

FCC PART 15C TEST REPORT FOR CERTIFICATION

On Behalf of

ION Audio, LLC

Karaoke Amplified speaker with effects

Model Number: SINGING STAR

Project Code: iPK2

FCC ID: 2AB3E-IPK2

Prepared for : ION Audio, LLC

200 Scenic View Drive, Cumberland, RI 02864, U.S.A.

Prepared By : EST Technology Co., Ltd.

San Tun Management Zone, Houjie District, Dongguan, China

Tel: 86-769-83081888-808

Report Number: ESTE-R1701014

Date of Test : January 01 ~ 11, 2016

Date of Report : January 12, 2017

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## Test Report Verification

<b>Applicant:</b>	ION Audio, LLC	
<b>Address:</b>	200 Scenic View Drive, Cumberland, RI 02864, U.S.A.	
<b>Manufacturer</b>	ION Audio, LLC	
<b>Address:</b>	200 Scenic View Drive, Cumberland, RI 02864, U.S.A.	
<b>E.U.T:</b>	Karaoke Amplified speaker with effects	
<b>Model Number:</b>	SINGING STAR Note: There will be two colors, Black and white.	
<b>Project Code:</b>	IPK2	
<b>Power Supply:</b>	AC 100-240V, 50/60Hz	
<b>Test Voltage:</b>	AC 120V/60Hz AC 240V/60Hz	
<b>Trade Name:</b>	ION	Serial No.: -----
<b>Date of Receipt:</b>	January 01, 2016	Date of Test: January 01 – 11, 2016
<b>Test Specification:</b>	FCC Rules and Regulations Part 15 Subpart C:2016 ANSI C63.10:2013	
<b>Test Result:</b>	<p>The device described above is tested by EST Technology Co., Ltd.. The measurement results were contained in this test report and EST Technology Co., Ltd. was assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliance with the FCC Rules and Regulations Part 15 Subpart C requirements.</p> <p>This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd.</p>	
<b>Date:</b> January 12, 2017		
Prepared by:	Tested by:	Approved by:
		
Ada / Assistant	Tony.Tang/ Engineer	IcemanHu / Manager
<b>Other Aspects:</b>		
None.		
Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested		
<p><i>This test report is based on a single evaluation of one sample of above mentioned products ,It is not permitted to be duplicated in extracts without written approval of EST Technology Co., Ltd.</i></p>		

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

Product Name	:	Karaoke Amplified speaker with effects
FCC ID	:	2AB3E-IPK2
Model Number	:	SINGING STAR
Operation frequency	:	2402MHz~2480MHz
Number of channel	:	79
Antenna	:	Dipole antenna, 2.0dBi gain
Modulation	:	BT V3.0 BDR: GFSK BT V3.0 EDR: $\pi/4$ -DQPSK BT V3.0 EDR: 8-DPSK
Sample Type	:	Prototype production

## 2. SUMMARY OF TEST

### 2.1. Summary of test result

Description of Test Item	Standard	Results
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1)	PASS
20dB Bandwidth	FCC Part 15: 15.247(a)(1)	PASS
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1)	PASS
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii)	PASS
Dwell Time	FCC Part 15: 15.247(a)(1)(iii)	PASS
Radiated Emissions	FCC Part 15: 15.209 FCC Part 15: 15.247(d)	PASS
Band Edge Compliance	FCC Part 15: 15.247(d)	PASS
Power Line Conducted Emissions	FCC Part 15: 15.207	PASS
Antenna requirement	FCC Part 15: 15.203	PASS

## 2.2. Test Facilities

EMC Lab : Certificated by CNAL, CHINA  
Registration No.: L5288  
Date of registration: December 07, 2015

Certificated by FCC, USA  
Registration No.: 989591  
Date of registration: November 15, 2016

Certificated by Industry Canada  
Registration No.: 9405A-1  
Date of registration: December 30, 2015

Certificated by VCCI, Japan  
Registration No.: R-3663 & C-4103  
Date of registration: July 25, 2011

Certificated by TUV Rheinland, Germany  
Registration No.: UA 50195514 0001  
Date of registration: January 07, 2011

Certificated by TUV/PS, Shenzhen  
Registration No.: SCN1017  
Date of registration: January 27, 2011

Certificated by Intertek ETL SEMKO  
Registration No.: 2011-RTL-L1-18  
Date of registration: April 28, 2011

Certificated by Siemic, Inc.  
Registration No.: SLCN021  
Date of registration: November 8, 2011

Certificated by Nemko, Hong Kong  
Registration No.: 175193  
Date of registration: May 4, 2011

Name of Firm : EST Technology Co., Ltd.

Site Location : San Tun Management Zone, Houjie District, Dongguan, China

## 2.3. Measurement uncertainty

Test Item	Uncertainty
Uncertainty for Conduction emission test	2.54dB
Uncertainty for Radiation Emission test (30MHz-1GHz)	3.62dB
Uncertainty for Radiation Emission test (1GHz to 18GHz)	4.86dB
Uncertainty for radio frequency	$7 \times 10^{-8}$
Uncertainty for conducted RF Power	0.20dB
Uncertainty for Power density test	0.26dB

Note: This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

## 2.4. Assistant equipment used for test

### 2.4.1. Notebook

Manufacturer	:	DELL
M/N	:	Latitude E6420
Adapter	:	M/N: DA90PM111

## 2.5. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.1 meter high above ground. EUT was set into BT test mode by software before test.



(EUT: Karaoke Amplified speaker with effects)

## 2.6. Test mode

The test software was used to control EUT work in Continuous TX mode, and select test channel, wireless mode

Mode	Channel	Frequency
GFSK	Low	2402MHz
	Middle	2441MHz
	High	2480MHz
8-DPSK	Low	2402MHz
	Middle	2441MHz
	High	2480MHz
Remark: The “GFSK” and “8-DPSK” is worst case, Will be recorded in the report.		

## 2.7. Channel List for Bluetooth

Channel No.	Frequency (MHz)						
1	2402	2	2403	3	2404	4	2405
5	2406	6	2407	7	2408	8	2409
9	2410	10	2411	11	2412	12	2413
13	2414	14	2415	15	2416	16	2417
17	2418	18	2419	19	2420	20	2421
21	2422	22	2423	23	2424	24	2425
25	2426	26	2427	27	2428	28	2429
29	2430	30	2431	31	2432	32	2433
33	2434	34	2435	35	2436	36	2437
37	2438	38	2439	39	2440	40	2441
41	2442	42	2443	43	2444	44	2445
45	2446	46	2447	47	2448	48	2449
49	2450	50	2451	51	2452	52	2453
53	2454	54	2455	55	2456	56	2457
57	2458	58	2459	59	2460	60	2461
61	2462	62	2463	63	2464	64	2465
65	2466	66	2467	67	2468	68	2469
69	2470	70	2471	71	2472	72	2473
73	2474	74	2475	75	2476	76	2477
77	2478	78	2479	79	2480	-	-

## 2.8. Test Equipment

### 2.8.1. For conducted emissions test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESHS30	832354	June 25,16	1 Year
Artificial Mains Network	Rohde & Schwarz	ENV216	101260	June 25,16	1 Year
Pulse Limiter	Rohde & Schwarz	ESSINGING STAR-Z2	101100	June 25,16	1 Year
RF Cable	Fujikura	3D-2W	844 Chamber No.1	June 25,16	1 Year

### 2.8.2. For radiated emission test(9 kHz-30MHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESCI	100435	June 25,16	1 Year
Loop Antenna	ETS-LINDGREN	6502	00071730	June,29,15	3 Year
RF Cable	MIYAZAKI	5D-2W	966 Chamber No.1	June 25,16	1 Year

### 2.8.3. For radiated emissions test (30-1000MHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESVS10	100004	June 25,16	1 Year
Spectrum Analyzer	Agilent	E4411B	MY50140697	June 25,16	1 Year
Bilog Antenna	Teseq	CBL 6111D	27090	June 28,15	3 Year
Signal Amplifier	Agilent	310N	187037	June 25,16	1 Year
RF Cable	MIYAZAKI	5D-2W	966 Chamber No.1	June 25,16	1 Year

### 2.8.4. For radio & radiated emissions test (above 1GHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Horn Antenna	SCHWARZB ECK	BBHA 9120 D	BBHA9120D1002	June 25,16	1 Year
Board-Band Horn Antenna	SCHWARZB ECK	BBHA 9170	9170-497	June 28,15	3 Year
Signal Amplifier	SCHWARZB ECK	BBV9718	9718-212	June 25,16	1 Year
Spectrum Analyzer	Agilent	E4408B	MY44211139	June 25,16	1 Year
Spectrum Analyzer	Rohde & Schwarz	FSV	103173	June 25,16	1 Year
RF Cable	Hubersuhner	RG 214/U	513423	June 25,16	1 Year

### 3. MAXIMUM PEAK OUTPUT POWER

#### 3.1. Limit

For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts, the e.i.r.p shall not exceed 4W

#### 3.2. Test Procedure

The transmitter output (antenna port) was connected to the spectrum analyzer. Connect EUT antenna terminal to the spectrum analyzer with a low loss SMA cable.

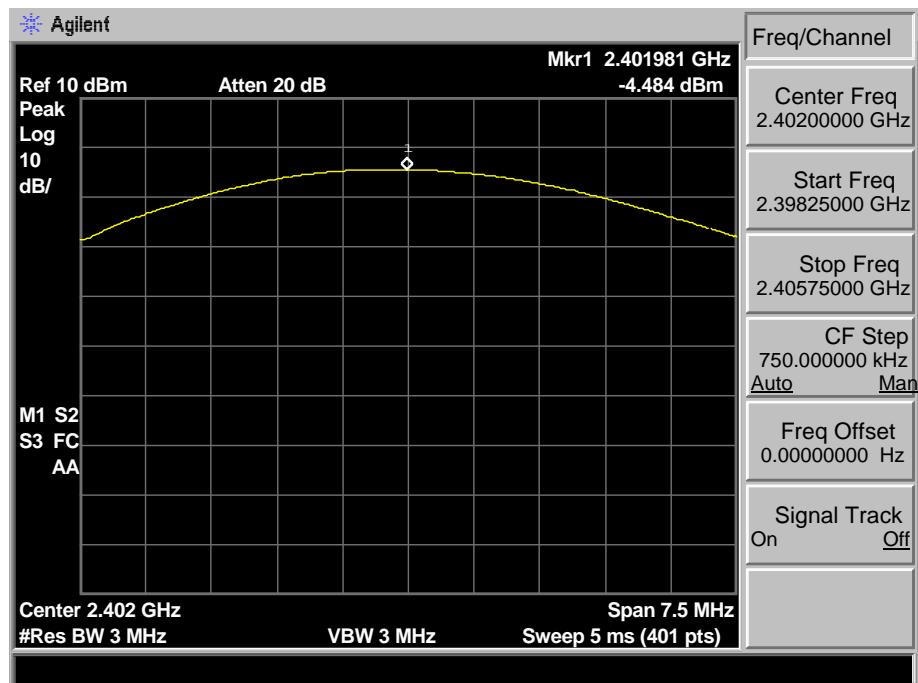
#### 3.3. Test Result

EUT: Karaoke Amplified speaker with effects M/N: SINGING STAR					
Test date: 2017-01-05		Test site: RF site		Tested by: Tony Tang	
Mode	Freq (MHz)	Result Peak power (dBm)	Limit		Margin (dB)
			dBm	W	
GFSK	2402	-4.484	30.00	1.000	34.484
	2441	-4.337	30.00	1.000	34.337
	2480	-4.479	30.00	1.000	34.479
8-DPSK	2402	-5.997	21.00	0.125	26.997
	2441	-5.670	21.00	0.125	26.670
	2480	-5.561	21.00	0.125	26.561

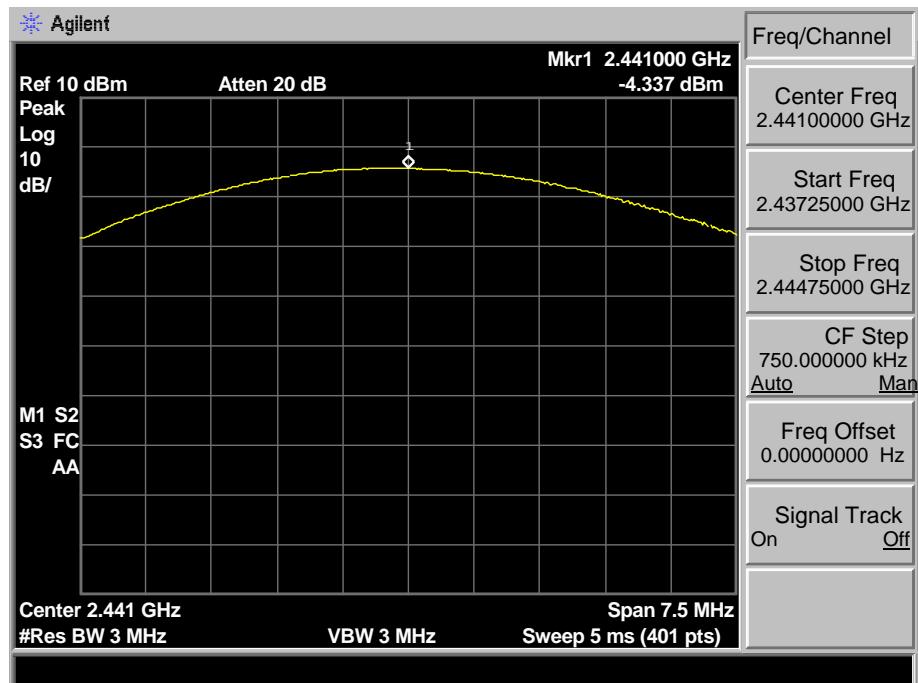
Conclusion: PASS

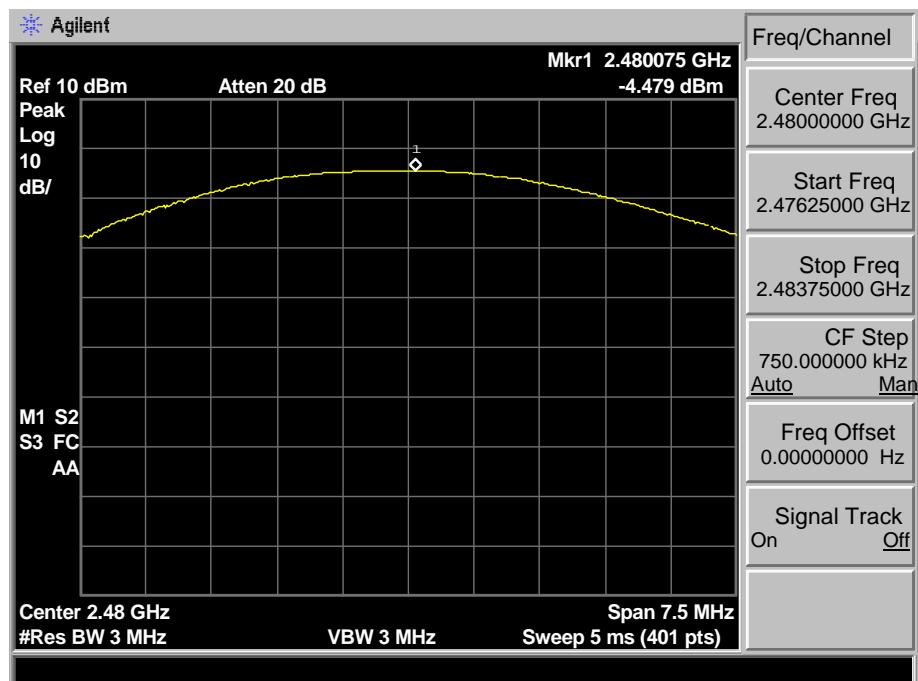
### 3.4. Test Data

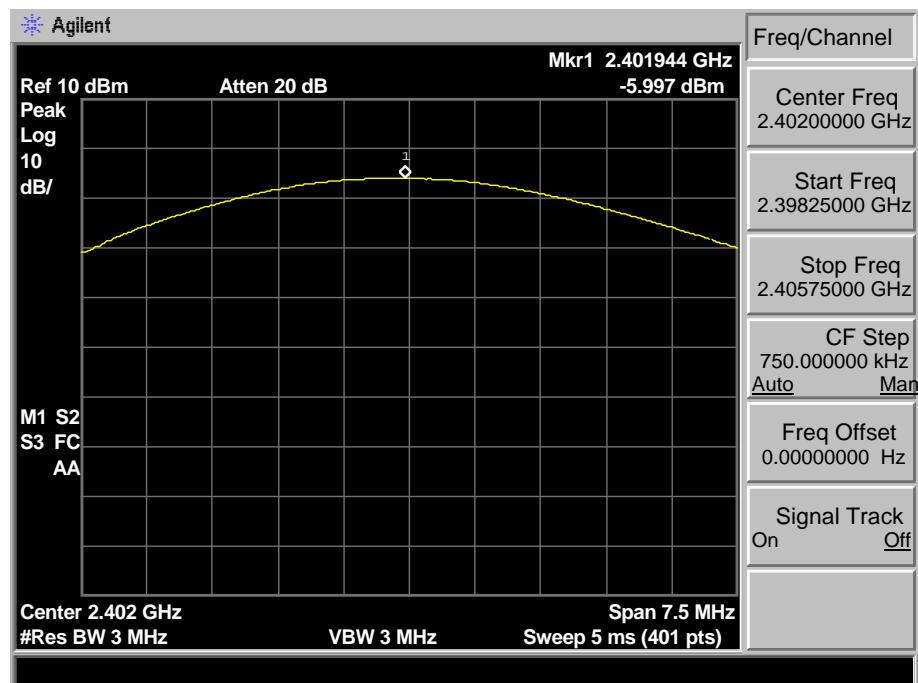
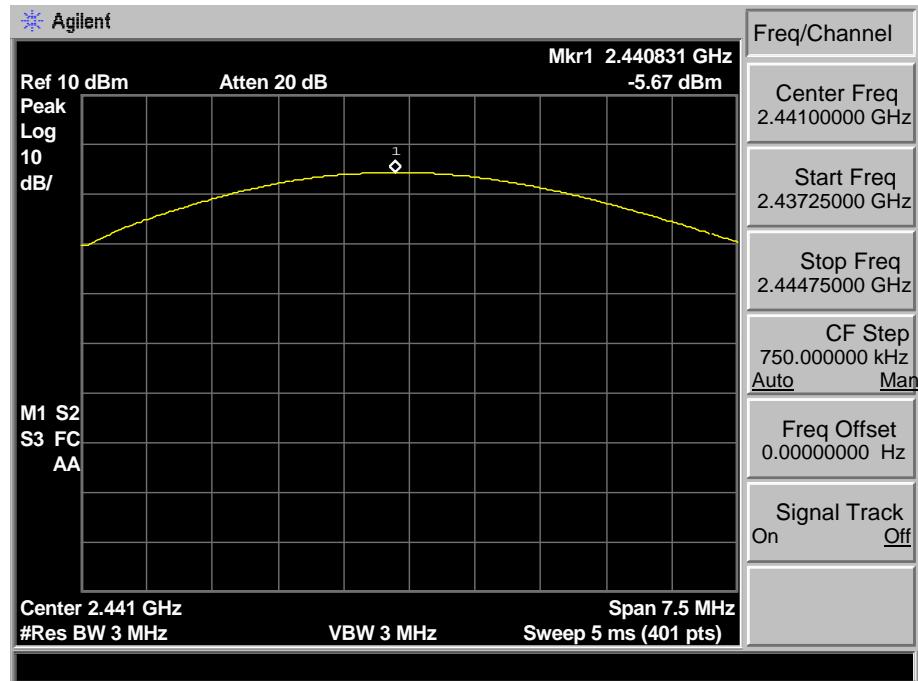
#### GFSK 2402 MHz

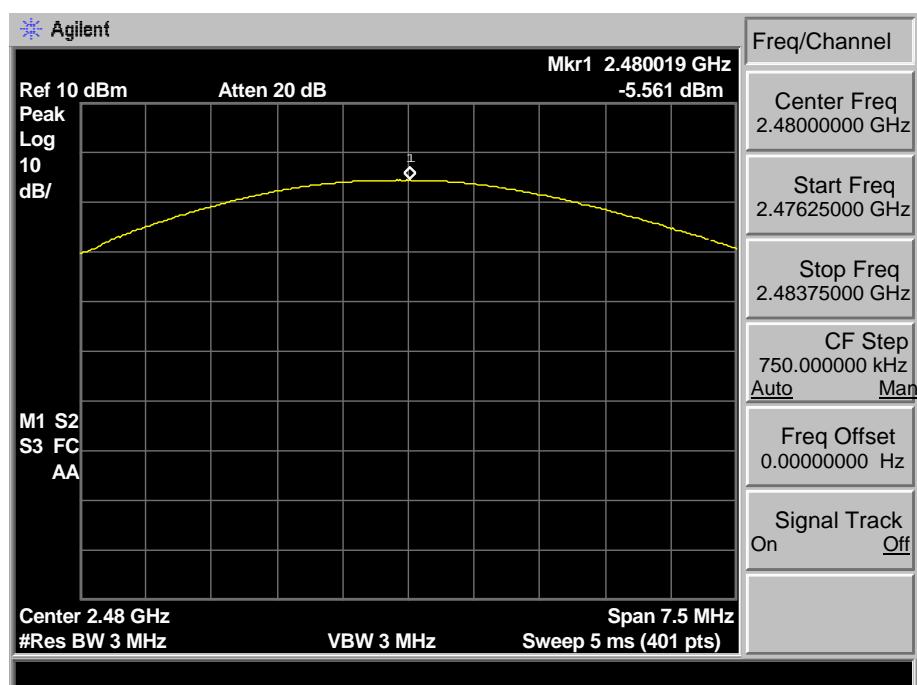


#### GFSK 2441 MHz



**GFSK 2480 MHz**

**8-DPSK 2402 MHz****8-DPSK 2441 MHz**

**8-DPSK 2480 MHz**

## 4. 20 DB BANDWIDTH

### 4.1. Limit

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.

### 4.2. Test Procedure

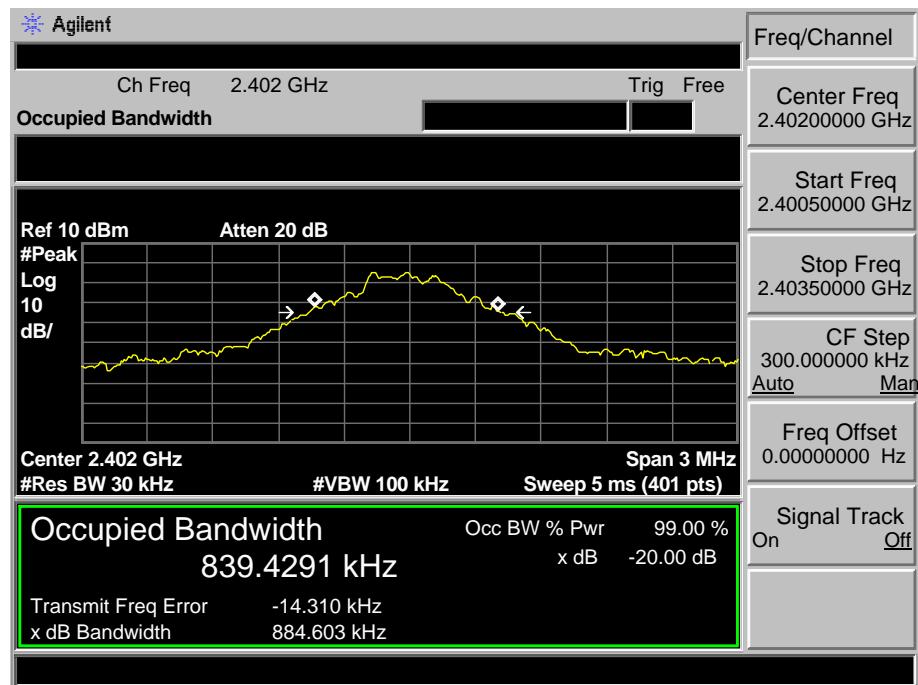
The transmitter output (antenna port) was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

### 4.3. Test Result

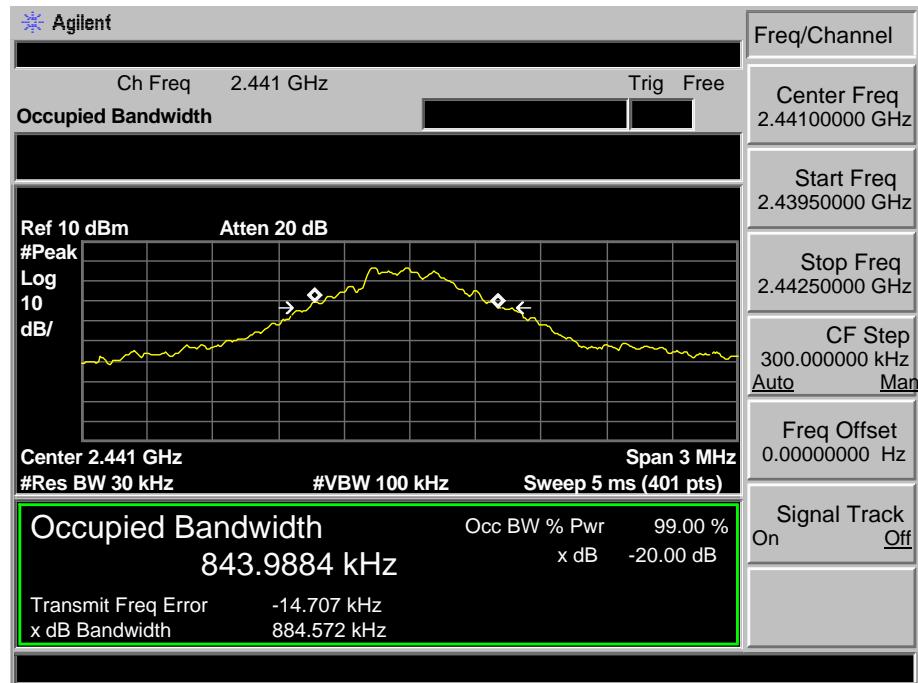
EUT: Karaoke Amplified speaker with effects M/N: SINGING STAR				
Test date: 2017-01-05		Test site: RF site	Tested by: Tony Tang	
Mode	Freq (MHz)	20dB Bandwidth (MHz)	Limit (kHz)	Conclusion
GFSK	2402	0.885	/	PASS
	2441	0.885	/	PASS
	2480	0.879	/	PASS
8-DPSK	2402	1.216	/	PASS
	2441	1.216	/	PASS
	2480	1.214	/	PASS

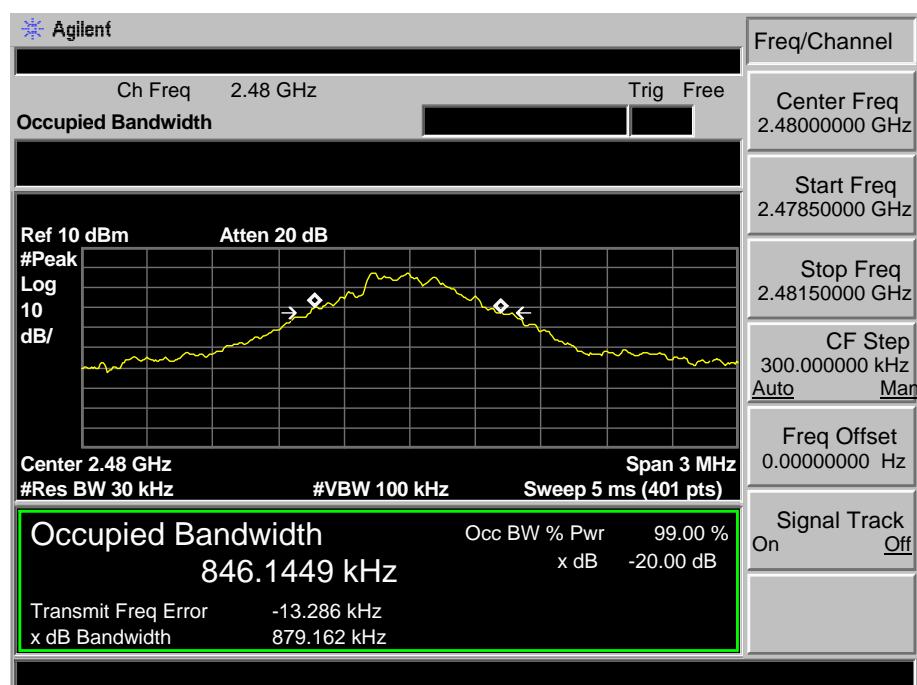
## 4.4. Test Data

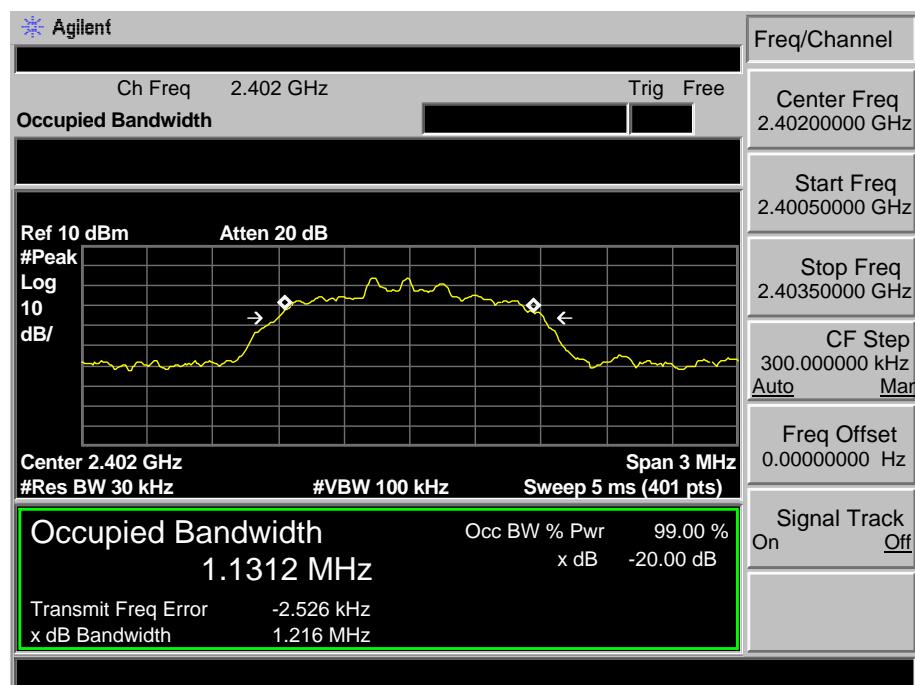
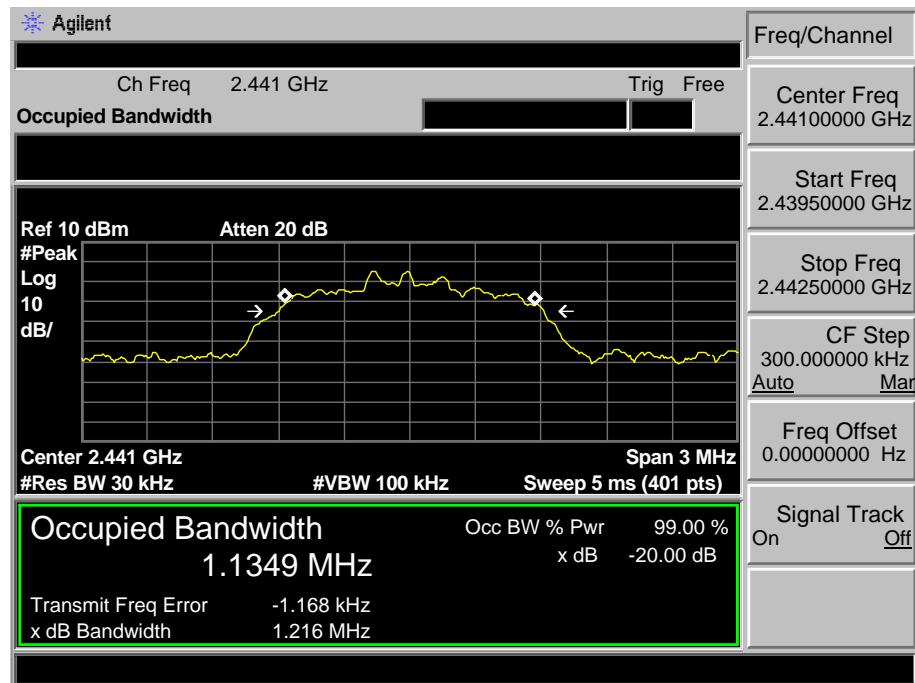
### GFSK 2402MHz

