

FCC TEST REPORT

Client Name : Shenzhen Proscenic Technology Co., Ltd
Address : 8F,Block 5A, Tusincere High-tech Park, Intersection of
Qingchun Road and Longfei Avenue, Longgang District,
Shenzhen, Guangdong Province, China 518000
Product Name : Robot Vacuum Cleaner
Date : Jul. 05, 2021

Shenzhen Anbotek Compliance Laboratory Limited



Contents

1. General Information.....	4
1.1. Client Information.....	4
1.2. Description of Device (EUT).....	4
1.3. Auxiliary Equipment Used During Test.....	5
1.4. Description of Test Modes.....	5
1.5. List of Channels.....	5
1.6. Description of Test Setup.....	6
1.7. Test Equipment List.....	7
1.8. Description of Test Facility.....	8
3. Conducted Emission Test.....	9
3.1. Test Standard and Limit.....	9
3.2. Test Setup.....	9
3.3. Test Procedure.....	9
3.4. Test Data.....	9
4. Radiated Emission and Band Edge.....	14
4.1. Test Standard and Limit.....	14
4.2. Test Setup.....	15
4.3. Test Procedure.....	16
4.4. Test Data.....	17
5. 20DB Occupy Bandwidth Test.....	22
5.1. Test Standard and Limit.....	22
5.2. Test Setup.....	22
5.3. Test Procedure.....	22
5.4. Test Data.....	22
6. Dwell Time Test.....	24
6.1. Test Standard and Limit.....	24
6.2. Test Setup.....	24
6.3. Test Procedure.....	24
6.4. Test Data.....	24
7. Antenna Requirement.....	26
7.1. Test Standard and Requirement.....	26
7.2. Antenna Connected Construction.....	26
APPENDIX I -- TEST SETUP PHOTOGRAPH.....	27
APPENDIX II -- EXTERNAL PHOTOGRAPH.....	27
APPENDIX III -- INTERNAL PHOTOGRAPH.....	27

TEST REPORT

Applicant : Shenzhen Proscenic Technology Co., Ltd

Manufacturer : Shenzhen Proscenic Technology Co., Ltd

Product Name : Robot Vacuum Cleaner

Model No. : LDS M8, LDS M8 PRO, LDS M8 PRO+, LDS M8 MAX, LDS M8 Smart, LDS M8 OAS, LDS M9, LDS M9 PRO, LDS M9 PRO+, LDS M9 MAX, T10 RS, T11, T11 PRO, T11MAX, T11 SE, T11 AI, T11 RS, T12, T12 PRO, T12 MAX, T12 SE, T12 AI, T12 RS, D7, D7s, D7 PRO, D7 MAX, D7 SE

Trade Mark : Proscenic, Ultenic

Rating(s) : Input: 100-240V~50/60Hz 1.0A Max Output: DC 24.0V 1.2A
(with DC 14.4V, 5200mAh battery inside)

Test Standard(s) : **FCC Part15 Subpart C, Section 15.231**

Test Method(s) : **ANSI C63.10: 2020**

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.

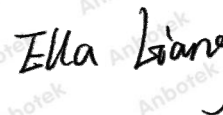
Date of Receipt

Mar. 09, 2021

Date of Test

Mar. 09~May. 10, 2021

Prepared by



(Ella Liang)

Approved & Authorized Signer



(Kingkong Jin)

1. General Information

1.1. Client Information

Applicant	:	Shenzhen Proscenic Technology Co., Ltd
Address	:	8F,Block 5A, Tusincere High-tech Park, Intersection of Qingchun Road and Longfei Avenue, Longgang District, Shenzhen, Guangdong Province, China 518000
Manufacturer	:	Shenzhen Proscenic Technology Co., Ltd
Address	:	8F,Block 5A, Tusincere High-tech Park, Intersection of Qingchun Road and Longfei Avenue, Longgang District, Shenzhen, Guangdong Province, China 518000
Factory	:	Shenzhen Proscenic Technology Co., Ltd
Address	:	8F,Block 5A, Tusincere High-tech Park, Intersection of Qingchun Road and Longfei Avenue, Longgang District, Shenzhen, Guangdong Province, China 518000

1.2. Description of Device (EUT)

Product Name	:	Robot Vacuum Cleaner
Model No.	:	LDS M8, LDS M8 PRO, LDS M8 PRO+, LDS M8 MAX, LDS M8 Smart, LDS M8 OAS, LDS M9, LDS M9 PRO, LDS M9 PRO+, LDS M9 MAX, LDS M9 Smart, LDS M9 BASE, T10, T10 PRO, T10 MAX, T10 SE, T10 AI, T10 RS, T11, T11 PRO, T11MAX, T11 SE, T11 AI, T11 RS, T12, T12 PRO, T12 MAX, T12 SE, T12 AI, T12 RS, D7, D7s, D7 PRO, D7 MAX, D7 SE (Note: All samples are the same except the model number and appearance, so we prepare "LDS M8" for test only.)
Trade Mark	:	Proscenic, Ultenic
Test Power Supply	:	DC 14.4V Battery inside
Test Sample No.	:	1-2-1(Normal Sample), 1-2-2(Engineering Sample)
Product Description	Operation Frequency:	SRD: 433.6MHz 2.4G WIFI: 802.11b/ g/ n(HT20): 2412~2462 MHz
	Number of Channel:	SRD: 1 Channel 2.4G WIFI: 02.11b/ g/ n(HT20): 11 Channels
	Modulation Type:	SRD: FSK 2.4G WIFI: CCK, DQPSK, DBPSK for DSSS 64QAM, 16QAM, QPSK, BPSK for OFDM
	Antenna Type:	SRD: PIFA Antenna 2.4G WIFI: PCB Antenna
	Antenna Gain(Peak):	SRD: 2dBi 2.4G WIFI: 1dBi

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 433MHz Module.

1.3. Auxiliary Equipment Used During Test

N/A	:	
-----	---	--

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	Frequency
TX Mode	433.6 MHz

