, VBW =1MHz, Detector= Peak, Trace mode= Max hold, Sweep- auto couple.
RBW =1MHz, VBW =10Hz, Detector= Average, Trace mode= Max hold, Sweep- auto couple.

5.4. Test Data

PASS

only the worst case is recorded in the report.

Field Strength within the band of operation

Freq.(MHz)	Ant. Orientation	Result at 3m (dBuV/m)	Limitation Converted 3m dist. (dBuV/m)	Margin dB
13.110	Front	57.68	80.5	-22.82
13.410	Front	62.15	80.5	-18.35
13.553	Front	73.96	90.5	-16.54
13.560	Front	85.63	124	-38.37
13.567	Front	63.57	90.5	-26.93
13.710	Front	62.42	80.5	-18.08
14.010	Front	56.31	80.5	-24.19
--	--	--	--	--
13.110	Side	54.22	80.5	-26.28
13.410	Side	59.99	80.5	-20.51
13.553	Side	70.64	90.5	-19.86
13.560	Side	85.73	124	-38.27
13.567	Side	66.08	90.5	-24.42
13.710	Side	54.33	80.5	-26.17
14.010	Side	63.37	80.5	-17.13
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Remark：

(1) Spectrum Setting:

150 K Hz – 30 MHz, RBW= 9 KHz, VBW=9 KHz, Sweep time = 200 ms.

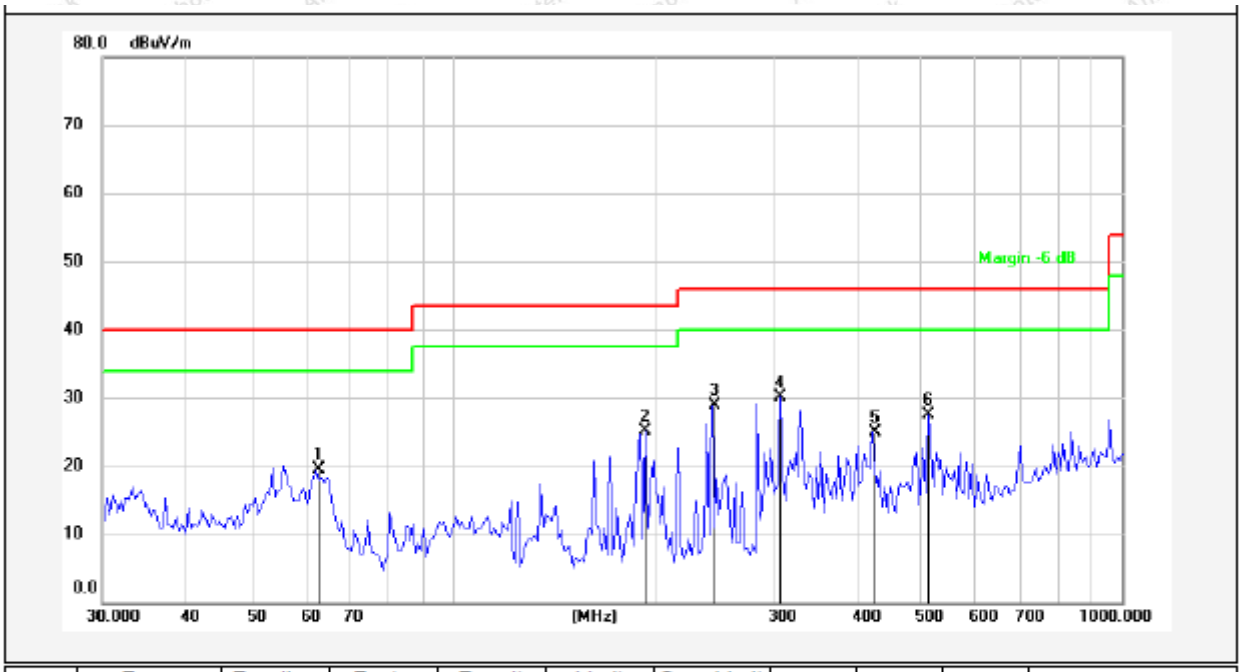
(2) The Log-Bicon Antenna will use to test frequency range from 30MHz to 1000MHz and the Loop Antenna will use to test frequency below 30MHz.

(3) If the peak scan value lower limit more than 20dB, then this signal data does not show in table.

(4) Only the worst case (x orientation).