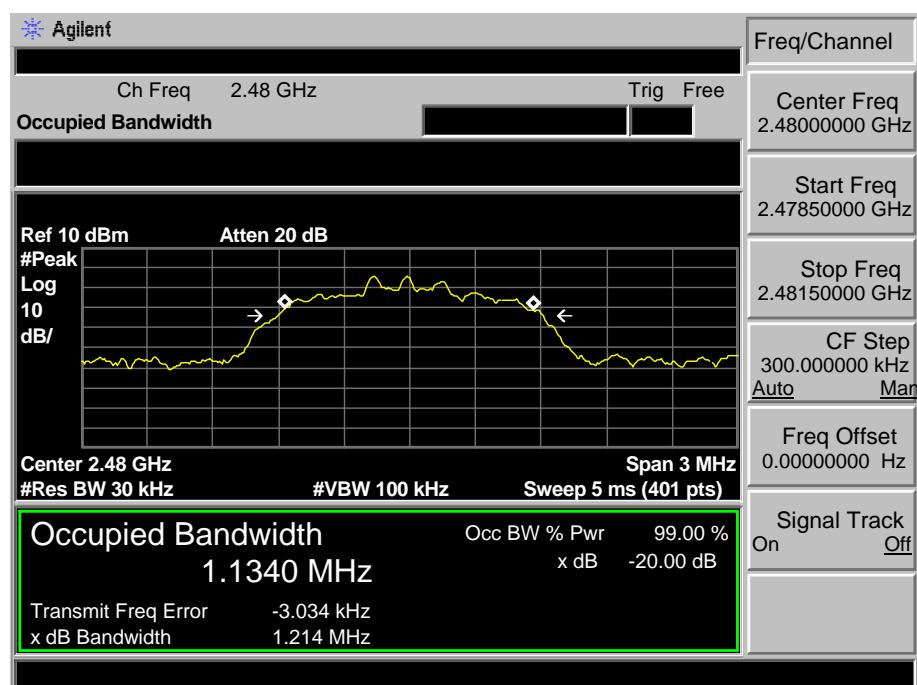


### GFSK 2441MHz



**GFSK 2480MHz**

**8-DPSK 2402MHz****8-DPSK 2441MHz**

**8-DPSK 2480MHz**

## 5. CARRIER FREQUENCY SEPARATION

### 5.1. Limit

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

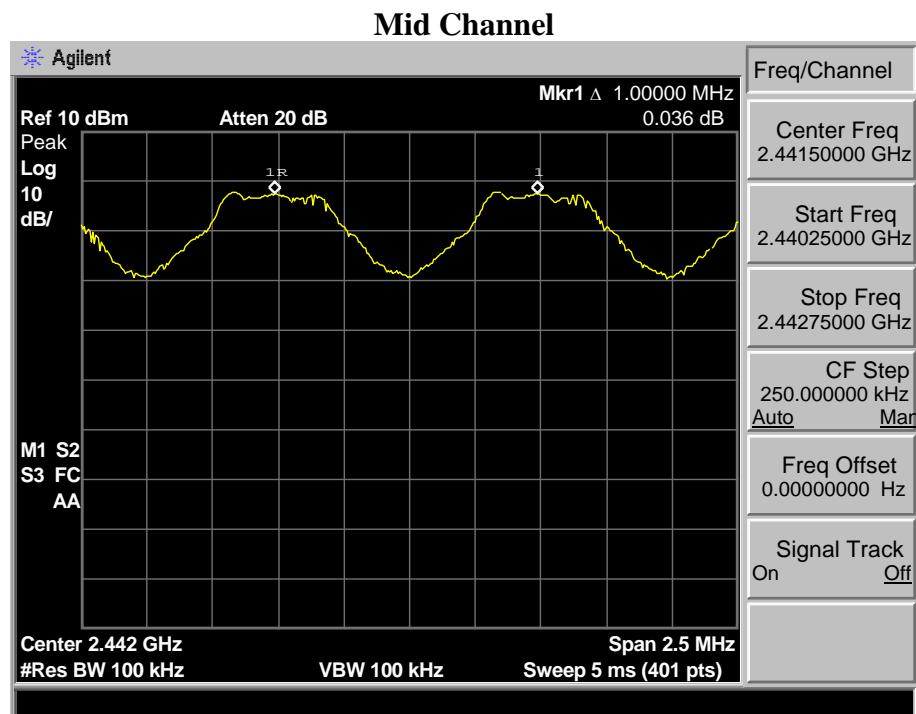
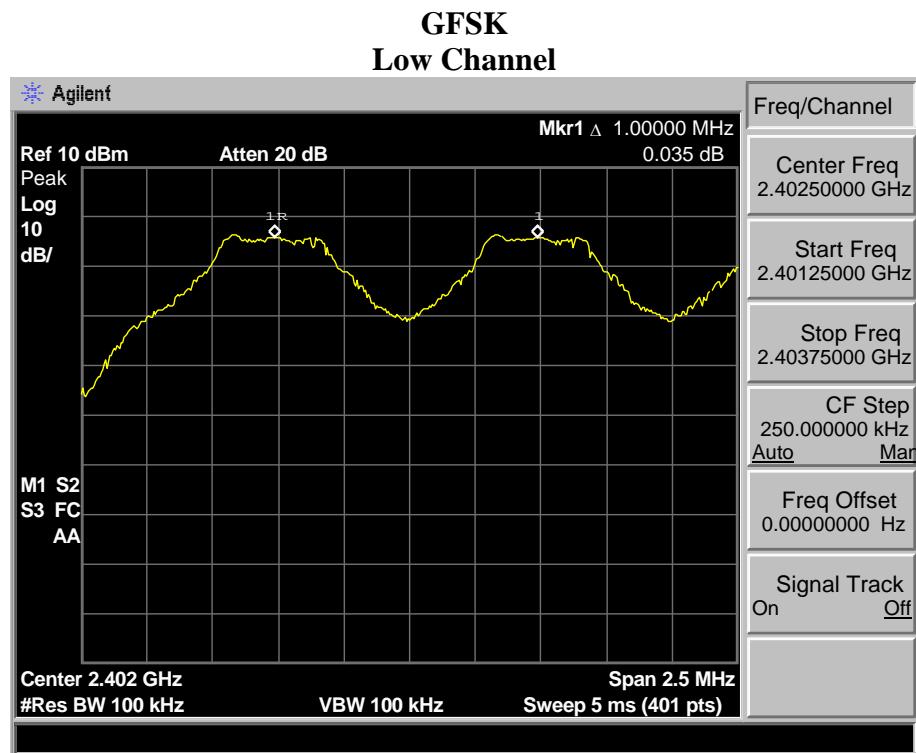
### 5.2. Test Procedure

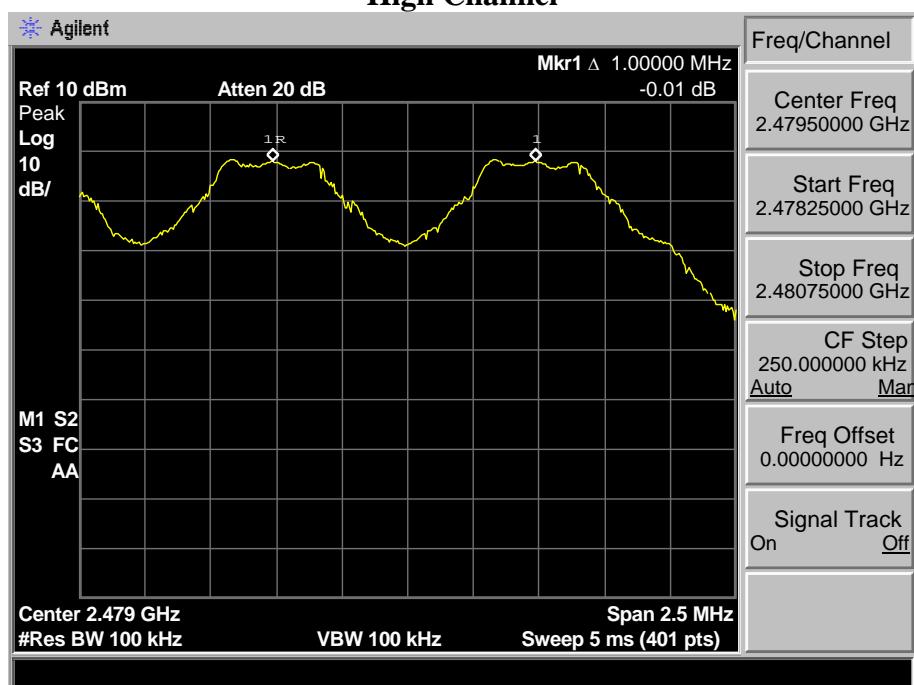
The transmitter output (antenna port) was connected to the spectrum analyzer. The carrier frequency was measured by spectrum analyzer with 100kHz RBW and 100kHz VBW.

### 5.3. Test Result

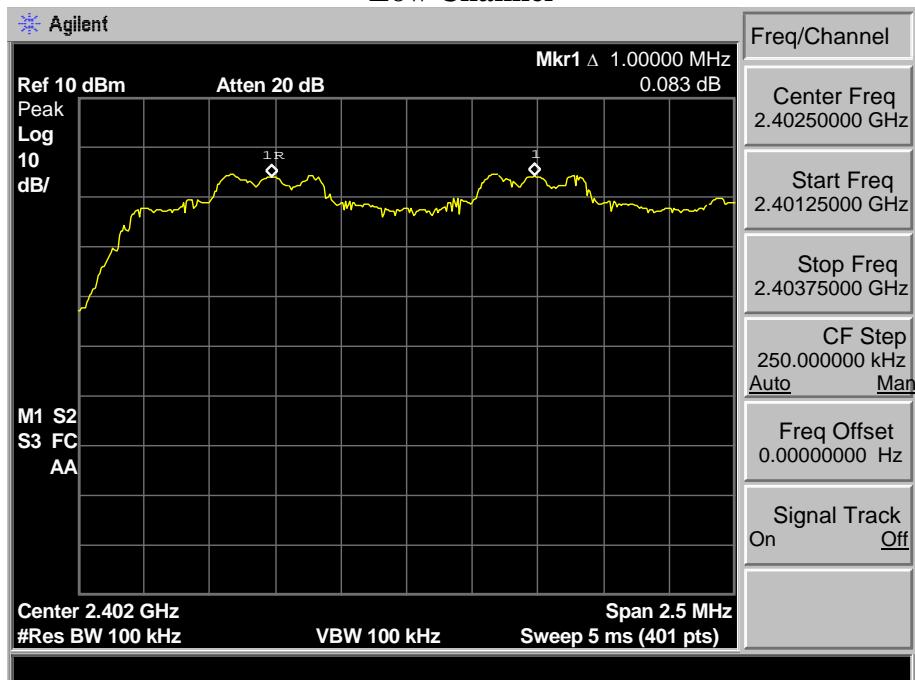
EUT: Karaoke Amplified speaker with effects M/N: SINGING STAR				
Test date: 2017-01-05		Test site: RF site	Tested by: Tony Tang	
Mode	Channel	Channel separation (MHz)	Limit	Conclusion
GFSK	Low CH	1.000	0.885 MHz	PASS
	Mid CH	1.000	0.885 MHz	PASS
	High CH	1.000	0.879 MHz	PASS
8-DPSK	Low CH	1.000	> 2/3 of the 20dB Bandwidth or 25[kHz]( whichever is greater)	PASS
	Mid CH	1.000		PASS
	High CH	1.000		PASS

## 5.4. Test Data

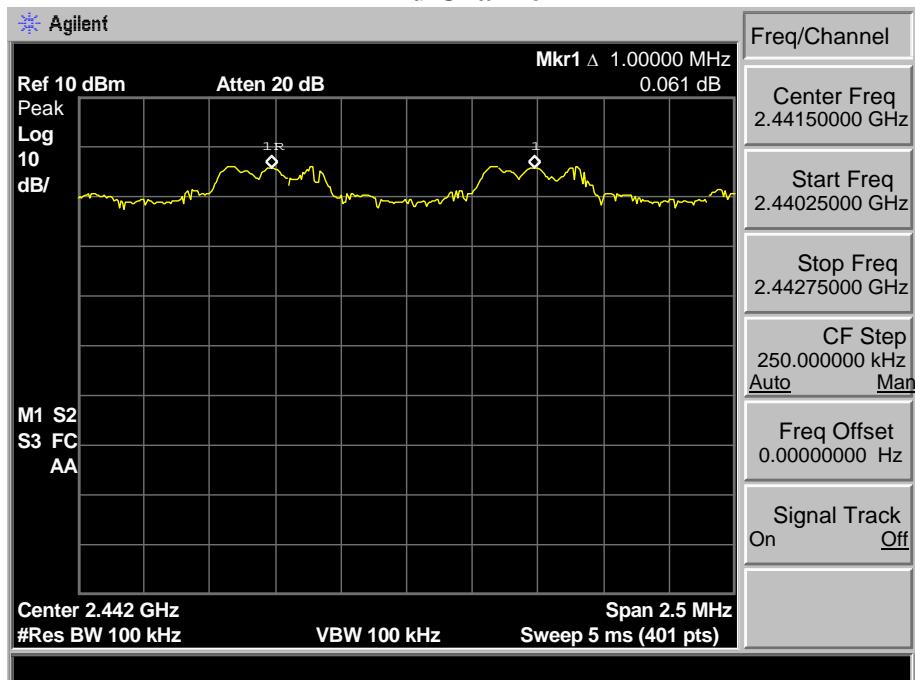


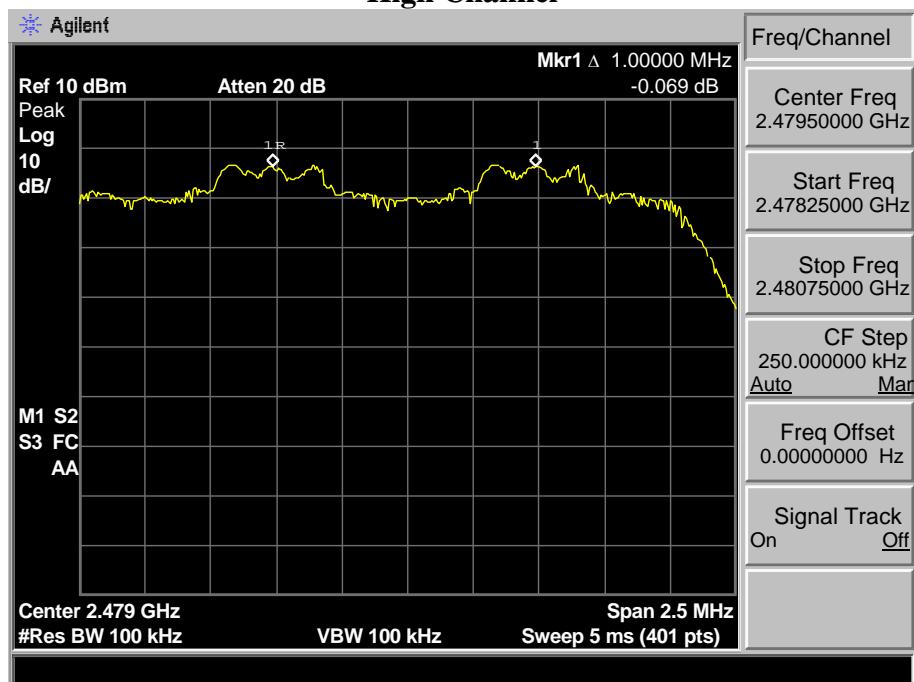
**High Channel**

## 8-DPSK Low Channel



## Mid Channel



**High Channel**

## 6. NUMBER OF HOPPING CHANNEL

### 6.1. Limit

Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

### 6.2. Test Procedure

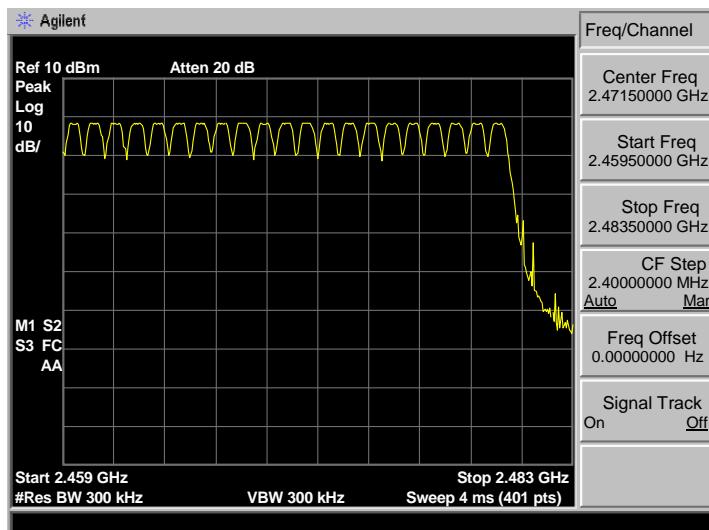
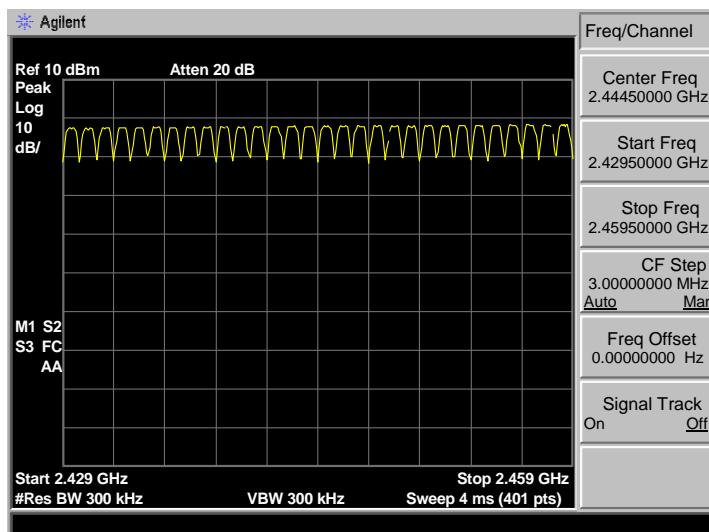
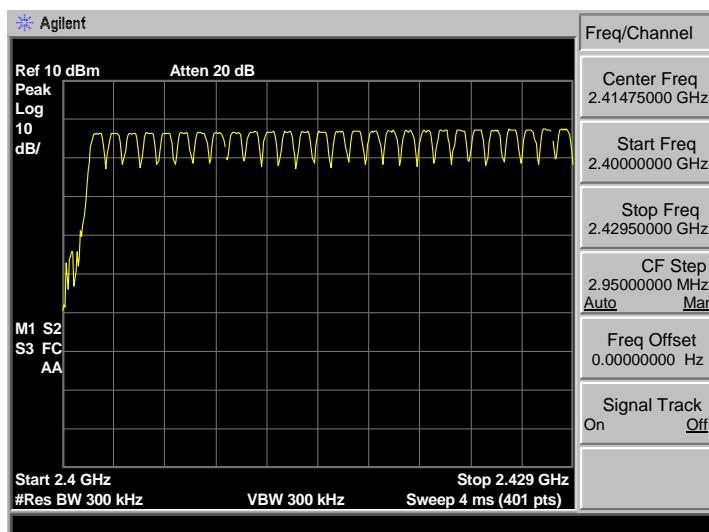
The transmitter output (antenna port) was connected to the spectrum analyzer. The number of hopping channel was measured by spectrum analyzer with 300kHz RBW and 300kHz VBW.

### 6.3. Test Result

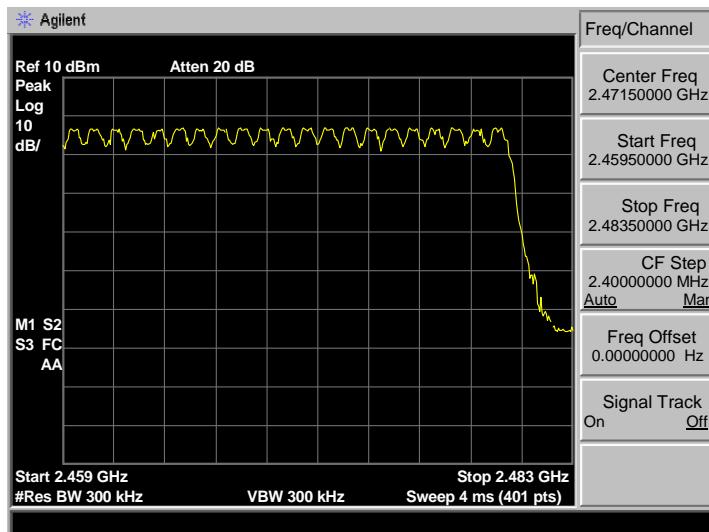
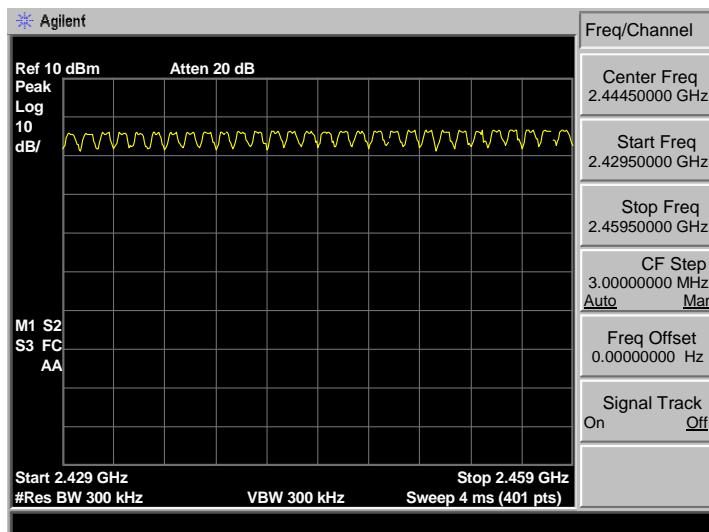
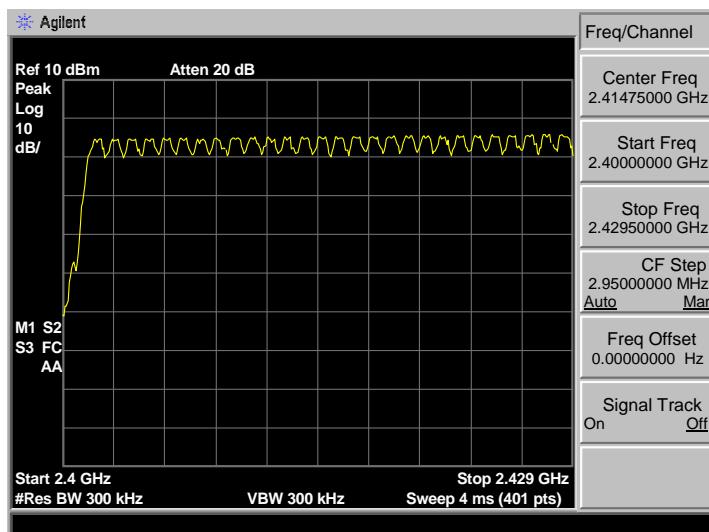
EUT: Karaoke Amplified speaker with effects M/N: SINGING STAR			
Test date: 2017-01-05	Test site: RF site		Tested by: Tony.Tang
Mode	Number of hopping channel	Limit	Conclusion
GFSK	79	>15	PASS
8-DPSK	79	>15	PASS

## 6.4. Test Data

### GFSK



## 8-DPSK



## 7. DWELL TIME

### 7.1. Limit

The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

### 7.2. Test Procedure

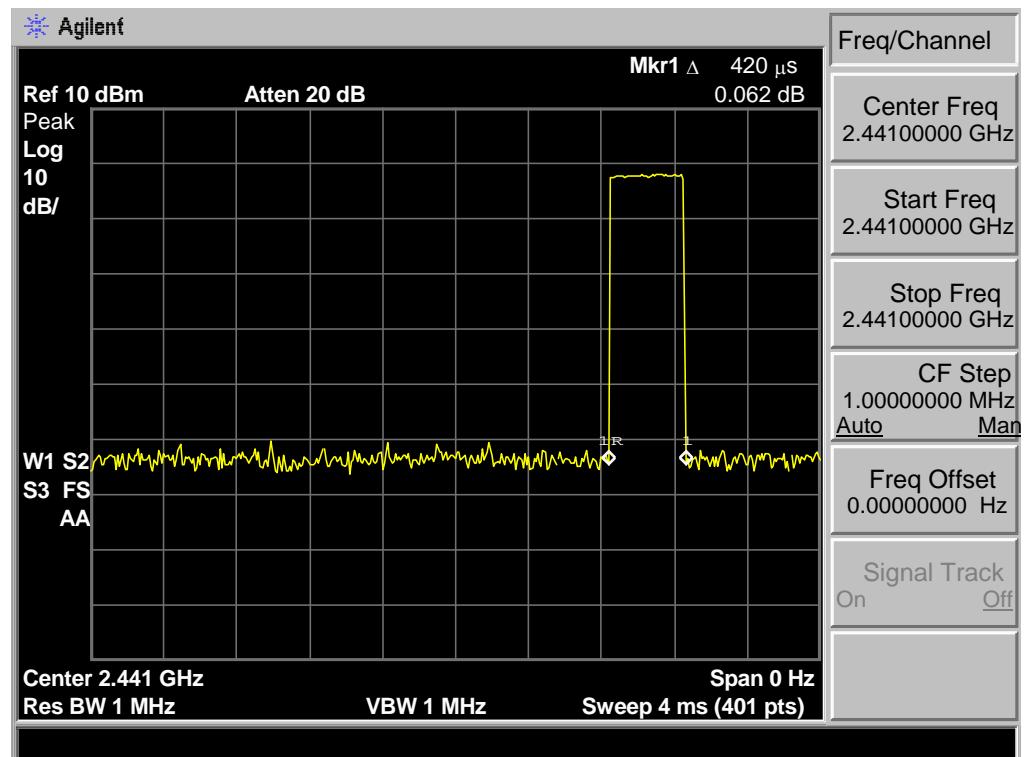
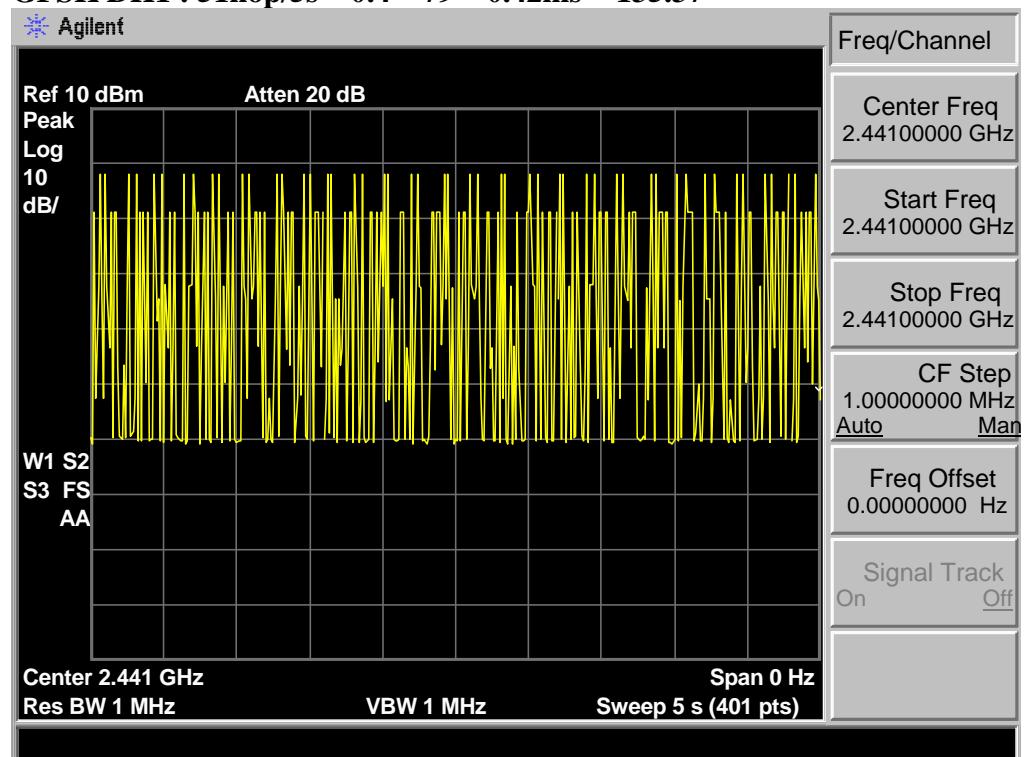
1. The transmitter output (antenna port) was connected to the spectrum analyzer. Connect EUT antenna terminal to the spectrum analyzer with a low loss SMA cable.
2. Set the EUT to proper test mode with relative test software and hardware.
3. Spectrum analyzer setting: Centered Frequency = measured channel, RBW = 1MHz, VBW= 1MHz, Frequency Span = 0 Hz.
4. Set sweep time properly to capture the entire dwell time per hopping channel.
5. Set detector type to Peak and trace mode to Max Hold and make the measurement.
6. Repeat step 3-5 until all channels measured were complete.