For Radiated Emission	
Final Test Mode	Frequency
TX Mode	433.6 MHz

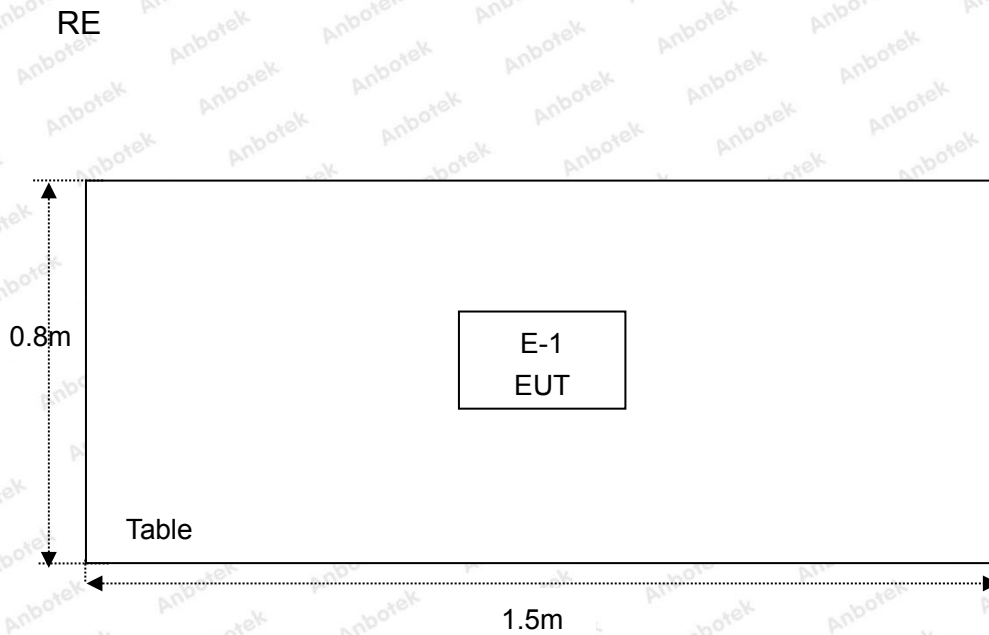
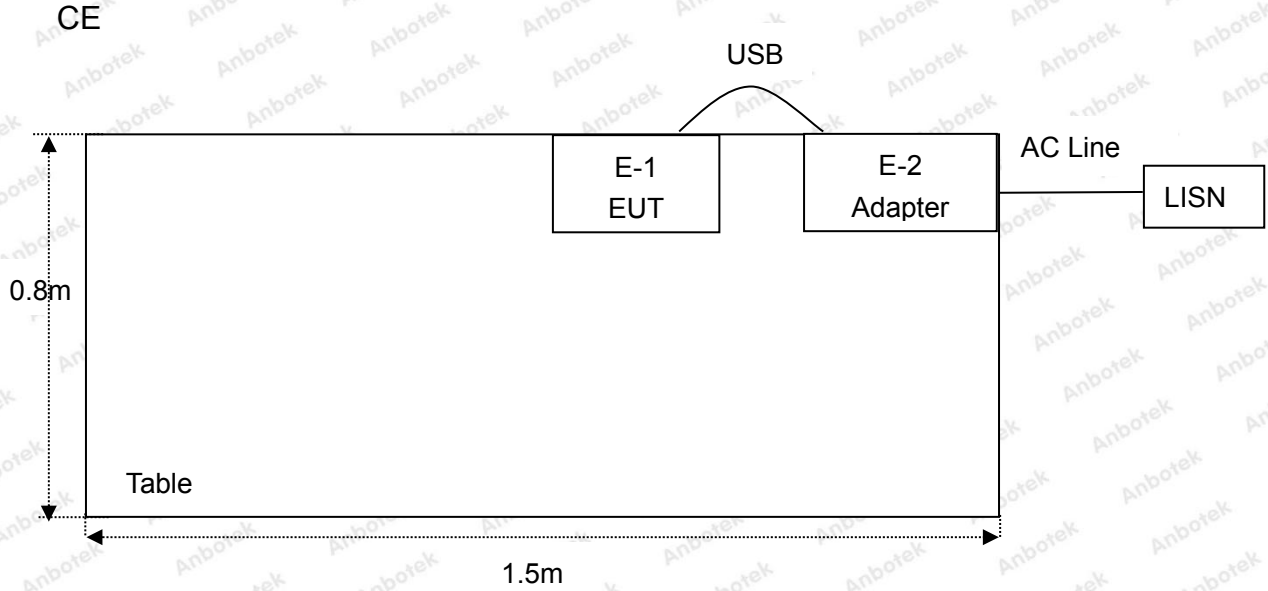
Note:

1. During the test, the EUT was keeping continuous transmission.

1.5. List of Channels

Mode	Frequency
Mode 1	433.6 MHz

1.6. Description of Test Setup



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	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

1.8. 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-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, 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.518128

2. Summary of Test Results

Standard Section	Test Item	Result
15.203	Antenna Requirement	PASS
15.207	Conducted Emission	PASS
15.205/15.209/15.231(b)	Spurious Emission	PASS
15.231(c)	20dB Occupied Bandwidth	PASS
15.231(a)	Dwell time	PASS
Remark: "N/A" is an abbreviation for Not Applicable.		

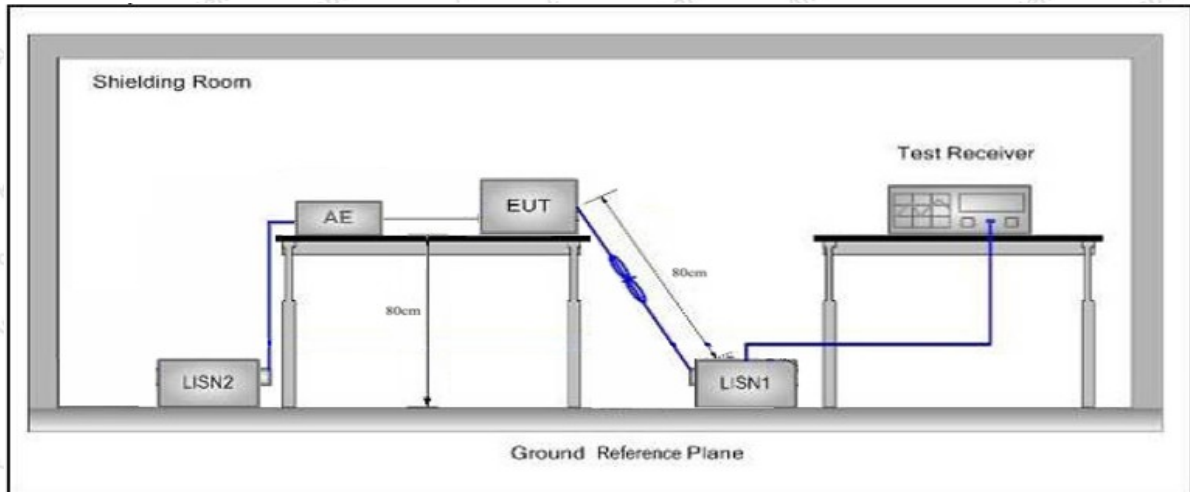
3. Conducted Emission Test

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 C63.10-2020 on Conducted Emission Measurement.

The bandwidth of test CAR REMOTE (ESCI) set at 9kHz.
 The frequency range from 150kHz to 30MHz is checked.