Field strength outside of the band of operationTest

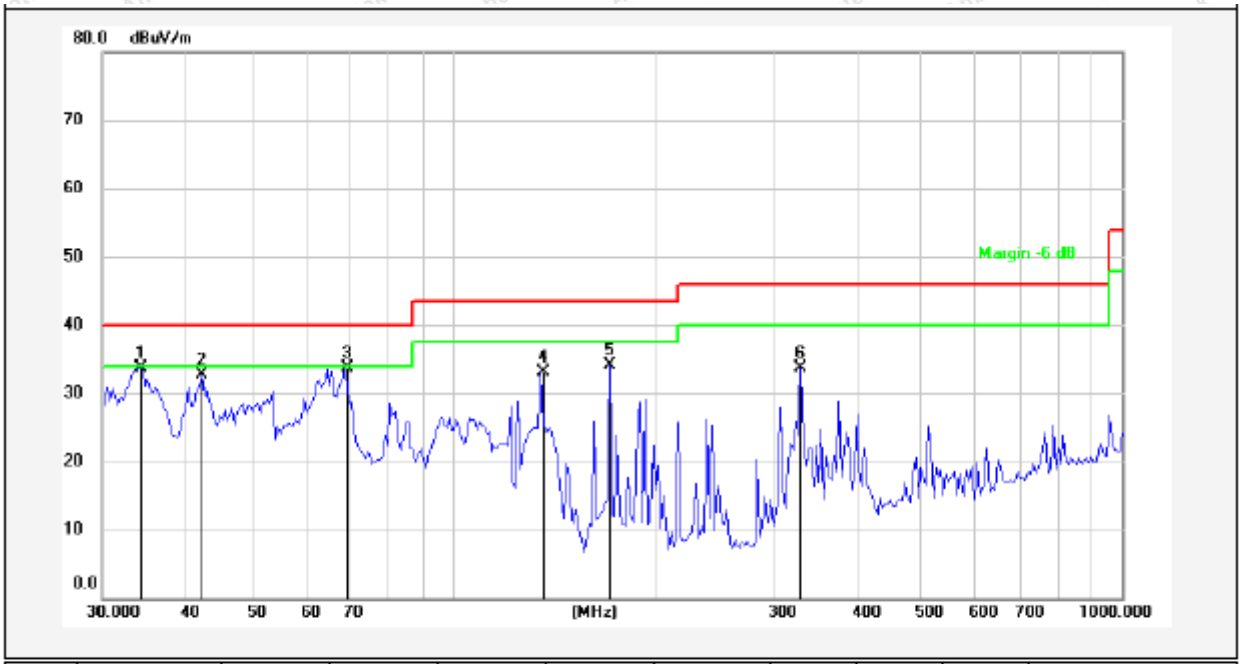
Job No.:	SZAWW181220002-03	Temp.(℃)/Hum.(%RH):	21.4℃/56%RH
Standard:	FCC PART 15C	Power Source:	AC 120V, 60Hz for adapter
Test Mode:	Mode 1	Polarization:	Horizontal



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	62.6507	36.81	-17.22	19.59	40.00	-20.41	QP	300	0	
2	194.1128	46.14	-21.12	25.02	43.50	-18.48	QP	300	360	
3	243.8043	47.82	-18.94	28.88	46.00	-17.12	QP	300	0	
4	308.9126	47.84	-17.74	30.10	46.00	-15.90	QP	300	360	
5	423.5403	39.18	-14.28	24.90	46.00	-21.10	QP	300	0	
6	513.6331	40.58	-13.02	27.56	46.00	-18.44	QP	300	360	

Test Results (30~1000MHz)

Job No.:	SZAWW181220002-03	Temp.(℃)/Hum.(%RH):	21.4℃/56%RH
Standard:	FCC PART 15C	Power Source:	AC 120V, 60Hz for adapter
Test Mode:	Mode 1	Polarization:	Vertical



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	33.9174	49.74	-15.97	33.77	40.00	-6.23	QP	100	0	
2	42.2281	47.29	-14.53	32.76	40.00	-7.24	QP	100	360	
3	68.9930	52.29	-18.65	33.64	40.00	-6.36	QP	100	0	
4	135.5062	52.11	-18.92	33.19	43.50	-10.31	QP	100	360	
5	171.6933	52.06	-18.04	34.02	43.50	-9.48	QP	100	0	
6	331.3546	48.67	-15.03	33.64	46.00	-12.36	QP	100	360	

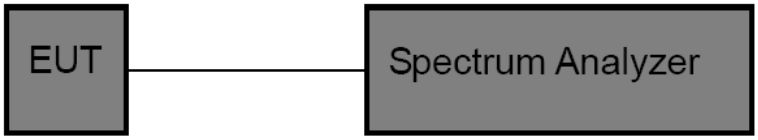
6. Frequency Tolerance

6.1. Test Standard and Limit

The frequency tolerance of the carrier signal shall be maintained within ±0.01% of the operating frequency.