### 7.3. Test Result

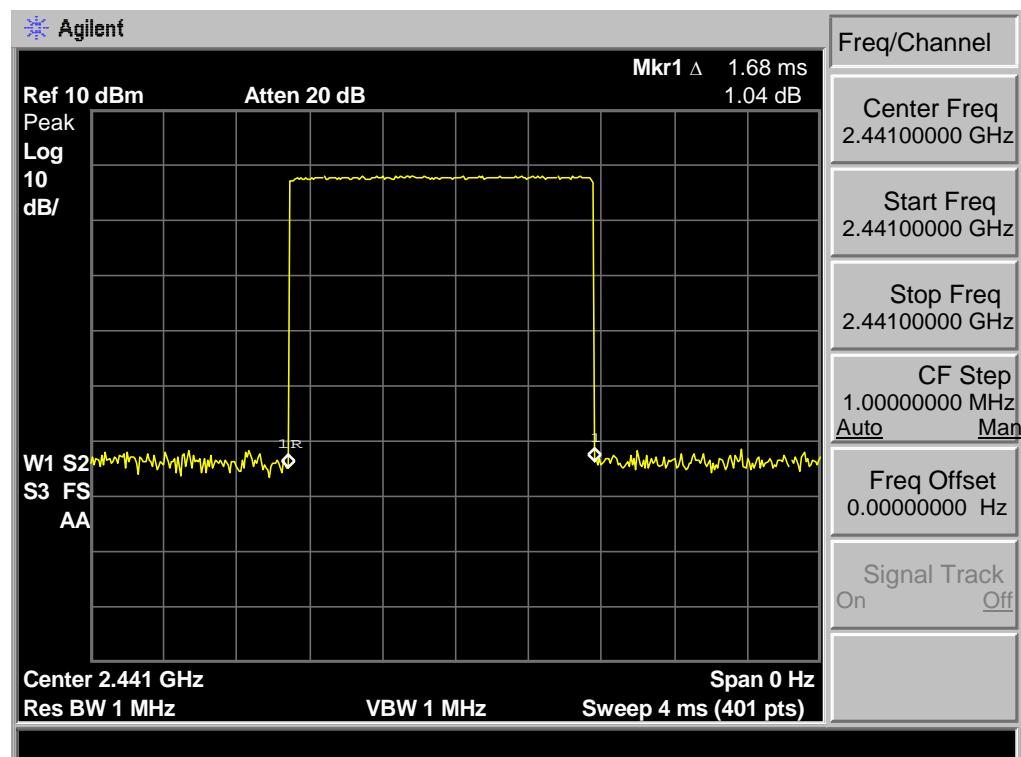
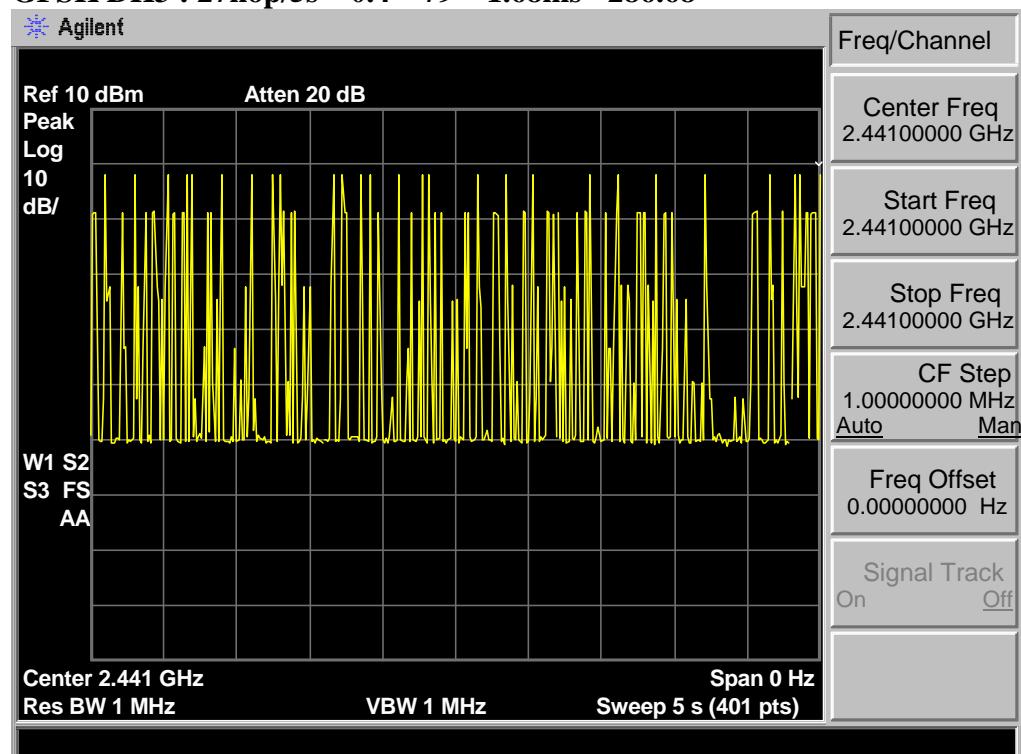
EUT: Karaoke Amplified speaker with effects M/N: SINGING STAR			
Test date: 2017-01-05	Test site: RF site	Tested by: Tony Tang	
Mode	Dwell time (ms)	Limit	Conclusion
GFSK DH1	135.37	<400ms	PASS
GFSK DH3	286.68	<400ms	PASS
GFSK DH5	316.95	<400ms	PASS
8-DPSK 3DH1	141.82	<400ms	PASS
8-DPSK 3DH3	291.79	<400ms	PASS
8-DPSK 3DH5	315.87	<400ms	PASS

## 7.4. Test Data

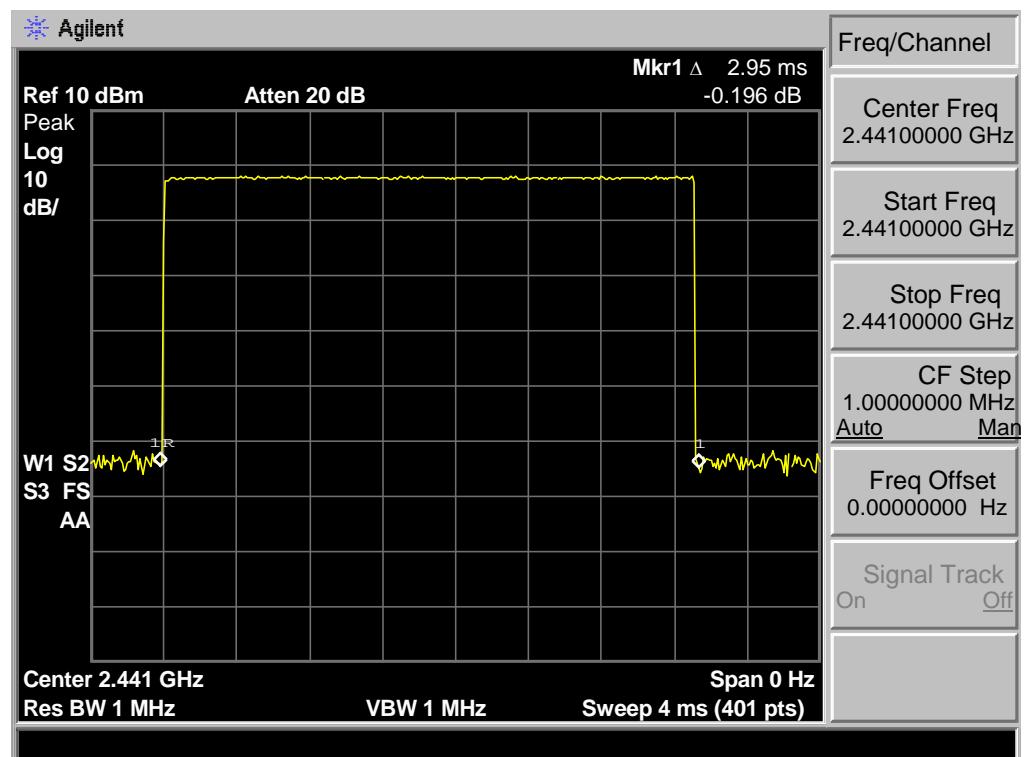
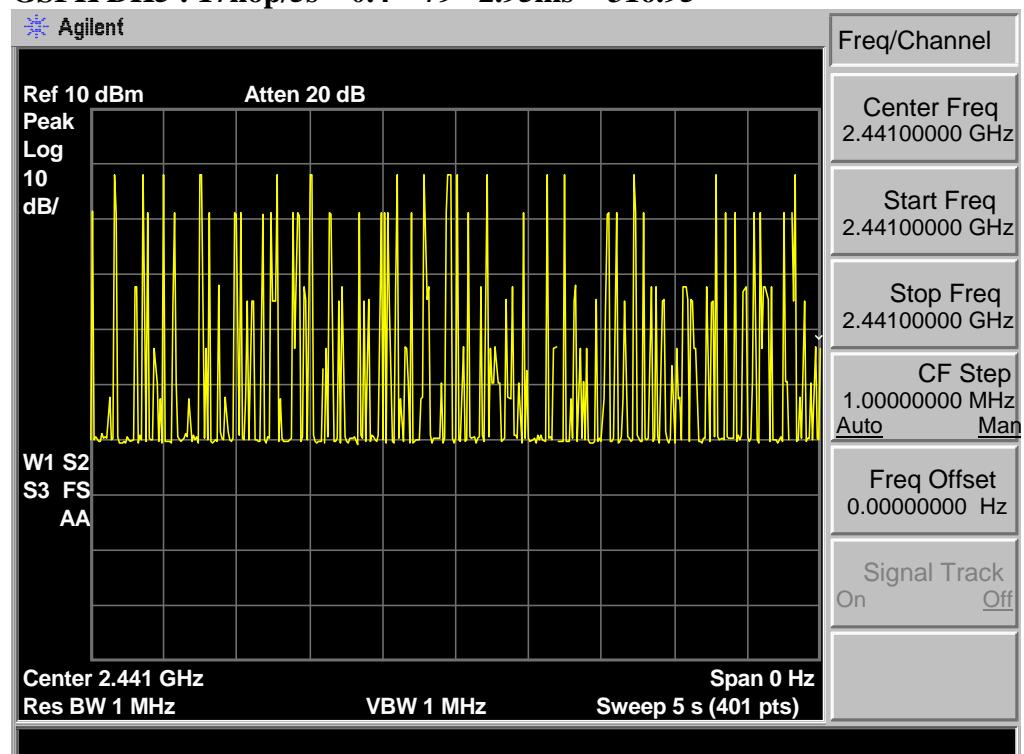
**GFSK DH1 : 51hop/5s \* 0.4 \* 79 \* 0.42ms = 135.37**



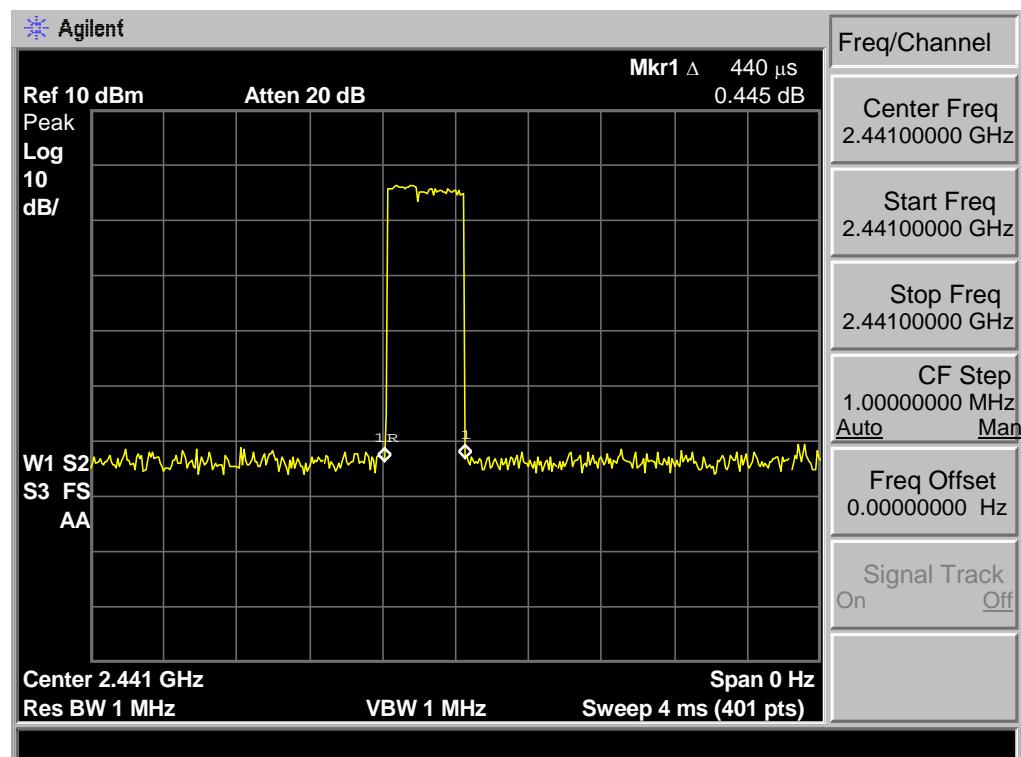
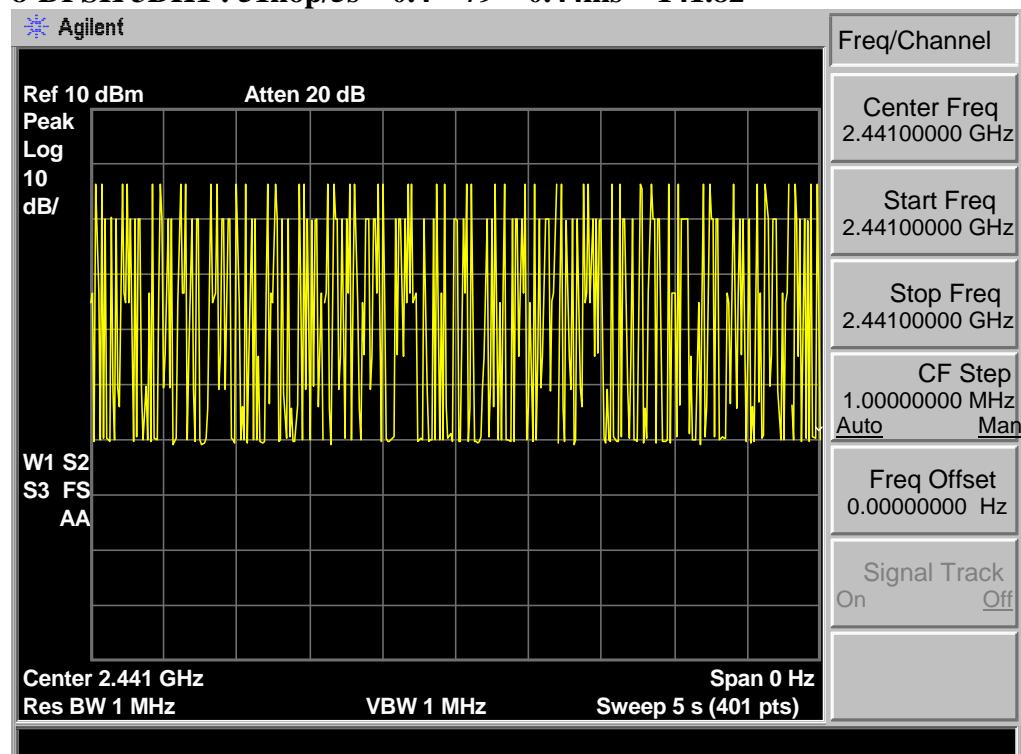
**GFSK DH3 : 27hop/5s \* 0.4 \* 79 \* 1.68ms= 286.68**



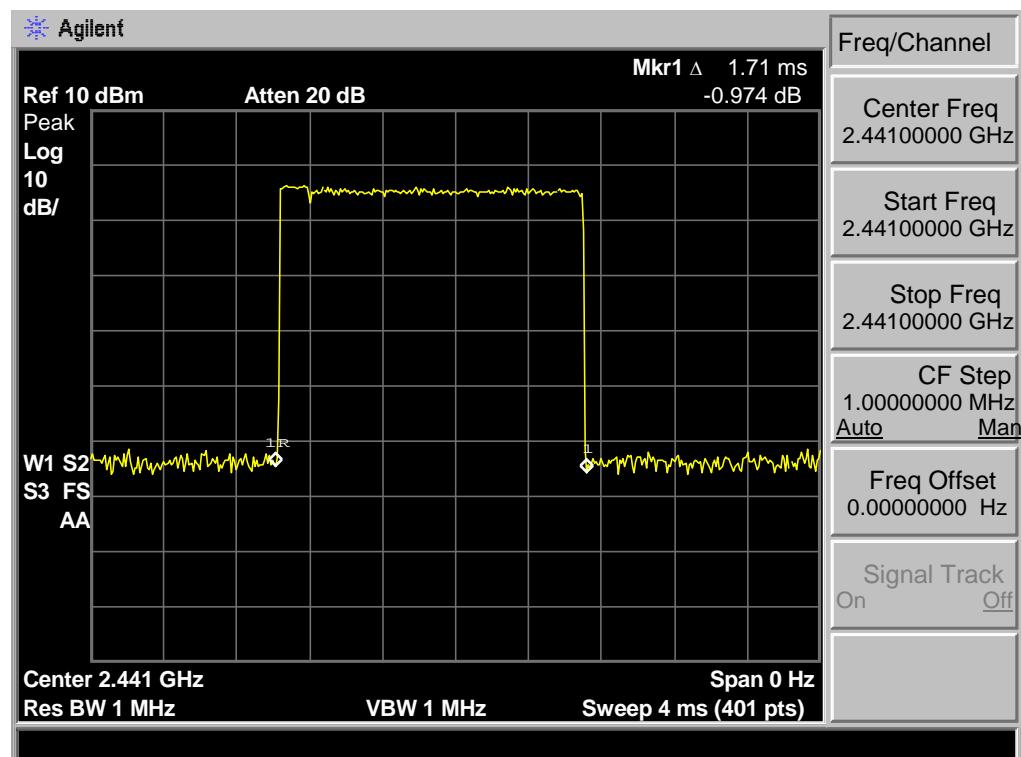
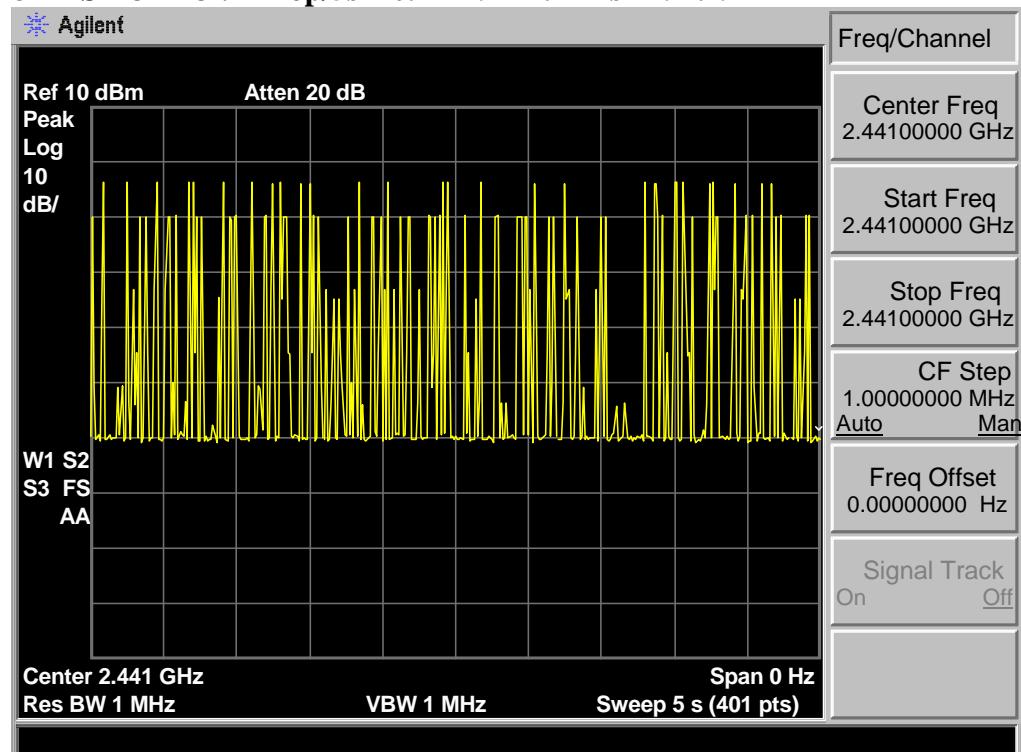
**GSFK DH5 : 17hop/5s \* 0.4 \* 79 \*2.95ms = 316.95**



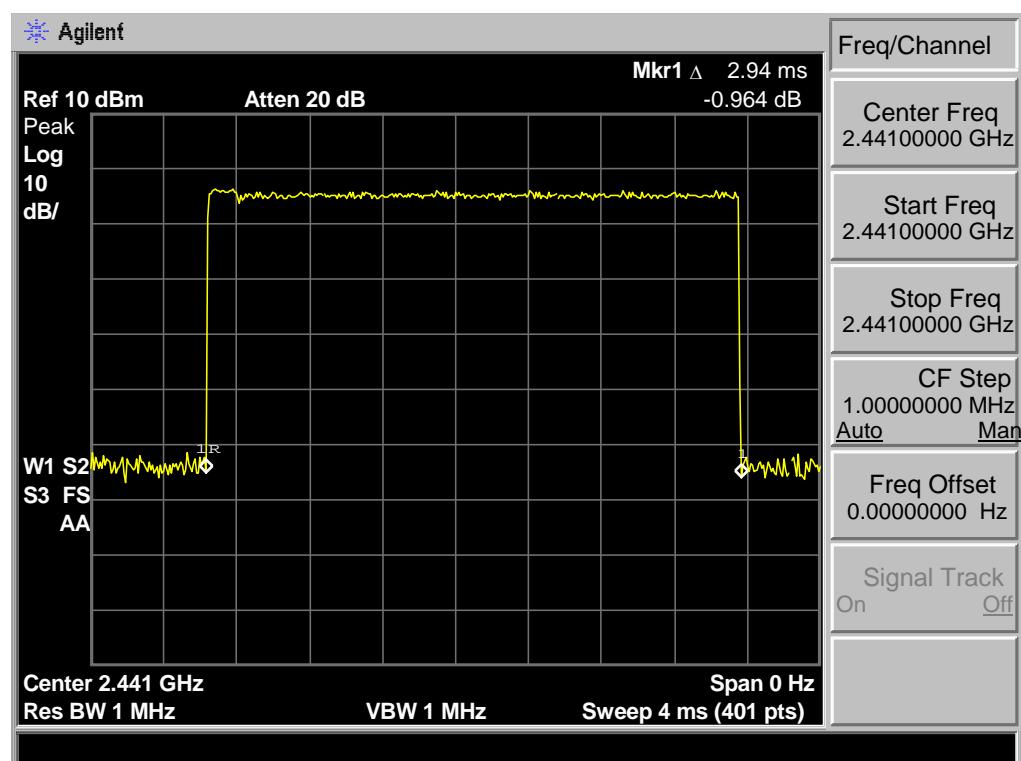
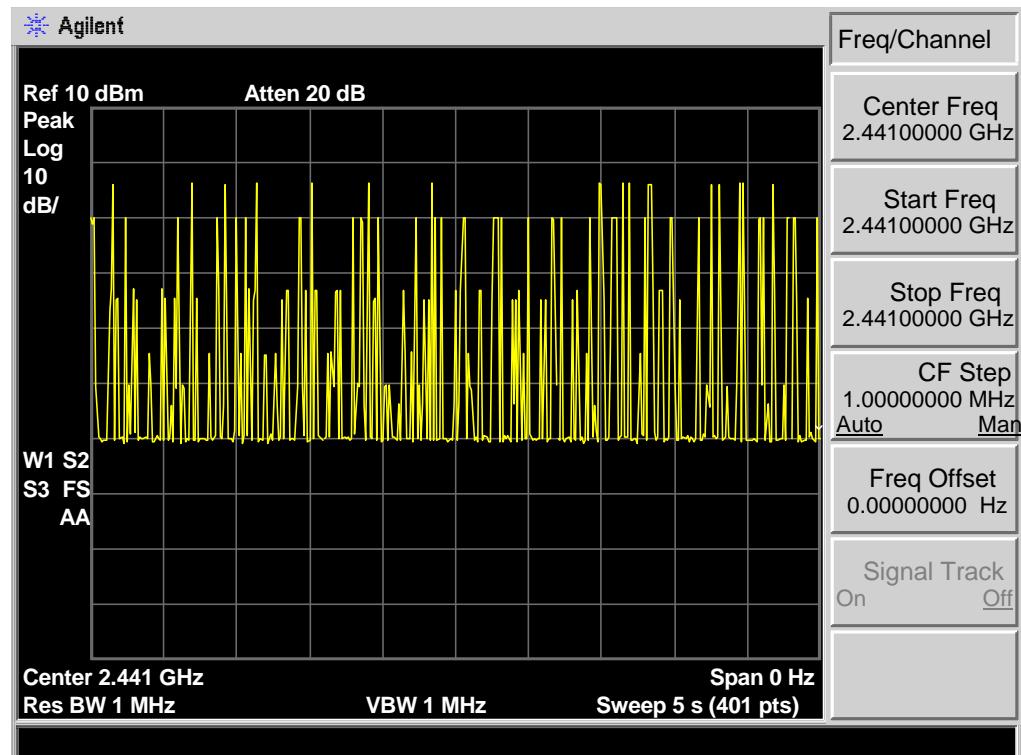
**8-DPSK 3DH1 : 51hop/5s \* 0.4 \* 79 \* 0.44ms = 141.82**



**8-DPSK 3DH3 : 27hop/5s \* 0.4 \* 79 \* 1.71ms= 291.79**



**8-DPSK 3DH5 : 17hop/5s \* 0.4 \* 79 \*2.94ms = 315.87**



## 8. RADIATED EMISSIONS

### 8.1. Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

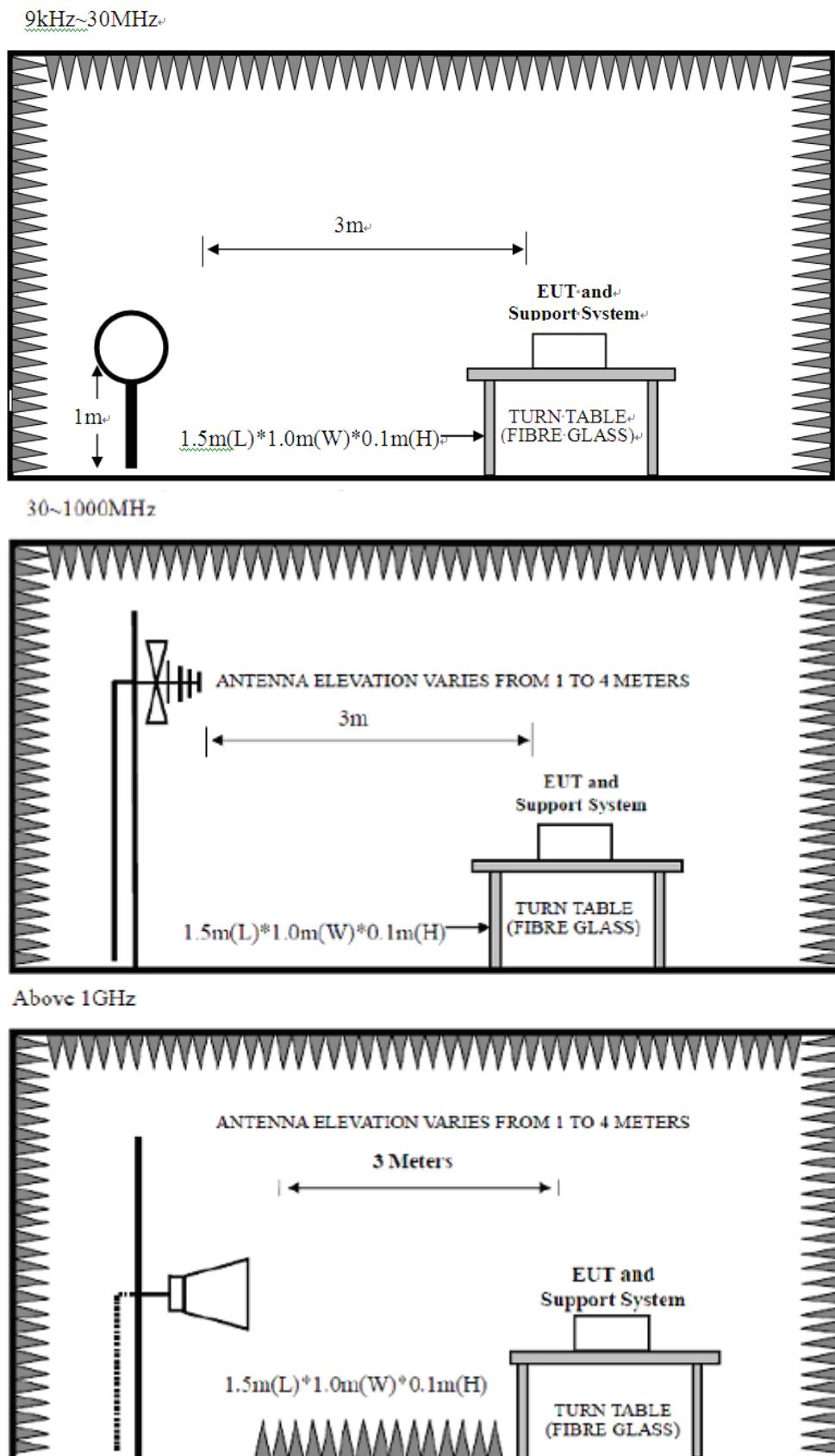
#### 15.205 Restricted frequency band

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )

#### 15.209 Limit

Frequency (MHz)	Field strength ( $\mu$ V/m)	Distance (m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

## 8.2. Block Diagram of Test setup



### 8.3. Test Procedure

EUT was placed on a turn table, which is 0.1 meter high above ground for test. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it. 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 between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

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.