3.4. Test Data

Pass

Shenzhen Anbotek Compliance Laboratory Limited

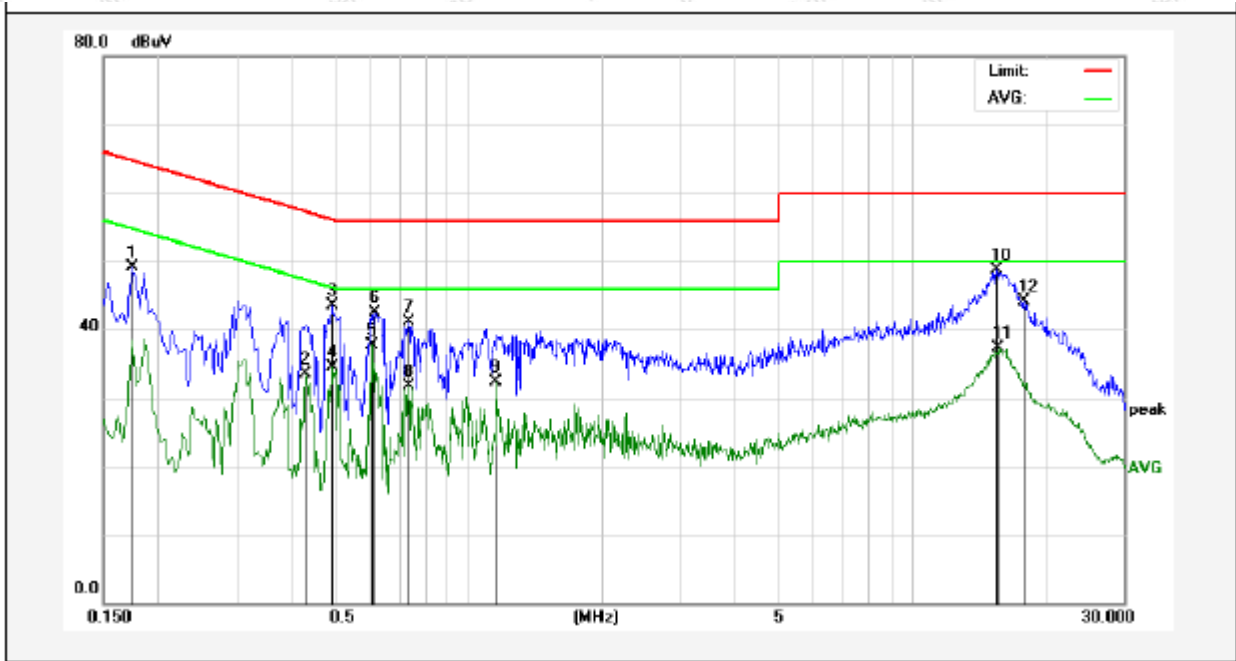
Address: 1/F., Building D, Sogood Science and Technology Park, Sanwei Community, Hangcheng Street, Bao'an District, Shenzhen, Guangdong, China.
 Tel: (86) 755-26066440 Fax: (86) 755-26014772 Email: service@anbotek.com

Code:AB-RF-05-a

Hotline
 400-003-0500
 www.anbotek.com

Conducted Emission Test Data

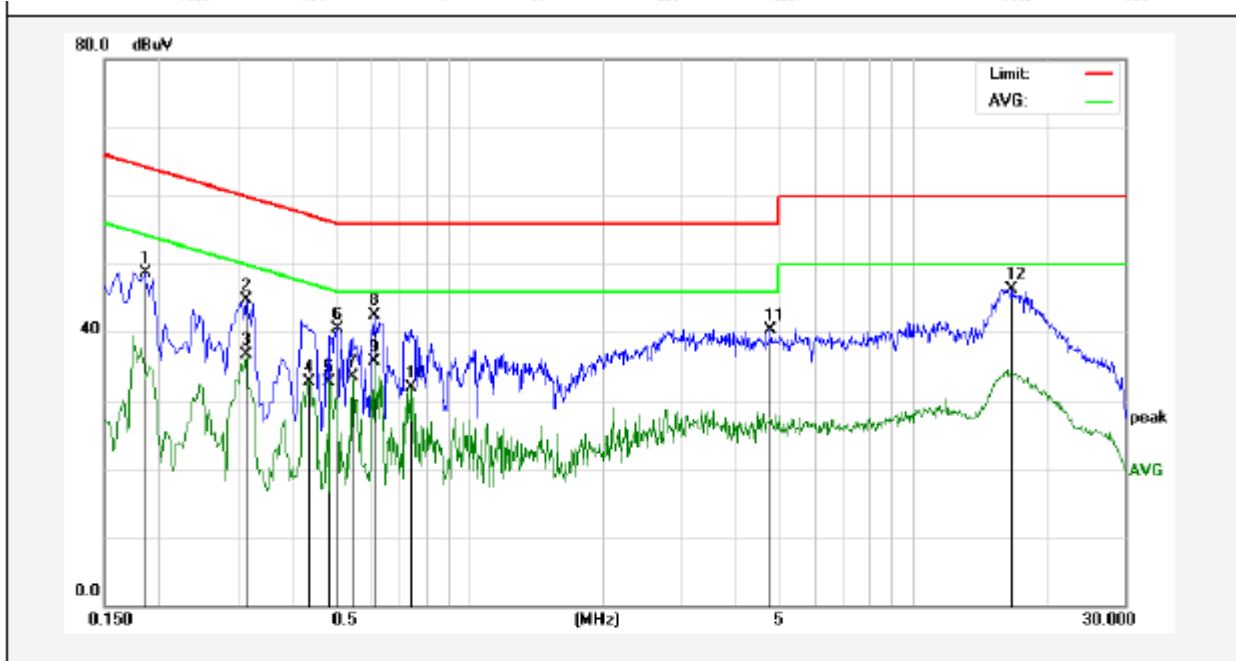
Test Site: 1# Shielded Room
 Operating Condition: 433.6MHz
 Test Specification: AC 120V, 60Hz for adapter
 Comment: Live Line
 Tem.: 21.6°C Hum.: 50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1740	29.14	19.90	49.04	64.76	-15.72	QP	
2	0.4300	13.57	19.95	33.52	47.25	-13.73	AVG	
3	0.4940	23.43	19.98	43.41	56.10	-12.69	QP	
4	0.4940	14.53	19.98	34.51	46.10	-11.59	AVG	
5	0.6060	17.61	20.01	37.62	46.00	-8.38	AVG	
6	0.6140	22.44	20.01	42.45	56.00	-13.55	QP	
7	0.7340	21.02	20.05	41.07	56.00	-14.93	QP	
8	0.7340	11.74	20.05	31.79	46.00	-14.21	AVG	
9	1.1539	12.17	20.12	32.29	46.00	-13.71	AVG	
10	15.4940	28.51	20.27	48.78	60.00	-11.22	QP	
11	15.6460	17.03	20.27	37.30	50.00	-12.70	AVG	
12	17.9020	23.88	20.31	44.19	60.00	-15.81	QP	

