

FCC PART 15C TEST REPORT FOR CERTIFICATION
On Behalf of

Dong guan Synst Electronics.Co.,Ltd

Bluetooth speaker

Model Number: NYNE Cruiser

FCC ID: SV9-NYNECRUISE

Prepared for : Dong guan Synst Electronics.Co.,Ltd
The Science&Technology Industrial Park Houjie Town,
Dongguan,Guangdong. china

Prepared By : EST Technology Co., Ltd.
Santun(guantai Road), Houjie Town, DongGuan City,
GuangDong, China.

Tel: 86-769-83081888-808

Report Number: ESTE-R1310011
Date of Test : September 09, 2013~ November 05, 2013
Date of Report : November 05, 2013

TABLE OF CONTENTS

Description	Page
TEST REPORT VERIFICATION.....	3
1. GENERAL INFORMATION.....	5
1.1. Description of Device (EUT)	5
2. SUMMARY OF TEST	6
2.1. Summary of test result.....	6
2.2. Test Facilities	7
2.3. Assistant equipment used for test	8
2.4. Block Diagram	8
2.5. Test mode	8
2.6. Channel List for Bluetooth.....	8
2.7. Test Equipment.....	9
3. RADIATED EMISSION TEST.....	10
3.1. Limit	10
3.2. Test Procedure	11
3.3. Block Diagram of Test setup	11
3.4. Test Result.....	11
3.5. Test Data	12
4. CONDUCTED SPURIOUS EMISSION.....	30
4.1. Limit	30
4.2. Test Procedure	30
4.3. Test Result.....	30
4.4. Test Data	31
5. BAND EDGE COMPLIANCE TEST	37
5.1. Limit	37
5.2. Test Procedure	37
5.3. Test Result.....	37
5.4. Test Data	38
6. 6dB Bandwidth Test.....	42
6.1. Limit	42
6.2. Test Procedure.....	42
6.3. Test Result.....	42
6.4. Test Data	43
7. OUTPUT POWER TEST	45
7.1. Limit	45
7.2. Test Procedure.....	45
7.3. Test Result.....	46
7.4. Test Data	47
8. POWER SPECTRAL DENSITY TEST	49
8.1. Limit	49
8.2. Test Procedure	49
8.3. Test Result.....	50
8.4. Test Data	51

9. ANTENNA REQUIREMENTS53

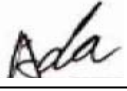
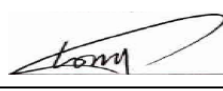
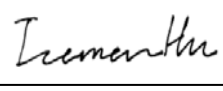
9.1. Limit53

9.2. Result.....53

10. TEST SETUP PHOTO.....54

11. PHOTOS OF EUT55

Test Report Verification

Applicant:	Dong guan Synst Electronics.Co.,Ltd		
Address:	The Science&Technology Industrial Park Houjie Town,Dongguan, Guangdong. china		
Manufacturer	Dong guan Synst Electronics.Co.,Ltd		
Address:	The Science&Technology Industrial Park Houjie Town,Dongguan, Guangdong. china		
E.U.T:	Bluetooth speaker		
Model Number:	NYNE Cruiser		
Additional Model:	NB350 Note: The products are difference in model number only.		
Power Supply:	DC 3.7V From Internal Battery		
Test Voltage:	DC 3.7V		
Trade Name:	NYNE	Serial No.:	-----
Date of Receipt:	Sep 09, 2013	Date of Test:	Sep 09,2013~Nov 05, 2013
Test Specification:	FCC Rules and Regulations Part 15 Subpart C:2012 ANSI C63.4:2009		
Test Result:	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 ETSI EN FCC Rules and Regulations Part 15 Subpart C requirements. This report applies to above tested sample only and shall not be reproduced in part without written approval of EST Technology Co., Ltd. Date: November 05, 2013		
Prepared by:	Tested by:	Approved by:	
			
Ada / Assistant	Tony.Tang/ Engineer	IcemanHu / Manager	
Other Aspects:	None.		
Abbreviations: OK/P=passed fail/F=failed n.a/N=not applicable E.U.T=equipment under tested			
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.			

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Product Name	: Bluetooth speaker
Model Number	: NYNE Cruiser
FCC ID	: SV9-NYNECRUISE
Operation frequency	: 2402MHz~2480MHz
Number of channel	: 40
Antenna	: Internal antenna, 0 dBi gain
Modulation	: Bluetooth V4.0 BLE: GFSK
Power Supply	: DC 3.7V From Internal Battery
Sample Type	: Prototype production

2. SUMMARY OF TEST

2.1. Summary of test result

Description of Test Item	Standard	Results
Power Line Conducted Emission	FCC Part 15: 15.207 ANSI C63.4:2009	PASS
Radiated Emission	FCC Part 15: 15.209 ANSI C63.4:2009 KDB 558074	PASS
Band Edge Compliance	FCC Part 15: 15.247 ANSI C63.4:2009 KDB 558074	PASS
Conducted spurious emissions	FCC Part 15: 15.247 ANSI C63.4:2009 KDB 558074	PASS
6dB Bandwidth	FCC Part 15: 15.247 ANSI C63.4:2009 KDB 558074	PASS
Peak Output Power	FCC Part 15: 15.247 ANSI C63.4:2009 KDB 558074	PASS
Power Spectral Density	FCC Part 15: 15.247 ANSI C63.4:2009 KDB 558074	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: October 28, 2011

 Certificated by FCC, USA
 Registration No.: 989591
 Date of registration: December 07, 2010

 Certificated by Industry Canada
 Registration No.: 46405-9405
 Date of registration: December 16, 2010

 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 Town, Dongguan,
 Guangdong, China

2.3. Assistant equipment used for test

2.3.1. N/A

2.4. Block Diagram

For radiated emissions test: EUT was placed on a turn table, which is 0.8 meter high above ground. EUT was set into BT test mode by Bluesuite software before test.



(EUT: NYNE Cruiser)

2.5. Test mode

A special test software was used to control EUT work in Continuous TX mode (100% duty cycle), and select test channel, wireless mode and data rate.

Mode	Channel	Frequency
BT 4.0-BLE GFSK	Low	2402MHz
	Middle	2440MHz
	High	2480MHz

2.6. Channel List for Bluetooth

Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
1	2402	2	2404
3	2406	4	2408
5	2410	6	2412
7	2414	8	2416
9	2418	10	2420
11	2422	12	2424
13	2426	14	2428
15	2430	16	2432
17	2434	18	2436
19	2438	20	2440
21	2442	22	2444
23	2446	24	2448
25	2450	26	2452
27	2454	28	2456
29	2458	30	2460
31	2462	32	2464
33	2466	34	2468
35	2470	36	2472
37	2474	38	2476
39	2478	40	2480

2.7. Test Equipment

2.7.1. For conducted emission test

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESHS30	832354	May,30,13	1 Year
Artificial Mains Networ	Rohde & Schwarz	ENV216	101260	May,30,13	1 Year
Pulse Limiter	Rohde & Schwarz	ESH3-Z2	101100	July,25,13	1 Year

2.7.2. For radiated emission test(30-1000MHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
EMI Test Receiver	Rohde & Schwarz	ESVS10	100004	May,30,13	1 Year
Spectrum Analyzer	Agilent	E4411B	MY50140697	May,30,13	1 Year
Bilog Antenna	Teseq	CBL 6111D	25872	Nov,08,12	1.5 Year
Signal Amplifier	Agilent	310N	187037	July,25,13	1 Year

2.7.3. For radiated emission test(above 1GHz)

Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
Temperature controller	Terchy	MHQ	120	May,08,13	1 Year
Spectrum Analyzer	Agilent	E4408B	MY44211139	May,08,13	1 Year
Vector Signal Generator	R&S	SMBV100A	1407.6004K02	May,08,13	1 Year
Double Ridged Horn Antenna	R&S	HF907	100276	Jan,16,13	2 Year
Double Ridged Horn Antenna	R&S	HF907	100268	Jan,16,13	2 Year
Log-periodic Dipole Antenna	R&S	HL223	100435	Jan,16,13	2 Year
Biconical Antenna	R&S	HK116	100431	Jan,16,13	2 Year
Trilog Broadband Antenna	Schwarzbeck	VULB 9163	9163-462	Jan,16,13	2 Year
Pre-amplifier	AH	PAM-0118	10008	May,08,13	1 Year
Pre-amplifier	R&S	SCU-01	10049	May,08,13	1 Year
High Pass filter	Micro	HPM50111	324455	May,08,13	1 Year
RF Cable	Hubersuhner	W10.02	534096	May,08,13	1 Year
RF Cable	Hubersuhner	W10.02	534123	May,08,13	1 Year
RF Cable	Hubersuhner	RG 214/U	513423	May,08,13	1 Year
RF Cable	Hubersuhner	RG 214/U	523455	May,08,13	1 Year

3. RADIATED EMISSION TEST

3.1. Limit

3.1.1. 15.209 limits

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Remark : (1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V/m}$

(2) The smaller limit shall apply at the cross point between two frequency bands.

(3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.1.2. 15.205 Restricted bands of operation

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 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	(²)

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.

3.2. Test Procedure

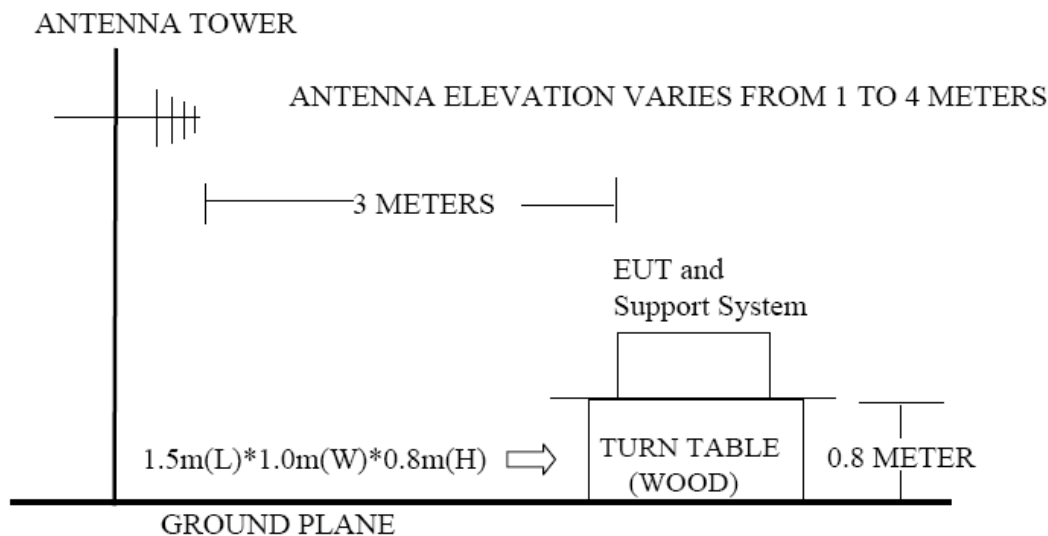
EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it working in test mode, then test it. EUT is set 3 meters away from the receiving antenna, 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. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the EMI test receiver is set at 120kHz for frequency range from 30MHz to 1000 MHz.

The bandwidth of the Spectrum's VBW is set at 3MHz and RBW is set at 1MHz for peak emissions measurement above 1GHz and 1MHz RBW, 10Hz VBW for average emissions measure above 1GHz

The frequency range from 30MHz to 10th harmonic (25GHz) are checked. and no any emissions were found from 18GHz to 25 GHz, So the radiated emissions from 18GHz to 25GHz were not record.

3.3. Block Diagram of Test setup



3.4. Test Result

PASS.

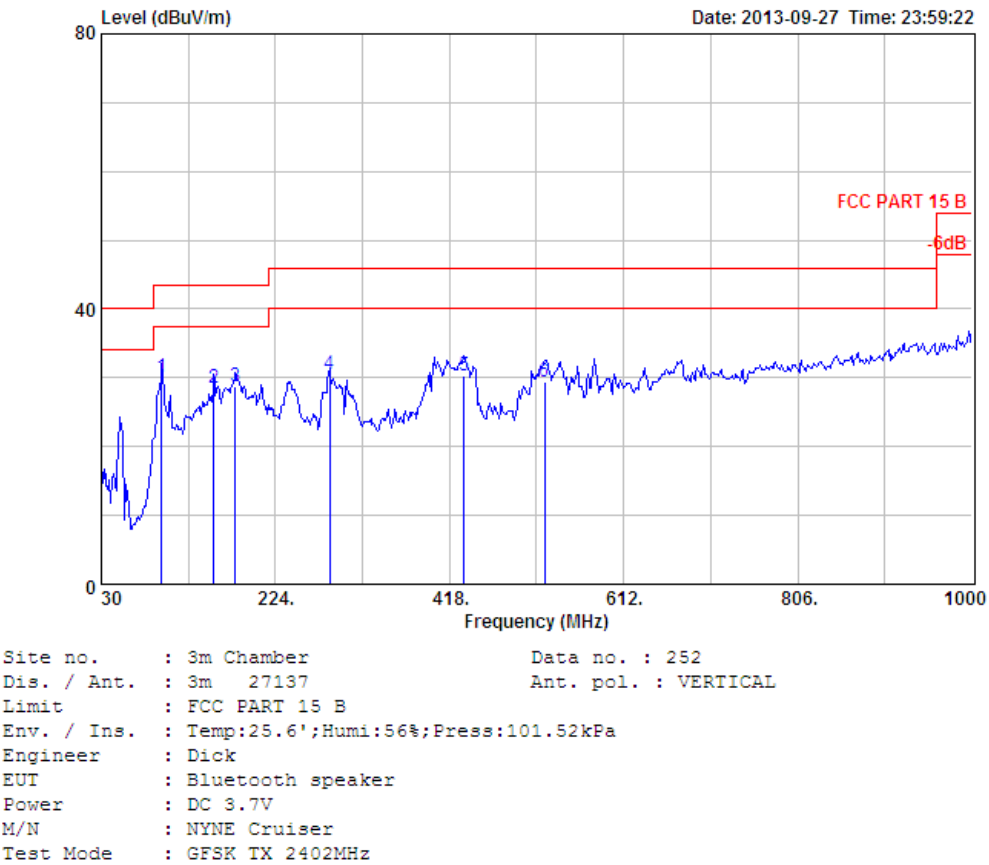
All the emissions from 30MHz to 25 GHz were comply with 15.209 limits.

Note: 1、 For emissions above 1GHz, if peak level comply with average limit, then the average level is deemed to comply with average limit.

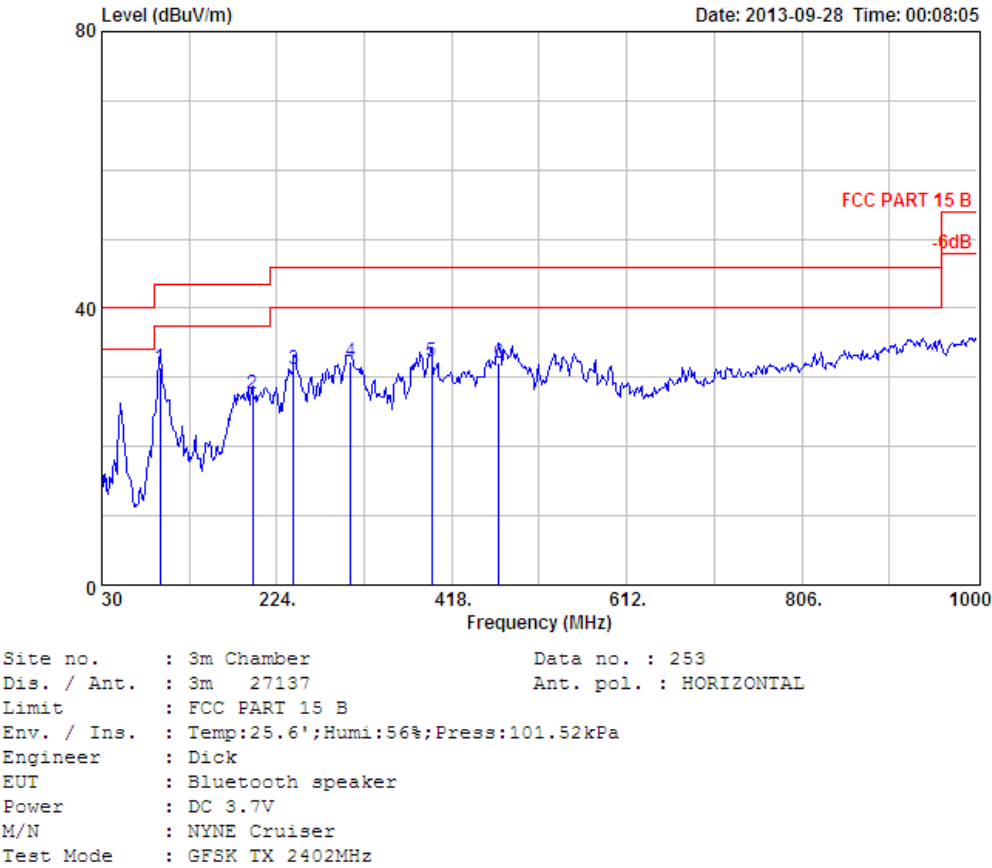
2、 The frequency 2402MHz 、 2440MHz and 2480 MHz is fundamental frequency which no limit, the limit on plots is automatically generated by the software, it's not fundamental limit, we can't remove it.