The test frequency analyzer system was set to Peak Detect (300Hz RBW in 9kHz to 150kHz and 10kHz RBW in 150kHz to 30MHz) Function and Specified Bandwidth with Maximum Hold Mode.

The bandwidth of the EMI test receiver (R&S ESVS10) is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 1MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz

PEAK detector, 1MHz/1MHz for PAEK measurement,

PEAK detector, 1MHz/10Hz for Average measurement

The frequency range from 30MHz to 10th harmonic (25GHz) are checked.

### 8.4. Test Result

Pass

- Note: 1、For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.
- 2、The frequency 2402MHz ,2441MHz and 2480MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.

## 8.5. Test Data

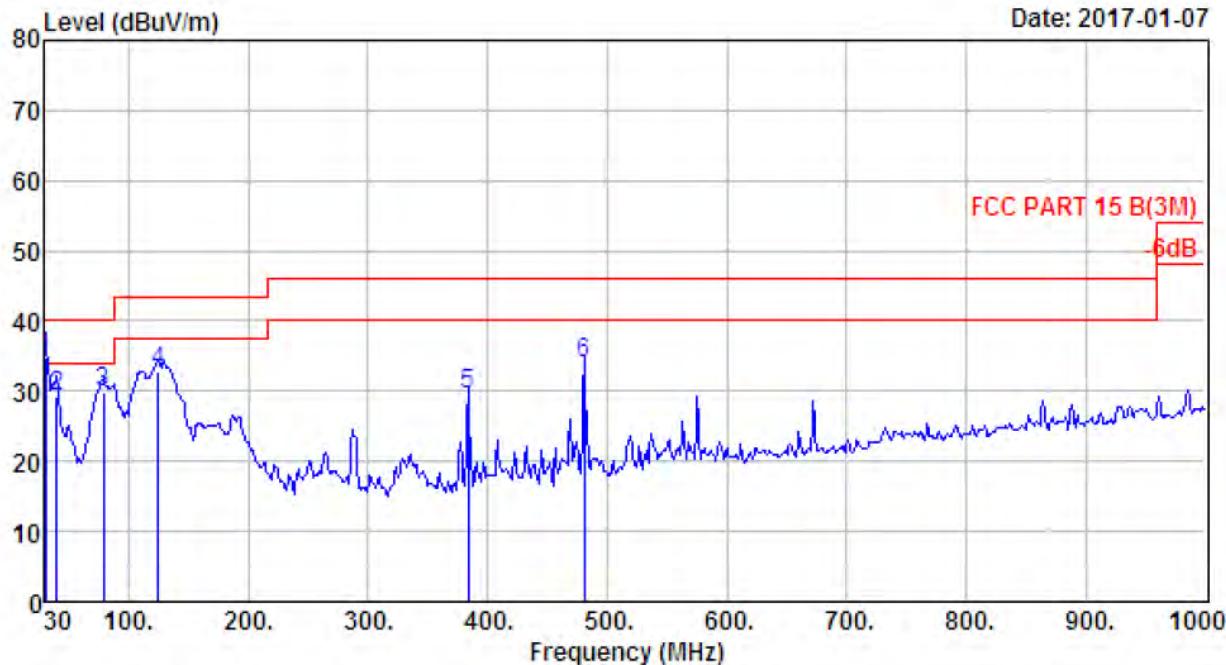
9 kHz – 30 MHz

Pass

Note: The amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

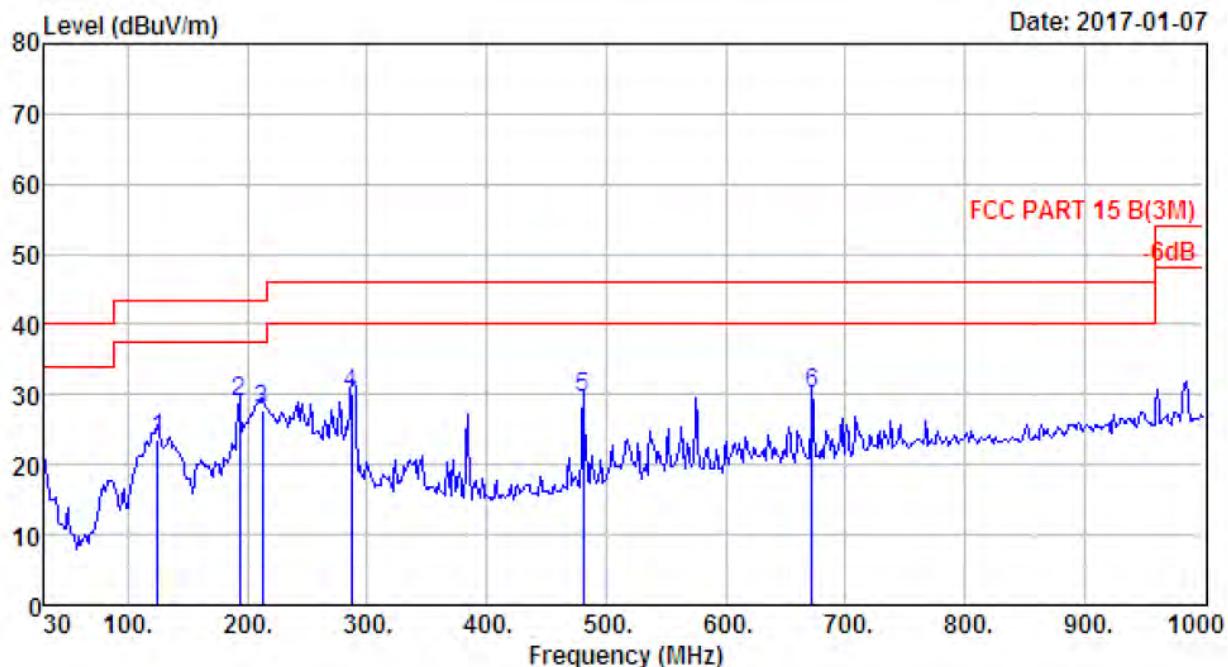
30 MHz – 1000 MHz

Date: 2017-01-07



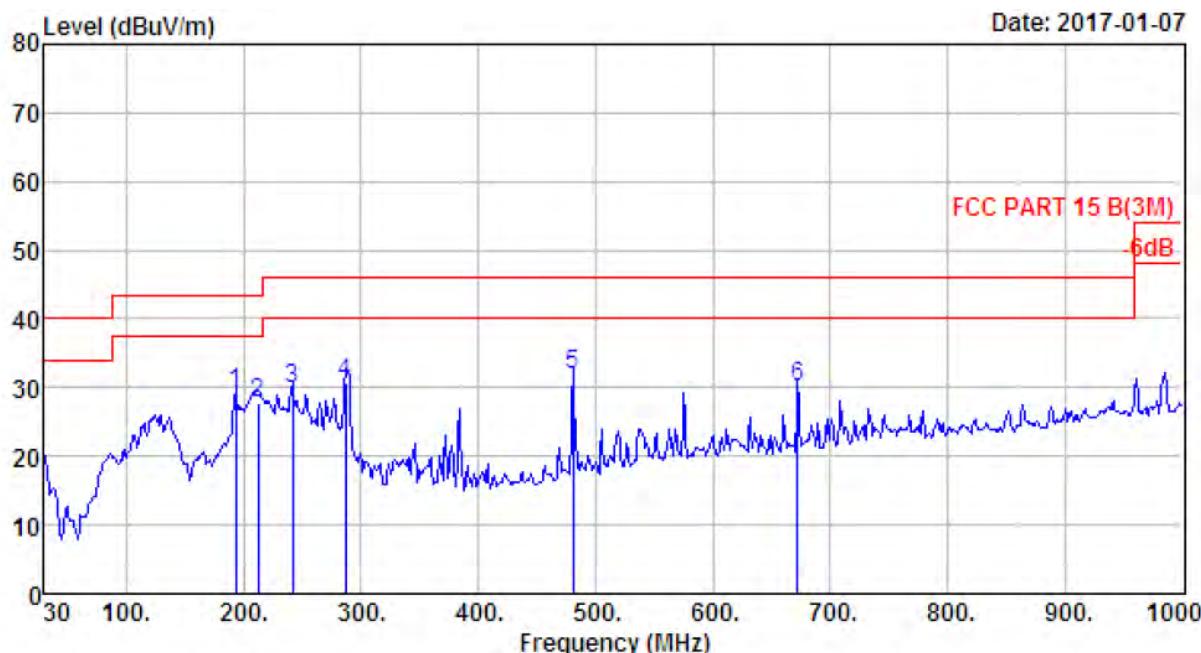
Site no. : 1# 966 Chamber Data no. : 147  
 Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2402MHz

Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Emission				Remark
			Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	
1 30.00	18.51	0.65	15.67	34.83	40.00	5.17	QP
2 39.70	12.90	0.81	15.51	29.22	40.00	10.78	QP
3 78.50	6.89	1.22	21.82	29.93	40.00	10.07	QP
4 125.06	11.35	1.52	19.75	32.62	43.50	10.88	QP
5 384.05	15.24	2.64	11.62	29.50	46.00	16.50	QP
6 481.05	17.49	3.09	13.36	33.94	46.00	12.06	QP



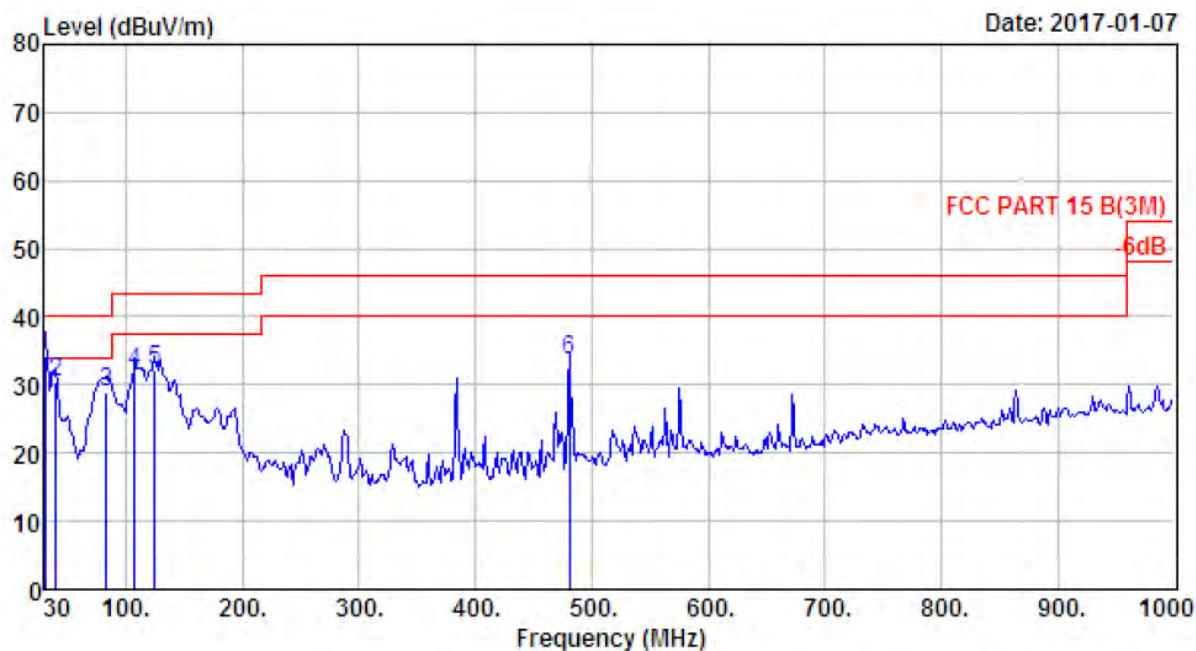
Site no. : 1# 966 Chamber Data no. : 148  
 Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2402MHz

Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Emission				Remark
			Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	
1 125.06	11.35	1.52	10.71	23.58	43.50	19.92	QP
2 192.96	7.85	1.77	19.25	28.87	43.50	14.63	QP
3 212.36	8.56	1.91	17.18	27.65	43.50	15.85	QP
4 287.05	12.59	2.32	15.27	30.18	46.00	15.82	QP
5 481.05	17.49	3.09	8.95	29.53	46.00	16.47	QP
6 672.14	20.23	3.62	6.16	30.01	46.00	15.99	QP



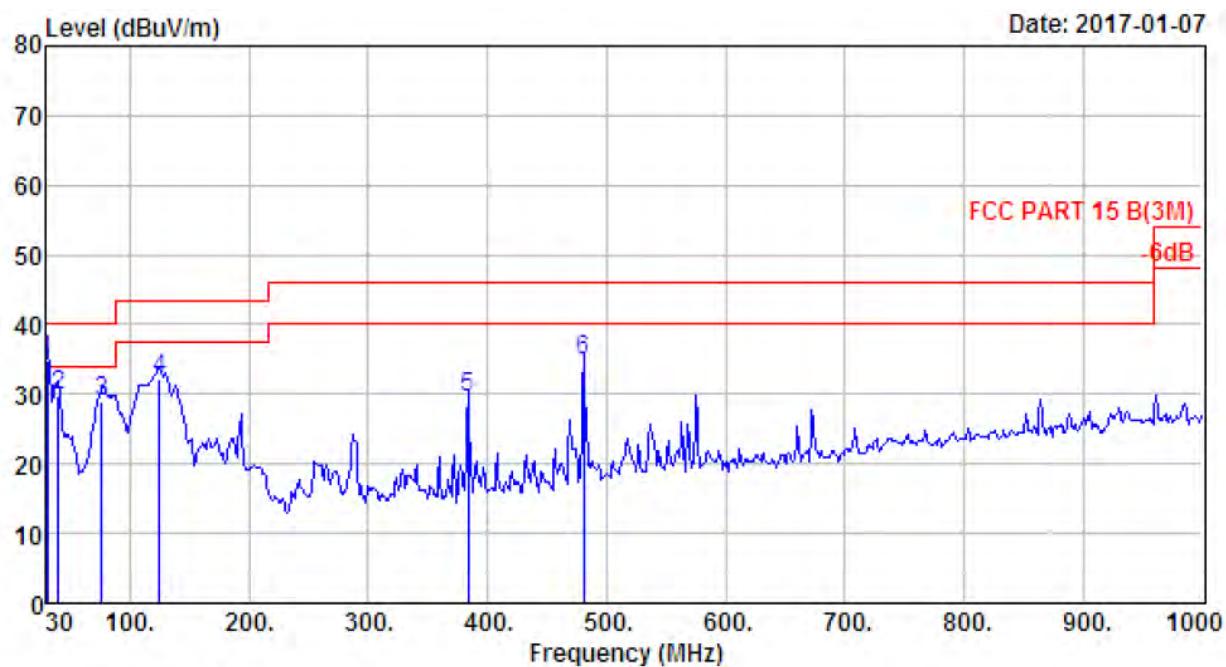
Site no. : 1# 966 Chamber Data no. : 149  
 Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2441MHz

Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission			
				Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1 192.96	7.85	1.77	19.59	29.21	43.50	14.29	QP
2 212.36	8.56	1.91	17.17	27.64	43.50	15.86	QP
3 241.46	10.50	2.14	17.22	29.86	46.00	16.14	QP
4 287.05	12.59	2.32	15.77	30.68	46.00	15.32	QP
5 481.05	17.49	3.09	11.32	31.90	46.00	14.10	QP
6 672.14	20.23	3.62	6.12	29.97	46.00	16.03	QP



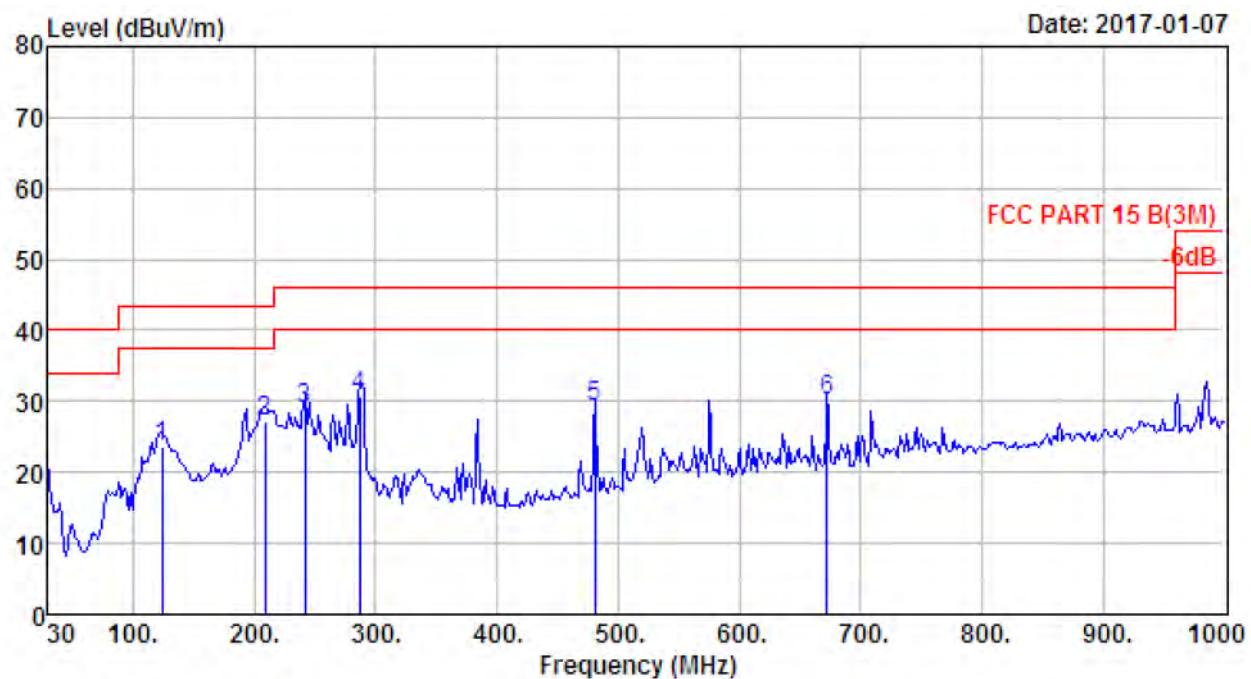
Site no. : site Data no. : 150  
 Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2441MHz

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.00	18.51	0.65	15.23	34.39	40.00	5.61	QP
2	39.70	12.90	0.81	16.57	30.28	40.00	9.72	QP
3	83.35	7.47	1.23	20.38	29.08	40.00	10.92	QP
4	107.60	10.24	1.39	20.31	31.94	43.50	11.56	QP
5	125.06	11.35	1.52	19.34	32.21	43.50	11.29	QP
6	481.05	17.49	3.09	13.00	33.58	46.00	12.42	QP



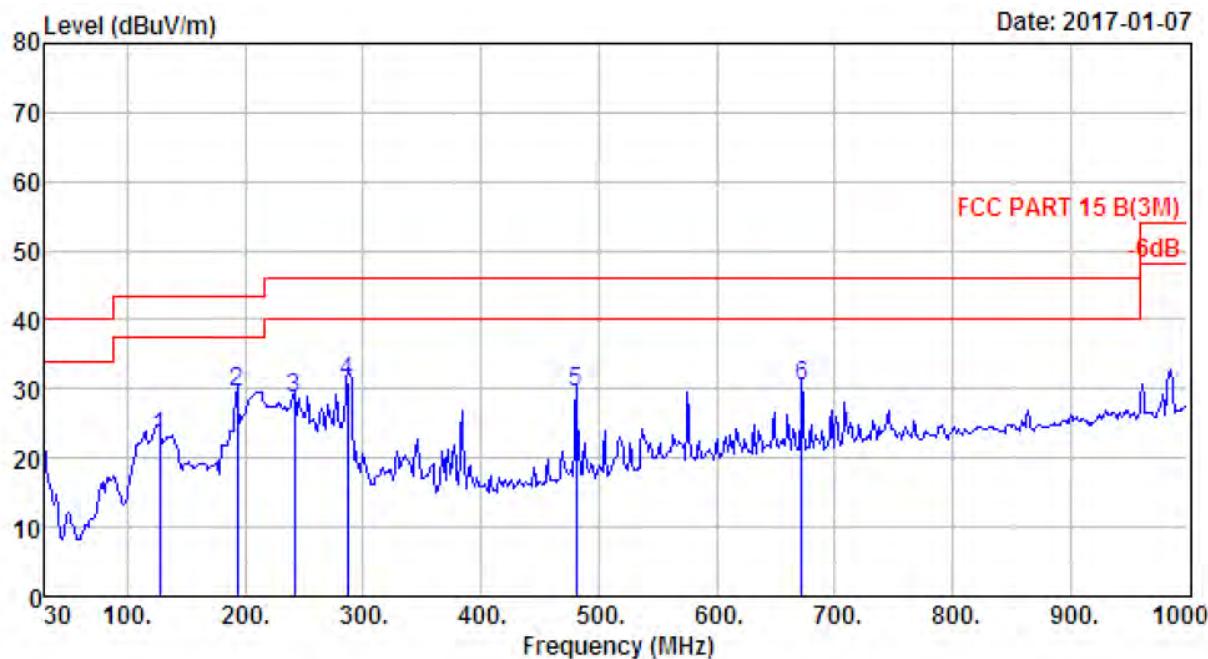
Site no. : 1# 966 Chamber Data no. : 151  
 Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2480MHz

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Emission Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	30.00	18.51	0.65	15.58	34.74	40.00	5.26	QP
2	39.70	12.90	0.81	16.24	29.95	40.00	10.05	QP
3	76.56	6.66	1.19	21.15	29.00	40.00	11.00	QP
4	125.06	11.35	1.52	19.19	32.06	43.50	11.44	QP
5	384.05	15.24	2.64	11.59	29.47	46.00	16.53	QP
6	481.05	17.49	3.09	14.33	34.91	46.00	11.09	QP



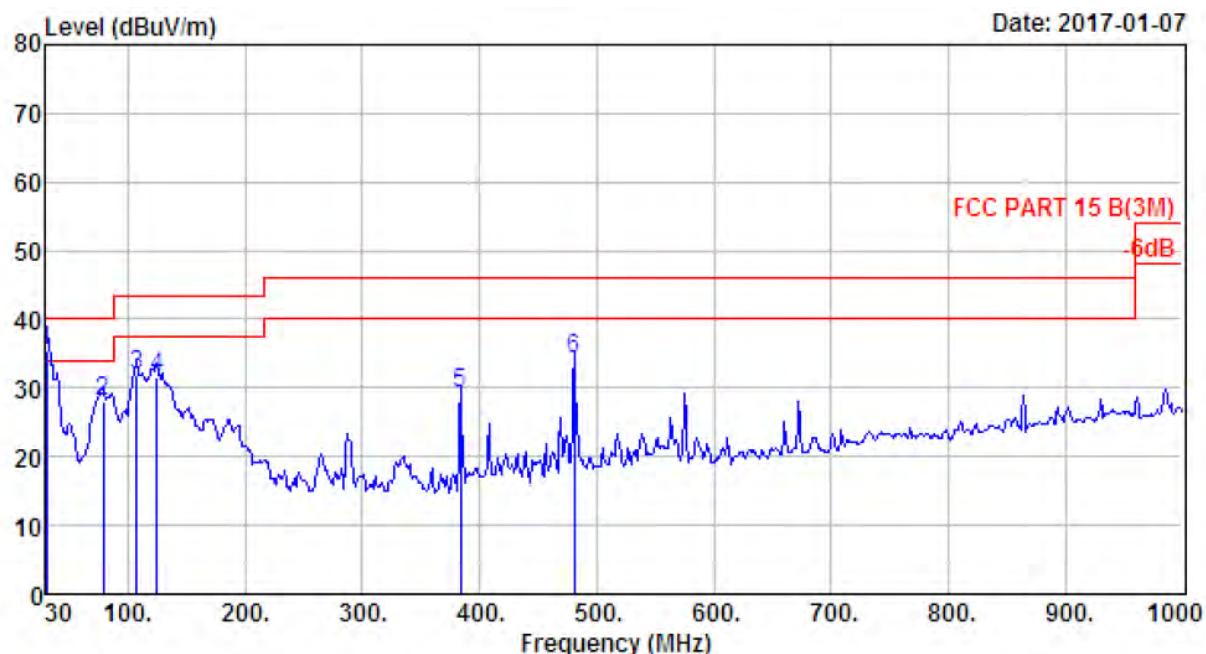
Site no. : 1# 966 Chamber Data no. : 152  
 Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2480MHz

Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Emission				Remark
			Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	
1 124.09	11.31	1.53	10.90	23.74	43.50	19.76	QP
2 208.48	8.28	1.95	16.97	27.20	43.50	16.30	QP
3 241.46	10.50	2.14	16.40	29.04	46.00	16.96	QP
4 287.05	12.59	2.32	15.75	30.66	46.00	15.34	QP
5 481.05	17.49	3.09	8.58	29.16	46.00	16.84	QP
6 672.14	20.23	3.62	6.34	30.19	46.00	15.81	QP



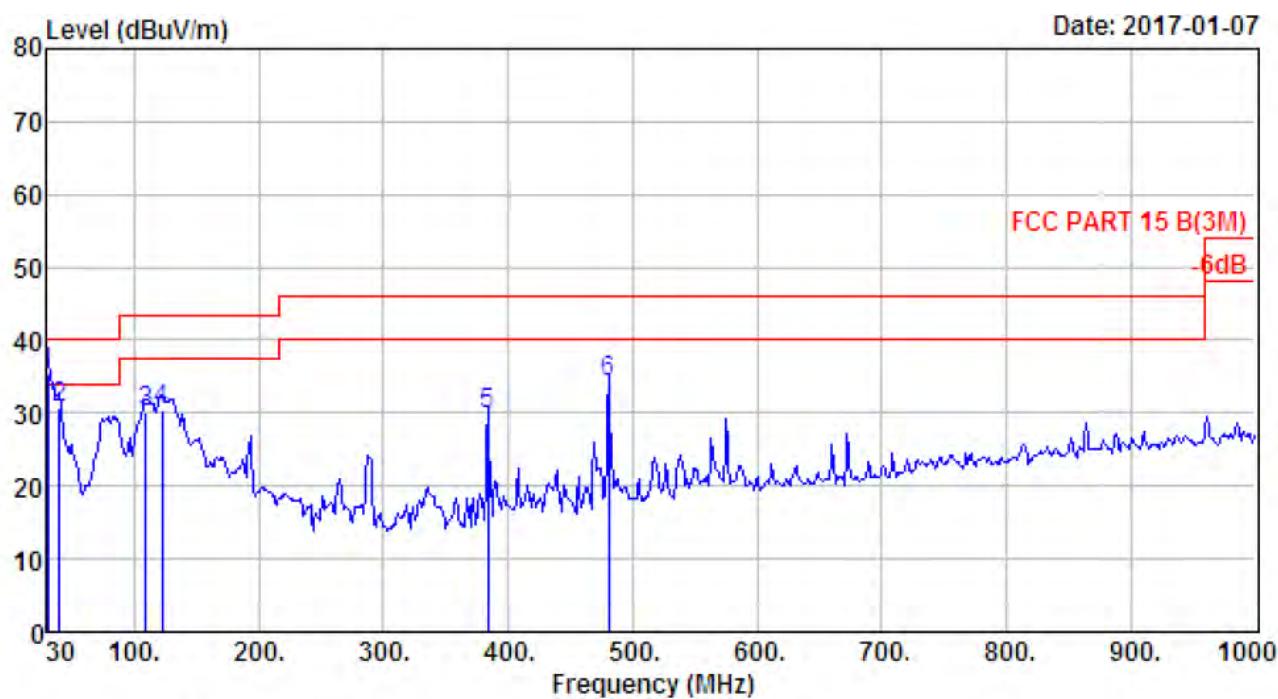
Site no. : 1# 966 Chamber Data no. : 153  
 Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2402MHz