Conducted Emission Test Data

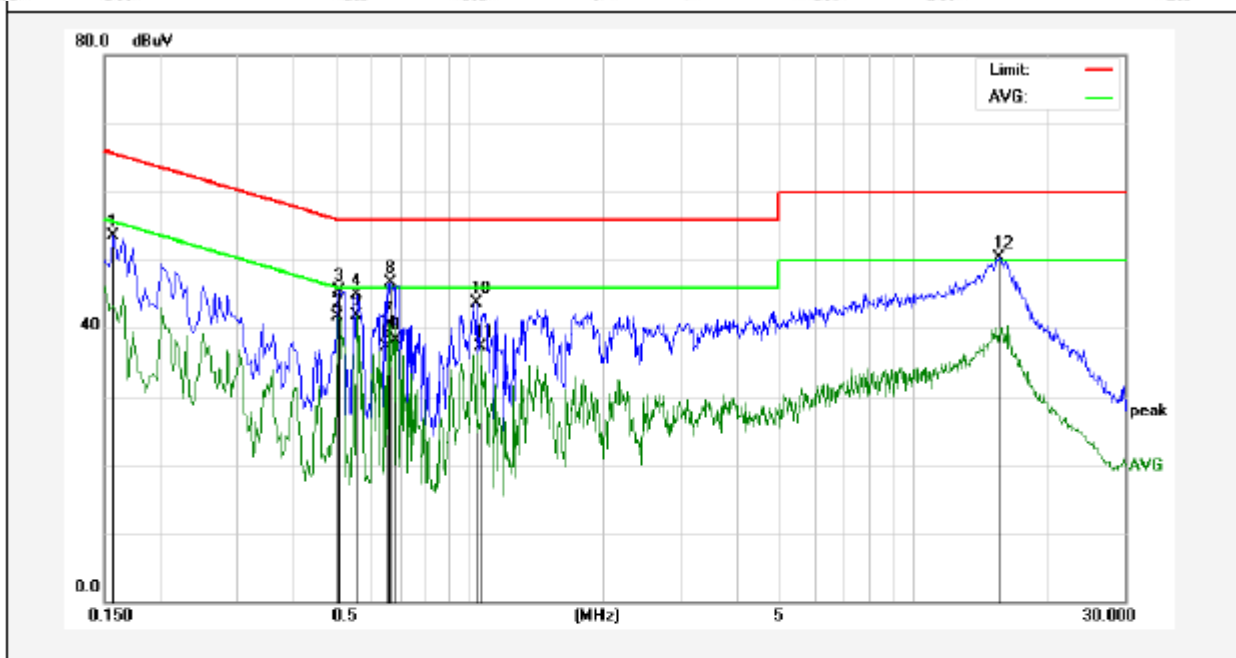
Test Site: 1# Shielded Room
 Operating Condition: 433.6MHz
 Test Specification: AC 120V, 60Hz for adapter
 Comment: Neutral Line
 Tem.: 21.6°C Hum.: 50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1860	28.72	19.90	48.62	64.21	-15.59	QP	
2	0.3140	24.90	19.90	44.80	59.86	-15.06	QP	
3	0.3140	16.85	19.90	36.75	49.86	-13.11	AVG	
4	0.4340	12.79	19.95	32.74	47.18	-14.44	AVG	
5	0.4860	12.83	19.97	32.80	46.24	-13.44	AVG	
6	0.5020	20.43	19.98	40.41	56.00	-15.59	QP	
7	0.5460	13.44	19.99	33.43	46.00	-12.57	AVG	
8	0.6100	22.44	20.01	42.45	56.00	-13.55	QP	
9	0.6100	15.73	20.01	35.74	46.00	-10.26	AVG	
10	0.7380	11.79	20.05	31.84	46.00	-14.16	AVG	
11	4.7740	20.15	20.20	40.35	56.00	-15.65	QP	
12	16.6980	26.10	20.29	46.39	60.00	-13.61	QP	

Conducted Emission Test Data

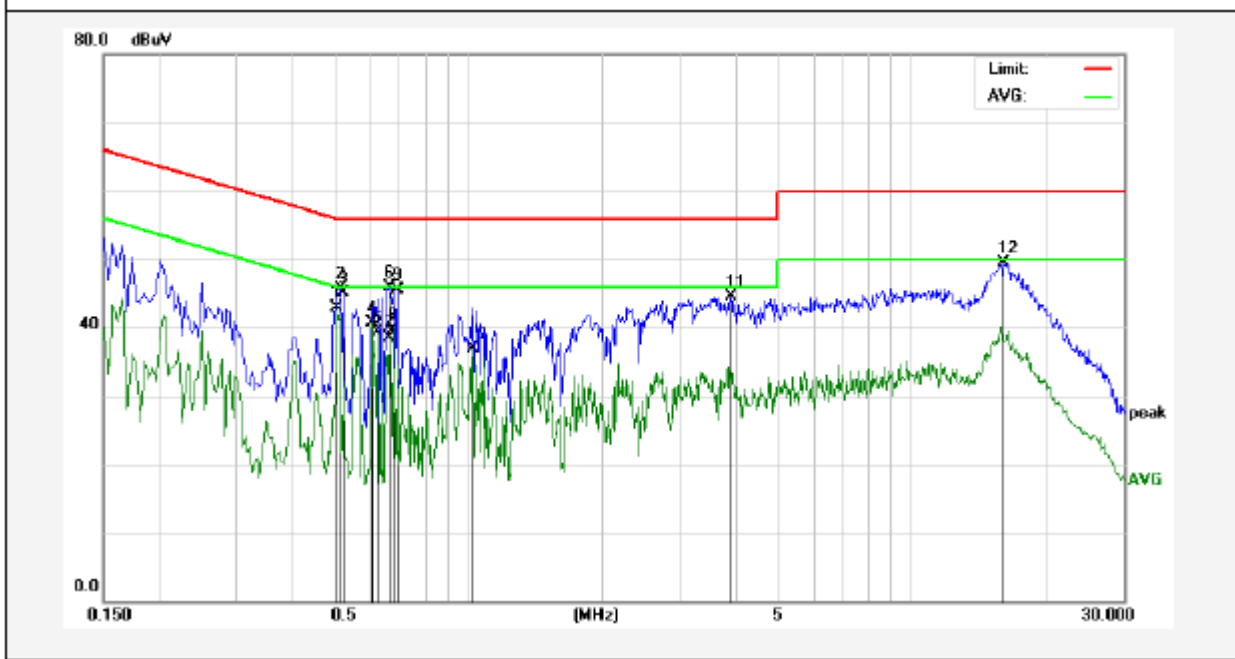
Test Site: 1# Shielded Room
 Operating Condition: 433.6MHz
 Test Specification: AC 240V, 60Hz for adapter
 Comment: Live Line
 Tem.: 21.6°C Hum.: 50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1580	33.62	19.90	53.52	65.56	-12.04	QP	
2	0.5060	21.70	19.98	41.68	46.00	-4.32	AVG	
3	0.5100	25.51	19.98	45.49	56.00	-10.51	QP	
4	0.5580	24.95	20.00	44.95	56.00	-11.05	QP	
5	0.5580	21.99	20.00	41.99	46.00	-4.01	AVG	
6	0.6500	17.38	20.02	37.40	46.00	-8.60	AVG	
7	0.6580	20.65	20.03	40.68	46.00	-5.32	AVG	
8	0.6620	26.58	20.03	46.61	56.00	-9.39	QP	
9	0.6860	18.29	20.04	38.33	46.00	-7.67	AVG	
10	1.0339	23.67	20.12	43.79	56.00	-12.21	QP	
11	1.0620	17.28	20.12	37.40	46.00	-8.60	AVG	
12	15.6460	30.09	20.27	50.36	60.00	-9.64	QP	