3.5. Test Data

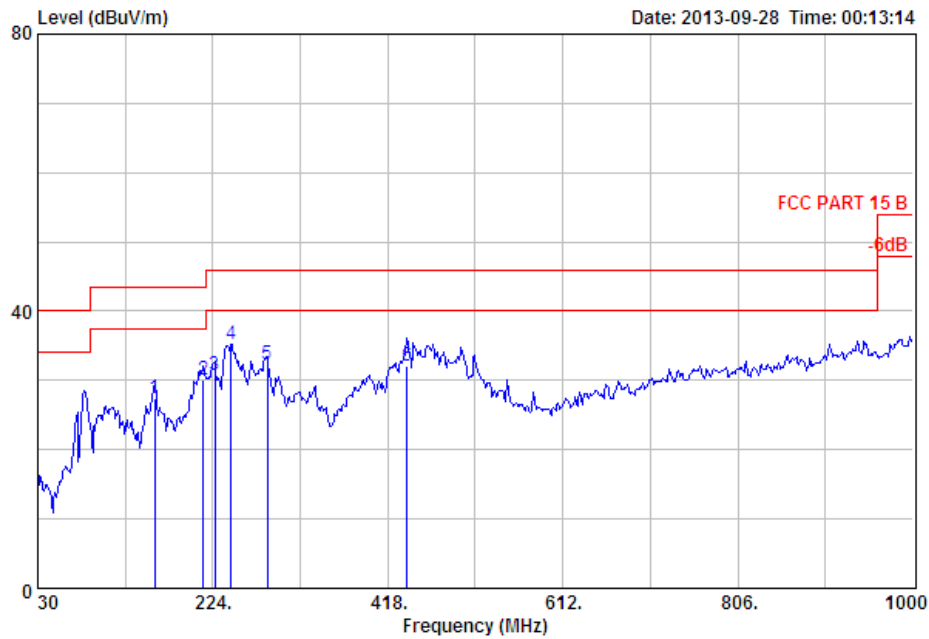
30-1000 MHz



		Ant.		Cable	Emission			
Freq.	Factor	Loss	Reading	Level	Limits	Margin	Reamark	
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	
1	96.93	8.92	3.03	18.06	30.01	43.50	13.49	QP
2	155.13	10.67	3.82	14.10	28.59	43.50	14.91	QP
3	179.38	8.96	4.11	15.78	28.85	43.50	14.65	QP
4	284.14	12.52	5.12	12.82	30.46	46.00	15.54	QP
5	434.49	16.15	6.27	7.81	30.23	46.00	15.77	QP
6	523.73	18.07	6.90	4.55	29.52	46.00	16.48	QP

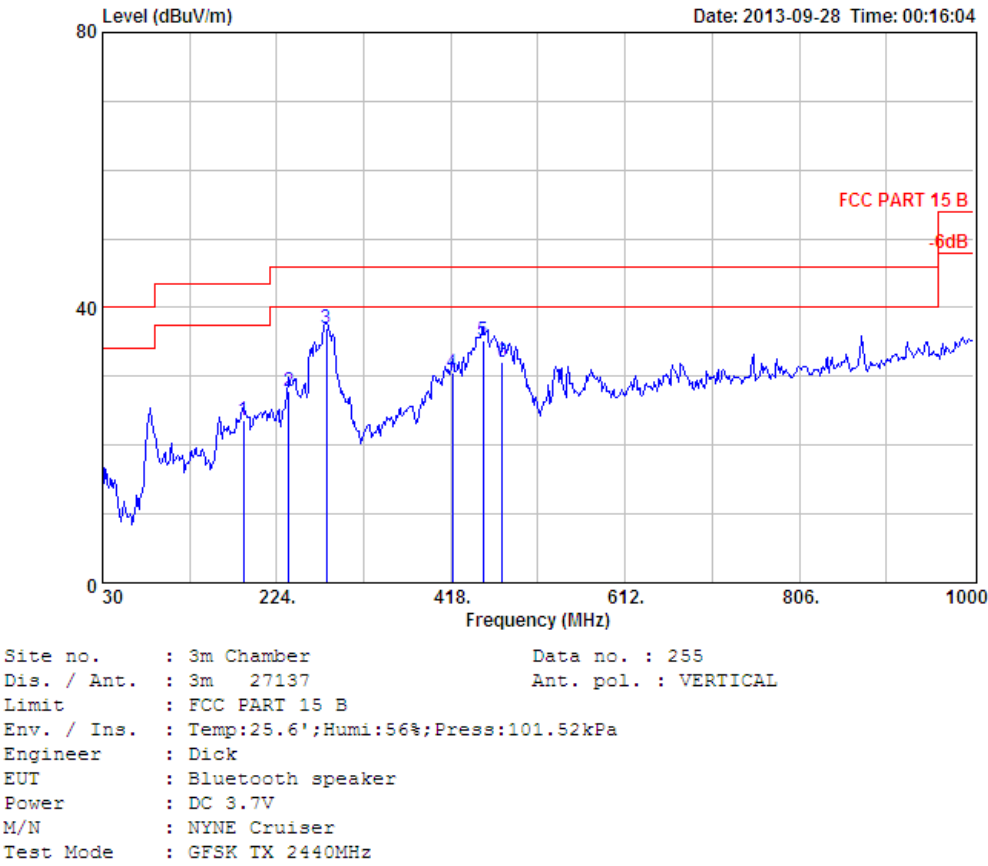


	Freq.	Ant.	Cable		Emission				
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Reamark	
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	(dB)	
1	94.99	8.83	2.99	19.69	31.51	43.50	11.99	QP	
2	196.84	7.72	4.26	15.73	27.71	43.50	15.79	QP	
3	242.43	10.64	4.72	15.81	31.17	46.00	14.83	QP	
4	305.48	13.11	5.28	13.92	32.31	46.00	13.69	QP	
5	395.69	15.87	5.93	10.48	32.28	46.00	13.72	QP	
6	470.38	17.21	6.57	8.29	32.07	46.00	13.93	QP	

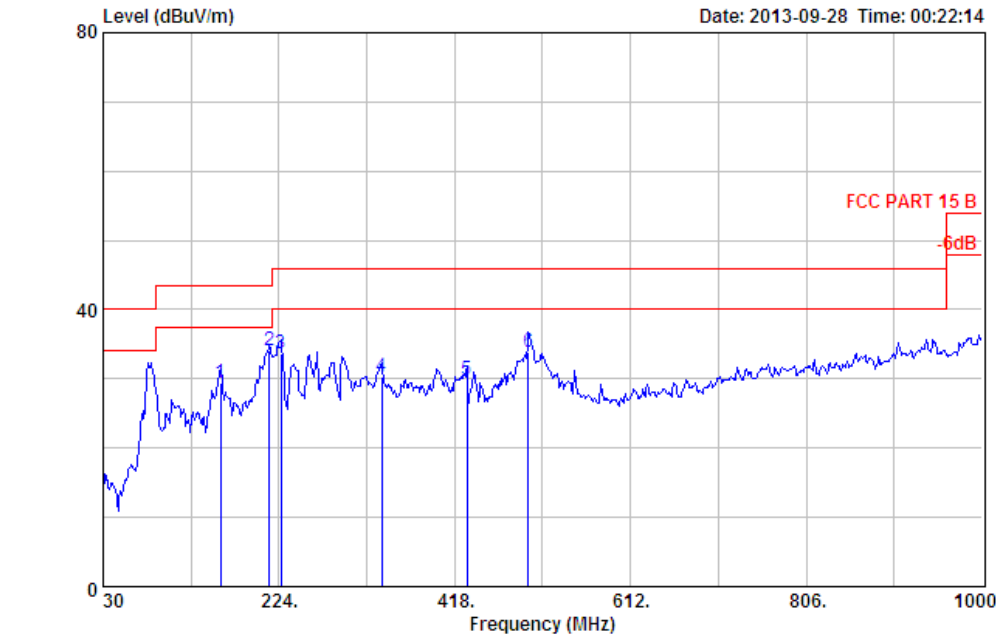


Site no. : 3m Chamber Data no. : 254
Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 B
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Dick
EUT : Bluetooth speaker
Power : DC 3.7V
M/N : NYNE Cruiser
Test Mode : GFSK TX 2440MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission		Margin (dB)	Reamark
					Level (dBuV/m)	Limits (dBuV/m)		
1	159.98	10.36	3.89	13.19	27.44	43.50	16.06	QP
2	213.33	8.60	4.35	17.12	30.07	43.50	13.43	QP
3	225.94	9.47	4.51	16.75	30.73	46.00	15.27	QP
4	244.37	10.92	4.76	19.54	35.22	46.00	10.78	QP
5	284.14	12.52	5.12	14.71	32.35	46.00	13.65	QP
6	439.34	16.23	6.31	9.47	32.01	46.00	13.99	QP

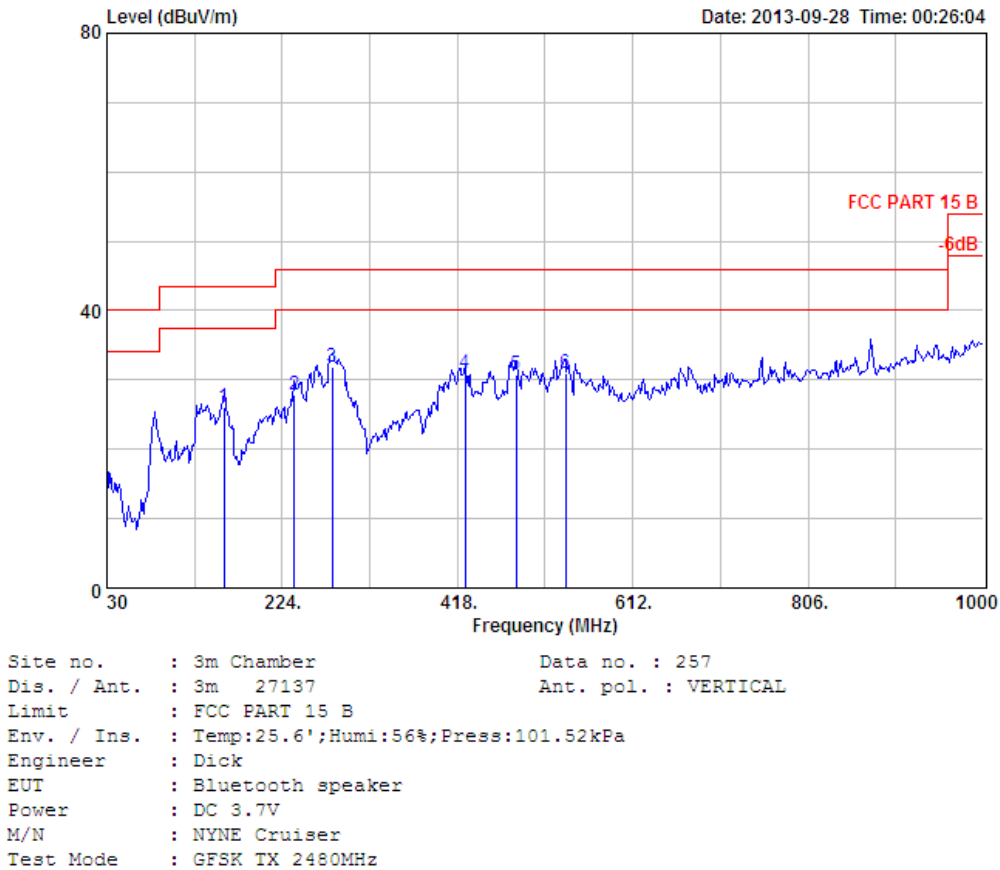


	Freq.	Ant.	Cable	Emission				
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Reamark
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	(dB)
1	187.14	8.26	4.19	11.23	23.68	43.50	19.82	QP
2	237.58	10.01	4.65	13.29	27.95	46.00	18.05	QP
3	279.29	12.37	5.08	19.50	36.95	46.00	9.05	QP
4	419.94	16.30	6.19	8.08	30.57	46.00	15.43	QP
5	453.89	16.62	6.41	12.09	35.12	46.00	10.88	QP
6	475.23	17.33	6.61	8.14	32.08	46.00	13.92	QP



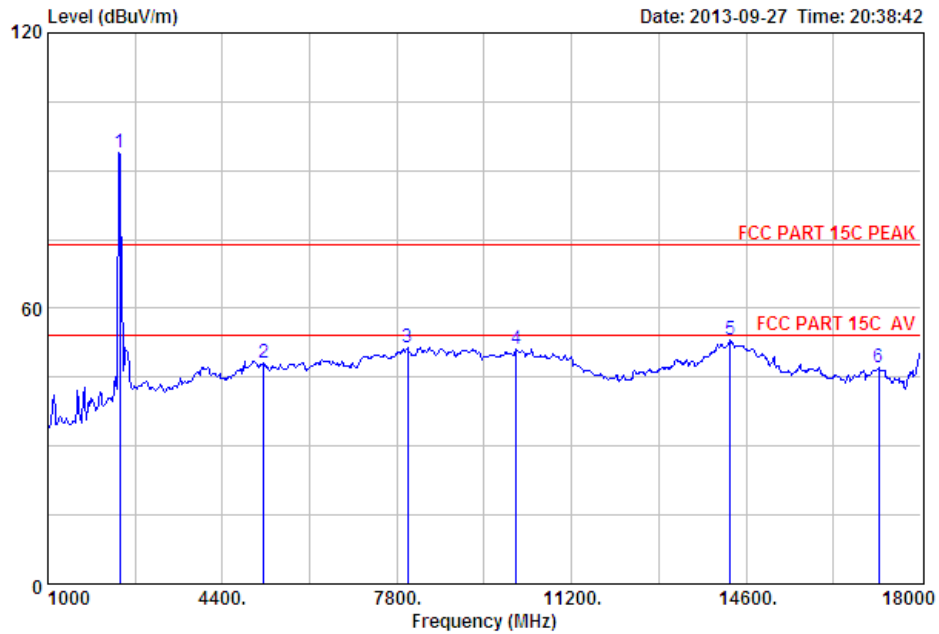
Site no. : 3m Chamber Data no. : 256
Dis. / Ant. : 3m 27137 Ant. pol. : HORIZONTAL
Limit : FCC PART 15 B
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Dick
EUT : Bluetooth speaker
Power : DC 3.7V
M/N : NYNE Cruiser
Test Mode : GFSK TX 2480MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission			
					Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark (dB)
1	159.98	10.36	3.89	15.19	29.44	43.50	14.06	QP
2	213.33	8.60	4.35	21.12	34.07	43.50	9.43	QP
3	225.94	9.47	4.51	19.75	33.73	46.00	12.27	QP
4	337.49	14.08	5.55	10.67	30.30	46.00	15.70	QP
5	431.58	16.09	6.26	7.42	29.77	46.00	16.23	QP
6	499.48	17.87	6.72	9.18	33.77	46.00	12.23	QP



	Freq.	Ant.	Cable		Emission			
	(MHz)	Factor	Loss	Reading	Level	Limits	Margin	Reamark
		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	(dB)
1	159.98	10.36	3.89	11.73	25.98	43.50	17.52	QP
2	237.58	10.01	4.65	13.29	27.95	46.00	18.05	QP
3	279.29	12.37	5.08	14.50	31.95	46.00	14.05	QP
4	426.73	16.13	6.25	8.66	31.04	46.00	14.96	QP
5	482.99	17.56	6.66	6.49	30.71	46.00	15.29	QP
6	537.31	19.12	6.96	4.84	30.92	46.00	15.08	QP

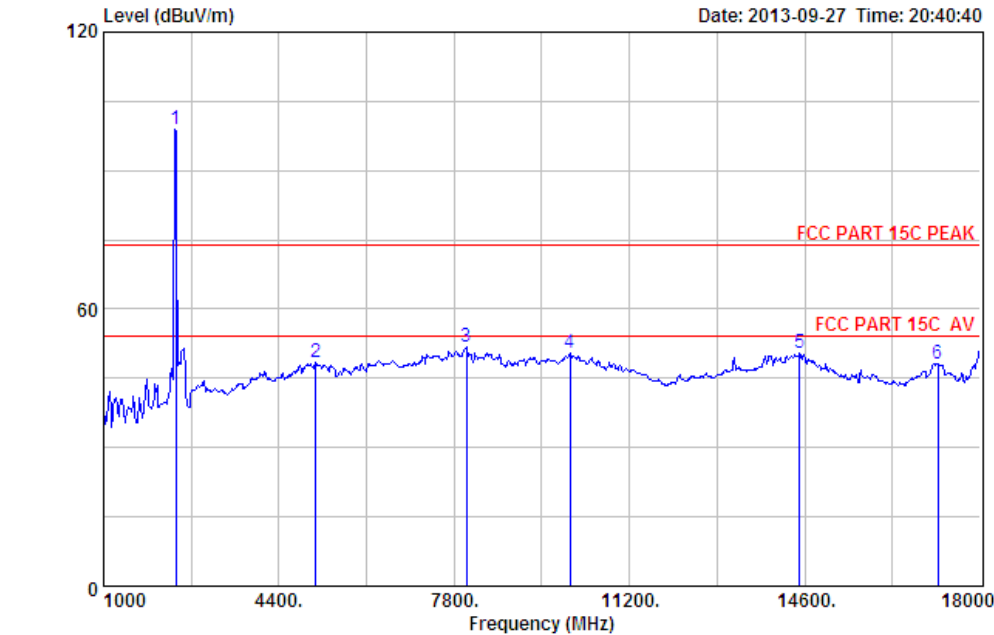
1000-18000 MHz



Site no. : 3m Chamber Data no. : 184
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Bluetooth speaker
 Power : DC 3.7V
 M/N : NYNE Cruiser
 Test Mode : GFSK TX 2402MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission				Remark
					Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)		
1	27.61	6.62	34.18	93.98	94.03	74.00	-20.03		Peak
2	31.67	12.35	32.16	36.13	47.99	74.00	26.01		Peak
3	37.01	11.40	31.22	34.35	51.54	74.00	22.46		Peak
4	38.33	11.52	32.01	33.38	51.22	74.00	22.78		Peak
5	41.71	10.92	33.08	33.46	53.01	74.00	20.99		Peak
6	40.45	10.92	33.34	29.12	47.15	74.00	26.85		Peak

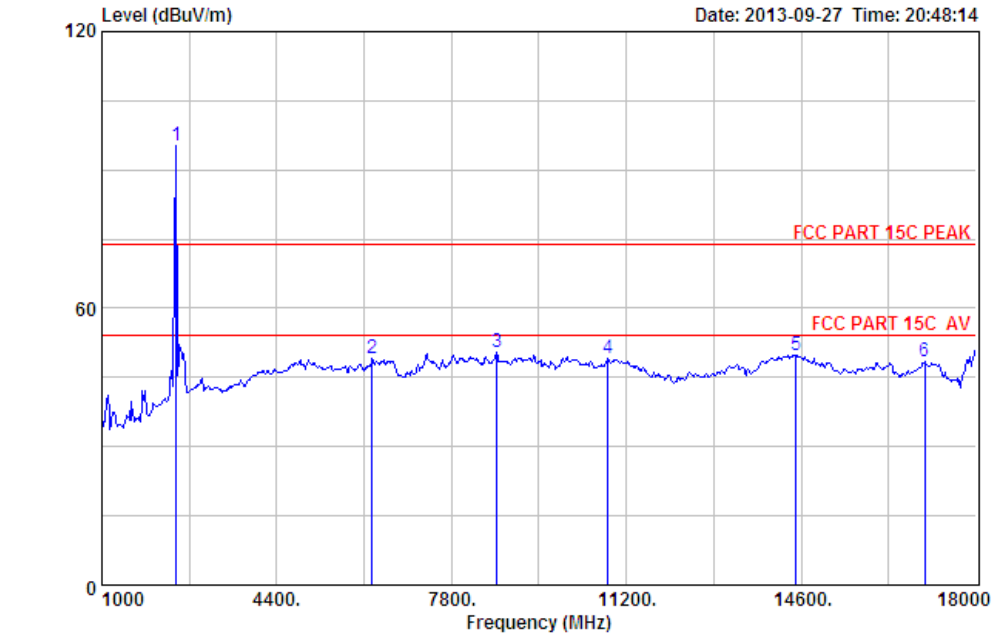
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 185
Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Bluetooth speaker
Power : DC 3.7V
M/N : NYNE Cruiser
Test Mode : GFSK TX 2402MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission				
					Reading	Level	Limits	Margin	Remark
					(dBUV)	(dBUV/m)	(dBUV/m)	(dB)	
1	2402.00	27.61	6.62	34.18	98.79	98.84	74.00	-24.84	Peak
2	5114.00	31.62	12.45	32.17	36.48	48.38	74.00	25.62	Peak
3	8038.00	36.95	11.40	31.28	34.71	51.78	74.00	22.22	Peak
4	10044.00	38.18	11.56	31.85	32.50	50.39	74.00	23.61	Peak
5	14498.00	41.88	10.93	33.08	30.62	50.35	74.00	23.65	Peak
6	17184.00	40.45	10.92	33.34	30.27	48.30	74.00	25.70	Peak