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	127.00	11.34	1.50	10.20	23.04	43.50	20.46	QP
2	192.96	7.85	1.77	19.97	29.59	43.50	13.91	QP
3	241.46	10.50	2.14	16.11	28.75	46.00	17.25	QP
4	287.05	12.59	2.32	16.16	31.07	46.00	14.93	QP
5	481.05	17.49	3.09	8.96	29.54	46.00	16.46	QP
6	672.14	20.23	3.62	6.50	30.35	46.00	15.65	QP



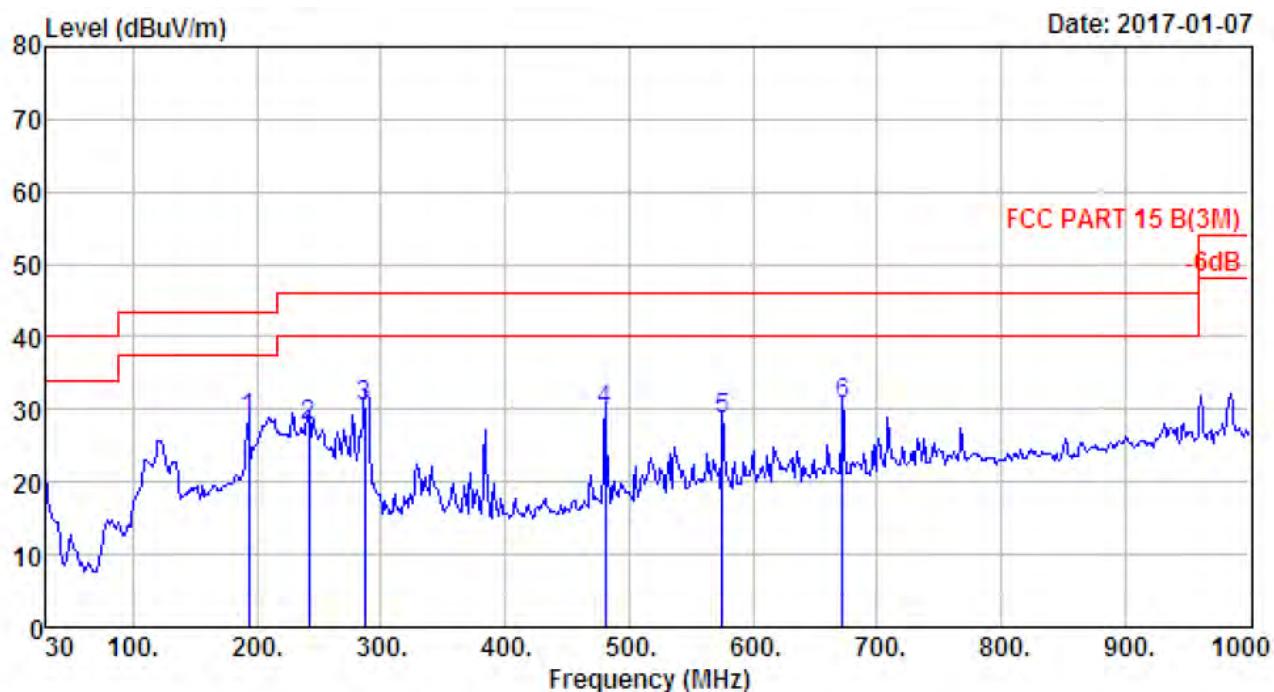
Site no. : 1# 966 Chamber Data no. : 154  
 Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2402MHz

Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission			
				Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1 30.00	18.51	0.65	16.23	35.39	40.00	4.61	QP
2 78.50	6.89	1.22	20.05	28.16	40.00	11.84	QP
3 107.60	10.24	1.39	20.18	31.81	43.50	11.69	QP
4 125.06	11.35	1.52	18.67	31.54	43.50	11.96	QP
5 384.05	15.24	2.64	11.46	29.34	46.00	16.66	QP
6 481.05	17.49	3.09	13.80	34.38	46.00	11.62	QP



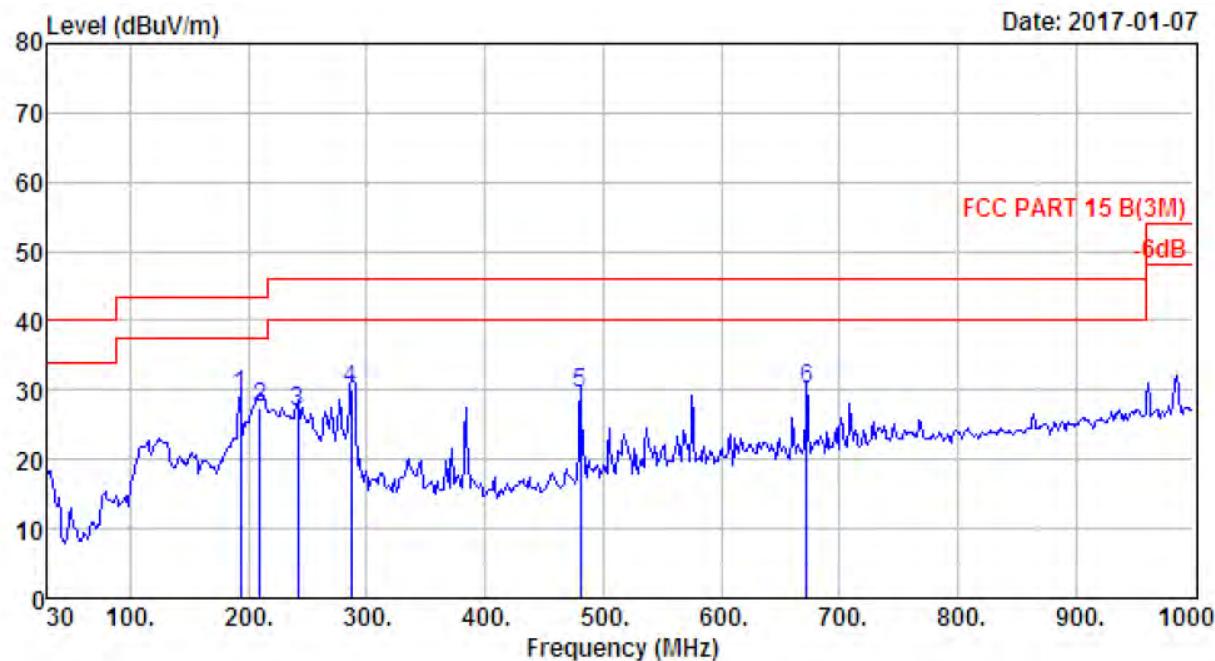
Site no. : 1# 966 Chamber Data no. : 155  
 Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2441MHz

	ANT	Cable	Emission				Remark
Freq.	Factor	Loss	Reading	Level	Limit	Margin	
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	30.00	18.51	0.65	16.31	35.47	40.00	4.53
2	39.70	12.90	0.81	16.93	30.64	40.00	9.36
3	109.54	10.44	1.40	18.15	29.99	43.50	13.51
4	122.15	11.24	1.45	17.84	30.53	43.50	12.97
5	384.05	15.24	2.64	11.97	29.85	46.00	16.15
6	481.05	17.49	3.09	13.58	34.16	46.00	11.84



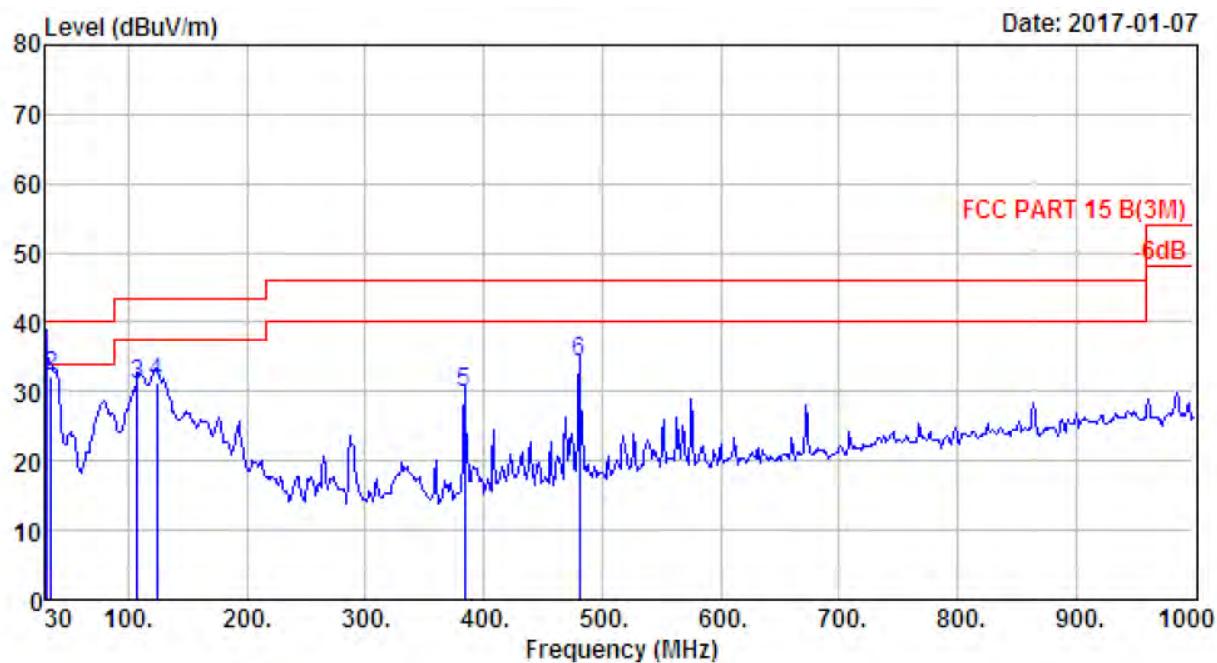
Site no. : 1# 966 Chamber Data no. : 156  
 Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2441MHz

	Freq. (MHz)	ANT Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	192.96	7.85	1.77	18.97	28.59	43.50	14.91	QP
2	241.46	10.50	2.14	15.10	27.74	46.00	18.26	QP
3	287.05	12.59	2.32	15.60	30.51	46.00	15.49	QP
4	481.05	17.49	3.09	9.30	29.88	46.00	16.12	QP
5	575.14	19.55	3.40	5.75	28.70	46.00	17.30	QP
6	672.14	20.23	3.62	6.95	30.80	46.00	15.20	QP



Site no. : 1# 966 Chamber Data no. : 157  
 Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2480MHz

	ANT	Cable	Emission				
Freq. (MHz)	Factor (dB/m)	Loss (dB)	Reading (dBuV)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1 192.96	7.85	1.77	19.66	29.28	43.50	14.22	QP
2 209.45	8.37	1.91	17.27	27.55	43.50	15.95	QP
3 241.46	10.50	2.14	14.10	26.74	46.00	19.26	QP
4 287.05	12.59	2.32	15.27	30.18	46.00	15.82	QP
5 481.05	17.49	3.09	9.04	29.62	46.00	16.38	QP
6 672.14	20.23	3.62	6.35	30.20	46.00	15.80	QP



Site no. : 1# 966 Chamber Data no. : 158  
 Dis. / Ant. : 3m 27137 Ant. pol. : VERTICAL  
 Limit : FCC PART 15 B(3M)  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2480MHz

	ANT	Cable	Emission				
Freq. (MHz)	Factor (dB/m)	Loss (dB)	Reading (dB <sub>uV</sub> )	Level (dB <sub>uV/m</sub> )	Limit (dB <sub>uV/m</sub> )	Margin (dB)	Remark
1 30.00	18.51	0.65	16.22	35.38	40.00	4.62	QP
2 34.85	15.55	0.72	15.78	32.05	40.00	7.95	QP
3 107.60	10.24	1.39	19.26	30.89	43.50	12.61	QP
4 124.09	11.31	1.53	18.49	31.33	43.50	12.17	QP
5 384.05	15.24	2.64	11.86	29.74	46.00	16.26	QP
6 481.05	17.49	3.09	13.73	34.31	46.00	11.69	QP

**Above 1000 MHz**

Site no. : 1# 966 Chamber Data no. : 159  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2402MHz

		Ant.	Cable	Amp	Emission				
Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1	2402.00	27.61	6.62	34.64	87.68	87.27	74.00	-13.27	Peak
2	4804.00	31.25	11.77	35.64	32.47	39.85	74.00	34.15	Peak
3	7206.00	36.52	11.54	33.95	26.84	40.95	74.00	33.05	Peak
4	8684.00	37.32	11.45	33.66	28.16	43.27	74.00	30.73	Peak
5	11064.00	39.48	11.24	33.83	25.89	42.78	74.00	31.22	Peak
6	13920.00	41.26	11.00	33.00	24.05	43.31	74.00	30.69	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : 1# 966 Chamber Data no. : 160  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2402MHz

		Ant.	Cable	Amp	Emission				
Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1	2402.00	27.61	6.62	34.64	86.28	85.87	74.00	-11.87	Peak
2	4804.00	31.25	11.77	35.64	32.40	39.78	74.00	34.22	Peak
3	7206.00	36.52	11.54	33.95	28.85	42.96	74.00	31.04	Peak
4	8684.00	37.32	11.45	33.66	28.81	43.92	74.00	30.08	Peak
5	10316.00	38.65	11.41	34.51	28.10	43.65	74.00	30.35	Peak
6	13444.00	39.95	11.49	32.74	24.63	43.33	74.00	30.67	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : 1# 966 Chamber Data no. : 163  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2441MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	27.60	6.67	34.85	88.31	87.73	74.00	-13.73	Peak
2	4882.00	31.37	12.07	35.76	33.11	40.79	74.00	33.21	Peak
3	7323.00	36.55	11.57	34.14	29.40	43.38	74.00	30.62	Peak
4	8497.00	36.96	11.45	34.12	28.89	43.18	74.00	30.82	Peak
5	10146.00	38.36	11.51	34.58	27.09	42.38	74.00	31.62	Peak
6	13325.00	39.66	11.48	32.94	25.68	43.88	74.00	30.12	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : 1# 966 Chamber Data no. : 164  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2441MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2441.00	27.60	6.67	34.85	86.87	86.29	74.00	-12.29	Peak
2	4882.00	31.37	12.07	35.76	32.33	40.01	74.00	33.99	Peak
3	7323.00	36.55	11.57	34.14	28.53	42.51	74.00	31.49	Peak
4	8684.00	37.32	11.45	33.66	27.55	42.66	74.00	31.34	Peak
5	11030.00	39.50	11.27	33.98	25.40	42.19	74.00	31.81	Peak
6	14124.00	41.57	10.91	33.22	24.04	43.30	74.00	30.70	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : 1# 966 Chamber Data no. : 165  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2480MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.58	6.71	35.11	87.59	86.77	74.00	-12.77	Peak
2	4960.00	31.49	12.44	36.01	30.27	38.19	74.00	35.81	Peak
3	7440.00	36.54	11.61	34.22	29.05	42.98	74.00	31.02	Peak
4	8684.00	37.32	11.45	33.66	28.86	43.97	74.00	30.03	Peak
5	10826.00	39.33	11.30	34.00	27.52	44.15	74.00	29.85	Peak
6	13988.00	41.45	10.92	33.00	25.01	44.38	74.00	29.62	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : 1# 966 Chamber Data no. : 166  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2480MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.58	6.71	35.11	89.44	88.62	74.00	-14.62	Peak
2	4960.00	31.49	12.44	36.01	34.02	41.94	74.00	32.06	Peak
3	7440.00	36.54	11.61	34.22	28.68	42.61	74.00	31.39	Peak
4	9194.00	37.75	11.55	34.18	27.63	42.75	74.00	31.25	Peak
5	11404.00	39.25	10.99	33.57	26.74	43.41	74.00	30.59	Peak
6	13274.00	39.54	11.47	32.92	26.12	44.21	74.00	29.79	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : 1# 966 Chamber Data no. : 169  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2402MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.61	6.62	34.64	85.76	85.35	74.00	-11.35	Peak
2	4804.00	31.25	11.77	35.64	31.69	39.07	74.00	34.93	Peak
3	7206.00	36.52	11.54	33.95	27.83	41.94	74.00	32.06	Peak
4	8650.00	37.27	11.45	33.68	28.27	43.31	74.00	30.69	Peak
5	10656.00	39.15	11.30	34.31	25.83	41.97	74.00	32.03	Peak
6	13937.00	41.31	10.98	33.00	23.98	43.27	74.00	30.73	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : 1# 966 Chamber Data no. : 170  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2402MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2402.00	27.61	6.62	34.64	87.06	86.65	74.00	-12.65	Peak
2	4804.00	31.25	11.77	35.64	31.57	38.95	74.00	35.05	Peak
3	7206.00	36.52	11.54	33.95	27.27	41.38	74.00	32.62	Peak
4	8684.00	37.32	11.45	33.66	27.64	42.75	74.00	31.25	Peak
5	10214.00	38.48	11.47	34.50	27.97	43.42	74.00	30.58	Peak
6	13240.00	39.46	11.46	32.88	25.36	43.40	74.00	30.60	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : 1# 966 Chamber Data no. : 173  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2441MHz

		Ant.	Cable	Amp	Emission				
Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1	2441.00	27.60	6.67	34.85	86.33	85.75	74.00	-11.75	Peak
2	4882.00	31.37	12.07	35.76	32.15	39.83	74.00	34.17	Peak
3	7323.00	36.55	11.57	34.14	28.06	42.04	74.00	31.96	Peak
4	8684.00	37.32	11.45	33.66	27.61	42.72	74.00	31.28	Peak
5	11200.00	39.39	11.14	33.24	25.92	43.21	74.00	30.79	Peak
6	14056.00	41.51	10.90	33.06	24.97	44.32	74.00	29.68	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : 1# 966 Chamber Data no. : 174  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2441MHz

		Ant.	Cable	Amp	Emission				
Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1	2441.00	27.60	6.67	34.85	87.32	86.74	74.00	-12.74	Peak
2	4882.00	31.37	12.07	35.76	31.73	39.41	74.00	34.59	Peak
3	7323.00	36.55	11.57	34.14	28.55	42.53	74.00	31.47	Peak
4	8650.00	37.27	11.45	33.68	28.47	43.51	74.00	30.49	Peak
5	11166.00	39.41	11.17	33.31	26.49	43.76	74.00	30.24	Peak
6	13954.00	41.35	10.96	32.99	24.29	43.61	74.00	30.39	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : 1# 966 Chamber Data no. : 175  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2480MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.58	6.71	35.11	87.82	87.00	74.00	-13.00	Peak
2	4960.00	31.49	12.44	36.01	33.53	41.45	74.00	32.55	Peak
3	7440.00	36.54	11.61	34.22	29.45	43.38	74.00	30.62	Peak
4	8650.00	37.27	11.45	33.68	28.97	44.01	74.00	29.99	Peak
5	11064.00	39.48	11.24	33.83	26.49	43.38	74.00	30.62	Peak
6	13580.00	40.31	11.40	32.64	24.85	43.92	74.00	30.08	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

Site no. : 1# 966 Chamber Data no. : 176  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2480MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2480.00	27.58	6.71	35.11	86.92	86.10	74.00	-12.10	Peak
2	4960.00	31.49	12.44	36.01	31.38	39.30	74.00	34.70	Peak
3	7440.00	36.54	11.61	34.22	28.25	42.18	74.00	31.82	Peak
4	8684.00	37.32	11.45	33.66	28.14	43.25	74.00	30.75	Peak
5	11064.00	39.48	11.24	33.83	26.43	43.32	74.00	30.68	Peak
6	13597.00	40.36	11.38	32.65	24.42	43.51	74.00	30.49	Peak

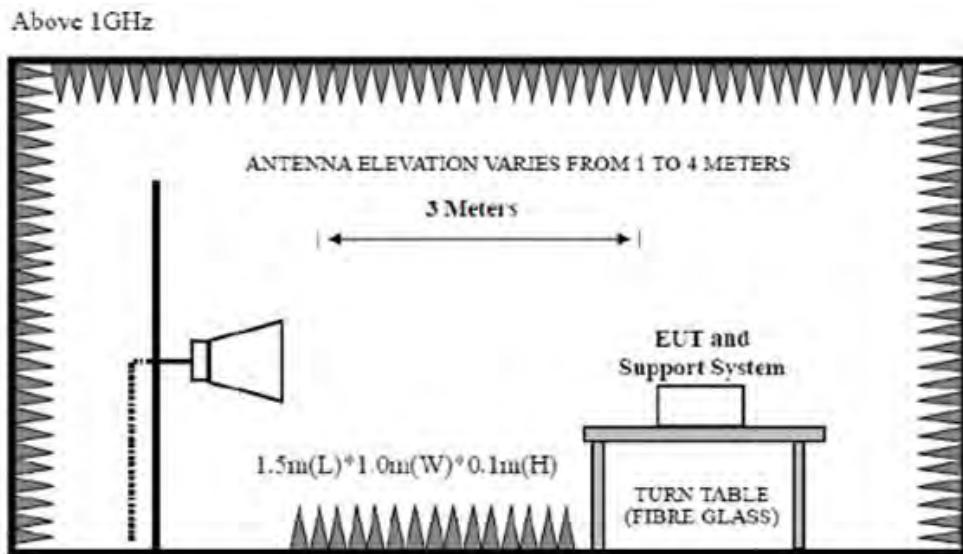
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

## 9. BAND EDGE COMPLIANCE

### 9.1. Limit

All the lower and upper band-edges emissions appearing within 2310MHz to 2390MHz and 2483.5MHz to 2500MHz restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation frequency band 2400MHz to 2483.5MHz shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

### 9.2. Block Diagram of Test setup



### 9.3. Test Procedure

EUT was placed on a turn table, which is 0.1 m high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it. 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 between 1 meter and 4 meters to find out the maximum emission level. Both horizontal and vertical polarization of the antenna are set on test.

Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of emissions

Peak : RBW = 1MHz, VBW = 1MHz, Detector=PEAK detector, Sweep time = auto.

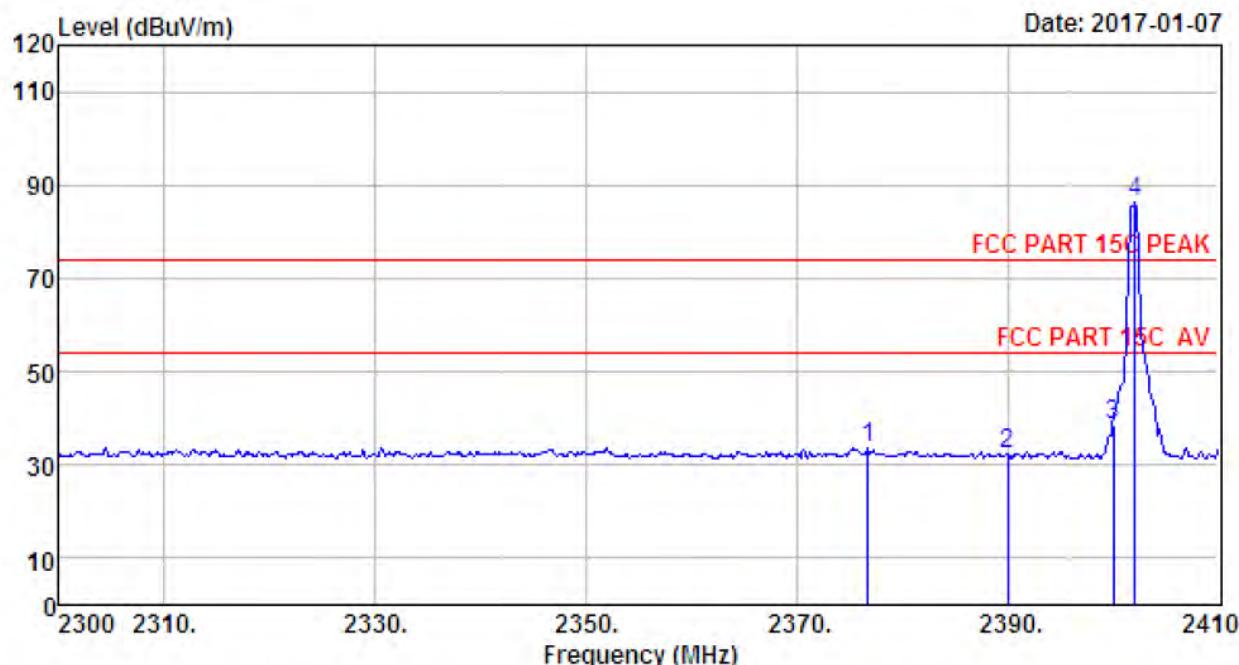
AV : RBW = 1MHz, VBW = 10Hz, Detector=PEAK detector, Sweep time = auto.

### 9.4. Test Result

Pass

- Note:
- 1、For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.
  - 2、The frequency 2402MHz 、2441MHz and 2480MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.

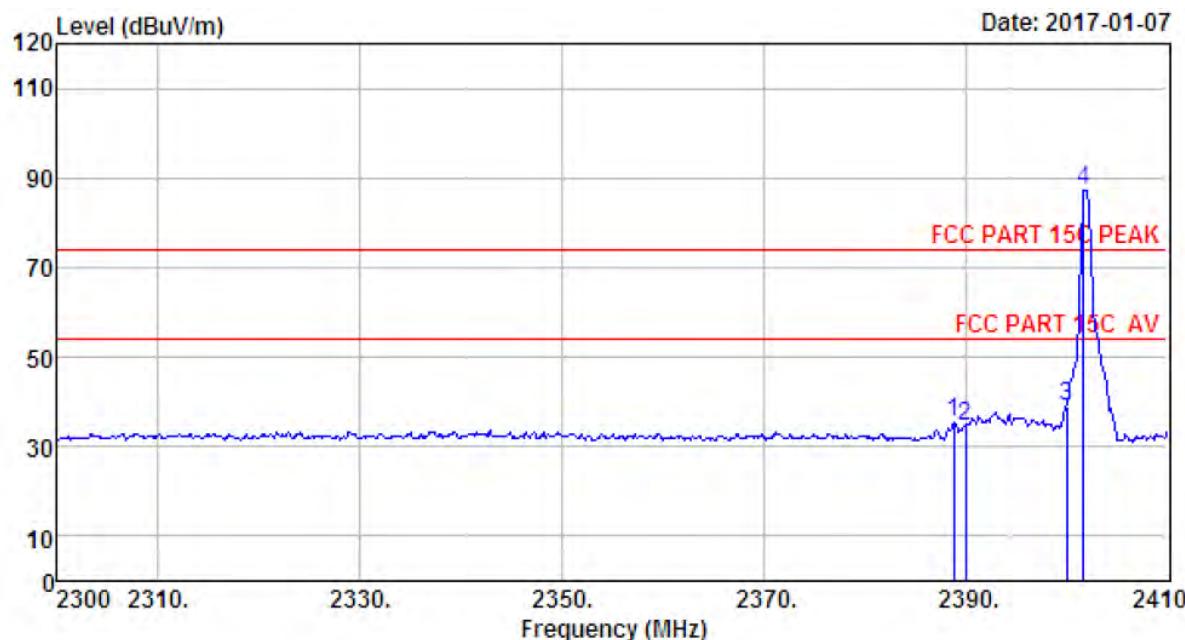
## 9.5. Test Data



Site no. : 1# 966 Chamber Data no. : 161  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2402MHz (No Hopping)

	Ant.	Cable	Amp	Emission					
Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1	2376.78	27.64	6.60	34.59	34.04	33.69	74.00	40.31	Peak
2	2390.00	27.64	6.62	34.62	32.59	32.23	74.00	41.77	Peak
3	2400.00	27.61	6.62	34.64	39.04	38.63	74.00	35.37	Peak
4	2402.08	27.61	6.62	34.64	86.68	86.27	74.00	-12.27	Peak

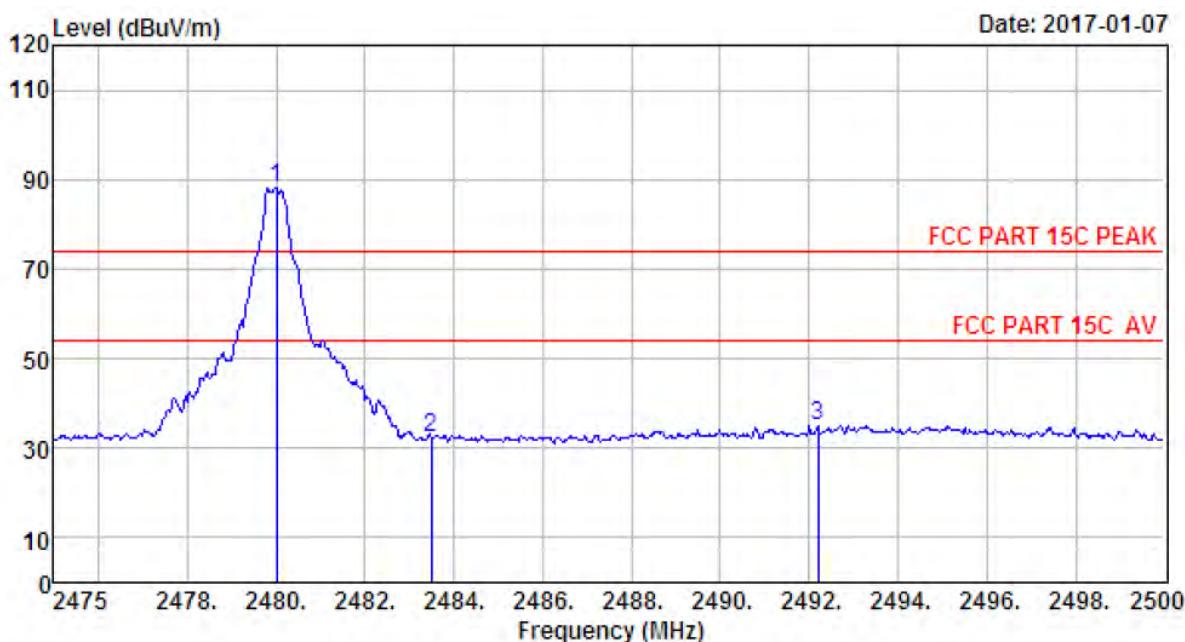
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 162  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL.  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2402MHz (No Hopping)