Conducted Emission Test Data

Test Site: 1# Shielded Room
 Operating Condition: 433.6MHz
 Test Specification: AC 240V, 60Hz for adapter
 Comment: Neutral Line
 Tem.: 21.6°C Hum.: 50%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.5060	22.86	19.98	42.84	46.00	-3.16	AVG	
2	0.5140	25.73	19.98	45.71	56.00	-10.29	QP	
3	0.5220	25.18	19.99	45.17	56.00	-10.83	QP	
4	0.6060	20.73	20.01	40.74	46.00	-5.26	AVG	
5	0.6220	19.32	20.02	39.34	46.00	-6.66	AVG	
6	0.6620	25.78	20.03	45.81	56.00	-10.19	QP	
7	0.6620	18.49	20.03	38.52	46.00	-7.48	AVG	
8	0.6780	19.63	20.03	39.66	46.00	-6.34	AVG	
9	0.6900	25.40	20.04	45.44	56.00	-10.56	QP	
10	1.0260	16.71	20.12	36.83	46.00	-9.17	AVG	
11	3.9180	24.37	20.18	44.55	56.00	-11.45	QP	
12	16.0740	29.29	20.28	49.57	60.00	-10.43	QP	

4. Radiated Emission and Band Edge

4.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.209, 15.205 and 15.231(b)				
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.

the formulas for calculating the maximum permitted fundamental field strengths are as follows:

for the band 260-470 MHz, $\mu\text{V/m}$ at 3 meters = $41.6667(F) - 7083.3333$.

The maximum permitted unwanted emission level is 20 dB below the maximum permitted fundamental level

$$\text{Emission Level (dBuV/m)} = 20 \log \text{Emission Level}(\mu\text{V/m})$$

The field strength of emission limits have been calculated in below table:

(MHz)	Field Strength of Fundamental (dBuV/m)@3m
433.6	80.82 (AVG)
433.6	100.82 (Peak)

4.2. Test Setup

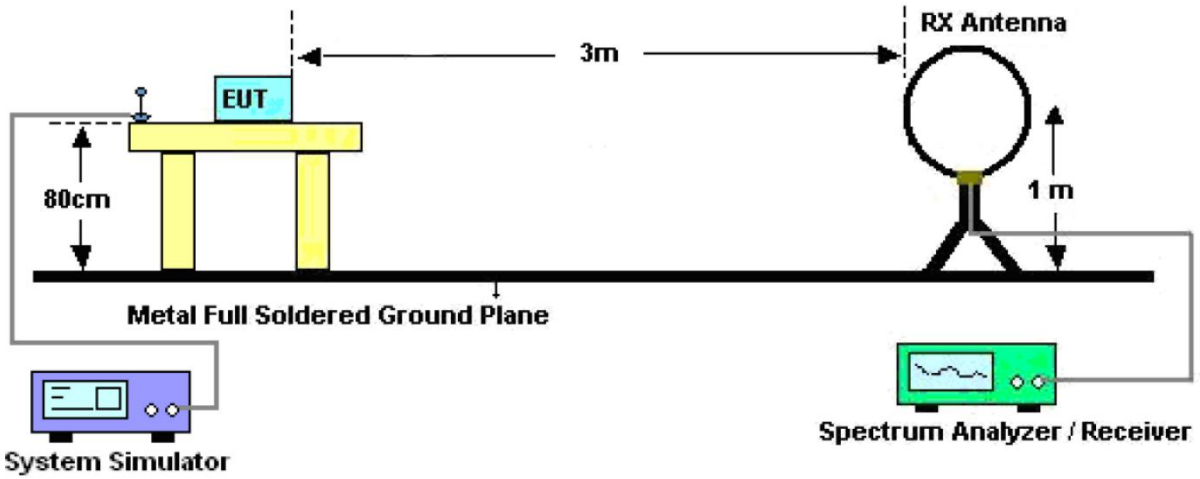


Figure 1. Below 30MHz

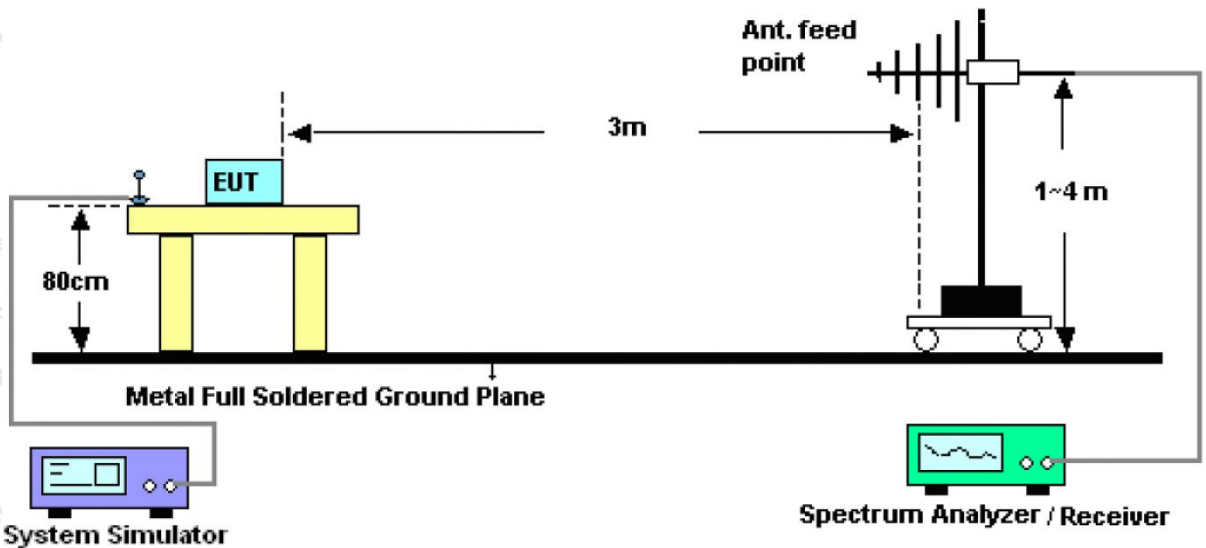


Figure 2. 30MHz to 1GHz

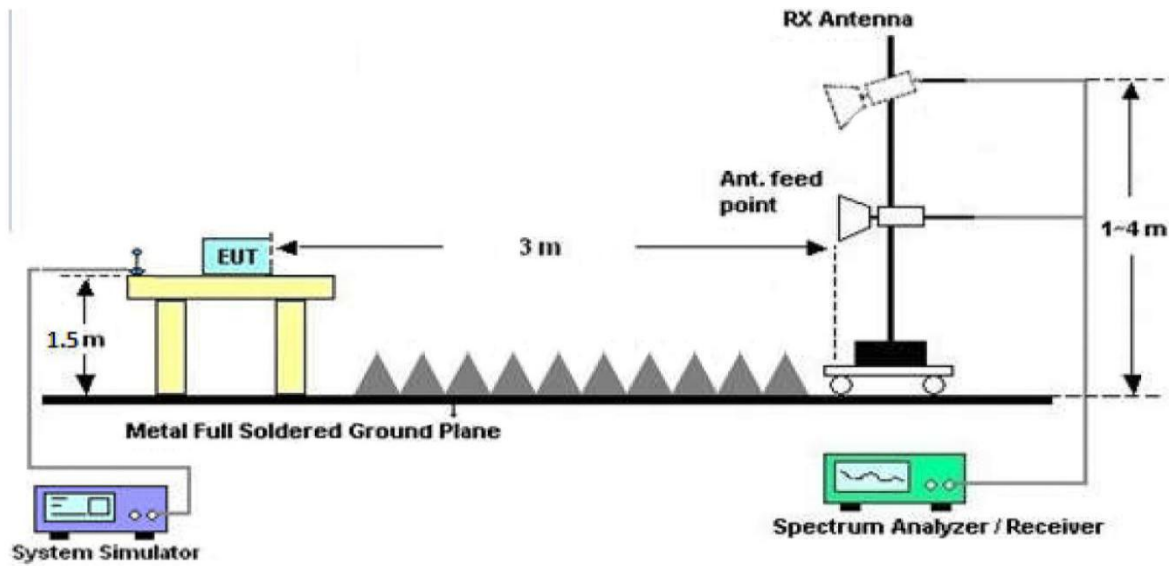


Figure 3. Above 1 GHz

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.