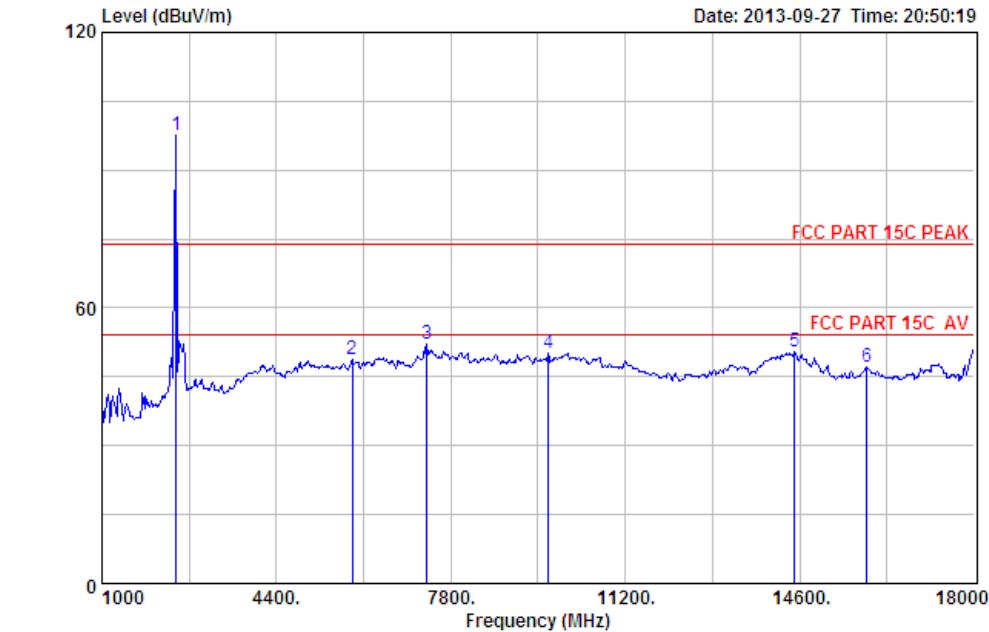
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 188
Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Bluetooth speaker
Power : DC 3.7V
M/N : NYNE Cruiser
Test Mode : GFSK TX 2440MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission		Limits (dBuV/m)	Margin (dB)	Remark
				Reading (dBuV)	Level (dBuV/m)			
1	2440.00	27.60	6.67	34.12	95.13	95.28	74.00	-21.28 Peak
2	6253.00	33.42	12.17	31.96	35.57	49.20	74.00	24.80 Peak
3	8684.00	37.32	11.45	32.43	34.26	50.60	74.00	23.40 Peak
4	10843.00	39.35	11.30	33.36	31.93	49.22	74.00	24.78 Peak
5	14498.00	41.88	10.93	33.08	30.18	49.91	74.00	24.09 Peak
6	16997.00	39.74	10.99	33.21	30.94	48.46	74.00	25.54 Peak

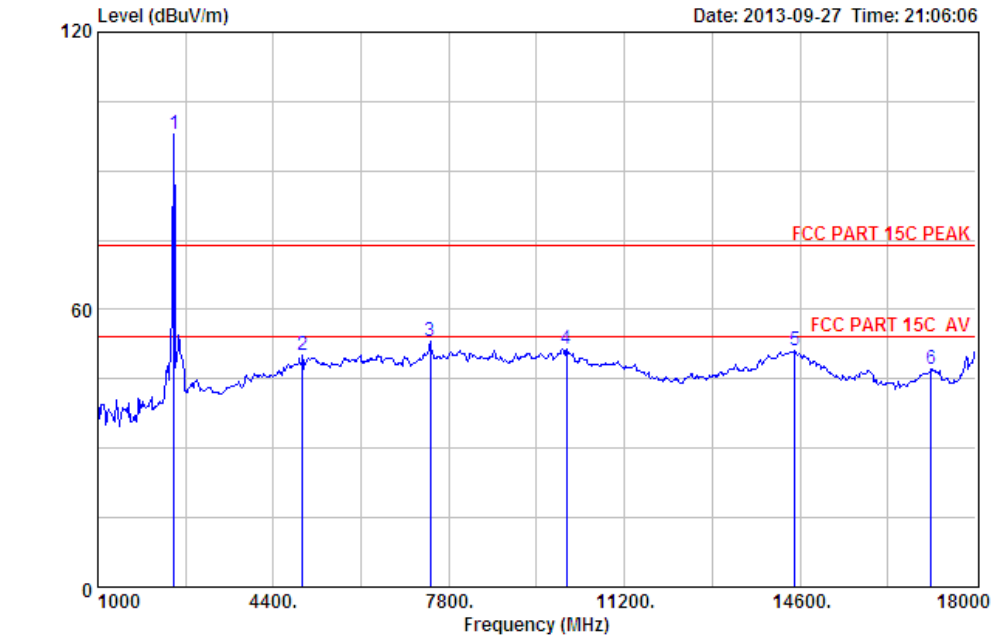
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 189
Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Bluetooth speaker
Power : DC 3.7V
M/N : NYNE Cruiser
Test Mode : GFSK TX 2440MHz

	Freq.	Ant.	Cable	Amp	Emission				
	(MHz)	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2440.00	27.60	6.67	34.12	97.60	97.75	74.00	-23.75	Peak
2	5879.00	32.53	12.09	32.36	36.69	48.95	74.00	25.05	Peak
3	7341.00	36.56	11.58	31.99	36.10	52.25	74.00	21.75	Peak
4	9704.00	38.06	11.66	31.87	32.21	50.06	74.00	23.94	Peak
5	14498.00	41.88	10.93	33.08	30.69	50.42	74.00	23.58	Peak
6	15909.00	37.22	10.74	33.20	32.28	47.04	74.00	26.96	Peak

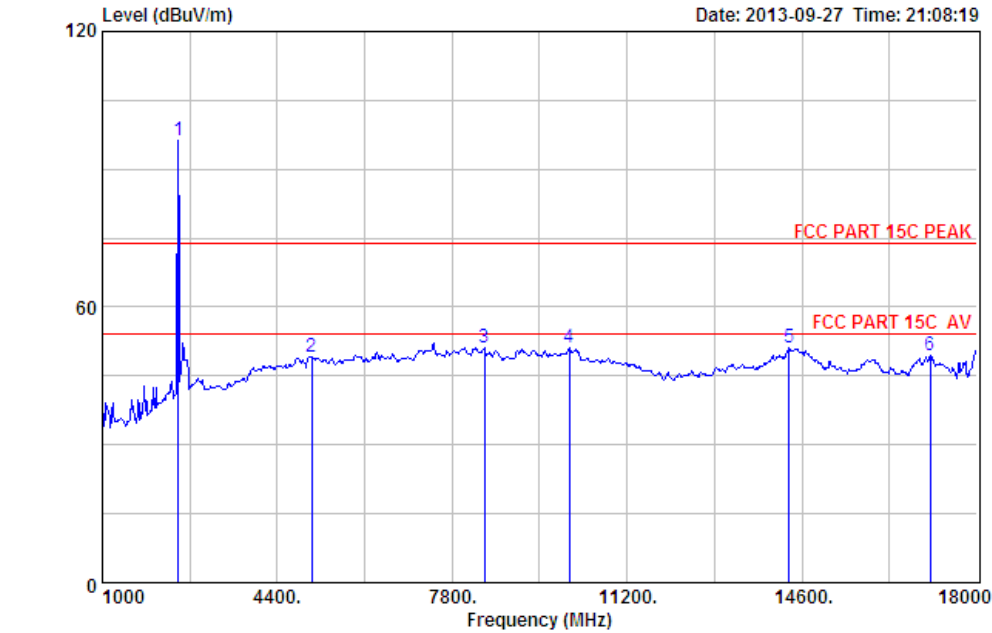
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 192
Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Bluetooth speaker
Power : DC 3.7V
M/N : NYNE Cruiser
Test Mode : GFSK TX 2480MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission		Limits (dBuV/m)	Margin (dB)	Remark
					Level				
1	2480.00	27.58	6.71	34.03	97.73	97.99	74.00	-23.99	Peak
2	4961.00	31.49	12.44	31.97	38.25	50.21	74.00	23.79	Peak
3	7443.00	36.54	11.61	31.93	36.85	53.07	74.00	20.93	Peak
4	10078.00	38.24	11.54	31.92	33.69	51.55	74.00	22.45	Peak
5	14498.00	41.88	10.93	33.08	31.28	51.01	74.00	22.99	Peak
6	17133.00	40.26	10.94	33.03	28.97	47.14	74.00	26.86	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.

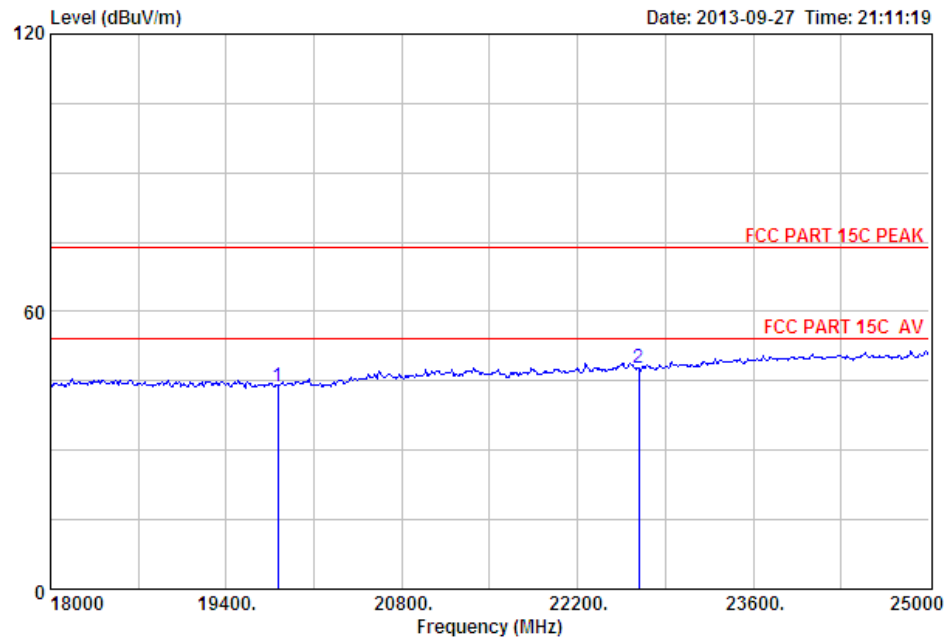


Site no. : 3m Chamber Data no. : 193
Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6°;Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Bluetooth speaker
Power : DC 3.7V
M/N : NYNE Cruiser
Test Mode : GFSK TX 2480MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission		Limits (dBuV/m)	Margin (dB)	Remark
					Level (dBuV/m)				
1	2480.00	27.58	6.71	34.03	95.89	96.15	74.00	-22.15	Peak
2	5063.00	31.58	12.51	32.11	37.17	49.15	74.00	24.85	Peak
3	8429.00	36.77	11.44	31.81	34.80	51.20	74.00	22.80	Peak
4	10078.00	38.24	11.54	31.92	33.33	51.19	74.00	22.81	Peak
5	14345.00	41.76	10.92	32.93	31.53	51.28	74.00	22.72	Peak
6	17099.00	40.13	10.95	32.96	31.23	49.35	74.00	24.65	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.

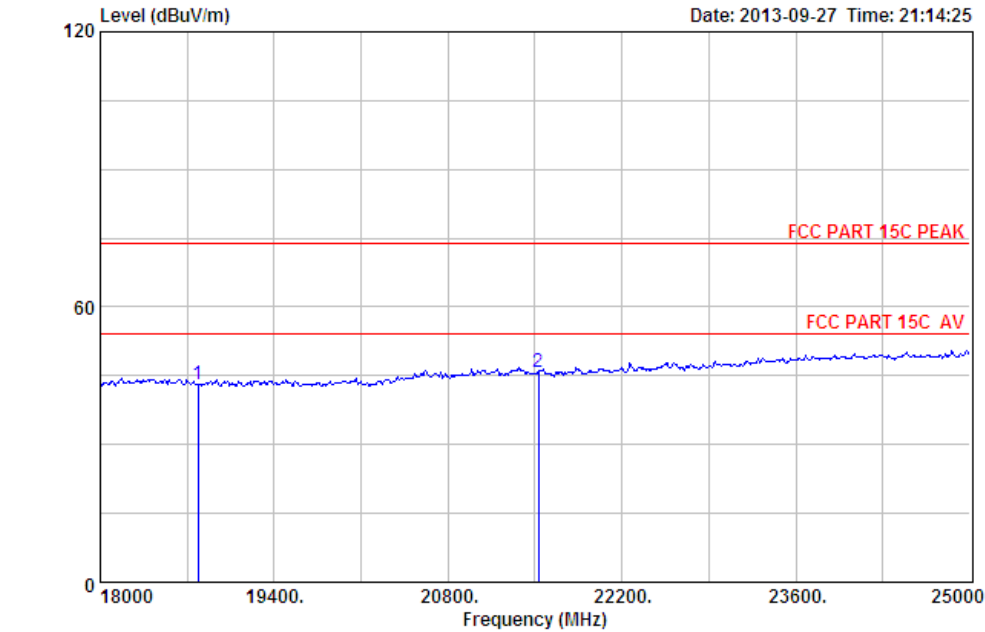
18000-25000 MHz



Site no. : 3m Chamber Data no. : 194
Dis. / Ant. : 3m ANT ABVOE 18G Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Bluetooth speaker
Power : DC 3.7V
M/N : NYNE Cruiser
Test Mode : GFSK TX 2402MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission		Limits (dBuV/m)	Margin (dB)	Remark
					Level				
1 19813.00	46.02	19.46	36.55	14.83	43.76		74.00	30.24	Peak
2 22690.00	45.73	20.97	34.17	15.10	47.63		74.00	26.37	Peak

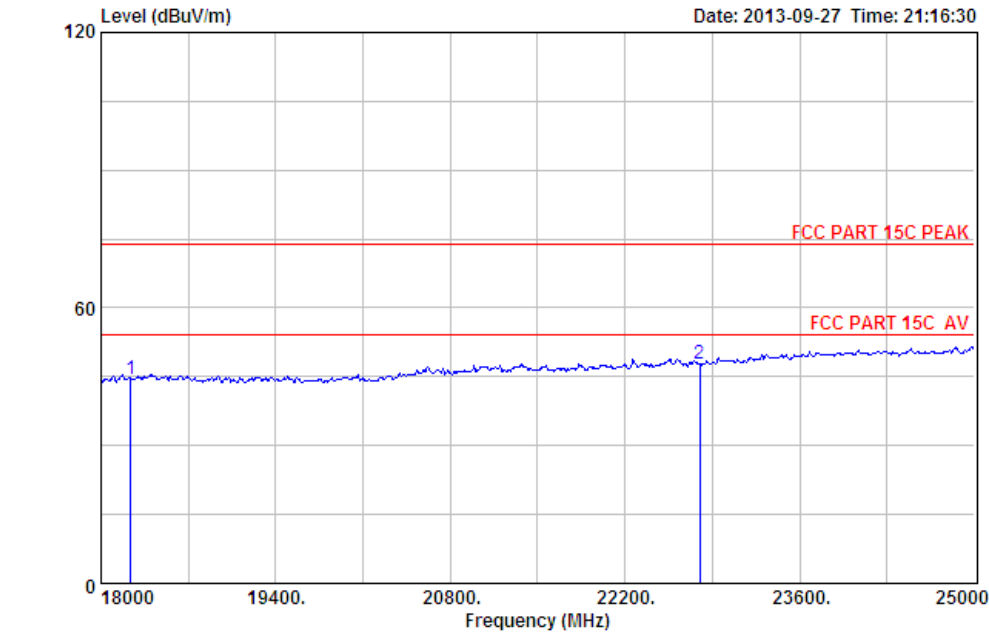
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 195
Dis. / Ant. : 3m ANT ABOVE 18G Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Bluetooth speaker
Power : DC 3.7V
M/N : NYNE Cruiser
Test Mode : GFSK TX 2402MHz

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission		Margin (dB)	Remark
						Level (dBuV/m)	Limits (dBuV/m)		
1	18784.00	45.20	18.28	35.66	15.26	43.08	74.00	30.92	Peak
2	21528.00	45.99	20.36	35.33	14.84	45.86	74.00	28.14	Peak