		Ant.	Cable	Amp	Emission			
Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2388.88	27.64	6.62	34.62	35.67	35.31	74.00	38.69 Peak
2	2390.00	27.64	6.62	34.62	35.03	34.67	74.00	39.33 Peak
3	2400.00	27.61	6.62	34.64	39.46	39.05	74.00	34.95 Peak
4	2401.75	27.61	6.62	34.64	87.82	87.41	74.00	-13.41 Peak

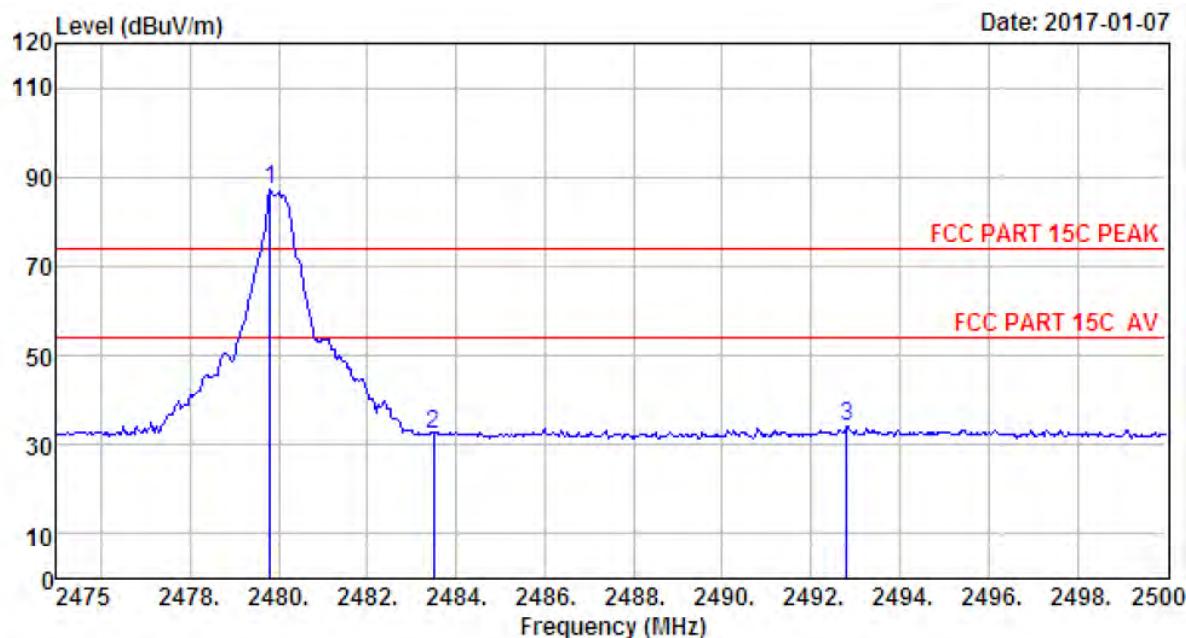
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 167  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2480MHz (No Hopping)

		Ant.	Cable	Amp	Emission			
Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2480.00	27.58	6.71	35.11	89.16	88.34	74.00	-14.34 Peak
2	2483.50	27.58	6.71	35.11	33.30	32.48	74.00	41.52 Peak
3	2492.20	27.58	6.73	35.24	35.89	34.96	74.00	39.04 Peak

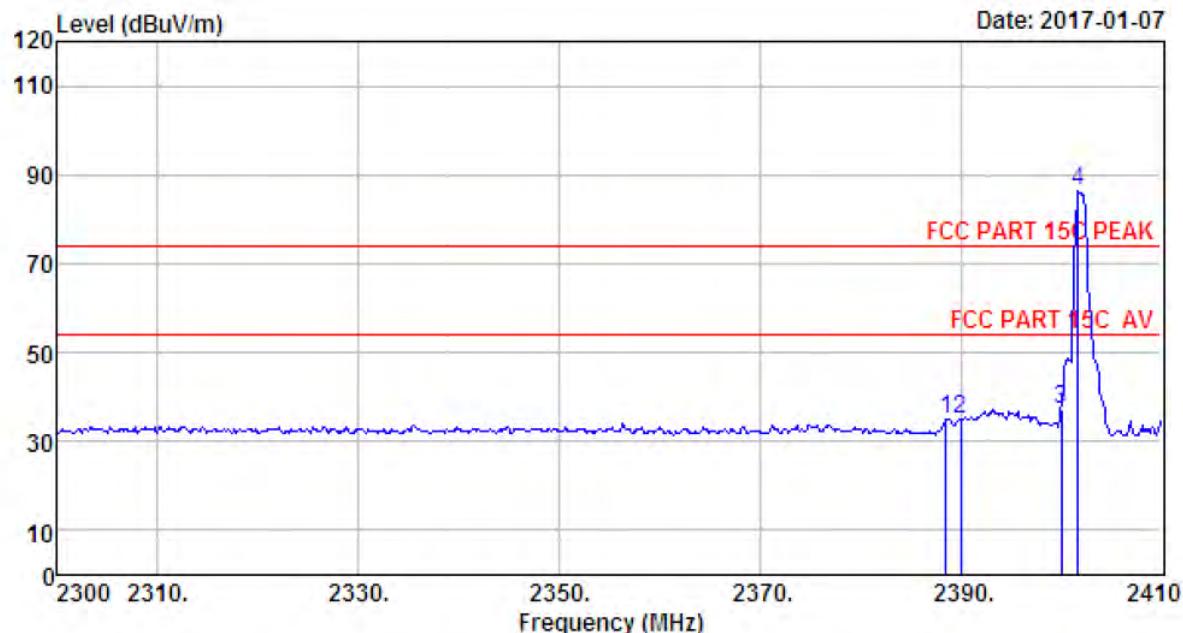
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 168  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2480MHz (No Hopping)

	Ant.	Cable	Amp	Emission					
Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark	
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)		
1	2479.80	27.58	6.71	35.11	88.04	87.22	74.00	-13.22	Peak
2	2483.50	27.58	6.71	35.11	33.31	32.49	74.00	41.51	Peak
3	2492.80	27.58	6.73	35.24	35.12	34.19	74.00	39.81	Peak

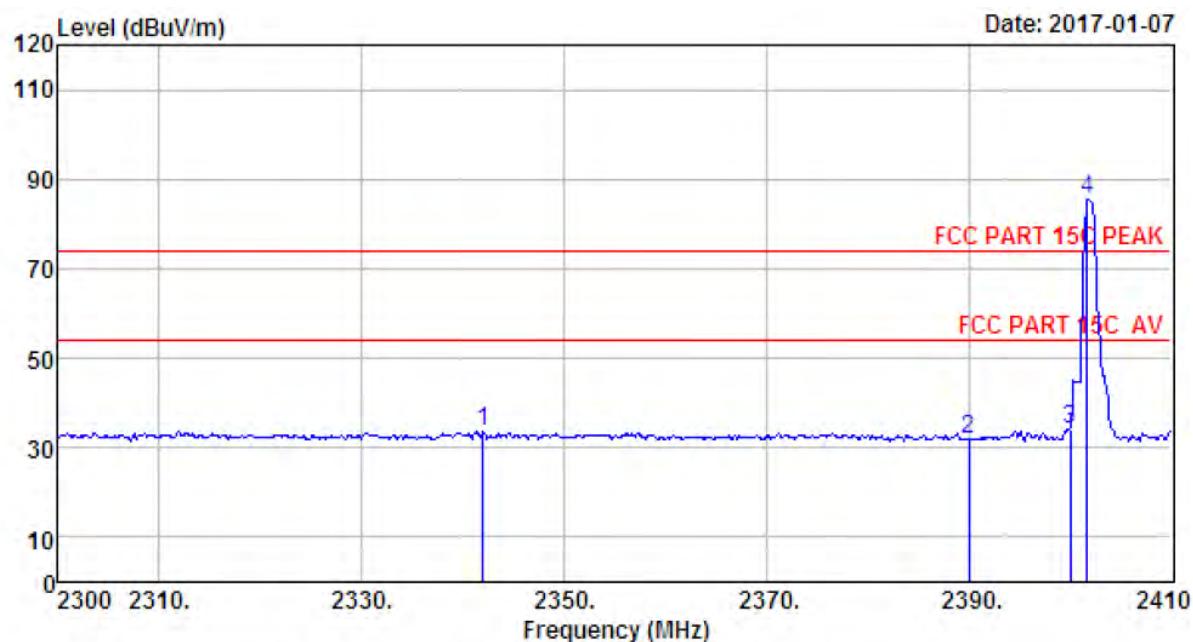
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 171  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2402MHz (No Hopping)

		Ant.	Cable	Amp	Emission			
Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2388.55	27.64	6.62	34.62	35.48	35.12	74.00	38.88 Peak
2	2390.00	27.64	6.62	34.62	35.27	34.91	74.00	39.09 Peak
3	2400.00	27.61	6.62	34.64	37.66	37.25	74.00	36.75 Peak
4	2401.75	27.61	6.62	34.64	86.66	86.25	74.00	-12.25 Peak

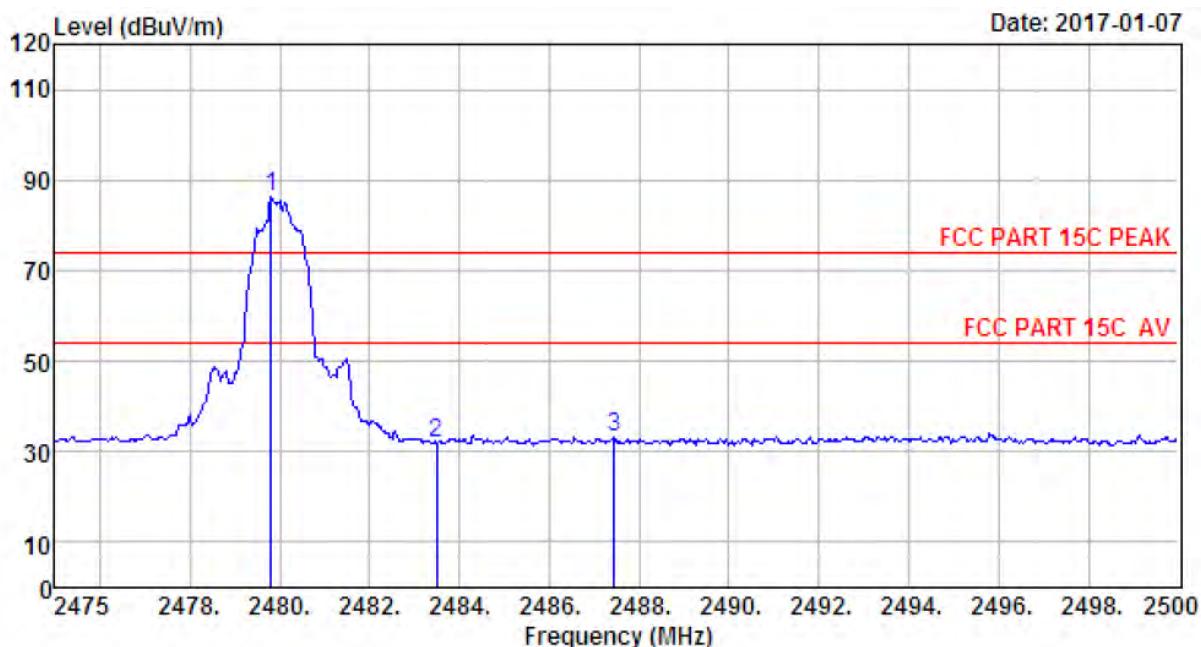
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 172  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2402MHz (No Hopping)

Freq. (MHz)	Ant. Factor	Cable Loss	Amp Factor	Emission				
				Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1 2342.02	27.70	6.56	34.59	34.07	33.74	74.00	40.26	Peak
2 2390.00	27.64	6.62	34.62	32.17	31.81	74.00	42.19	Peak
3 2400.00	27.61	6.62	34.64	34.69	34.28	74.00	39.72	Peak
4 2401.75	27.61	6.62	34.64	85.91	85.50	74.00	-11.50	Peak

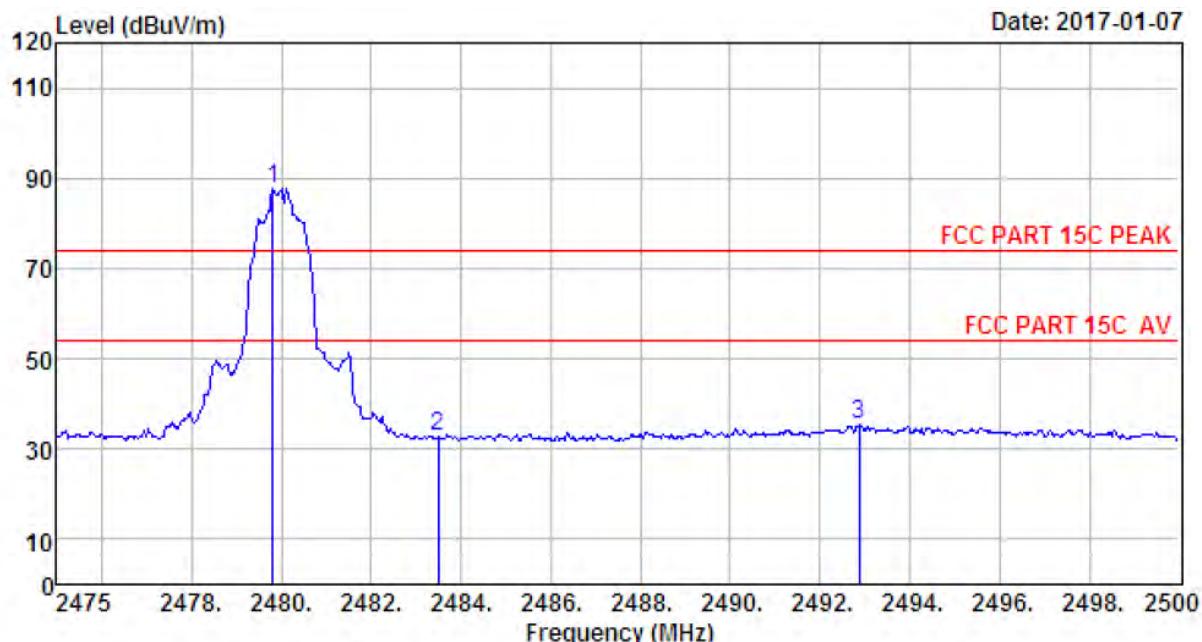
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 177  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2480MHz (No Hopping)

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission				Margin (dB)	Remark
				Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)			
1 2479.80	27.58	6.71	35.11	87.25	86.43	74.00	-12.43	Peak	
2 2483.50	27.58	6.71	35.11	32.67	31.85	74.00	42.15	Peak	
3 2487.45	27.58	6.71	35.11	34.08	33.26	74.00	40.74	Peak	

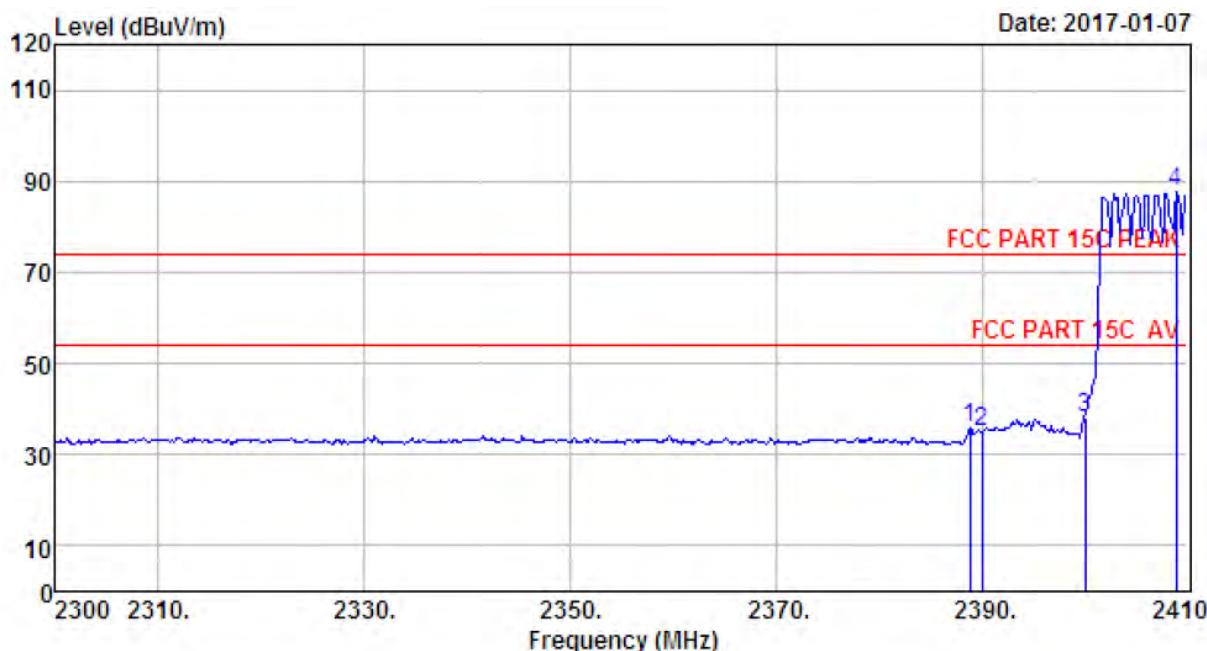
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 178  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2480MHz (No Hopping)

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission				Margin (dB)	Remark
				Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)			
1 2479.80	27.58	6.71	35.11	88.67	87.85	74.00	-13.85	Peak	
2 2483.50	27.58	6.71	35.11	33.70	32.88	74.00	41.12	Peak	
3 2492.88	27.58	6.73	35.24	36.26	35.33	74.00	38.67	Peak	

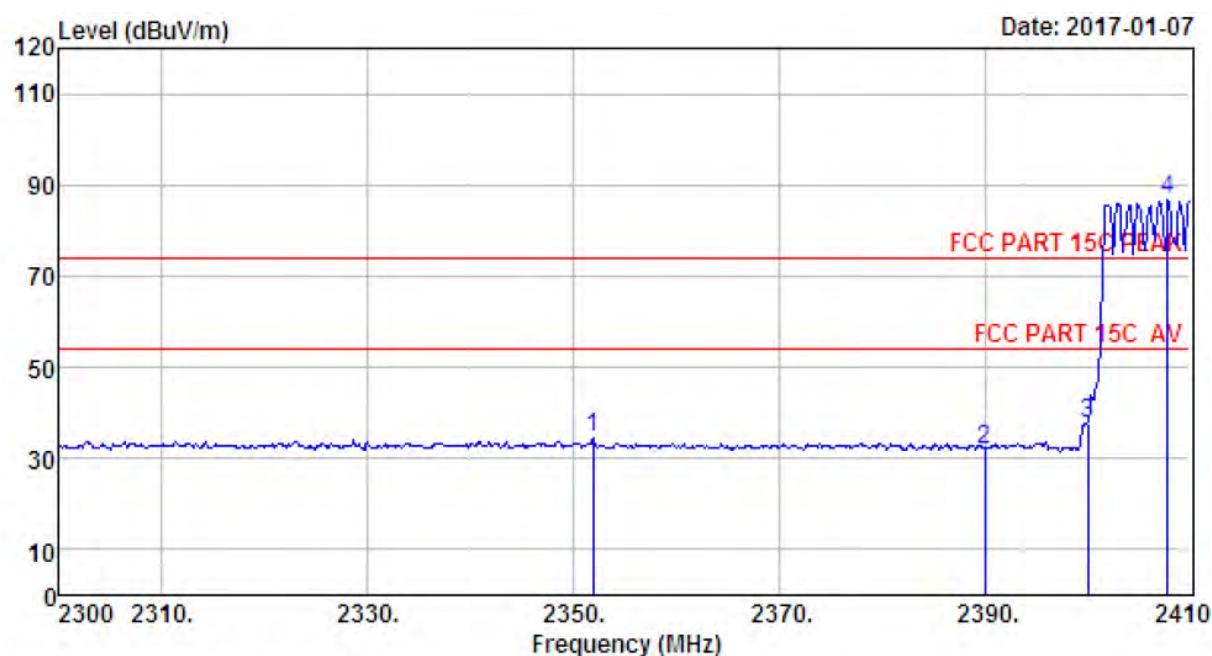
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 179  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2402MHz (Hopping On)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	2388.88	27.64	6.62	34.62	36.41	36.05	74.00	37.95	Peak
2	2390.00	27.64	6.62	34.62	35.26	34.90	74.00	39.10	Peak
3	2400.00	27.61	6.62	34.64	38.34	37.93	74.00	36.07	Peak
4	2408.90	27.60	6.64	34.64	88.01	87.61	74.00	-13.61	Peak

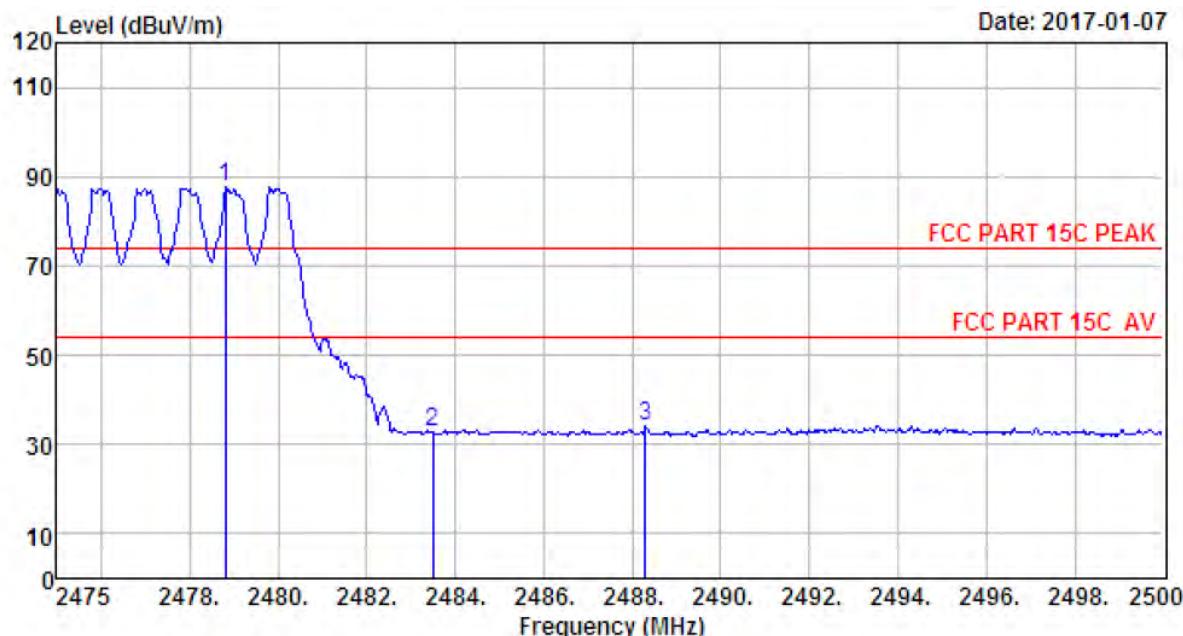
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 180  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2402MHz (Hopping On)

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission				Margin (dB)	Remark
				Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)			
1 2351.92	27.70	6.58	34.57	34.83	34.54	74.00	39.46	Peak	
2 2390.00	27.64	6.62	34.62	32.38	32.02	74.00	41.98	Peak	
3 2400.00	27.61	6.62	34.64	38.21	37.80	74.00	36.20	Peak	
4 2407.80	27.61	6.64	34.64	87.02	86.63	74.00	-12.63	Peak	

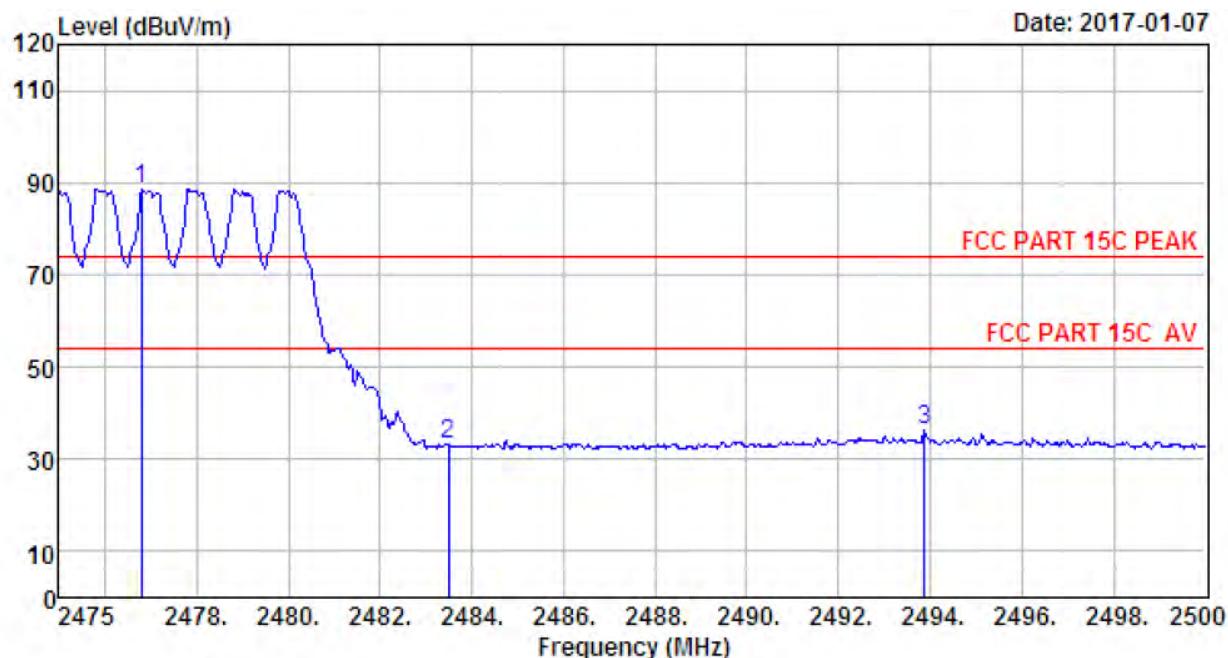
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 181  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2480MHz (Hopping On)

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission				Margin (dB)	Remark
				Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)			
1 2478.80	27.58	6.71	35.11	88.51	87.69	74.00	-13.69	Peak	
2 2483.50	27.58	6.71	35.11	33.41	32.59	74.00	41.41	Peak	
3 2488.30	27.58	6.73	35.11	34.69	33.89	74.00	40.11	Peak	

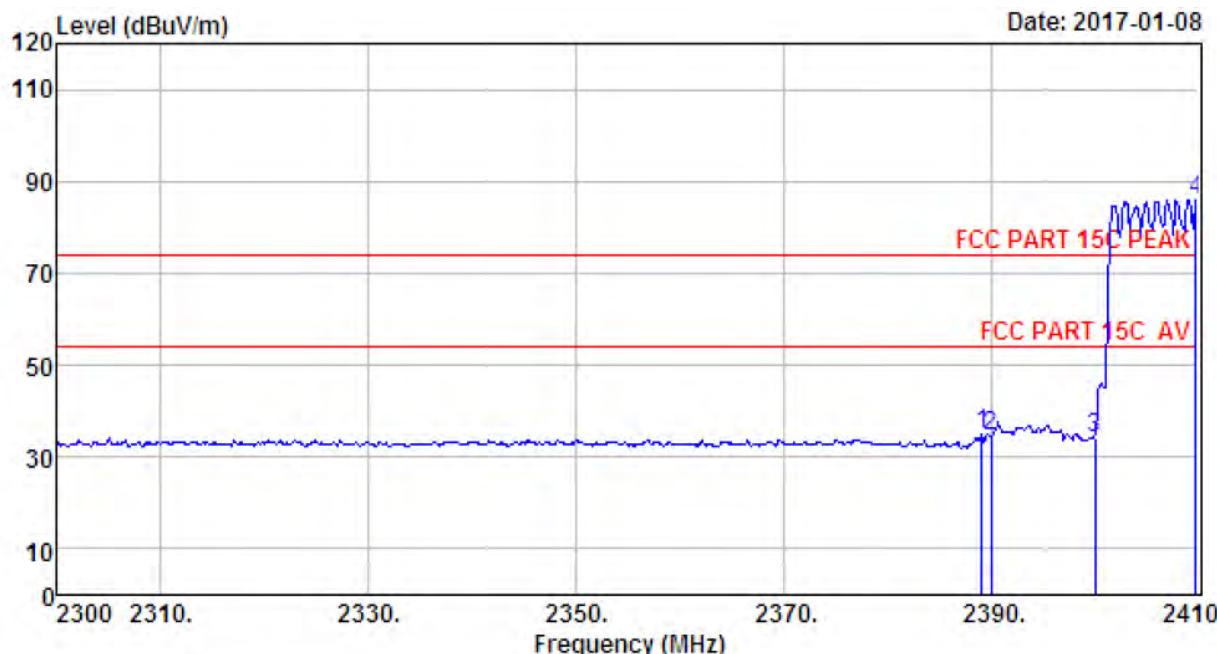
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 182  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : GFSK TX 2480MHz (Hopping On)