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.

4.4. Test Data

PASS

During the test, Pre-scan all kind of the place mode (X-axis, Y-axis, Z-axis), and found the X-axis is the worst case.

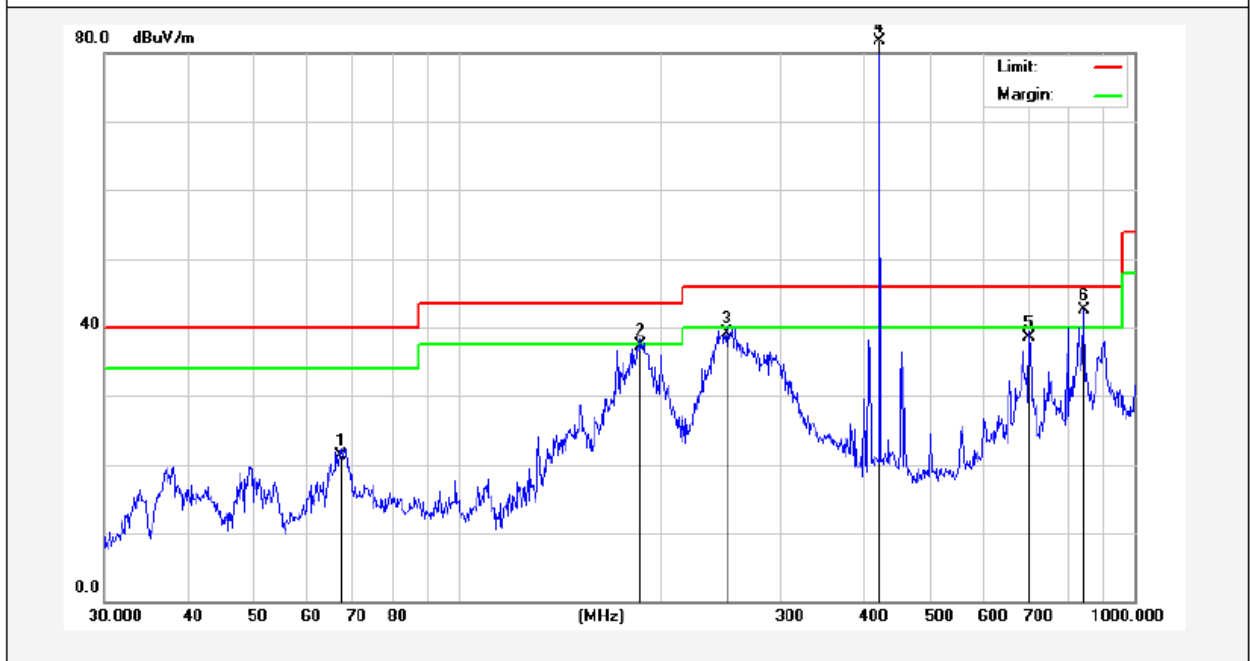
The test results of 9kHz-30MHz are attenuated more than 20dB below the permissible limits, so the results don't record in the report.

During the test, pre-scan all modes, only the worst case is recorded in the report.



Test Results (30~1000MHz)

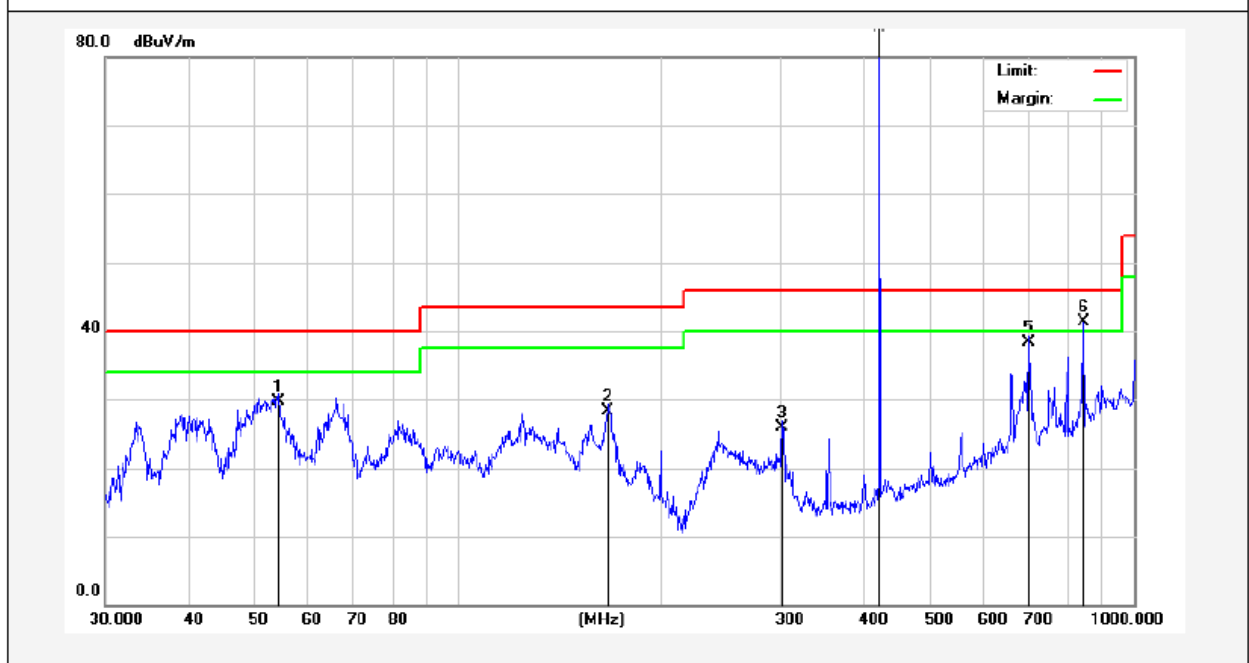
Test Mode: 433.6MHz(FSK)
 Power Source: DC 14.4V battery inside
 Polarization: Horizontal
 Temp.(°C)/Hum.(%RH): 22.0°C/50%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	67.2022	40.61	-19.24	21.37	40.00	-18.63	QP	100	360	
2	185.7882	57.94	-20.55	37.39	43.50	-6.11	QP	100	0	
3	249.4250	57.98	-18.85	39.13	46.00	-6.87	QP	100	360	
4	433.6000	98.98	-17.29	81.69	100.81	-19.12	peak			
5	699.3046	44.49	-6.01	38.48	46.00	-7.52	QP	100	360	
6	867.2000	59.56	-17.09	42.47	80.81	-39.34	peak			