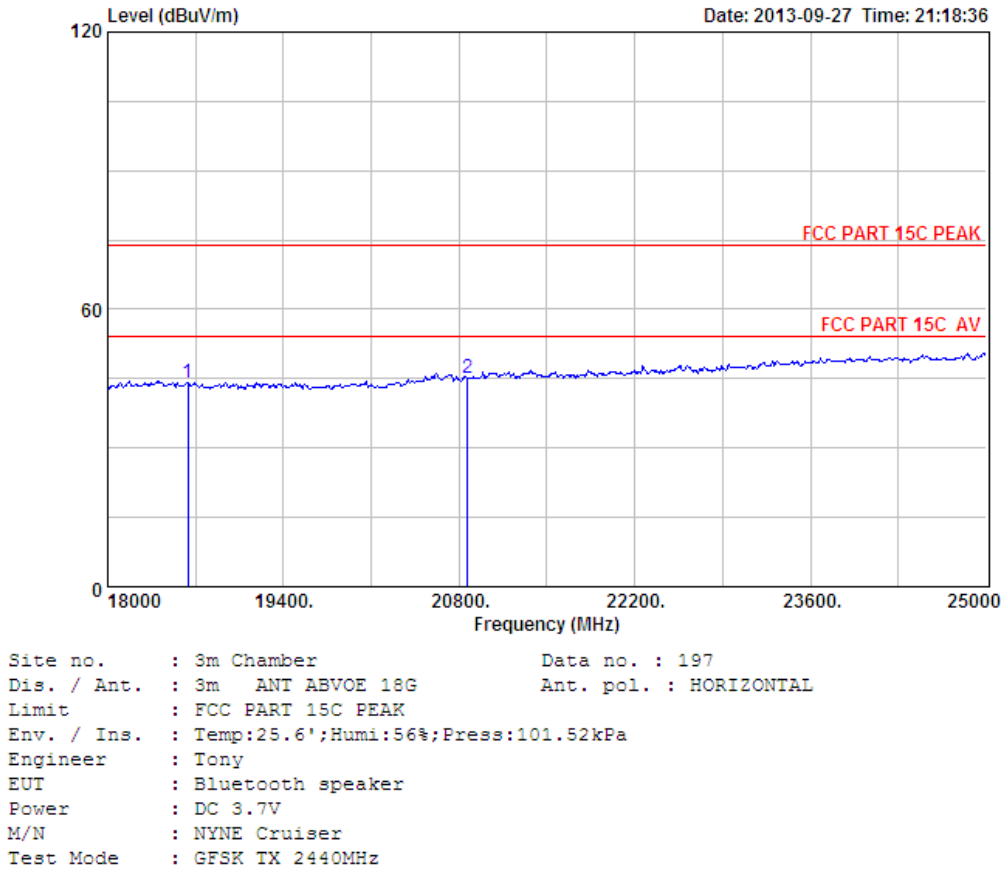
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 196
Dis. / Ant. : 3m ANT ABOVE 18G Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Bluetooth speaker
Power : DC 3.7V
M/N : NYNE Cruiser
Test Mode : GFSK TX 2440MHz

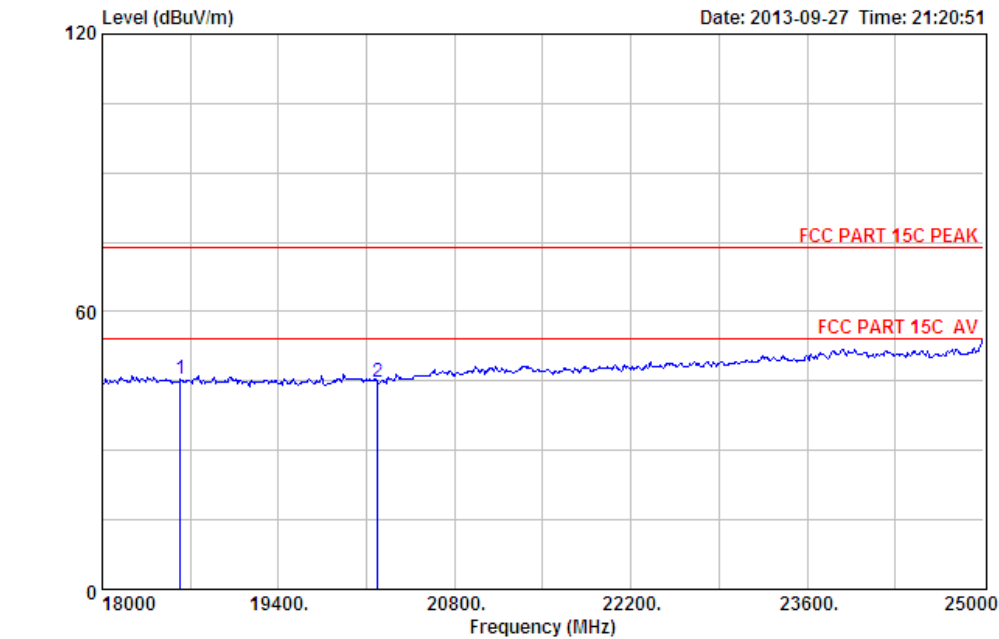
Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission				Remark
					Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)		
1 18238.00	44.53	17.61	35.21	17.64	44.57	74.00	29.43		Peak
2 22802.00	45.68	21.03	34.06	15.00	47.65	74.00	26.35		Peak

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.



Freq. (MHz)	Ant.	Cable	Amp	Emission					Remark
	Factor (dB/m)	Loss (dB)	Factor (dB)	Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)		
1 18637.00	45.04	18.10	35.53	16.56	44.17	74.00	29.83	Peak	
2 20870.00	46.22	20.07	35.91	14.90	45.28	74.00	28.72	Peak	

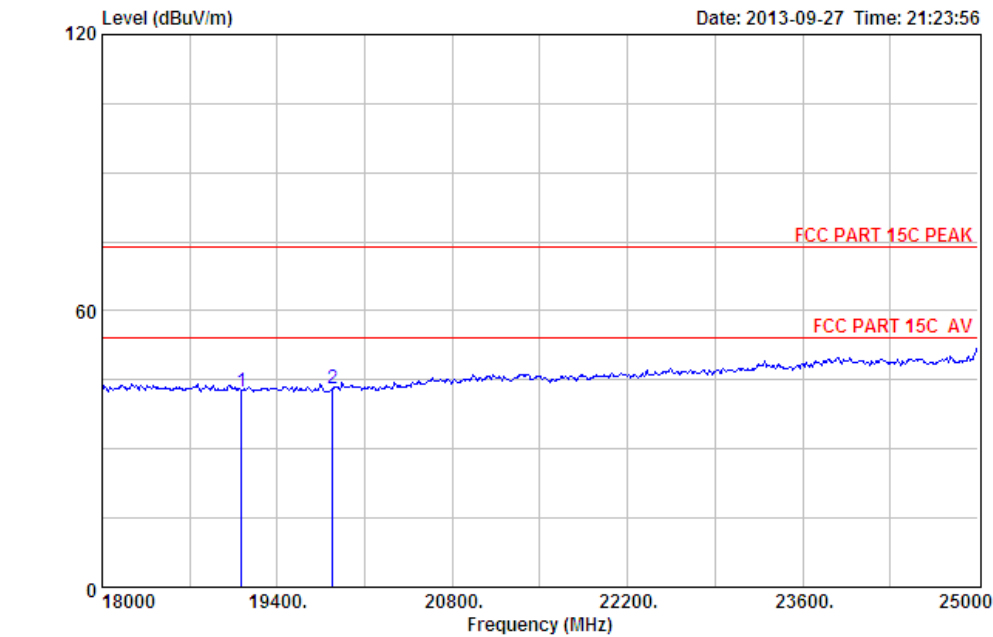
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 198
Dis. / Ant. : 3m ANT ABVOE 18G Ant. pol. : HORIZONTAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Bluetooth speaker
Power : DC 3.7V
M/N : NYNE Cruiser
Test Mode : GFSK TX 2480MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Reading (dBuV)	Emission		Margin (dB)	Remark
					Level (dBuV/m)	Limits (dBuV/m)		
1 18623.00	45.01	18.08	35.53	17.73	45.29	74.00	28.71	Peak
2 20191.00	46.06	19.77	36.52	15.54	44.85	74.00	29.15	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. : 3m Chamber Data no. : 199
Dis. / Ant. : 3m ANT ABOVE 18G Ant. pol. : VERTICAL
Limit : FCC PART 15C PEAK
Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
Engineer : Tony
EUT : Bluetooth speaker
Power : DC 3.7V
M/N : NYNE Cruiser
Test Mode : GFSK TX 2480MHz

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Amp Factor (dB)	Emission		Limits (dBuV/m)	Margin (dB)	Remark
				Reading (dBuV)	Level (dBuV/m)			
1 19113.00	45.53	18.67	35.96	14.35	42.59	74.00	31.41	Peak
2 19841.00	46.04	19.51	36.57	14.16	43.14	74.00	30.86	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.

4. CONDUCTED SPURIOUS EMISSION

4.1. Limit

In any 100kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power.

4.2. Test Procedure

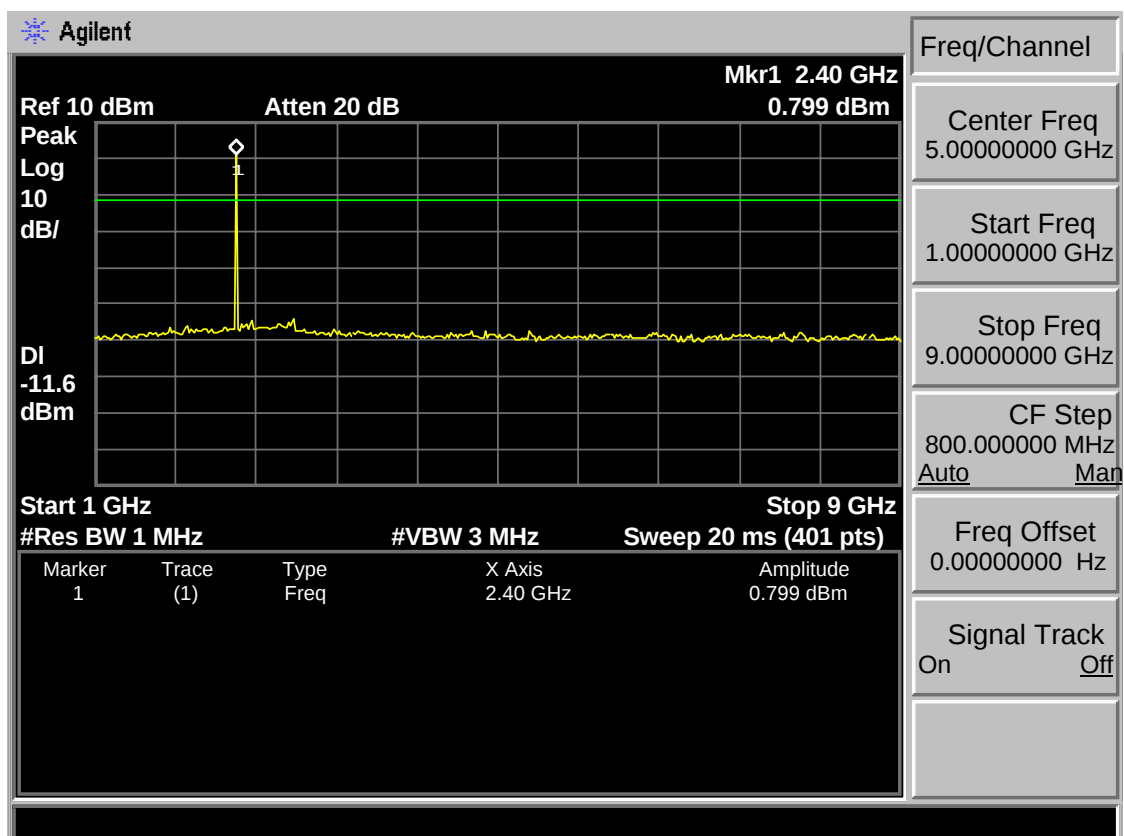
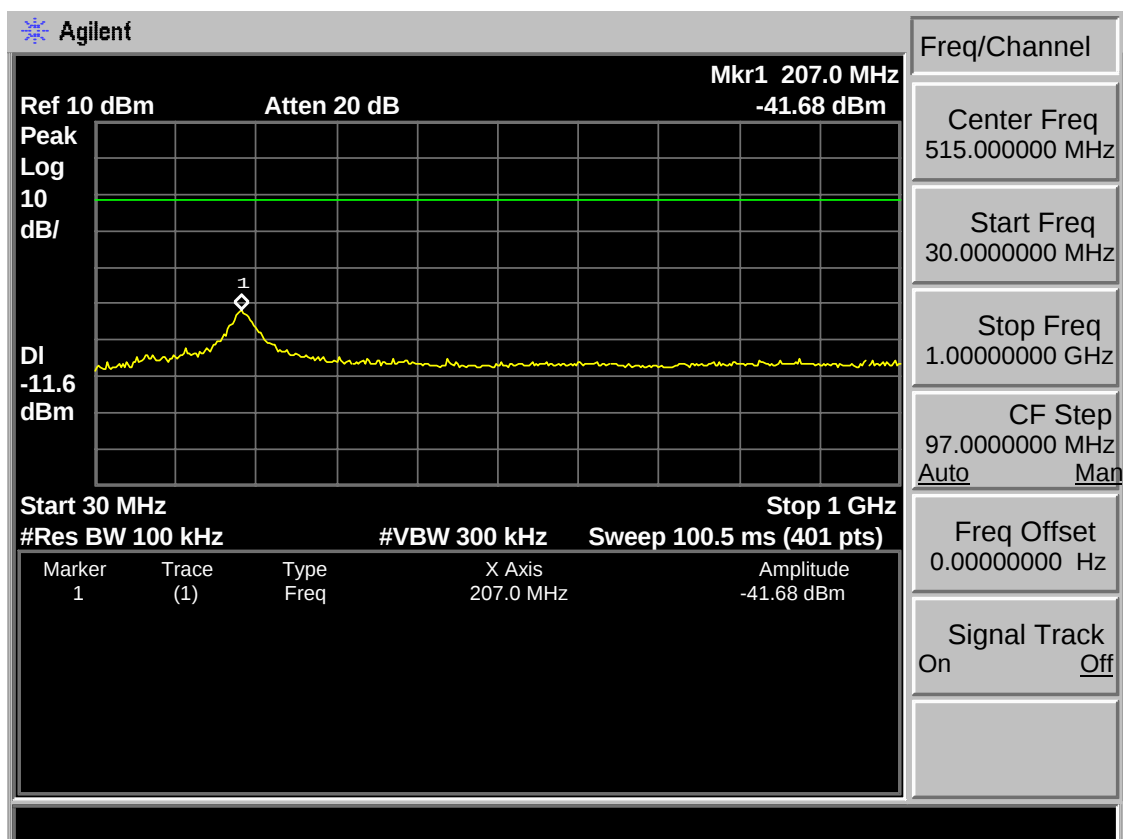
The transmitter output was connected to a spectrum analyzer, The resolution bandwidth is set to 100 kHz, The video bandwidth is set to 300 kHz for frequency range from 30MHz to 1000 MHz; The resolution bandwidth is set to 1 MHz, The video bandwidth is set to 3 MHz for frequency range from 1000MHz to 25000 MHz..

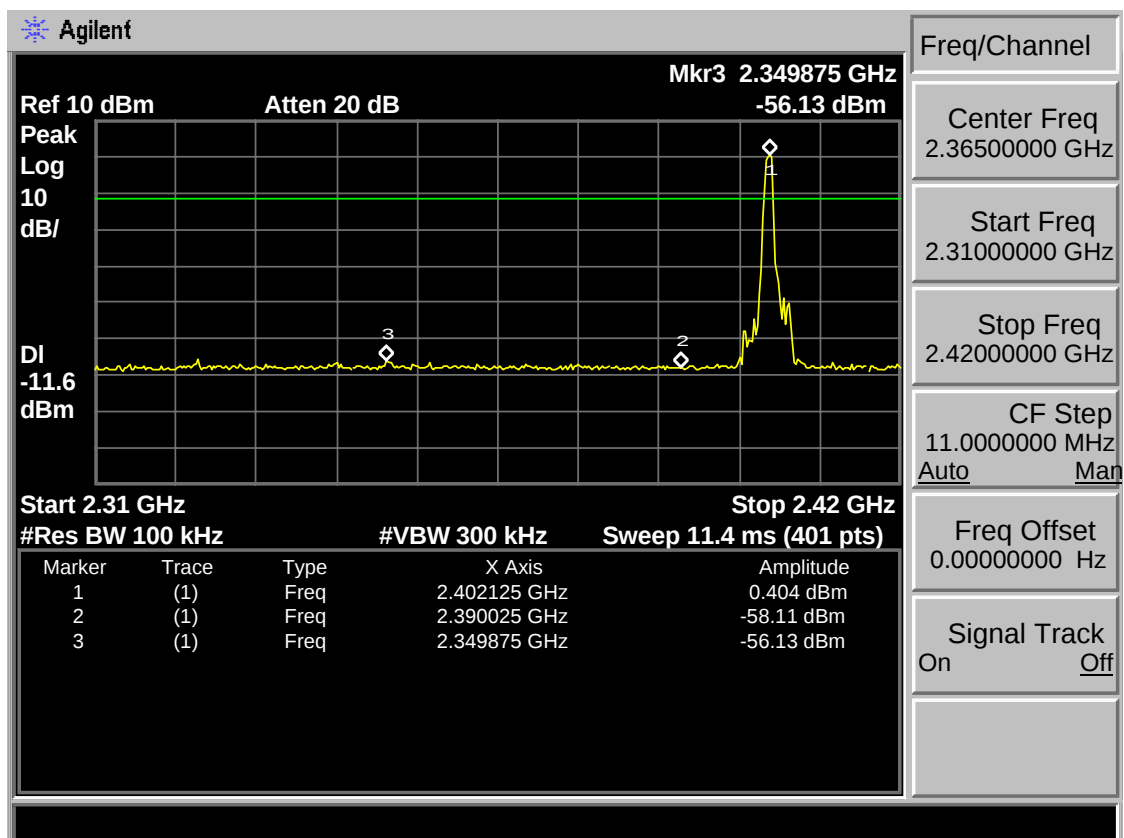
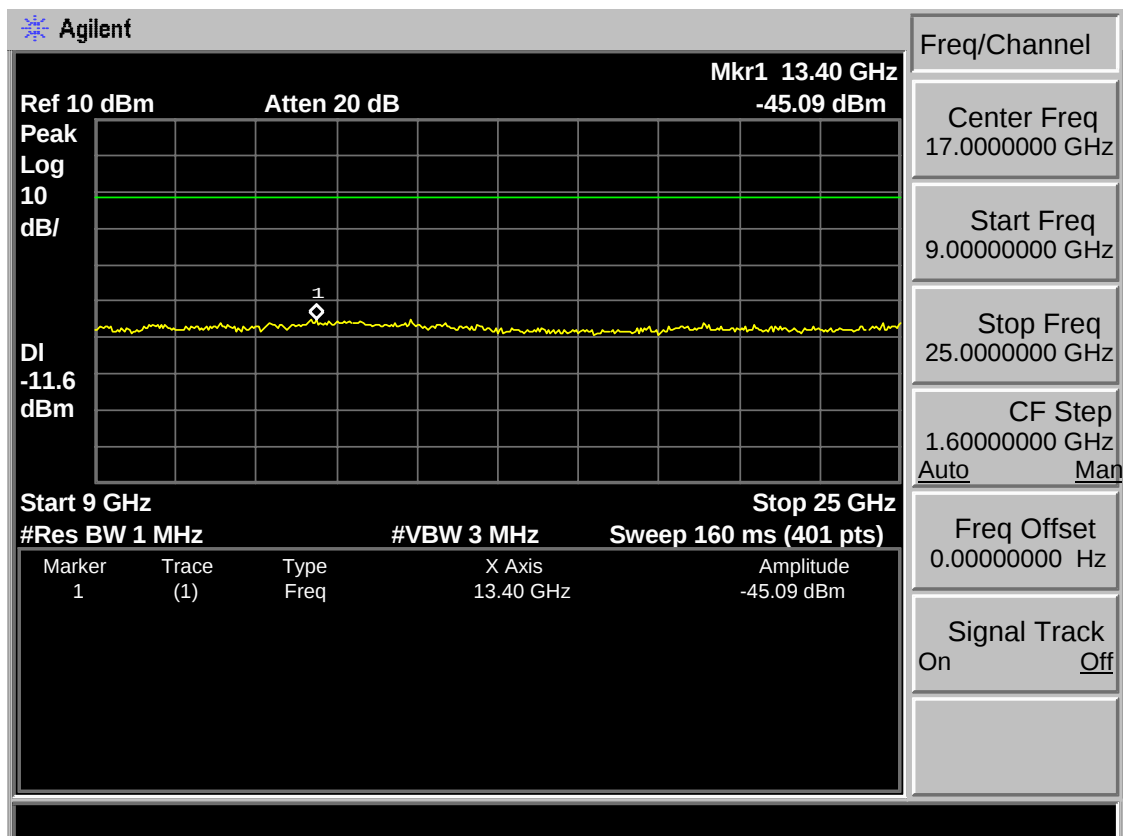
4.3. Test Result

PASS (The testing data was attached in the next pages.)