Fundamental Frequency (MHz)	Limit of Tolerance Bandwidth (Hz)
13.56	13.56*1000*1000*0.01%=1356

6.2. Test Setup



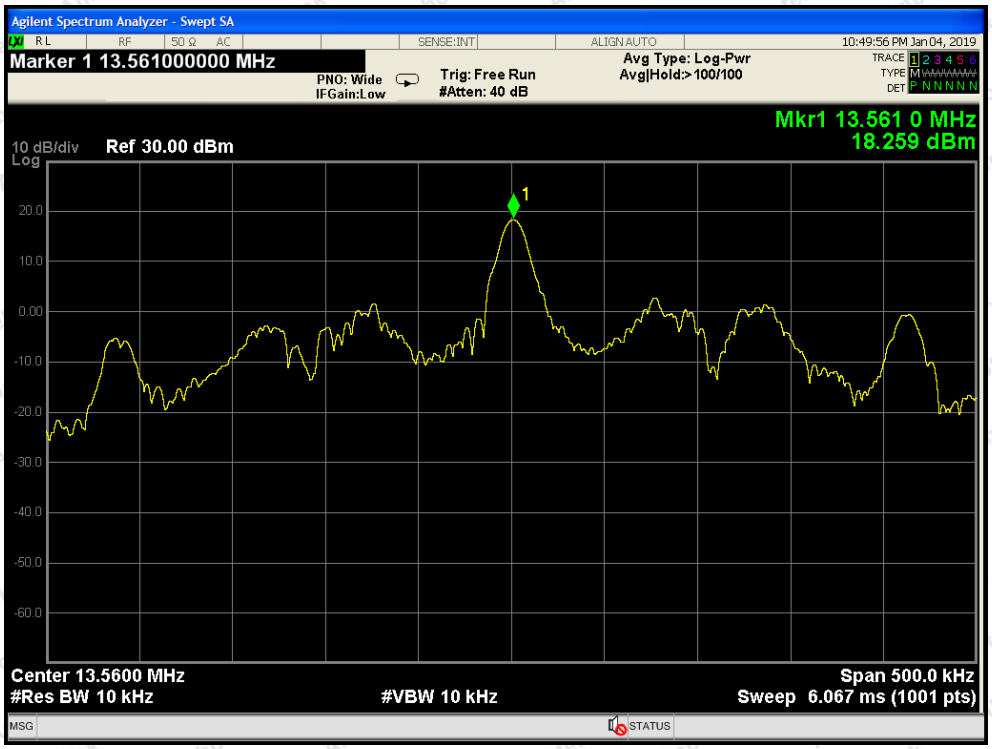
6.3. Test Procedure

Let the EUT works on temperature variation of −20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

6.4. Test Data

Test Item	:	Frequency tolerance	Test Mode	:	CH 01
Test Voltage	:	AC 120V, 60Hz for adapter	Temperature	:	See Below
Test Result	:	PASS	Humidity	:	50%RH

Test Condition				
	Voltage (V)	Temperature (℃)	Test Result (Hz)	Limit (Hz)
Normal Condition	AC 120V	-20	21	1356
		+20	10	1356
		+50	29	1356
Extreme Condition	AC 108V	+20	30	1356
	AC 132V	+20	18	1356

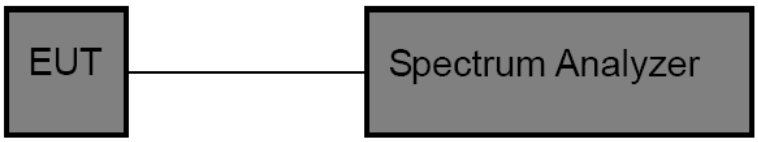

Agilent Spectrum Analyzer - Swept SA
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
10:49:56 PM Jan 04, 2019
Marker 1 13.561000000 MHz
PNO: Wide
IFGain:Low
Trig: Free Run
#Atten: 40 dB
Avg Type: Log-Pwr
Avg|Hold:>100/100
TRACE 1 2 3 4 5 6
TYPE M
DET P N N N N N
Mkr1 13.561 0 MHz
18.259 dBm
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
1
Center 13.5600 MHz
#Res BW 10 kHz
#VBW 10 kHz
Span 500.0 kHz
Sweep 6.067 ms (1001 pts)
MSG
STATUS

7. 20dB Bandwidth

7.1. Test Standard and Limit

According to 15.215 (c):
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§15.217 through 15.257 and in Subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.