Test Results (30~1000MHz)

Test Mode: 433.6MHz(FSK)
 Power Source: DC 14.4V battery inside
 Polarization: Vertical
 Temp.(°C)/Hum.(%RH): 22.0°C/50%RH



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Detector	Height (cm)	degree (deg)	Remark
1	54.2610	46.08	-16.28	29.80	40.00	-10.20	QP	100	360	
2	166.6514	47.28	-19.02	28.26	43.50	-15.24	QP	100	0	
3	301.4224	39.17	-13.35	25.82	46.00	-20.18	QP	100	360	
4	433.6000	101.73	-17.29	84.44	100.81	-16.37	peak			
5	699.3046	44.39	-6.01	38.38	46.00	-7.62	QP	100	360	
6	867.2000	58.33	-17.09	41.24	80.81	-39.57	peak			

Remark:

1. Results = Reading + Cable Loss +Ant Factor –Amplifier

Test Results (Fundamental)

Mode	Freq.	Antenna	Reading	Cable Loss	Ant Factor	Amplifier	Duty cycle Factor	Results	Limits	Det.
	(MHz)	Pol.	(dBuV/m)	(dB)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	Mode
TX Mode(FSK)	433.6	H	98.98	1.52	12.64	31.45	-	81.69	100.81	PK
	433.6	H	98.98	1.52	12.64	31.45	-7.08	74.60	80.81	AV
	433.6	V	101.73	1.52	12.64	31.45	-	84.44	100.81	PK
	433.6	V	101.73	1.52	12.64	31.45	-7.08	77.36	80.81	AV

Remark:

1. Result = Reading + Cable Loss +Ant Factor –Amplifier + Duty cycle Factor
2. Pulse Desensitization Correction Factor
3. AV=PEAK +Duty Cycle Factor
4. Duty Cycle Factor

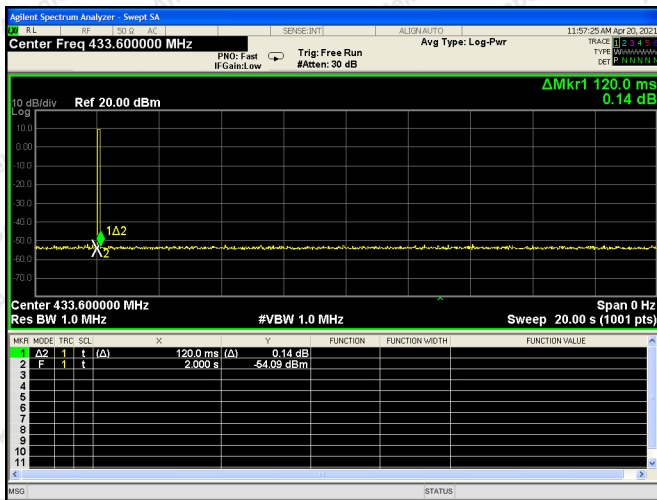
Mode	Freq. (MHz)	T on1 (ms)	N1	T period(ms)	Duty Cycle	Duty Cycle Factor
TX Mode	433.6(FSK)	53.10	1	120.0	44.25%	-7.08

$T_{on} = T_{on1} * N$

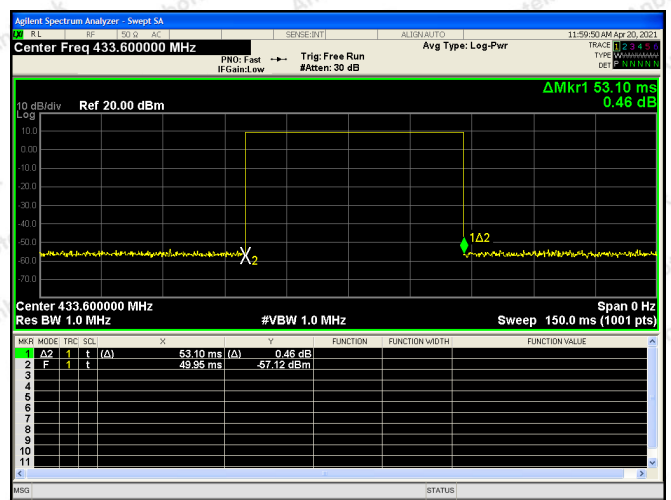
Duty Cycle = T_{on} / T_{period}

Duty Cycle Factor = $20 * \lg(\text{Duty Cycle})$

433.6MHz(FSK)-T period



433.6MHz(FSK)-T on1



Test Results (Harmonics Emissions+Radiated Emissions from 1G-4G)

433.6MHz(FSK)

Frequency	Antenna	Reading	Cable Loss	Ant Factor	Amplifier	Duty cycle Factor	Results	Limits	Det
(MHz)	Pol.	(dBuV/m)	(dB)	(dB)	(dB)	(dB)	(dBuV/m)	(dBuV/m)	Mode
867.2	H	59.56	1.92	12.71	31.72	-	42.47	80.81	PK
867.2	H	59.56	1.92	12.71	31.72	-7.08	35.39	60.81	AV
867.2	V	58.33	1.92	12.71	31.72	-	41.24	80.81	PK
867.2	V	58.33	1.92	12.71	31.72	-7.08	34.16	60.81	AV
1300.8	H	64.29	2.38	21.43	32.45	-	55.65	74	PK
1300.8	H	64.29	2.38	21.43	32.45	-7.08	48.57	54	AV
1300.8	V	66.48	2.38	18.56	32.45	-	54.97	74	PK
1300.8	V	66.48	2.38	18.56	32.45	-7.08	47.89	54	AV

Remark:

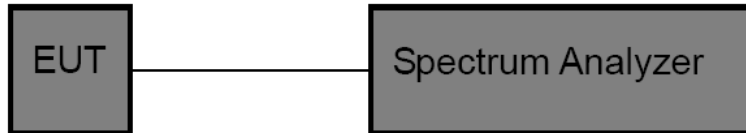
1. Result = Reading + Cable Loss +Ant Factor –Amplifier + Duty cycle Factor

5. 20DB Occupy Bandwidth Test

5.1. Test Standard and Limit

Test Standard	FCC Part15 C Section 15.231 (c)
Test Limit	According to FCC Part 15.231(c), The bandwidth of the emission shall be no wider than 0.25% of the center frequency for devices operating above 70MHz and below 900MHz. For devices operating above 900MHz, the emission shall be no wider than 0.5% of the center frequency. Bandwidth is determined at the points 20dB down from the modulated carrier.

5.2. Test Setup



5.3. Test Procedure

1. Place the EUT on the table and set it in the continuously transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set the spectrum analyzer as:
 RBW = 30kHz, VBW≥3*RBW =100kHz,
 Span= 1MHz
 Detector= Peak
 Trace mode= Max hold.
 Sweep- auto couple.
4. Mark the peak frequency and -20dB (upper and lower) frequency.
5. Repeat until all the rest channels are investigated.