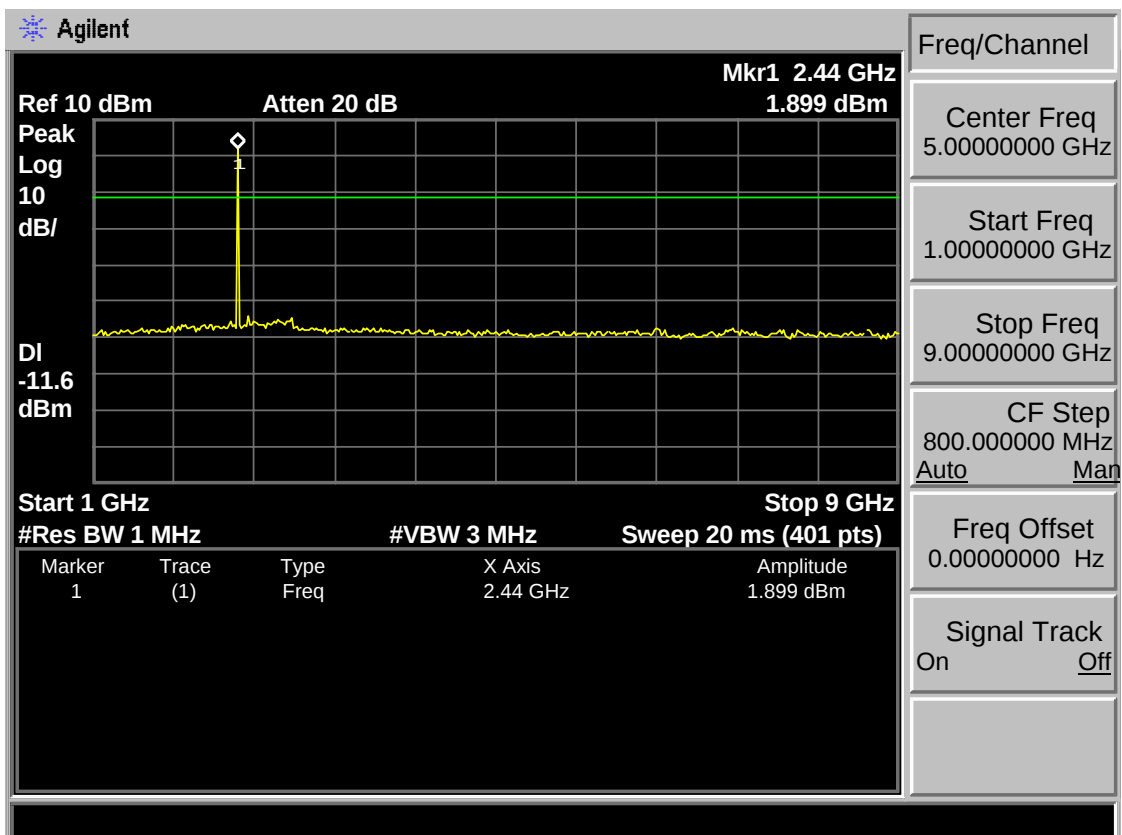
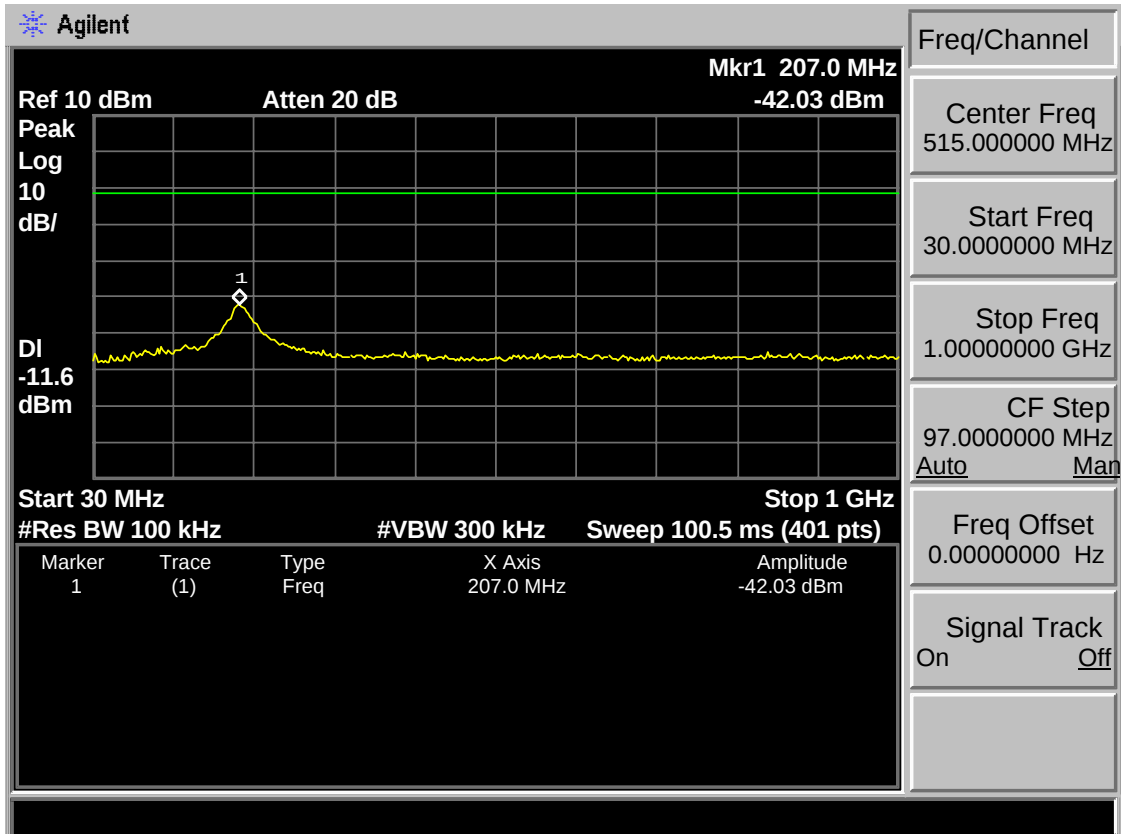
4.4. Test Data

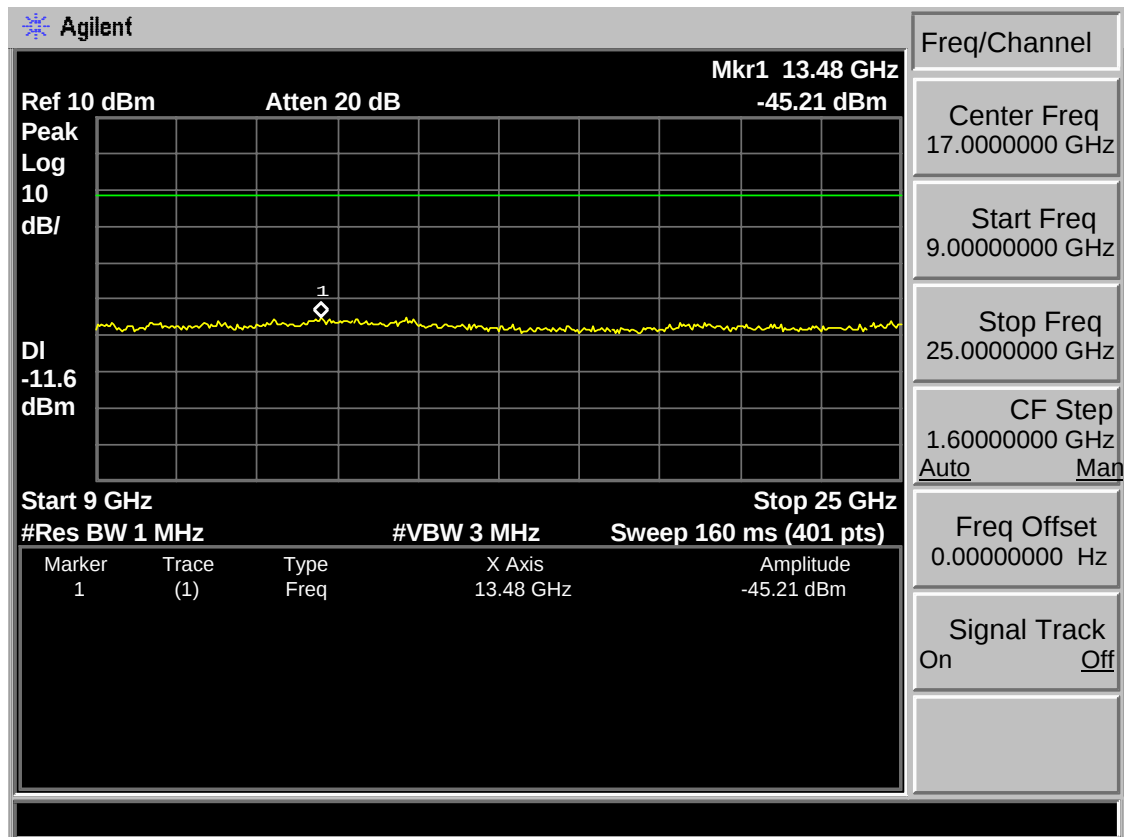
Test Mode: BT 4.0-BLE GFSK 2402MHz



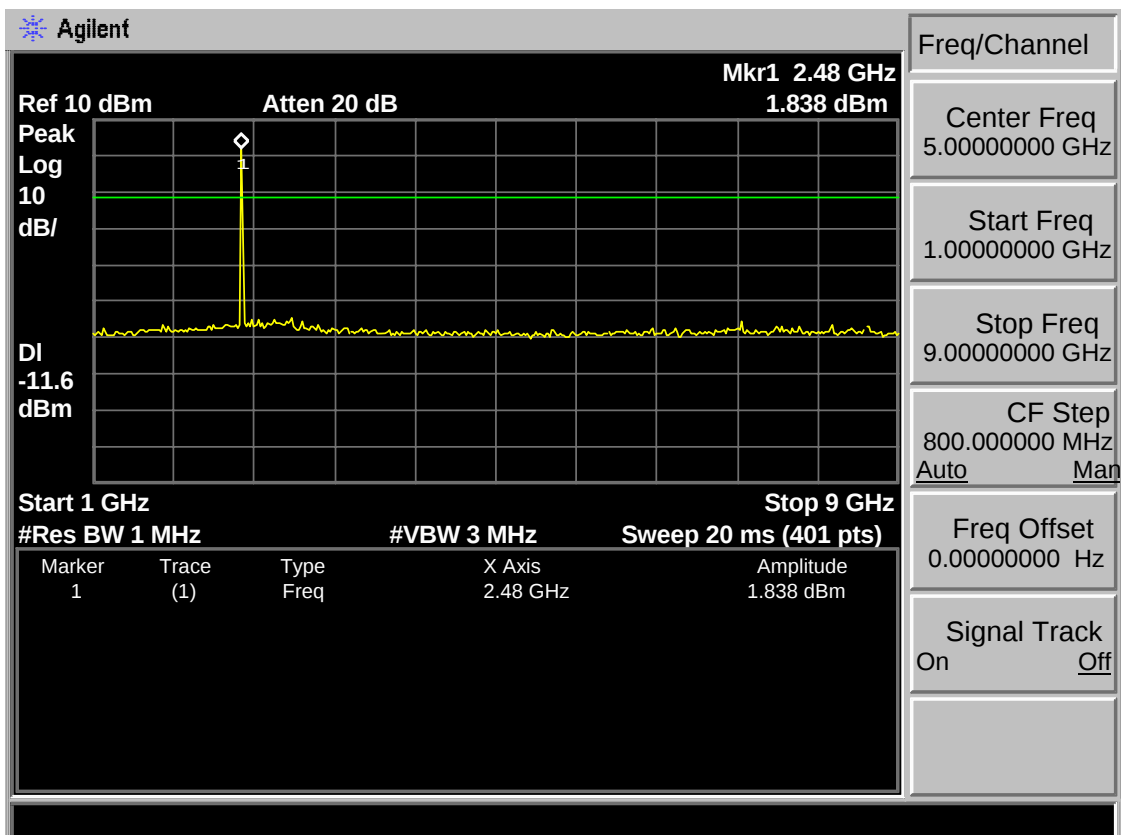
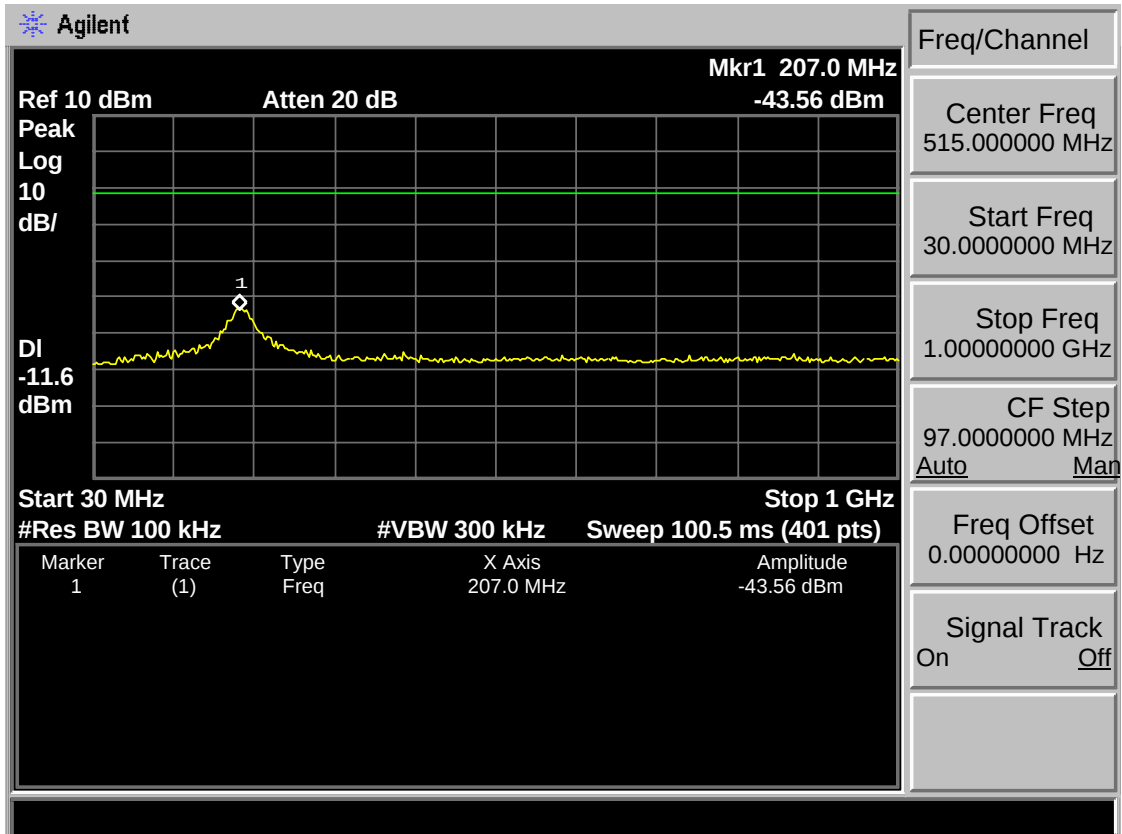