7.2. Test Setup



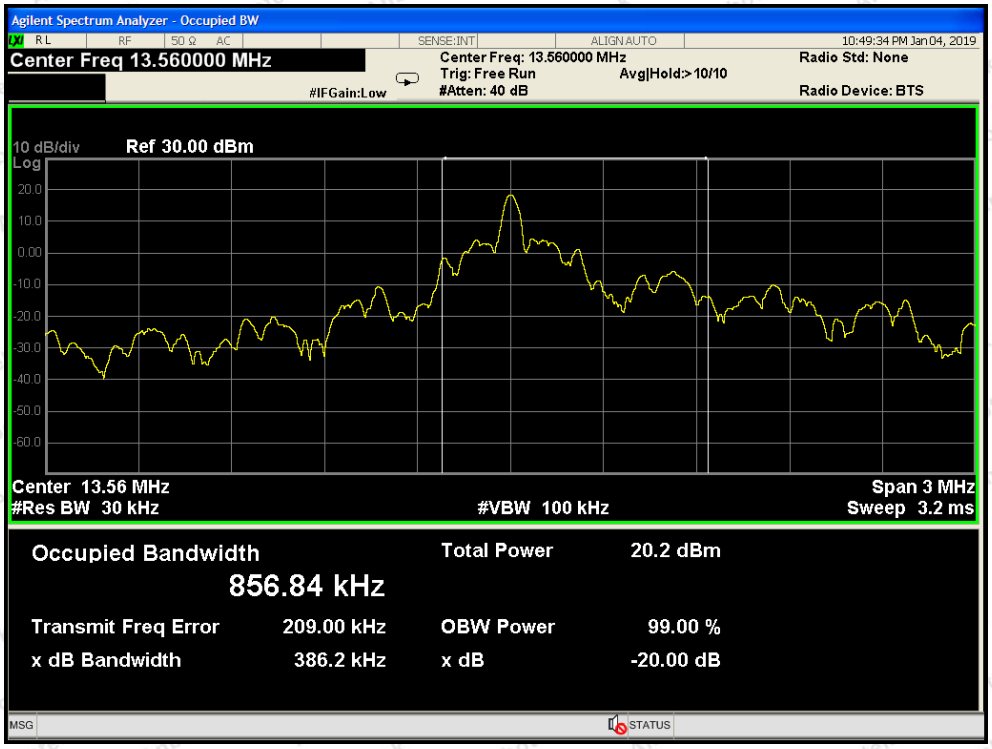
7.3. Test Procedure

The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

7.4. Test Data

Test Item	:	Power Spectral Density	Test Mode	:	CH 01
Test Voltage	:	AC 120V, 60Hz for adapter	Temperature	:	23.5℃
Test Result	:	PASS	Humidity	:	50%RH

Frequency(MHz)	20dB BW(kHz)
13.56	386.2


Agilent Spectrum Analyzer - Occupied BW
RL
RF
50 Ω AC
SENSE:INT
ALIGN AUTO
10:49:34 PM Jan 04, 2019
Center Freq 13.560000 MHz
Center Freq: 13.560000 MHz
Trig: Free Run
Avg|Hold:>10/10
#IFGain:Low
#Atten: 40 dB
Radio Std: None
Radio Device: BTS
10 dB/div
Log
Ref 30.00 dBm
20.0
10.0
0.00
-10.0
-20.0
-30.0
-40.0
-50.0
-60.0
Center 13.56 MHz
#Res BW 30 kHz
#VBW 100 kHz
Span 3 MHz
Sweep 3.2 ms
Occupied Bandwidth
856.84 kHz
Total Power 20.2 dBm
Transmit Freq Error 209.00 kHz
OBW Power 99.00 %
x dB Bandwidth 386.2 kHz
x dB -20.00 dB
MSG
STATUS

8. Antenna Requirement

8.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203
Requirement	The EUT'S antenna should met the requirement of FCC part 15C section 15.203. 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. Antenna requirement must meet at least one of the following: 1) Antenna must be permanently attached to device. 2) The antenna must use a unique type of connector to attach to the device. 3) Device must be professionally installed. The installer shall be responsible for ensuring that the correct antenna is employed by the device.

8.2. Antenna Connected Construction

The antenna is a PCB 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 the test report SZAWW181220002-01.

APPENDIX II -- EXTERNAL PHOTOGRAPH

Please refer to the test report SZAWW181220002-01.

APPENDIX III -- INTERNAL PHOTOGRAPH

Please refer to the test report SZAWW181220002-01.

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