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission			
					Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1 2476.80	27.58	6.71	35.11	89.50	88.68	74.00	-14.68	Peak
2 2483.50	27.58	6.71	35.11	33.95	33.13	74.00	40.87	Peak
3 2493.88	27.58	6.73	35.24	37.05	36.12	74.00	37.88	Peak

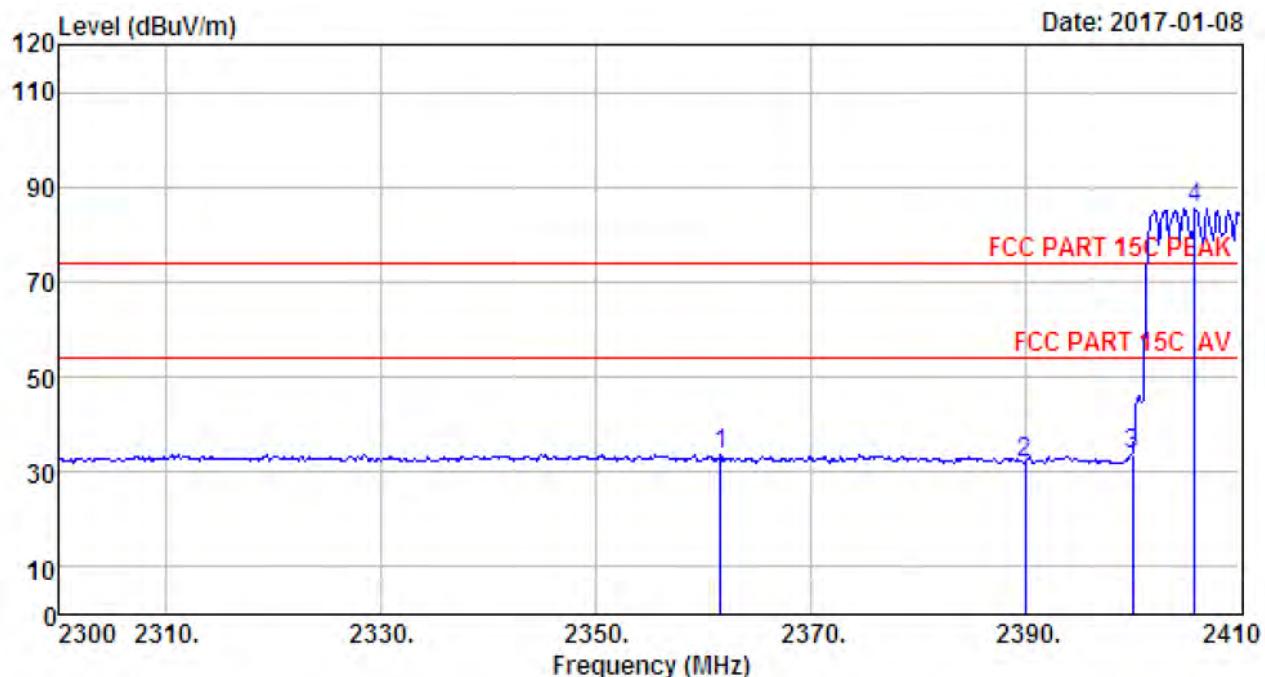
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 183  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2402MHz (Hopping On)

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission			
					Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1 2389.10	27.64	6.62	34.62	35.32	34.96	74.00	39.04	Peak
2 2390.00	27.64	6.62	34.62	34.93	34.57	74.00	39.43	Peak
3 2400.00	27.61	6.62	34.64	34.61	34.20	74.00	39.80	Peak
4 2409.78	27.60	6.64	34.64	86.47	86.07	74.00	-12.07	Peak

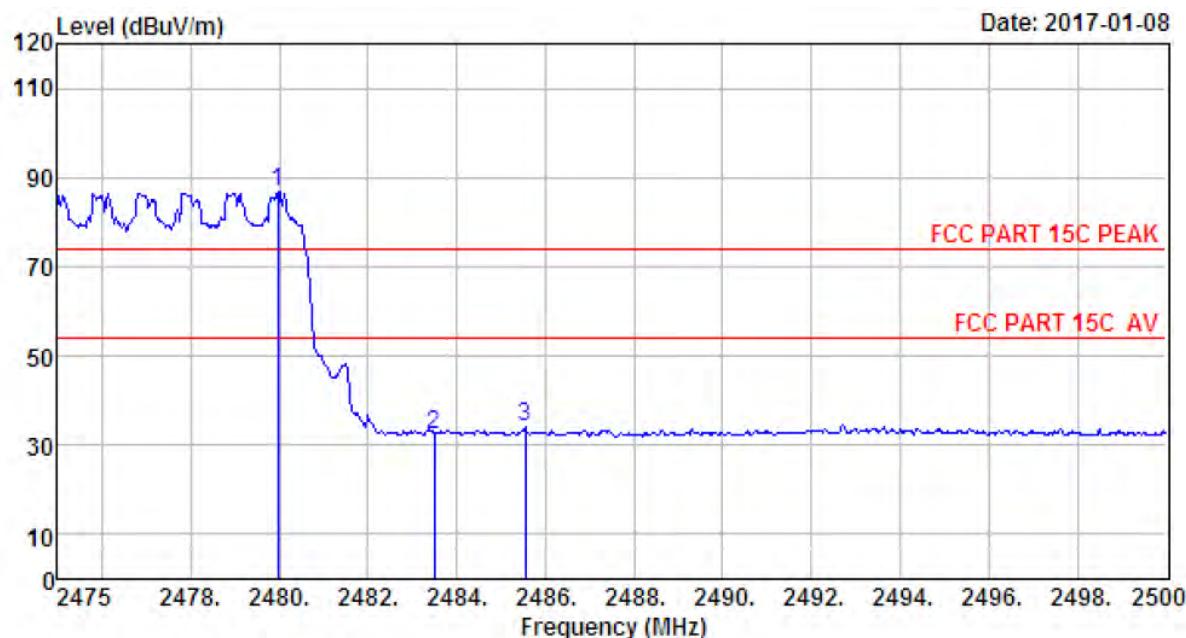
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 184  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2402MHz (Hopping On)

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission				Margin (dB)	Remark
				Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)			
1 2361.60	27.67	6.58	34.57	34.19	33.87	74.00	40.13	Peak	
2 2390.00	27.64	6.62	34.62	32.24	31.88	74.00	42.12	Peak	
3 2400.00	27.61	6.62	34.64	34.20	33.79	74.00	40.21	Peak	
4 2405.82	27.61	6.64	34.64	85.78	85.39	74.00	-11.39	Peak	

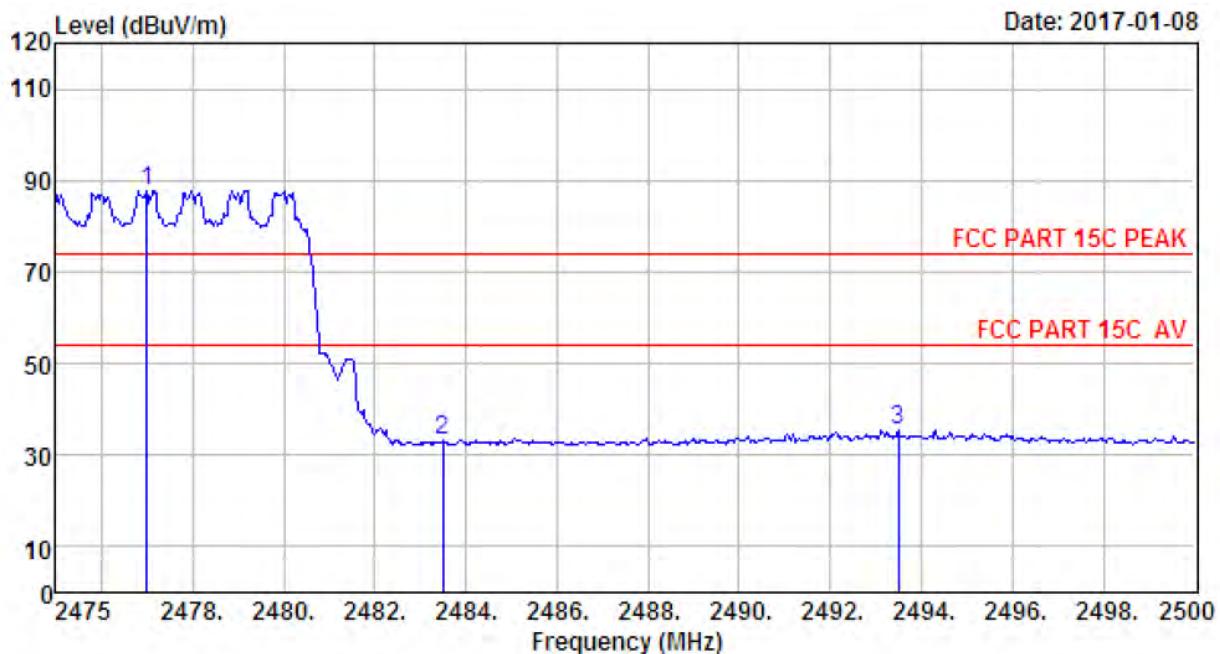
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 185  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2480MHz (Hopping On)

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission			
					Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1 2479.98	27.58	6.71	35.11	87.48	86.66	74.00	-12.66	Peak
2 2483.50	27.58	6.71	35.11	33.30	32.48	74.00	41.52	Peak
3 2485.55	27.58	6.71	35.11	34.83	34.01	74.00	39.99	Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 1# 966 Chamber Data no. : 186  
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL  
 Limit : FCC PART 15C PEAK  
 Env. / Ins. : Temp:23.6';Humi:56%;Press:101.52kPa  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : 8-DPSK TX 2480MHz (Hopping On)

		Ant.	Cable	Amp	Emission			
Freq.	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2477.00	27.58	6.71	35.11	88.47	87.65	74.00	-13.65 Peak
2	2483.50	27.58	6.71	35.11	33.83	33.01	74.00	40.99 Peak
3	2493.50	27.58	6.73	35.24	36.25	35.32	74.00	38.68 Peak

Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.

## 10. POWER LINE CONDUCTED EMISSIONS

### 10.1. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. \* Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

### 10.2. Test Procedure

The EUT was placed on a non-metallic table, 80cm above the ground plane. The EUT power mains through a line impedance stabilization network (L.I.S.N. 1#). 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 ANSI C63.10: 2013 on Conducted Emission Test.

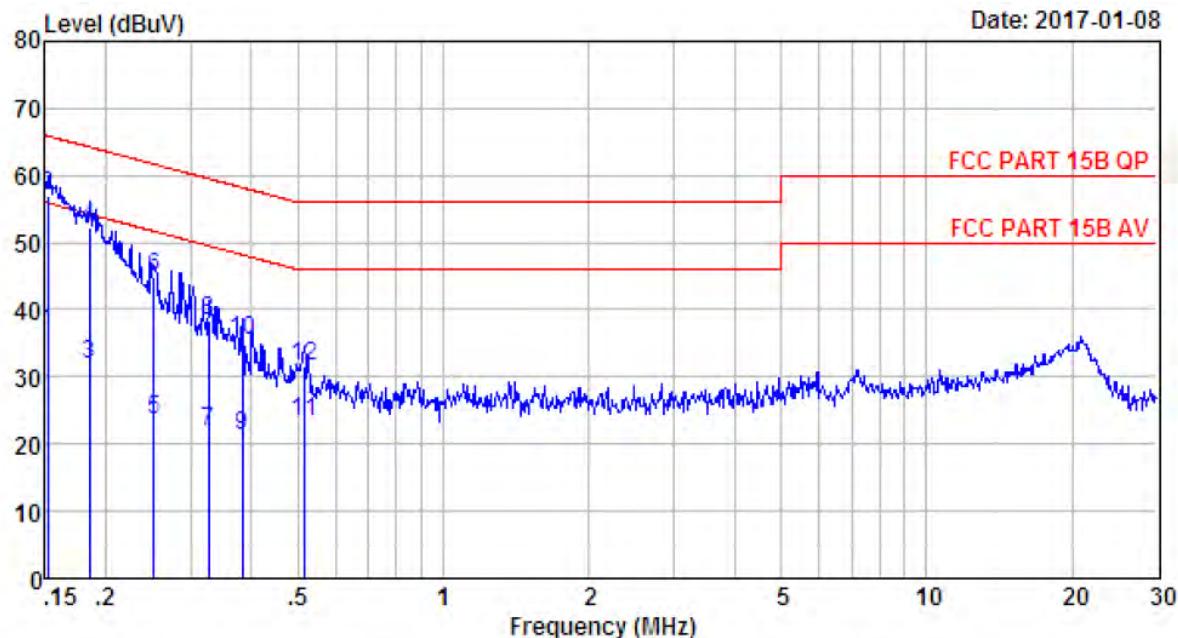
The bandwidth of test receiver (R & S ESHS30) is set at 10kHz.

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

### 10.3. Test Result

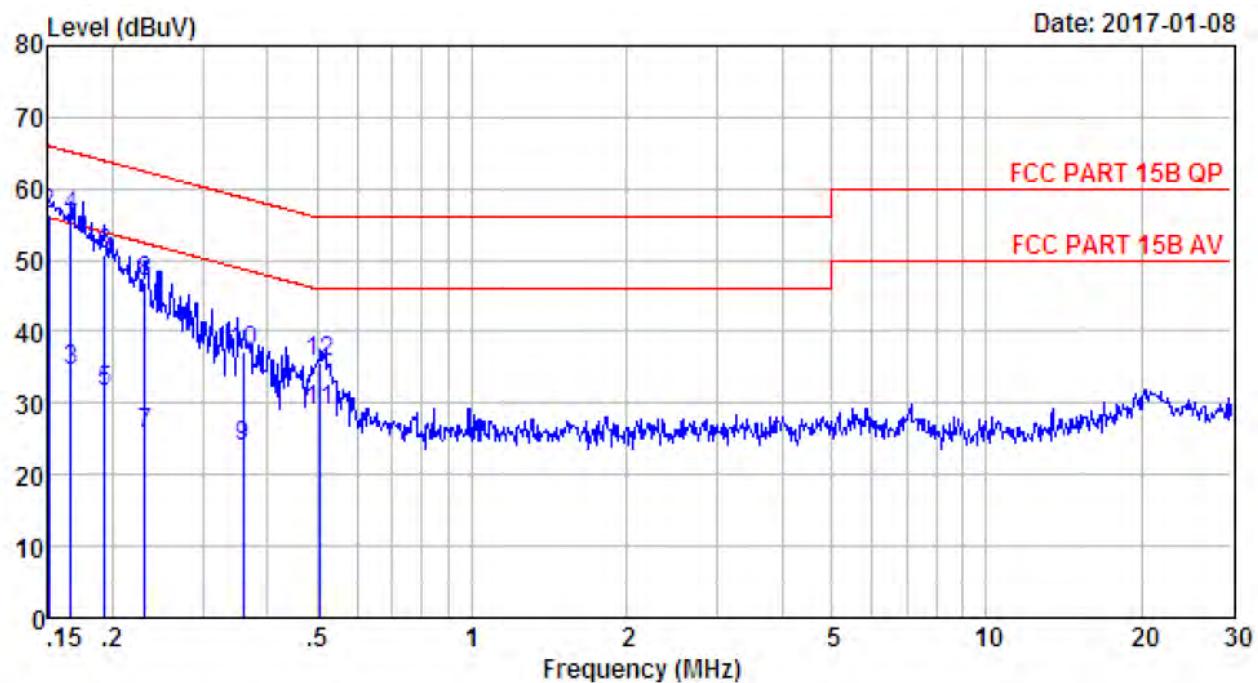
**PASS.** (All emissions not reported below are too low against the prescribed limits.)

## 10.4. Test data



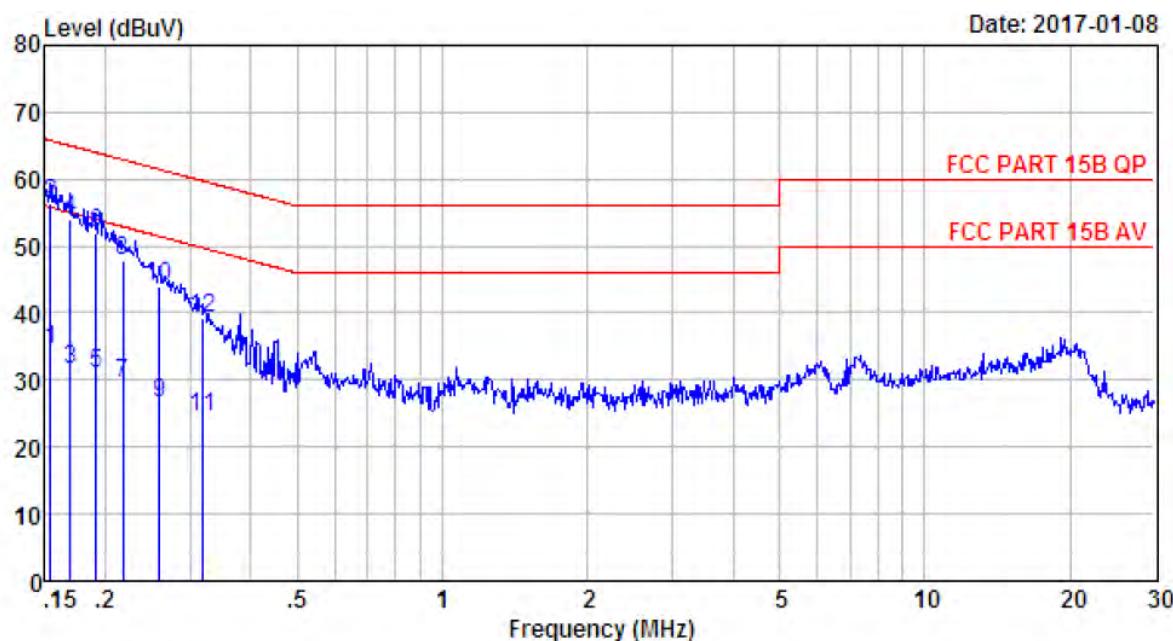
Site no : 844 Shield Room Data no. : 167  
 Env. / Ins. : Temp:24.3'C Humi:58% Press:101.50kPa LINE Phase : LINE  
 Limit : FCC PART 15B QP  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : TX Mode

	LISN	Cable	Emission				
Freq.	Factor	Loss	Reading	Level	Limits	Margin	Remark
(MHz)	(dB)	(dB)	(dBuV)	(dBuV)	(dBuV)	(dB)	
1	0.15	9.61	9.81	17.13	36.55	55.91	Average
2	0.15	9.61	9.81	37.65	57.07	65.91	QP
3	0.19	9.61	9.80	12.57	31.98	54.24	Average
4	0.19	9.61	9.80	32.81	52.22	64.24	QP
5	0.25	9.61	9.82	4.25	23.68	51.69	28.01
6	0.25	9.61	9.82	25.34	44.77	61.69	16.92
7	0.33	9.61	9.83	2.36	21.80	49.53	Average
8	0.33	9.61	9.83	18.81	38.25	59.53	QP
9	0.38	9.61	9.82	1.80	21.23	48.21	26.98
10	0.38	9.61	9.82	16.14	35.57	58.21	QP
11	0.52	9.61	9.81	3.79	23.21	46.00	Average
12	0.52	9.61	9.81	12.11	31.53	56.00	QP



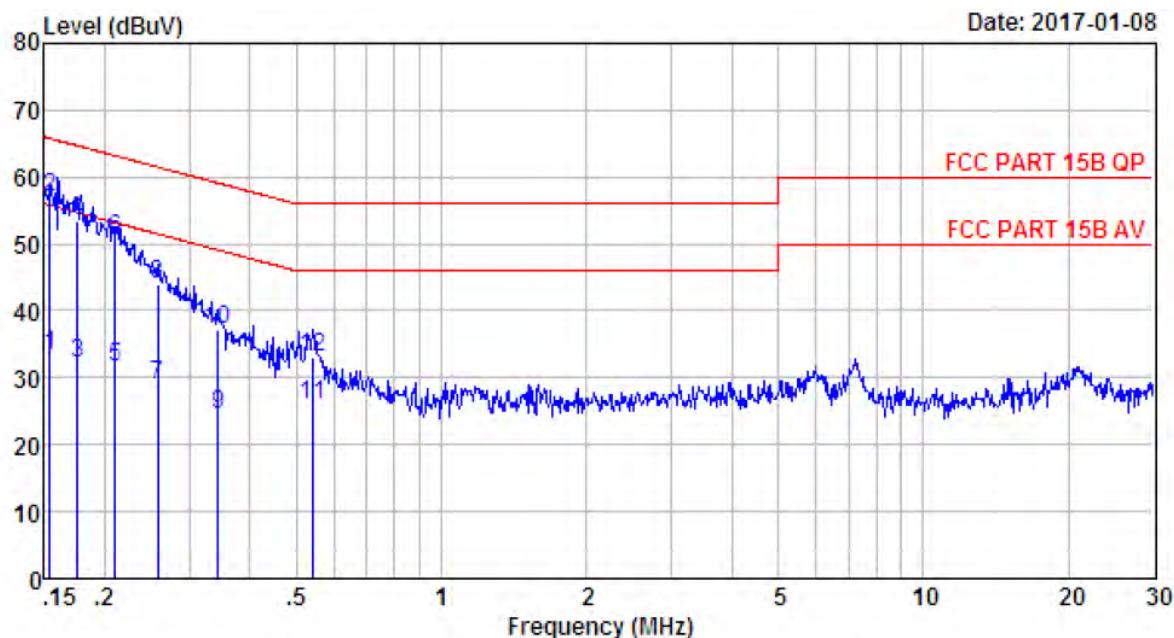
Site no : 844 Shield Room Data no. : 169  
 Env. / Ins. : Temp:24.3'C Humi:58% Press:101.50kPa LINE Phase : NEUTRAL  
 Limit : FCC PART 15B QP  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 120V/60Hz  
 M/N : SINGING STAR  
 Test Mode : TX Mode

	Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Emission Reading (dBuV)	Emission Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15	9.46	9.81	17.13	36.40	56.00	19.60	Average
2	0.15	9.46	9.81	37.26	56.53	66.00	9.47	QP
3	0.17	9.51	9.81	15.33	34.65	55.16	20.51	Average
4	0.17	9.51	9.81	36.80	56.12	65.16	9.04	QP
5	0.19	9.58	9.80	12.18	31.56	53.89	22.33	Average
6	0.19	9.58	9.80	31.40	50.78	63.89	13.11	QP
7	0.23	9.60	9.80	6.16	25.56	52.39	26.83	Average
8	0.23	9.60	9.80	27.42	46.82	62.39	15.57	QP
9	0.36	9.59	9.82	4.45	23.86	48.74	24.88	Average
10	0.36	9.59	9.82	17.64	37.05	58.74	21.69	QP
11	0.51	9.59	9.81	9.42	28.82	46.00	17.18	Average
12	0.51	9.59	9.81	16.22	35.62	56.00	20.38	QP



Site no : 844 Shield Room Data no. : 171  
 Env. / Ins. : Temp:24.3'C Humi:58% Press:101.50kPa LINE Phase : LINE  
 Limit : FCC PART 15B QP  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 240V/60Hz  
 M/N : SINGING STAR  
 Test Mode : TX Mode

Freq. (MHz)	LISN Factor (dB)	Cable Loss (dB)	Reading (dBuV)	Emission			
				Level (dBuV)	Limits (dBuV)	Margin (dB)	Remark
1	0.15	9.61	9.81	15.13	34.55	55.78	Average
2	0.15	9.61	9.81	37.05	56.47	65.78	QP
3	0.17	9.61	9.81	12.13	31.55	54.99	Average
4	0.17	9.61	9.81	34.47	53.89	64.99	QP
5	0.19	9.61	9.80	11.57	30.98	53.98	Average
6	0.19	9.61	9.80	32.41	51.82	63.98	QP
7	0.22	9.61	9.80	10.10	29.51	52.92	Average
8	0.22	9.61	9.80	28.51	47.92	62.92	QP
9	0.26	9.61	9.82	7.25	26.68	51.47	Average
10	0.26	9.61	9.82	24.62	44.05	61.47	QP
11	0.32	9.61	9.83	4.93	24.37	49.80	Average
12	0.32	9.61	9.83	19.77	39.21	59.80	QP



Site no : 844 Shield Room Data no. : 173  
 Env. / Ins. : Temp:24.3'C Humi:58% Press:101.50kPa LINE Phase : NEUTRAL  
 Limit : FCC PART 15B QP  
 Engineer : Tony  
 EUT : Karaoke Amplified speaker with effects  
 Power : AC 240V/60Hz  
 M/N : SINGING STAR  
 Test Mode : TX Mode

Freq. (MHz)	LISN Factor (dB)	Cable		Emission			Margin (dB)	Remark
		Loss (dB)	Reading (dBuV)	Level (dBuV)	Limits (dBuV)			
1	0.15	9.47	9.81	13.93	33.21	55.78	22.57	Average
2	0.15	9.47	9.81	37.57	56.85	65.78	8.93	QP
3	0.18	9.54	9.80	12.97	32.31	54.68	22.37	Average
4	0.18	9.54	9.80	34.08	53.42	64.68	11.26	QP
5	0.21	9.60	9.80	12.06	31.46	53.18	21.72	Average
6	0.21	9.60	9.80	31.29	50.69	63.18	12.49	QP
7	0.26	9.60	9.82	9.52	28.94	51.51	22.57	Average
8	0.26	9.60	9.82	24.61	44.03	61.51	17.48	QP
9	0.34	9.59	9.83	4.96	24.38	49.09	24.71	Average
10	0.34	9.59	9.83	17.63	37.05	59.09	22.04	QP
11	0.54	9.60	9.82	6.54	25.96	46.00	20.04	Average
12	0.54	9.60	9.82	13.66	33.08	56.00	22.92	QP

## 11. ANTENNA REQUIREMENTS

### 11.1. Limit

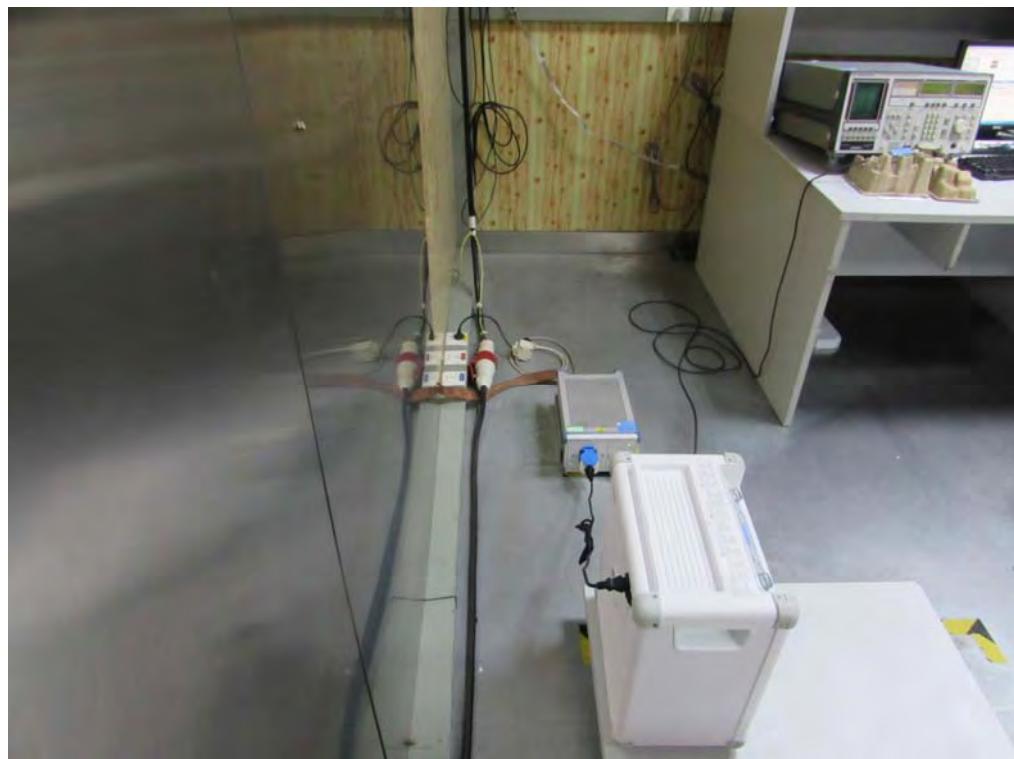
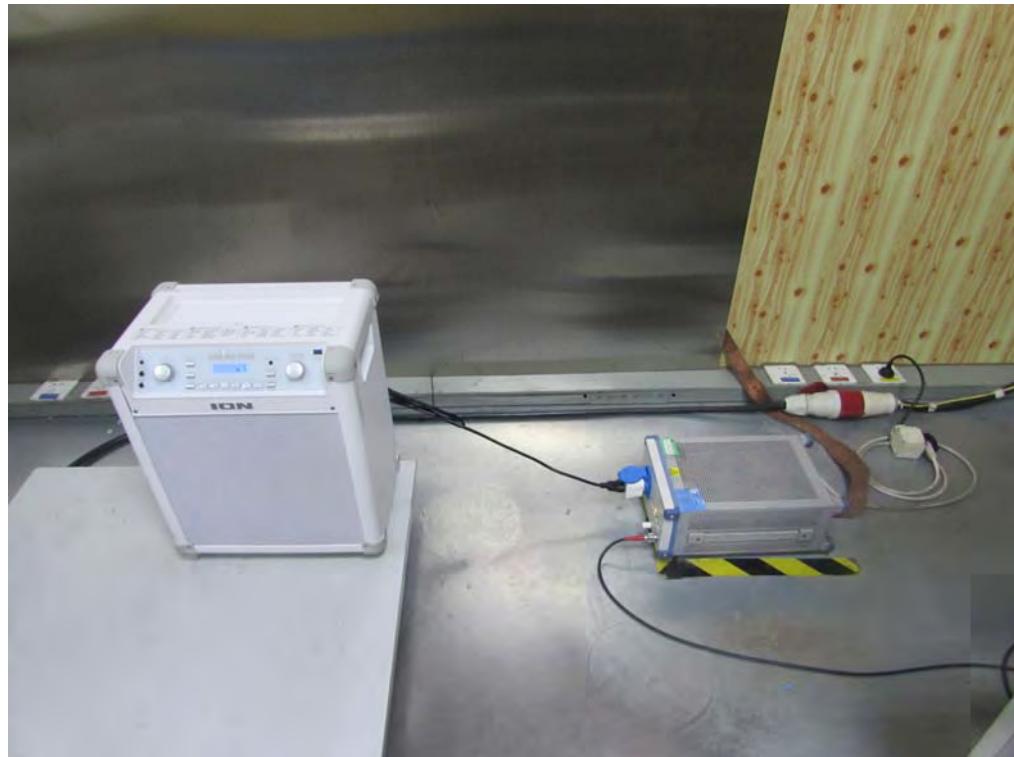
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

### 11.2. Result

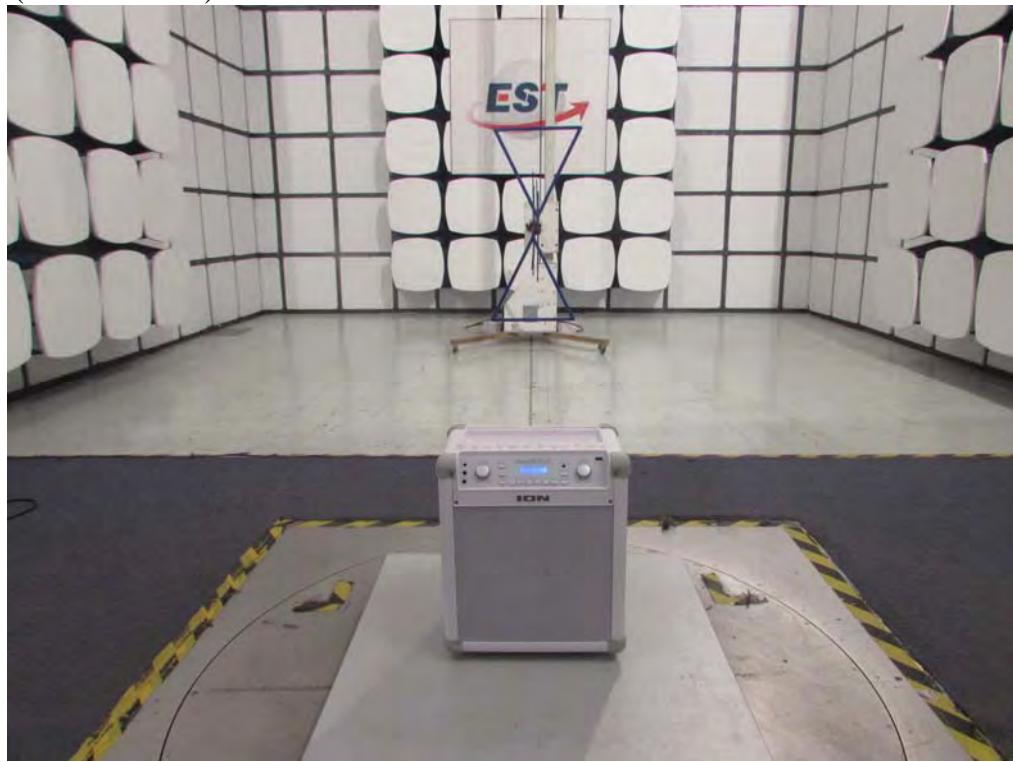
The antennas used for this product are Dipole antenna with the ipex connector and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 2.0dBi.