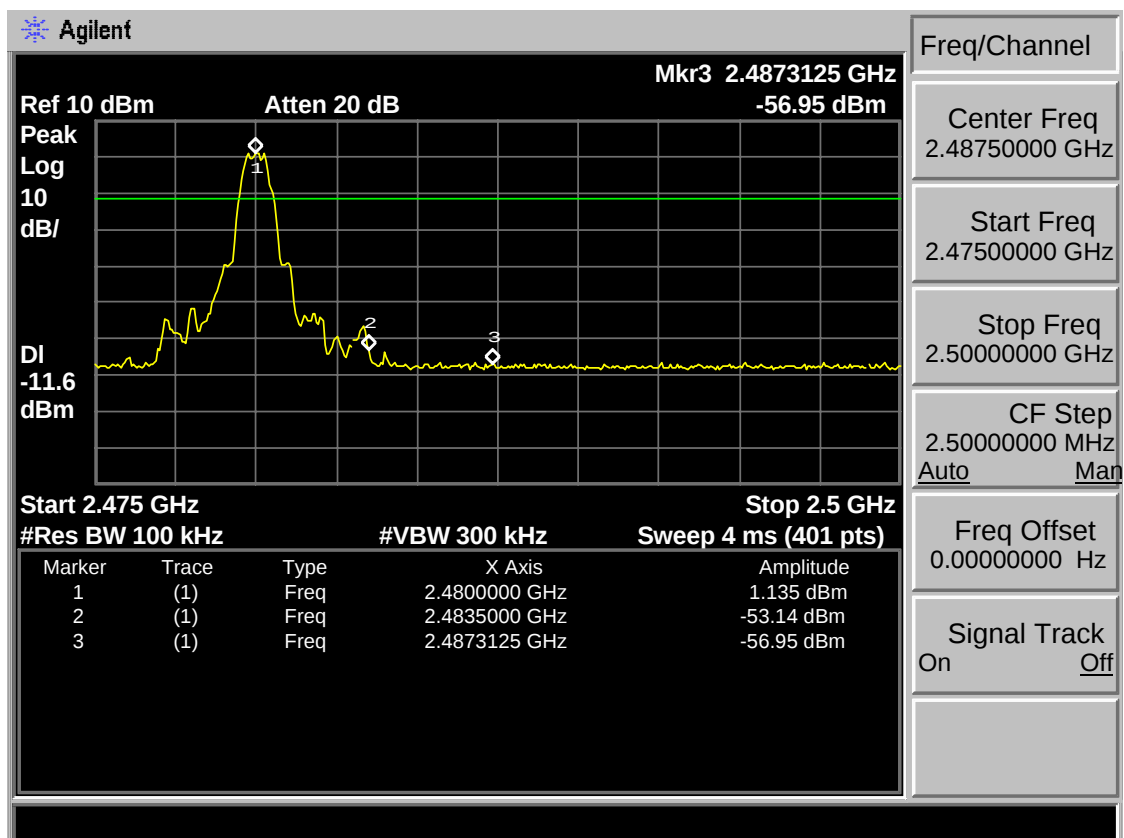
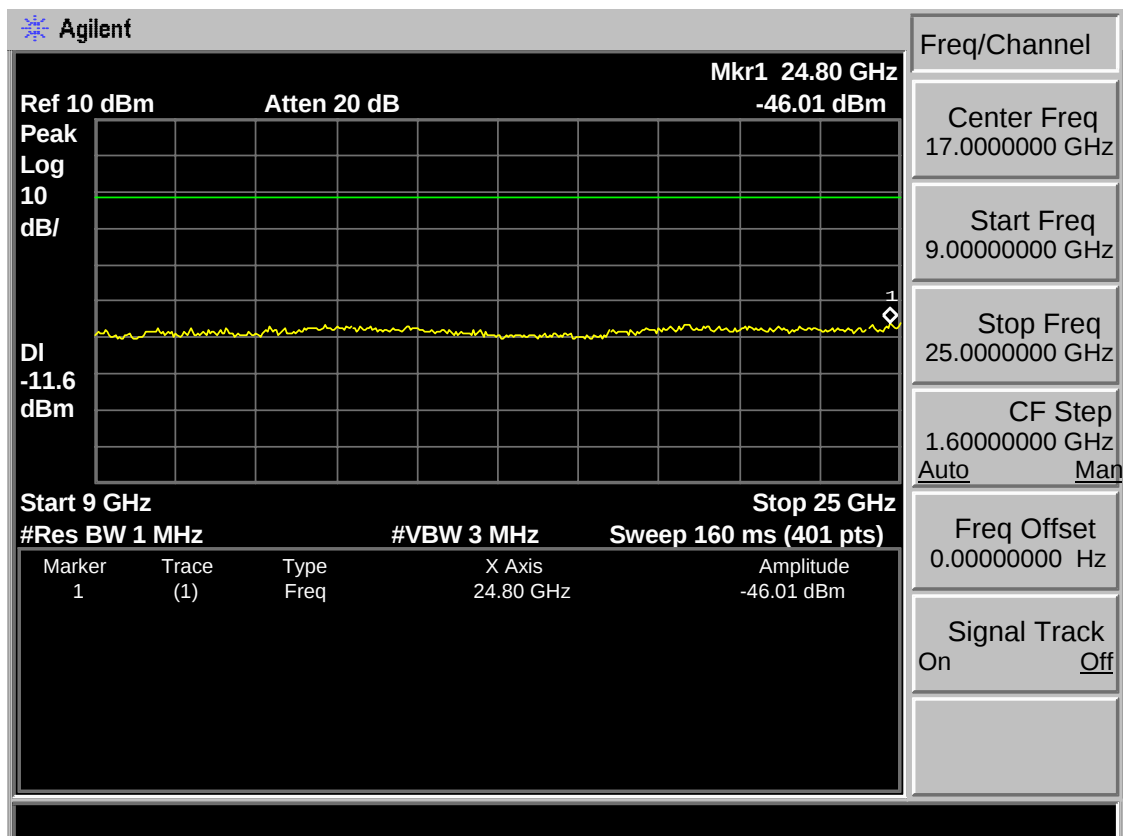
Test Mode: BT 4.0-BLE GFSK 2440MHz





Test Mode: BT 4.0-BLE GFSK 2480MHz





5. BAND EDGE COMPLIANCE TEST

5.1. 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

5.2. Test Procedure

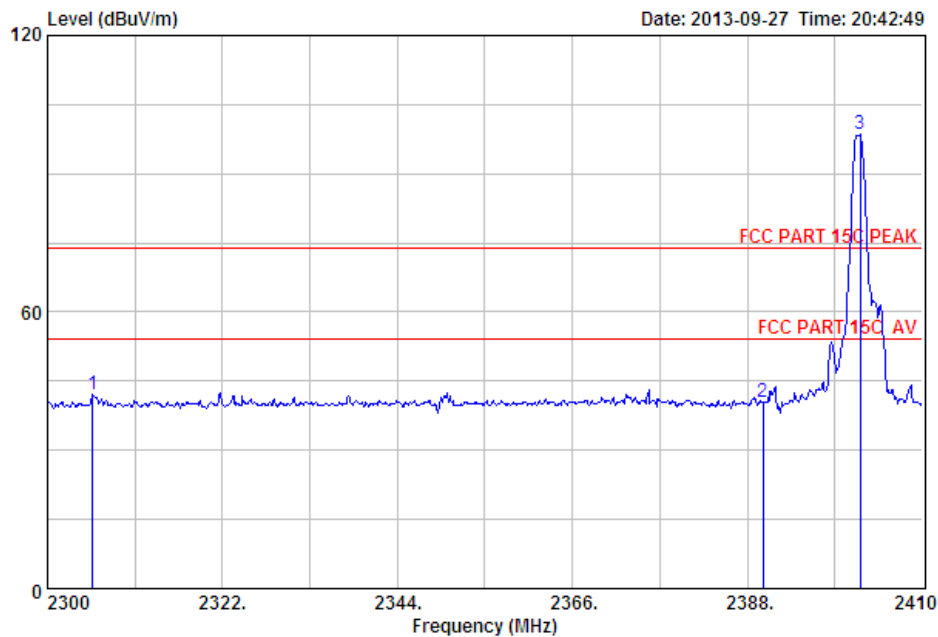
1. The EUT is placed on a turntable, which is 0.8m above the ground plane and worked at highest radiated power.
2. The turntable was rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
 - (a) PEAK: RBW=1MHz; VBW=3MHz; Sweep=AUTO
 - (b) AVERAGE: RBW=1MHz; VBW=10Hz; Sweep=AUTO

5.3. Test Result

Pass (The testing data was attached in the next pages.)

- 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 and 2480 MHz 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.

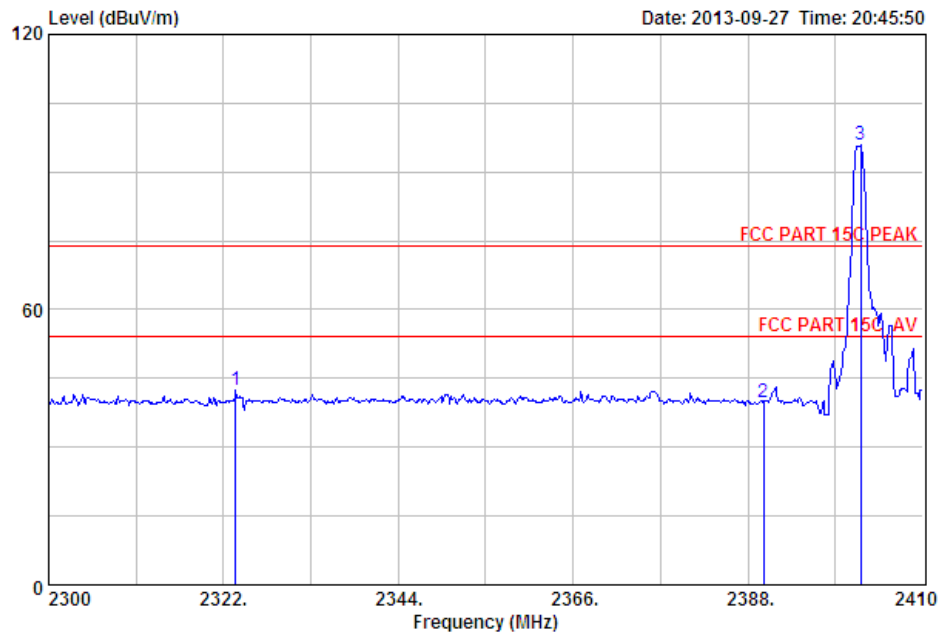
5.4. Test Data



Site no. : 3m Chamber Data no. : 186
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Bluetooth speaker
 Power : DC 3.7V
 M/N : NYNE Cruiser
 Test Mode : GFSK TX 2402MHz

	Freq.	Ant.	Cable	Amp	Emission				
	(MHz)	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(dBuV/m)	(dB)	
1	2305.72	27.76	6.53	34.24	41.95	42.00	74.00	32.00	Peak
2	2390.00	27.64	6.62	34.19	40.24	40.31	74.00	33.69	Peak
3	2402.19	27.61	6.62	34.18	98.44	98.49	74.00	-24.49	Peak

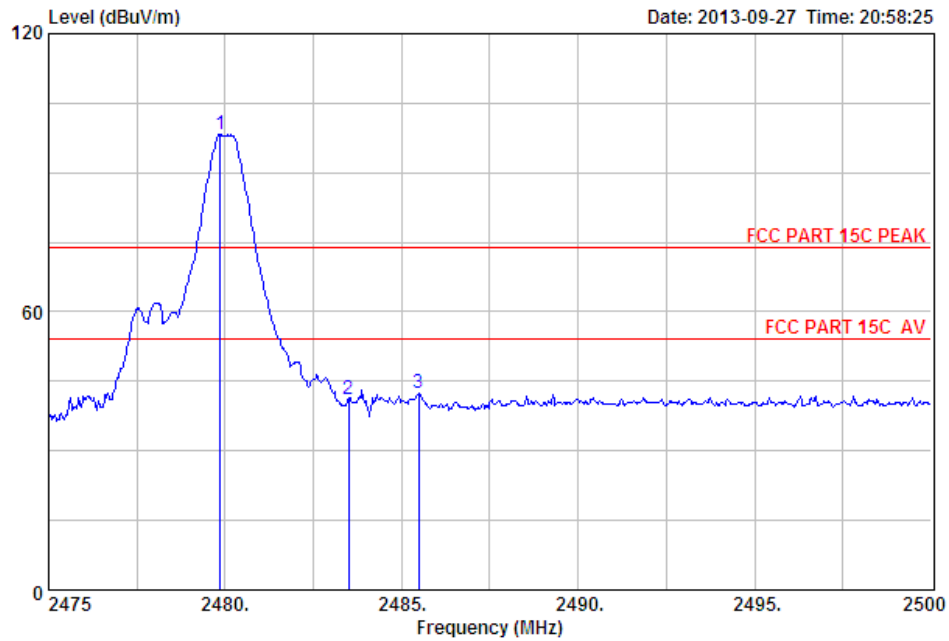
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 187
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Bluetooth speaker
 Power : DC 3.7V
 M/N : NYNE Cruiser
 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	2323.54	27.73	6.54	34.23	42.52	42.56	74.00	31.44	Peak
2	2390.00	27.64	6.62	34.19	39.81	39.88	74.00	34.12	Peak
3	2402.19	27.61	6.62	34.18	95.82	95.87	74.00	-21.87	Peak

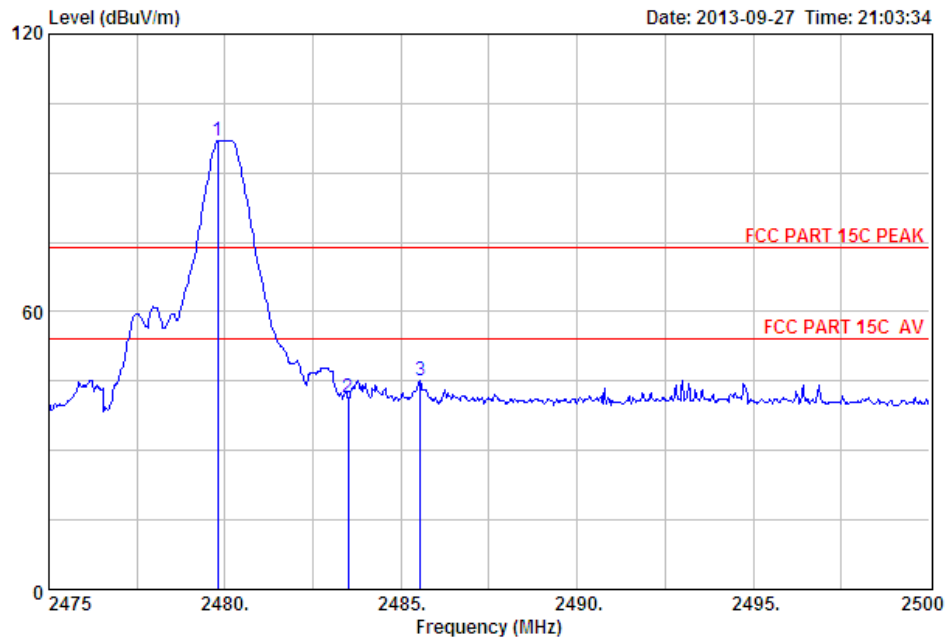
Remarks: 1. Emission Level= Antenna Factor + Cable Loss - Amp Factor + Reading.
 2. The emission levels that are 20dB below the official limit are not reported.



Site no. : 3m Chamber Data no. : 190
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : HORIZONTAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Bluetooth speaker
 Power : DC 3.7V
 M/N : NYNE Cruiser
 Test Mode : GFSK TX 2480MHz

	Freq.	Ant.	Cable	Amp	Emission				
	(MHz)	Factor	Loss	Factor	Reading	Level	Limits	Margin	Remark
		(dB/m)	(dB)	(dB)	(dBUV)	(dBUV/m)	(dBUV/m)	(dB)	
1	2479.85	27.58	6.71	34.03	98.07	98.33	74.00	-24.33	Peak
2	2483.50	27.58	6.71	34.03	41.01	41.27	74.00	32.73	Peak
3	2485.48	27.58	6.71	34.03	42.32	42.58	74.00	31.42	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. : 3m Chamber Data no. : 191
 Dis. / Ant. : 3m ANT 1-18G Ant. pol. : VERTICAL
 Limit : FCC PART 15C PEAK
 Env. / Ins. : Temp:25.6';Humi:56%;Press:101.52kPa
 Engineer : Tony
 EUT : Bluetooth speaker
 Power : DC 3.7V
 M/N : NYNE Cruiser
 Test Mode : GFSK TX 2480MHz

	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	34.03	96.79	97.05	74.00	-23.05	Peak
2	2483.50	27.58	6.71	34.03	41.22	41.48	74.00	32.52	Peak
3	2485.55	27.58	6.71	34.03	45.02	45.28	74.00	28.72	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.

6. 6dB Bandwidth Test

6.1. Limit

For direct sequence systems, the minimum 6dB bandwidth shall be at least 500kHz

6.2. Test Procedure

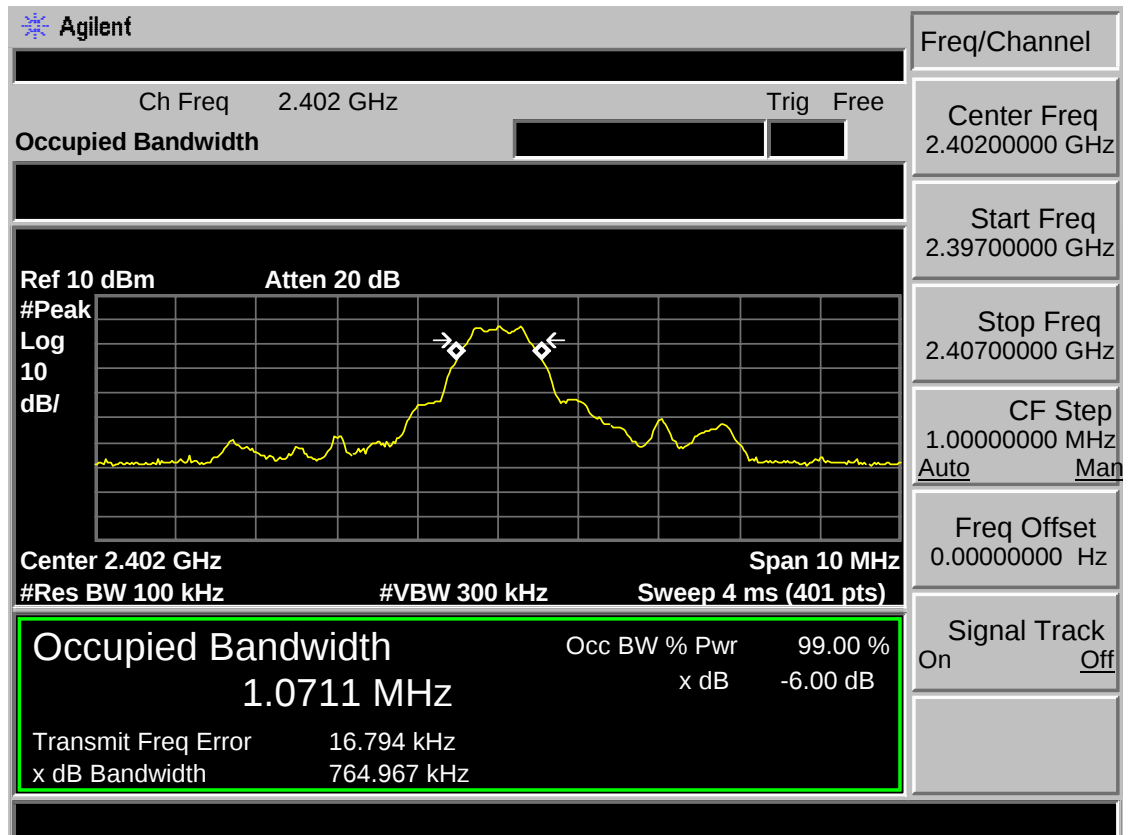
- 1, Connected the EUT's antenna port to spectrum analyzer device.
- 2, Follow the test procedure as described in KDB 558074
 - (1). Set resolution bandwidth (RBW) = 100 kHz.
 - (2). Set the video bandwidth (VBW) $\geq 3 \times$ RBW.
 - (3). Detector = Peak.
 - (4). Trace mode = max hold.
 - (5). Sweep = auto couple.
 - (6). Allow the trace to stabilize.
 - (7). Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