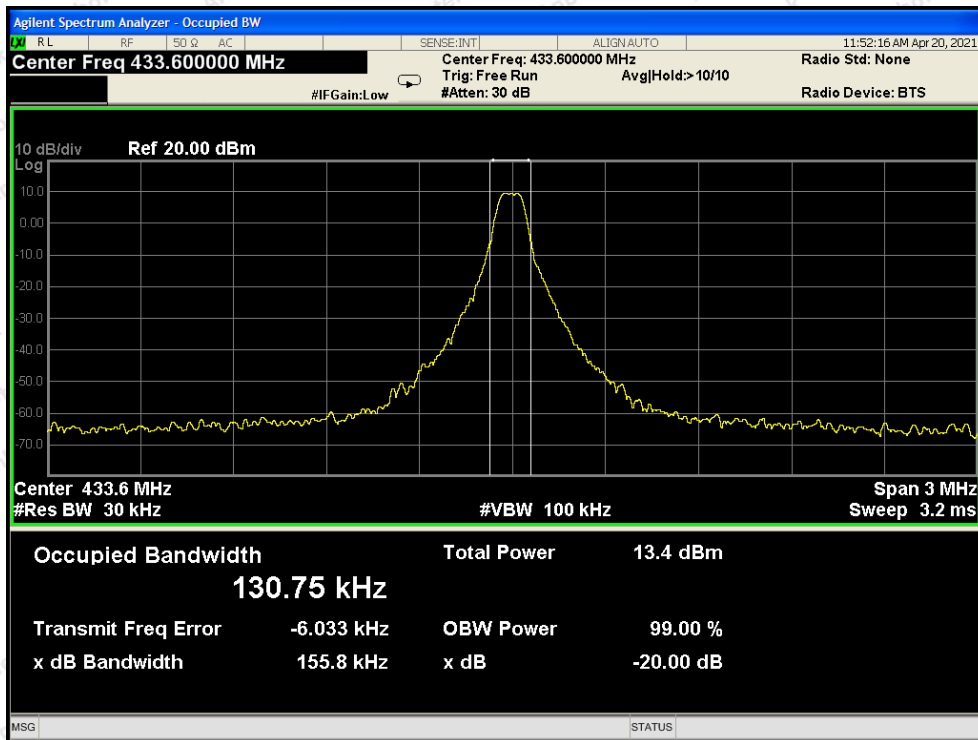
5.4. Test Data

Test Item	: 20dB Bandwidth	Test Mode	: Continuously transmitting
Test Voltage	: DC 14.4V Battery inside	Temperature	: 22°C
Test Result	: PASS	Humidity	: 50%RH

Mode	Freq. (MHz)	Modulation Type	20DB Bandwidth (kHz)	Limit (kHz)	Results
TX Mode	433.6	FSK	155.8	≤ 1084.8	PASS

Note: Limit=0.0025*Freq.

433.6 MHz(FSK)
Plot of 20DB Bandwidth

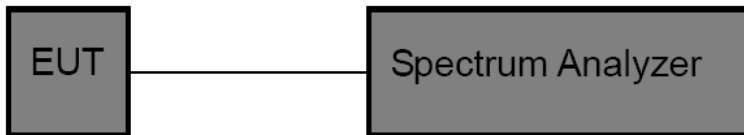


6. Dwell Time Test

6.1. Test Standard and Limit

Test Standard	FCC Part 15.231(a)(1)
Test Limit	According to FCC Part 15.231(a)(1), A manually operated transmitter shall employ a switch that will automatically deactivate the transmitter within not more than 5 seconds of being released

6.2. Test Setup



6.3. Test Procedure

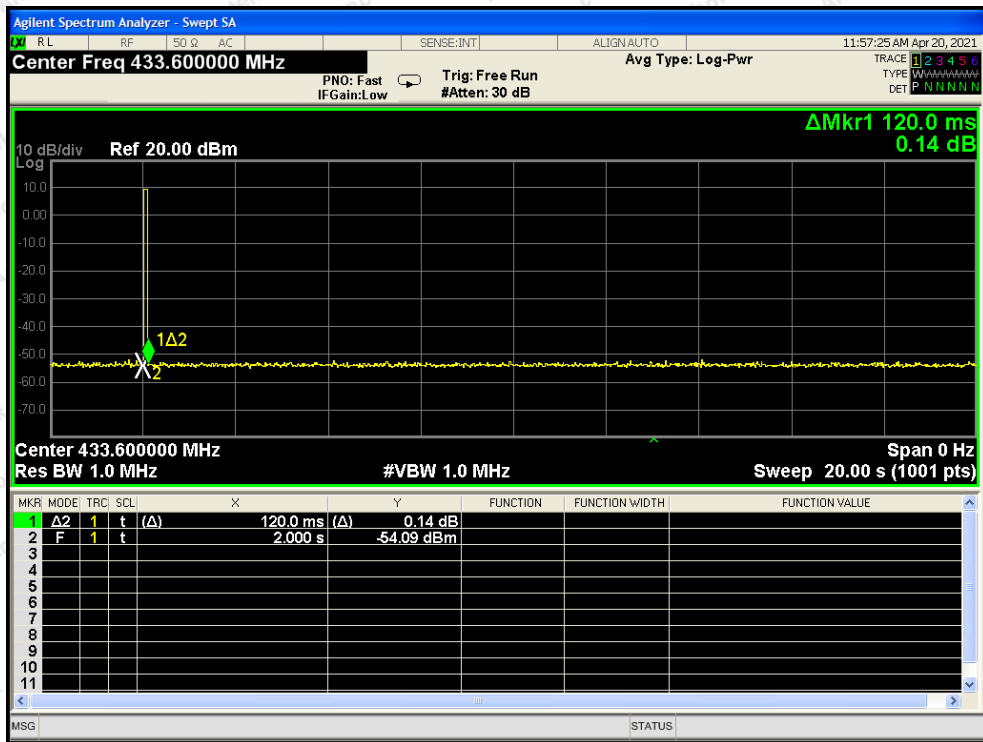
1. Place the EUT on the table and set it in continuously transmitting mode. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
2. Set the spectrum analyzer as
RBW=1000kHz, VBW= 1000 kHz, Span= 0Hz, Sweep Time= 20 Seconds.
3. Record the Delta mark time.

6.4. Test Data

Test Item	: Dwell Time	Test Mode	: Continuously transmitting
Test Voltage	: DC 14.4V Battery inside	Temperature	: 22°C
Test Result	: PASS	Humidity	: 50%RH

Mode	Freq. (MHz)	Modulation Type	Transmitting time(s)	Limit(s)	Results
TX Mode	433.6	FSK	0.12	≤5	PASS

Please refer the following plot.



7. Antenna Requirement

7.1. Test Standard and Requirement

Test Standard	FCC Part15 Section 15.203
Requirement	<p>1) 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. Antenna requirement must meet at least one of the following:</p> <ol style="list-style-type: none">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.

7.2. Antenna Connected Construction

The antenna is a PIFA Antenna which permanently attached, and the best case gain of the antenna is 2 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 -----