## 12. TEST SETUP PHOTO

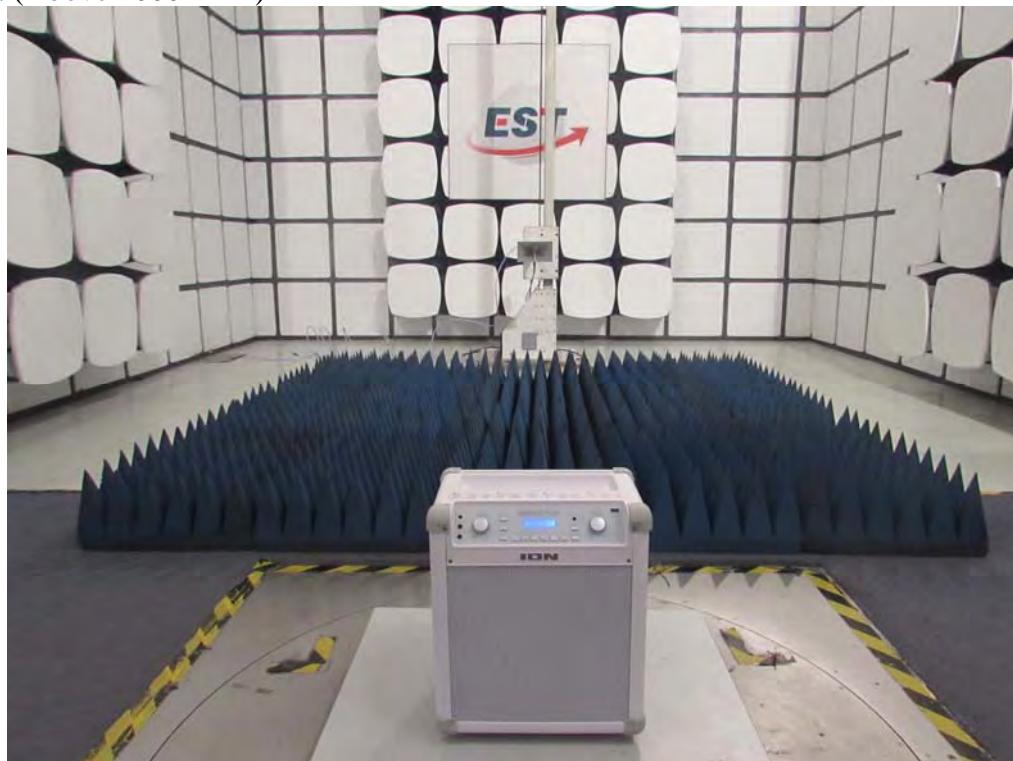
Conducted Test



Radiated Test (30-1000 MHz)

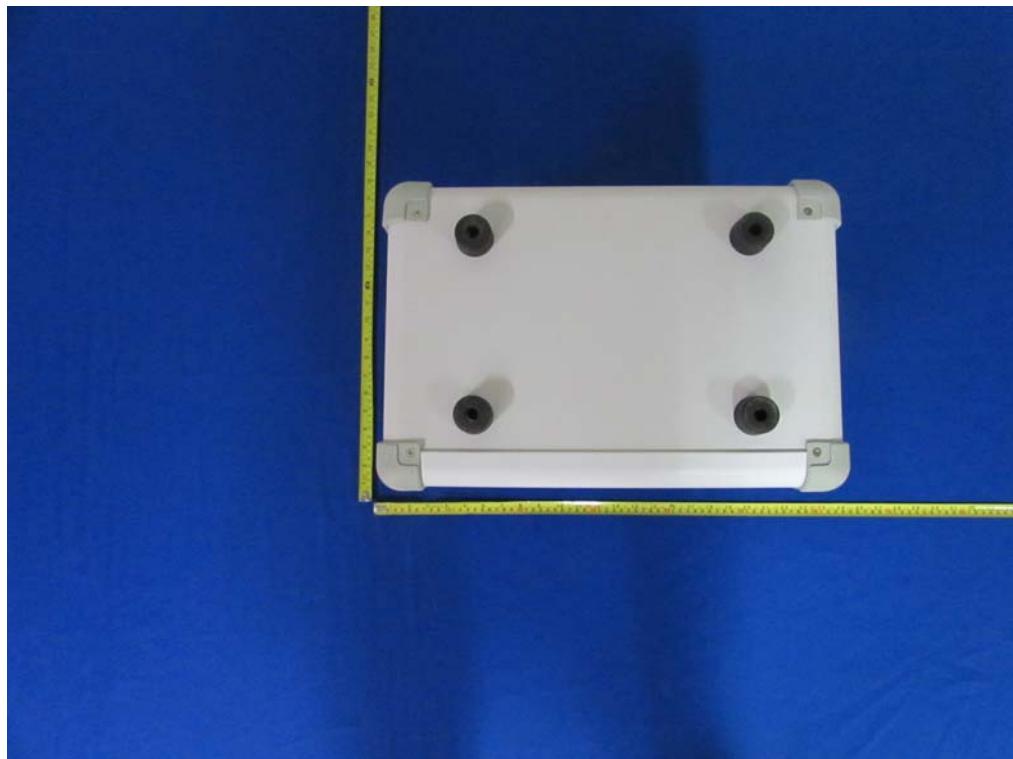


Radiated Test (Above 1000 MHz)



## 13.PHOTO EUT

**External Photos**  
M/N: SINGING STAR



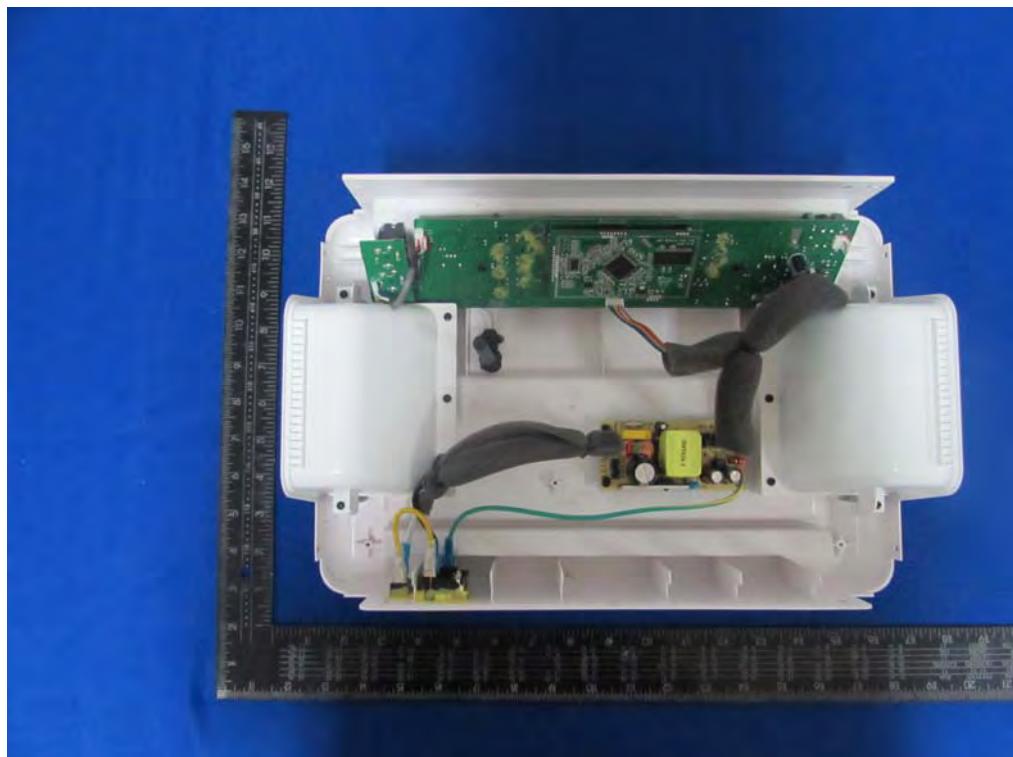
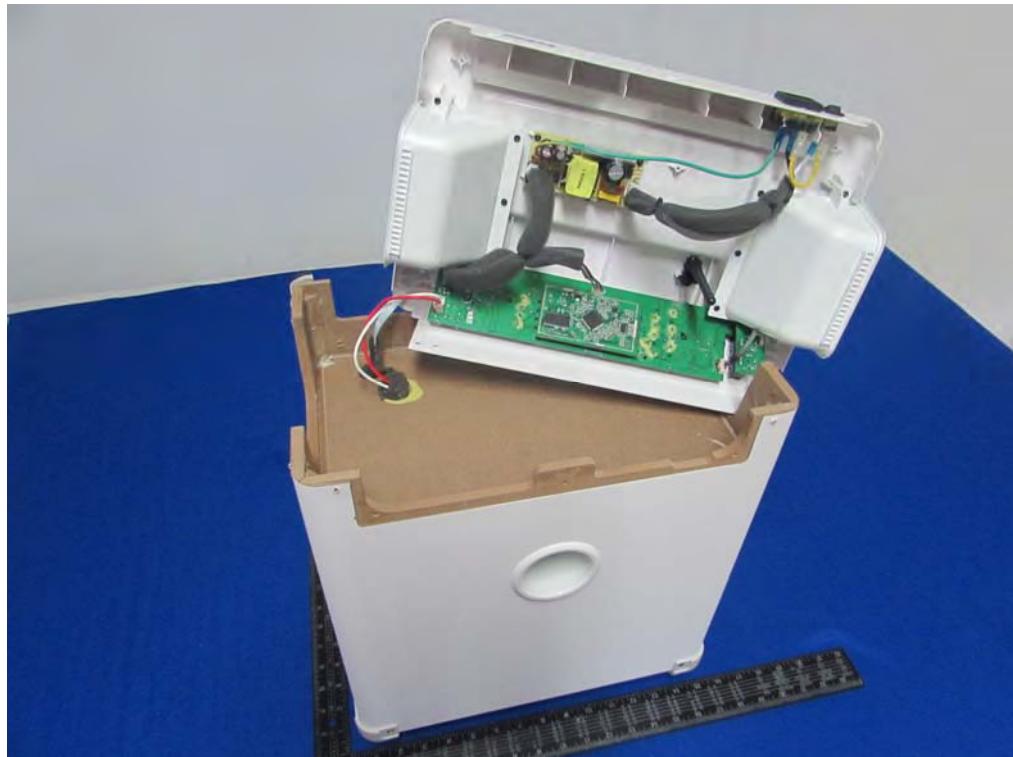
**External Photos**  
M/N: SINGING STAR



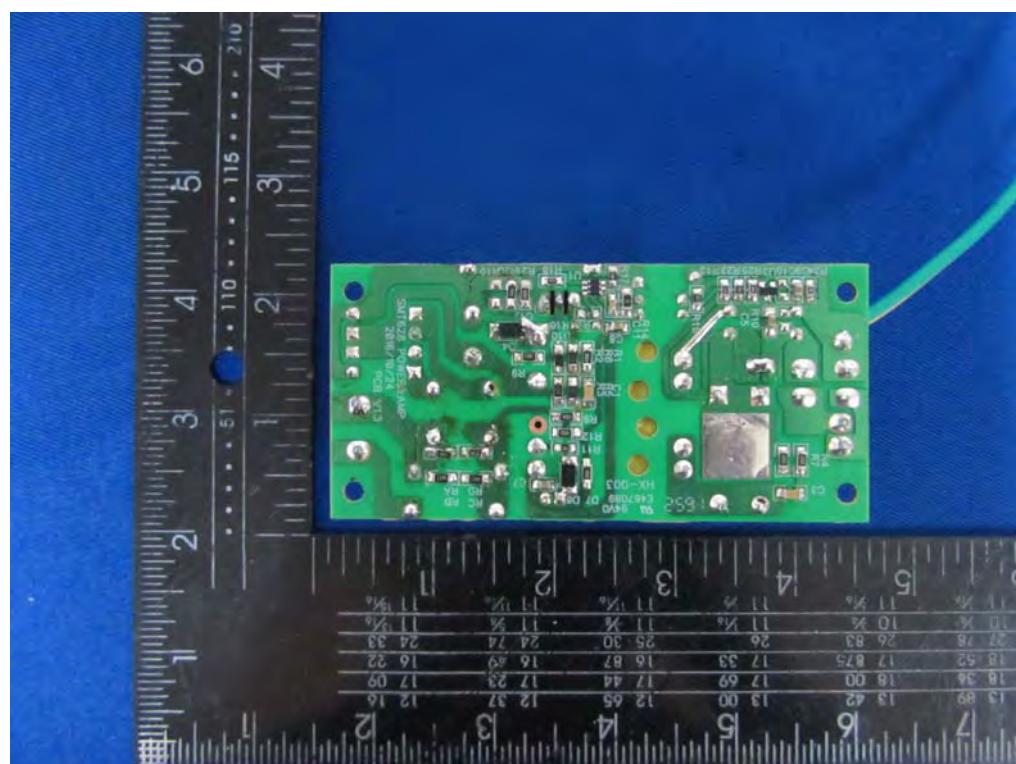
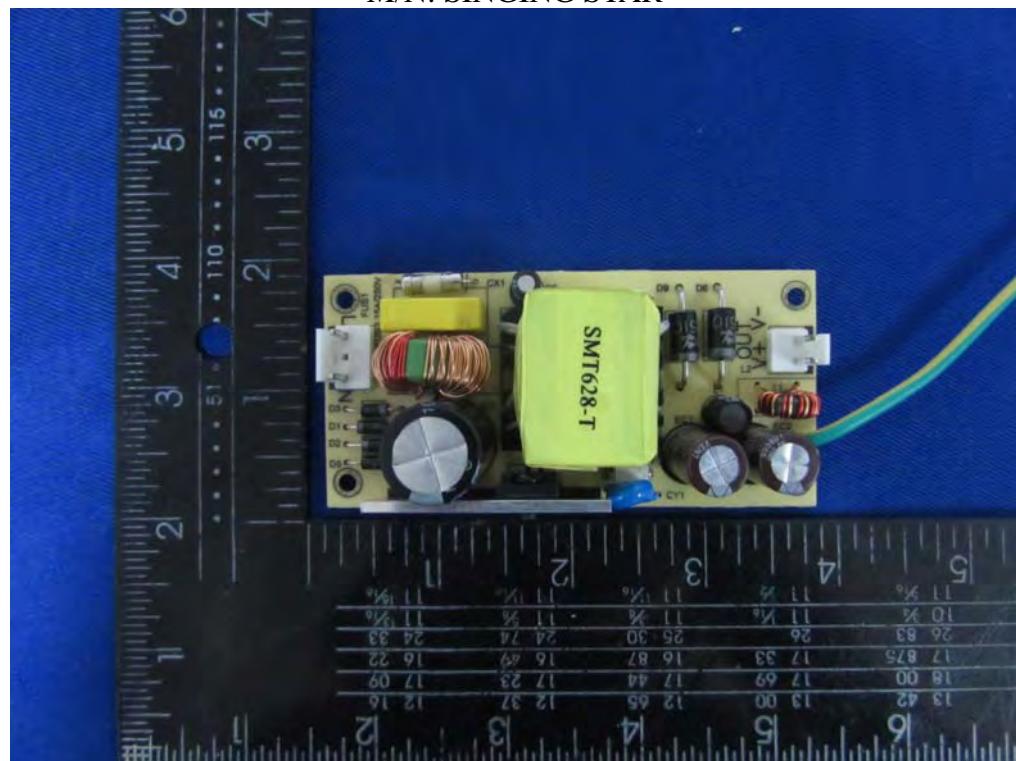
**External Photos**  
**M/N: SINGING STAR**



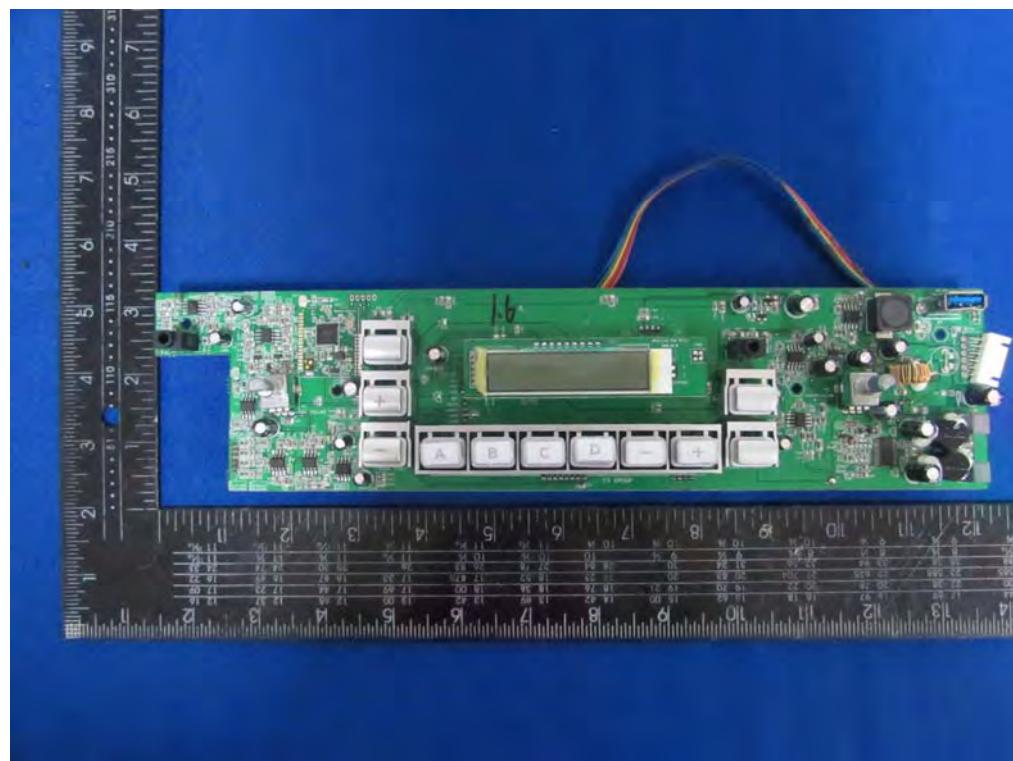
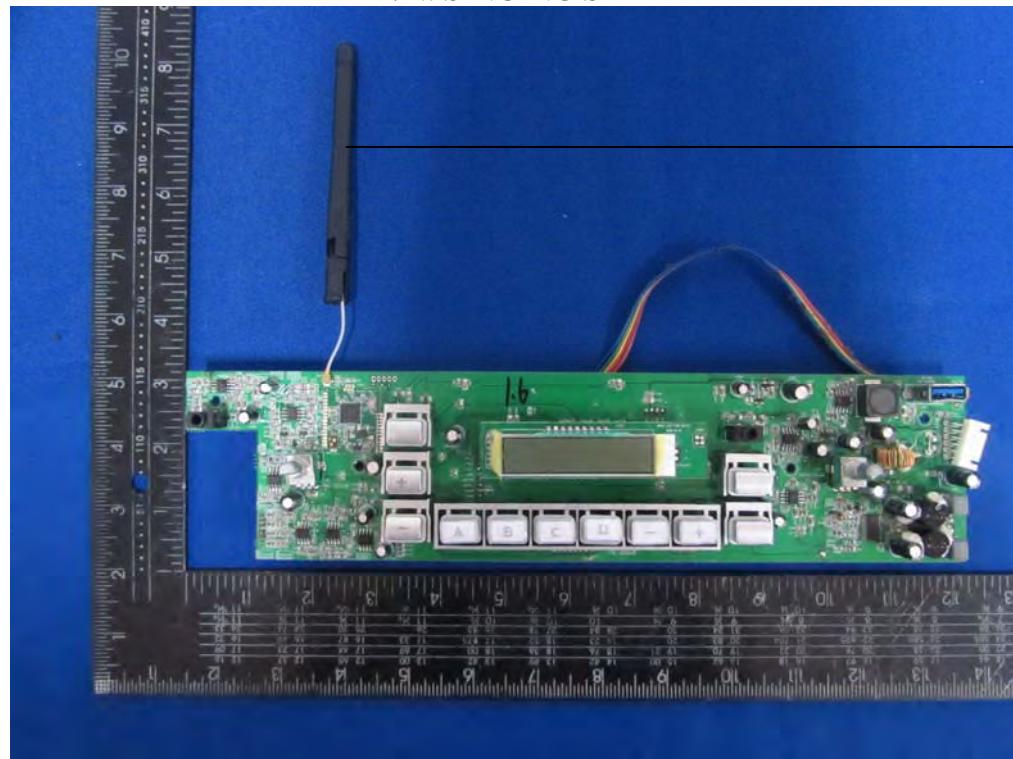
**Internal Photos**  
M/N: SINGING STAR



**Internal Photos**  
M/N: SINGING STAR

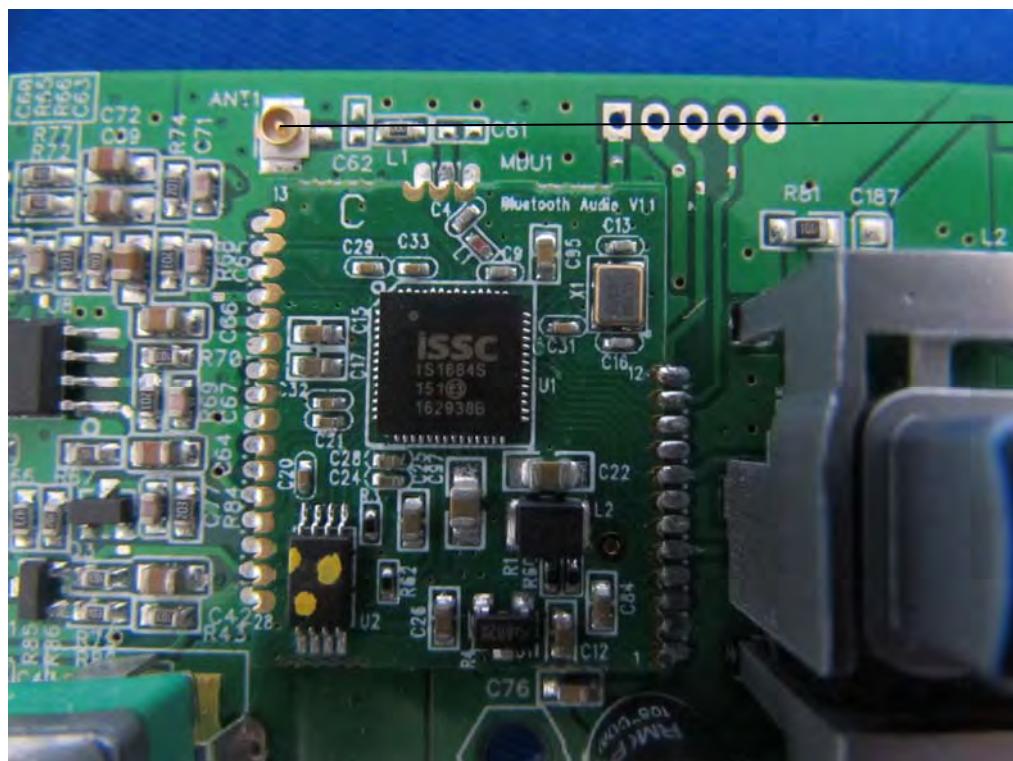
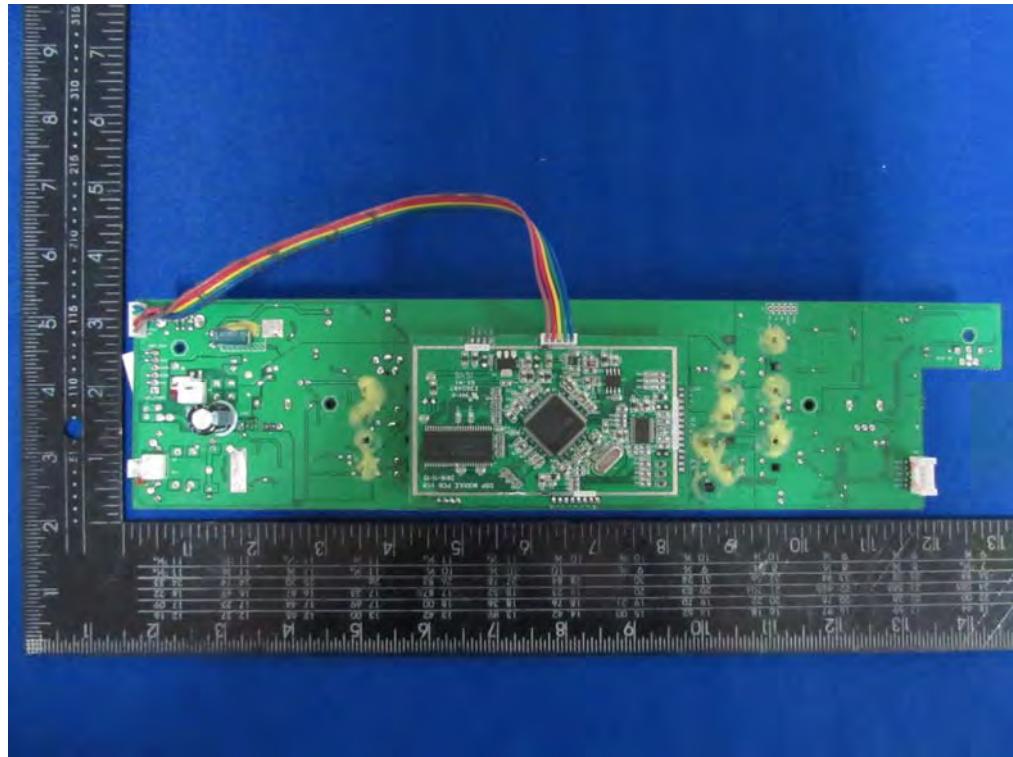


**Internal Photos**  
M/N: SINGING STAR



## **Internal Photos**

**M/N: SINGING STAR**



ipex  
connector