6.3. Test Result

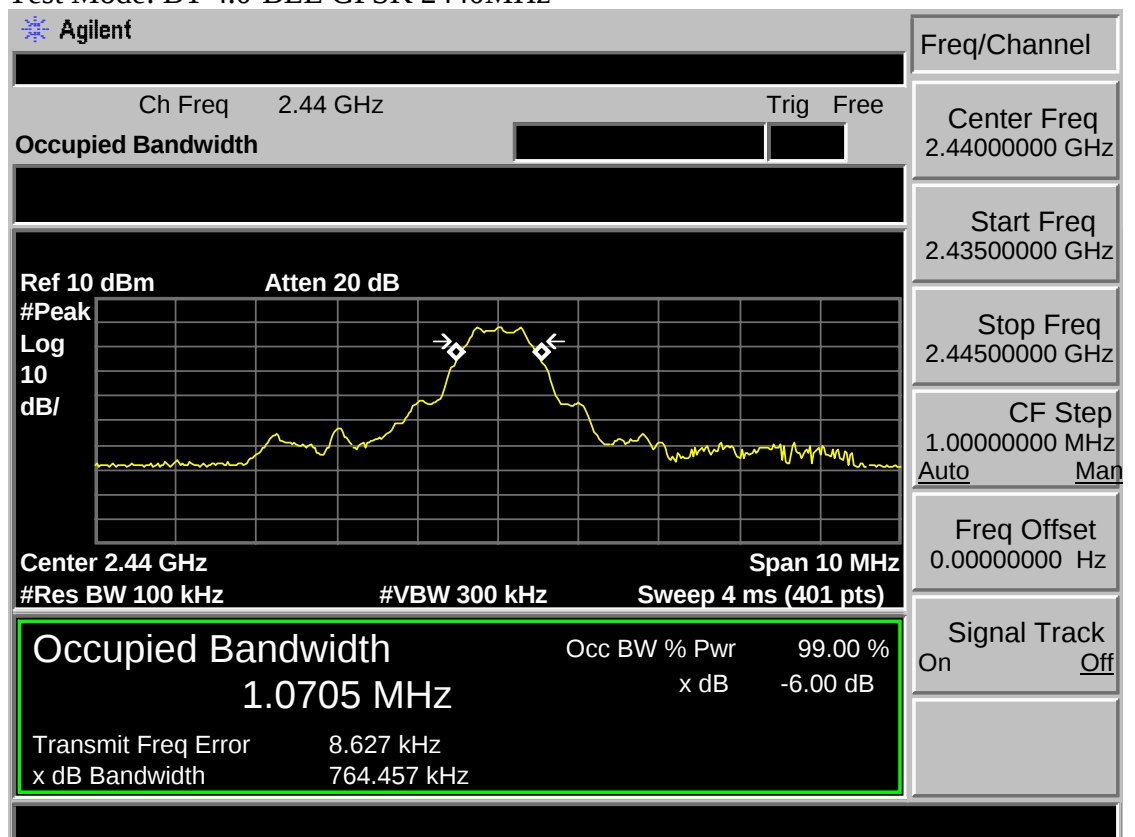
EUT: Bluetooth speaker			
M/N: NYNE Cruiser			
Test date: Sep 27, 2013		Tested by: Tony.Tang	Test site: RF Site
Test Mode	CH	6dB bandwidth (MHz)	Limit (KHz)
BT 4.0-BLE GFSK	CH1	0.765	>500
	CH20	0.764	>500
	CH40	0.765	>500
Conclusion : PASS			

6.4. Test Data

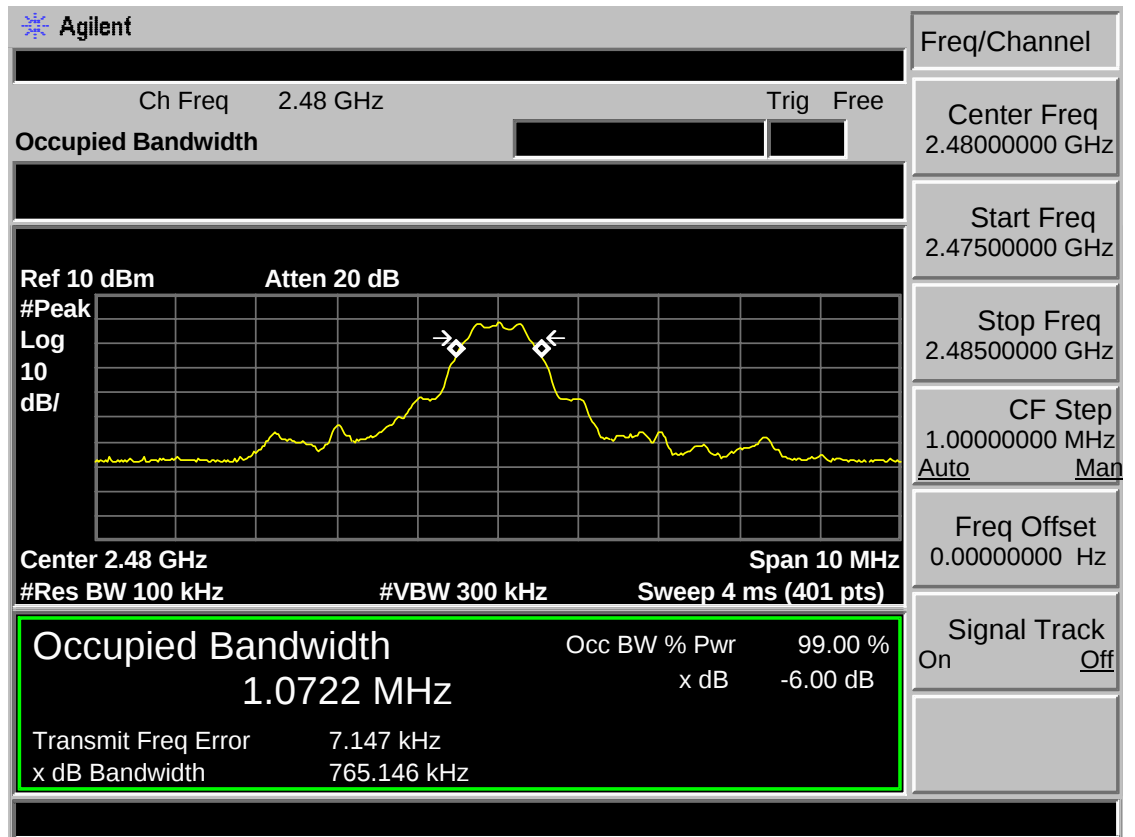
Test Mode: BT 4.0-BLE GFSK 2402MHz



Test Mode: BT 4.0-BLE GFSK 2440MHz



Test Mode: BT 4.0-BLE GFSK 2480MHz



7. OUTPUT POWER TEST

7.1. Limit

For systems using digital modulation in the 2400—2483.5MHz, The Peak out put Power shall not exceed 1W(30dBm)

7.2. Test Procedure

- 1, Connected the EUT's antenna port to spectrum analyzer device.
- 2, Follow the test procedure as described in KDB 558074
 - (1). Set the RBW $\geq$ DTS bandwidth.
 - (2). Set VBW $\geq$ RBW.
 - (3). Set span $\geq$ 3 x RBW.
 - (4). Sweep time = auto couple.
 - (5). Detector = peak.
 - (6). Trace mode = max hold.
 - (7). Allow trace to fully stabilize.
 - (8). Use peak marker function to determine the peak amplitude level.

Note: The cable loss and attenuator loss were offset into measure device as an amplitude offset.

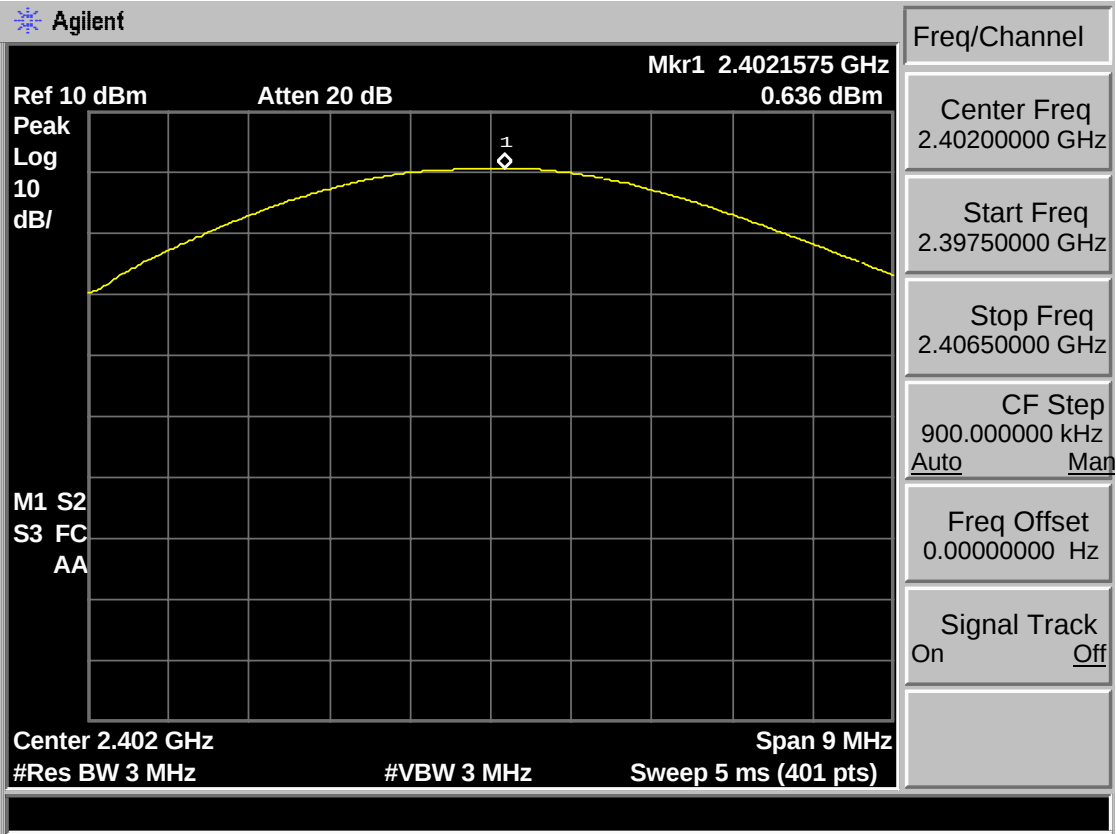
7.3. Test Result

EUT: Bluetooth speaker		
M/N: NYNE Cruiser		
Test date: Nov 05, 2013	Test site: 3m Chamber	Tested by: Tony Tang
Pass		

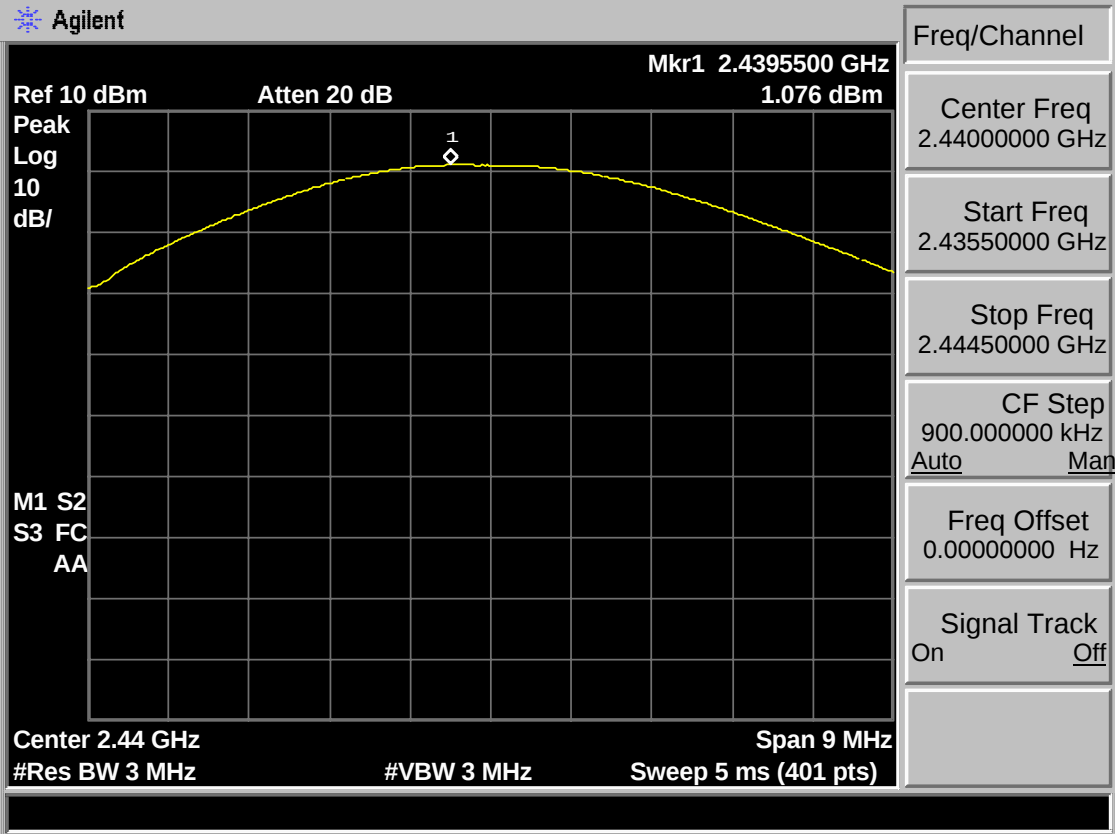
Test Mode	CH	Peak output Power (dBm)	Limit (dBm)
BT 4.0-BLE GFSK	CH1	0.636	30
	CH20	1.076	30
	CH40	1.397	30
Conclusion : PASS			

7.4. Test Data

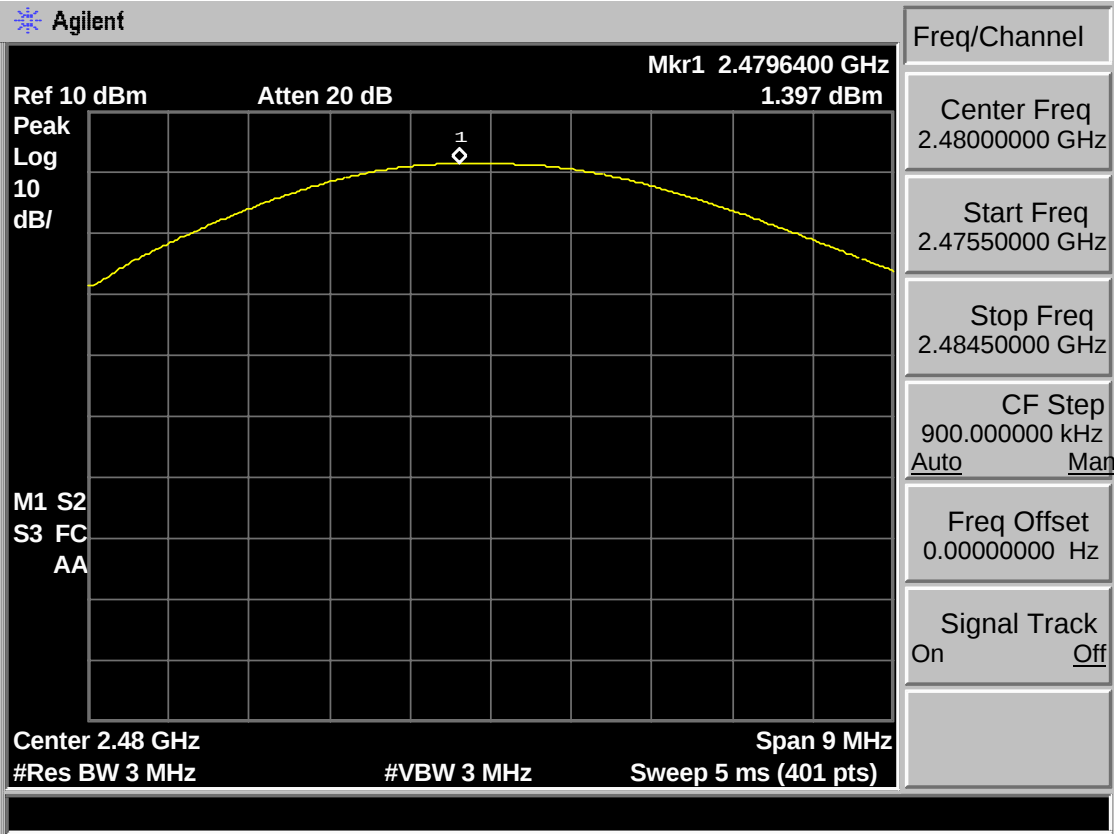
Test Mode: BT 4.0-BLE GFSK 2402MHz



Test Mode: BT 4.0-BLE GFSK 2440MHz



Test Mode: BT 4.0-BLE GFSK 2480MHz



8. POWER SPECTRAL DENSITY TEST

8.1. Limit

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band during any time interval of continuous transmission.

8.2. Test Procedure

- 1, Connected the EUT's antenna port to spectrum analyzer device.
- 2, Follow the test procedure as described in KDB 558074
 - (1). Set analyzer center frequency to DTS channel center frequency.
 - (2). Set the span to 1.5 times the DTS bandwidth.
 - (3). Set the RBW to: $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
 - (4). Set the VBW $\geq 3 \text{ RBW}$.
 - (5). Detector = peak.
 - (6). Sweep time = auto couple.
 - (7). Trace mode = max hold.
 - (8). Allow trace to fully stabilize.
 - (9). Use the peak marker function to determine the maximum amplitude level.
 - (10). If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

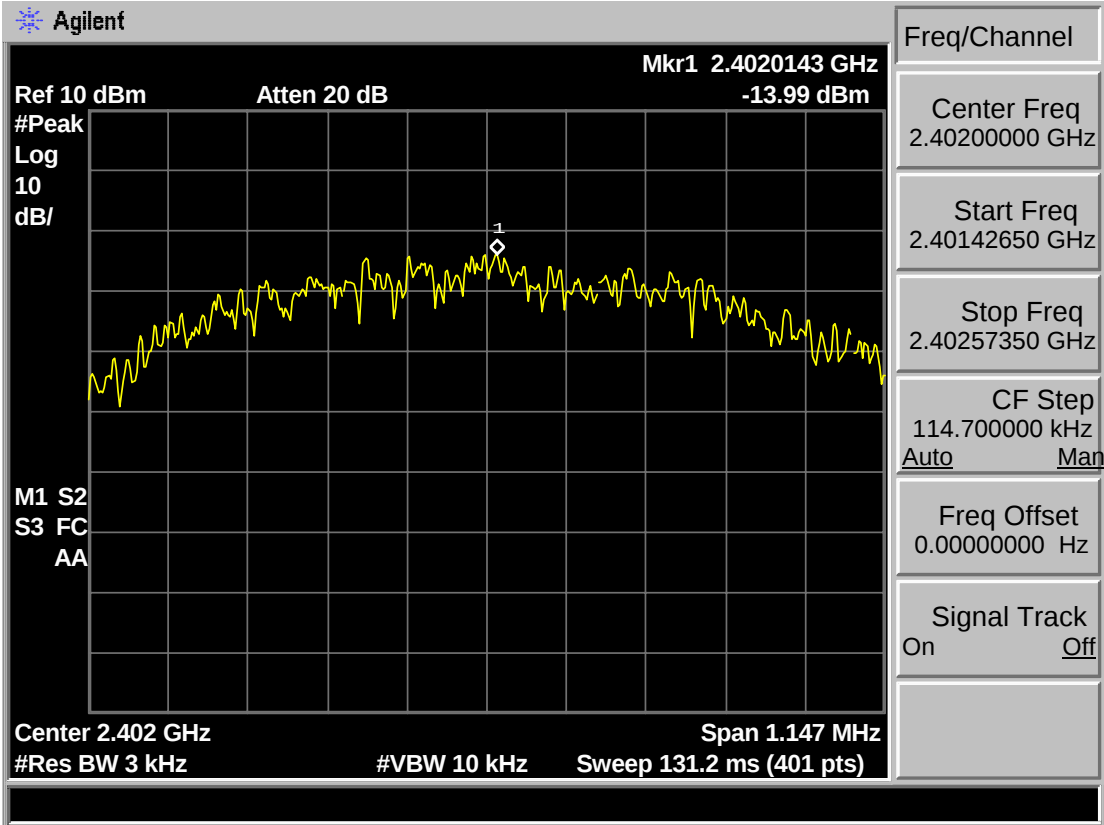
8.3. Test Result

EUT: Bluetooth speaker		
M/N: NYNE Cruiser		
Test date: Sep 27, 2013	Test site: 3m Chamber	Tested by: Tony Tang
Pass		

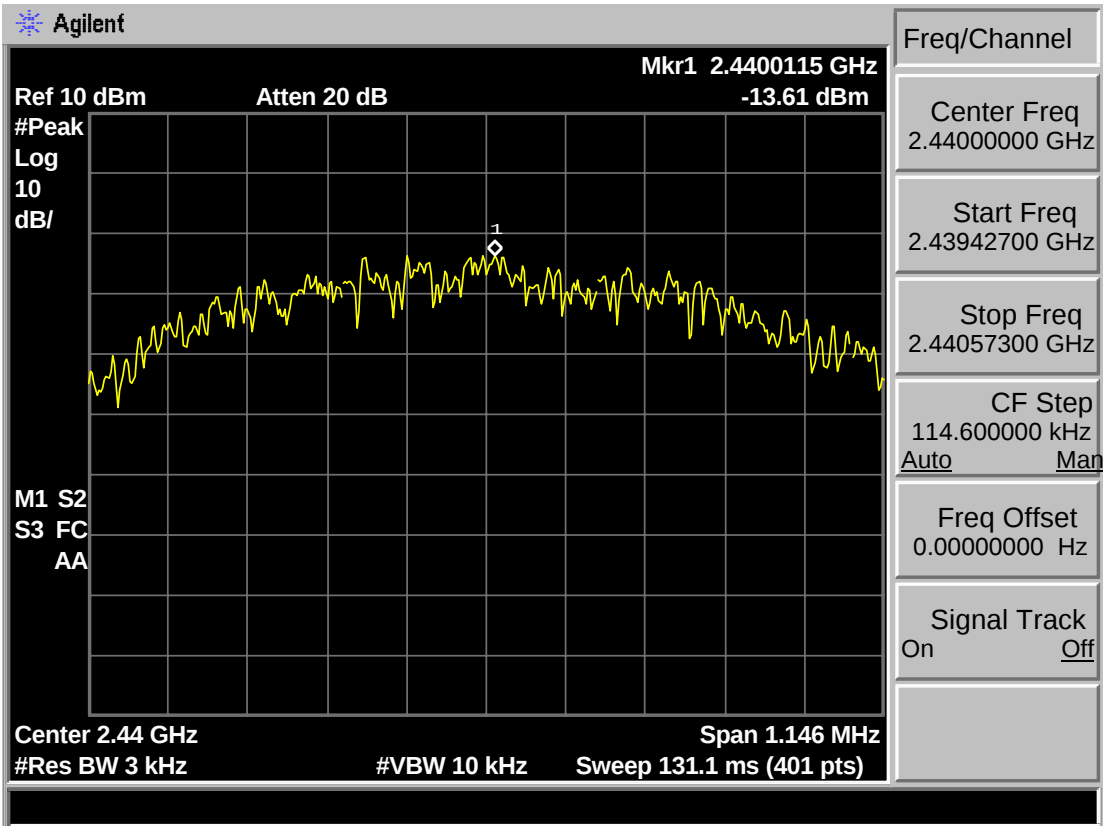
Test Mode	CH	Power density (dBm/3kHz)	Limit (dBm/3kHz)
BT 4.0-BLE GFSK	CH1	-13.99	8
	CH20	-13.61	8
	CH40	-12.28	8
Conclusion : PASS			

8.4. Test Data

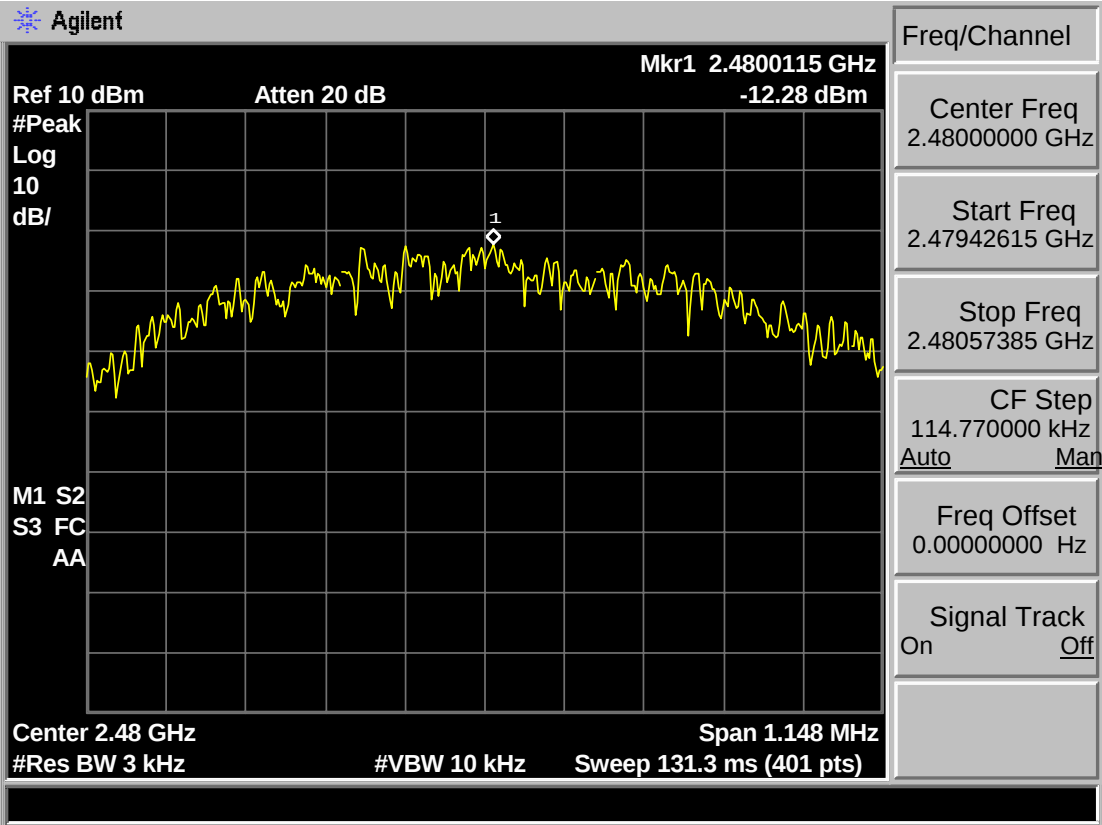
Test Mode: BT 4.0-BLE GFSK 2402MHz



Test Mode: BT 4.0-BLE GFSK 2440MHz



Test Mode: BT 4.0-BLE GFSK 2480MHz



9. ANTENNA REQUIREMENTS

9.1. Limit

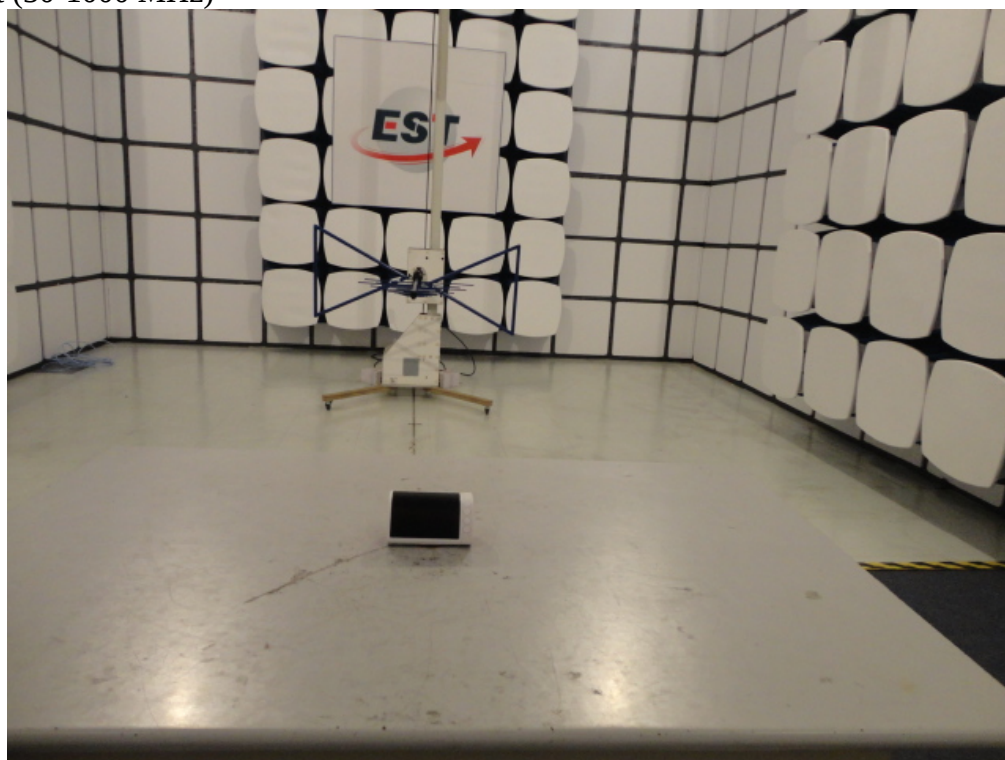
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional 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.

9.2. Result

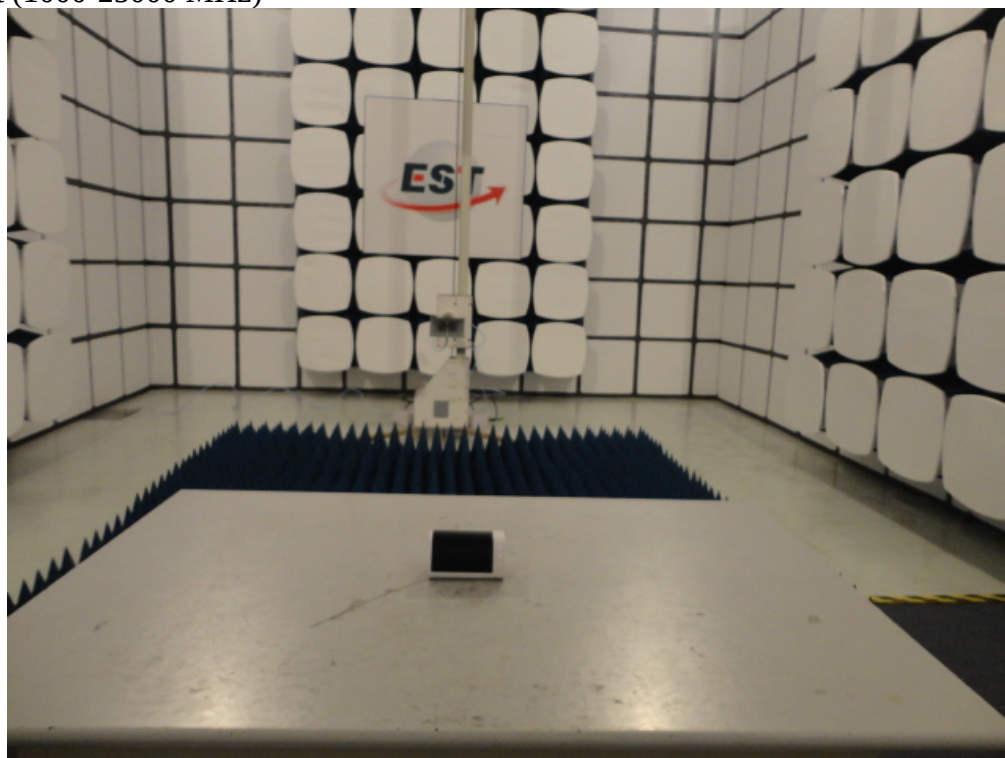
The antennas used for this product are integral Patch Antenna and that no antenna other than that furnished by the responsible party shall be used with the device, the maximum peak gain of the transmit antenna is only 0 dBi.

10. TEST SETUP PHOTO

Radiated Test (30-1000 MHz)

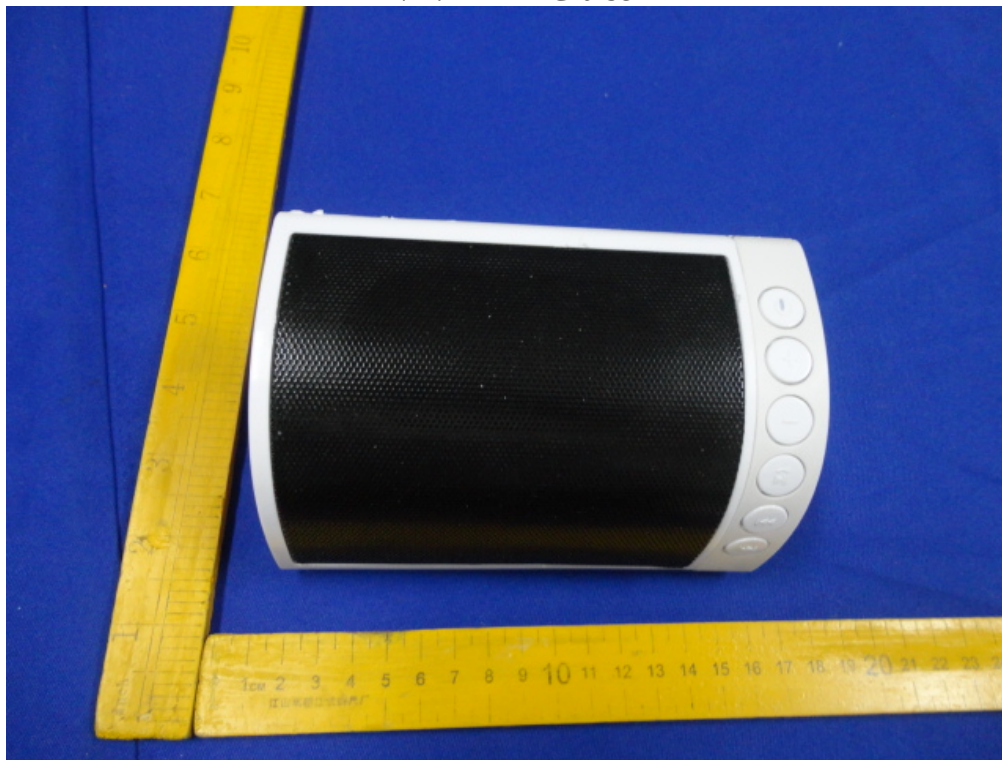


Radiated Test (1000-25000 MHz)



11. PHOTOS OF EUT

External Photos
M/N: NYNE Cruiser



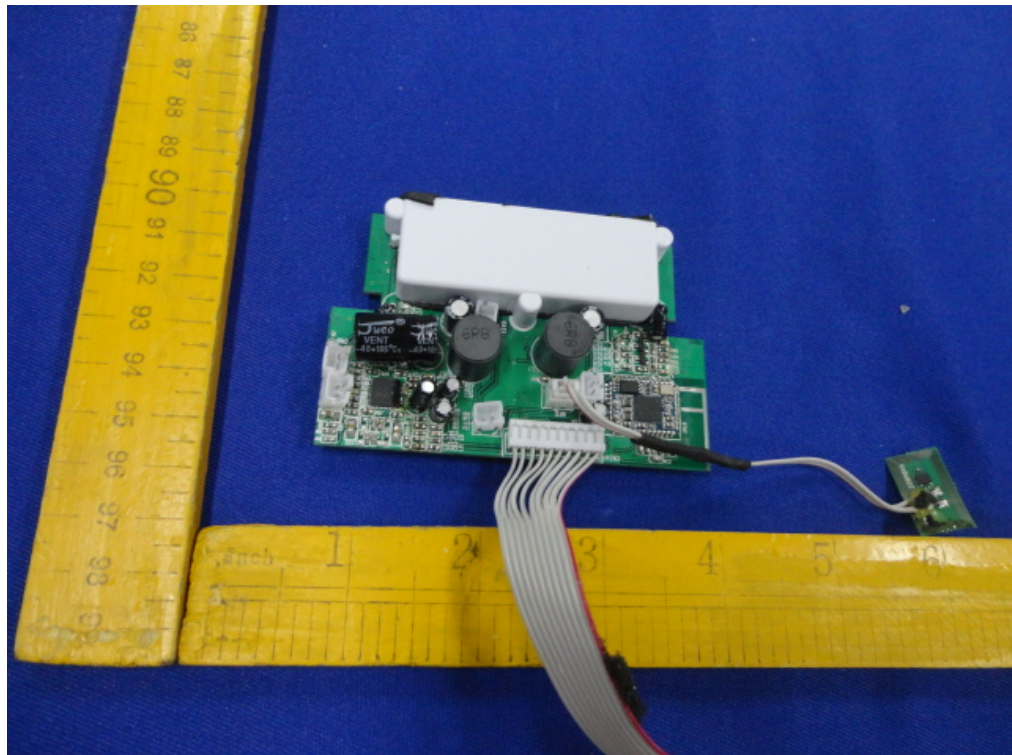
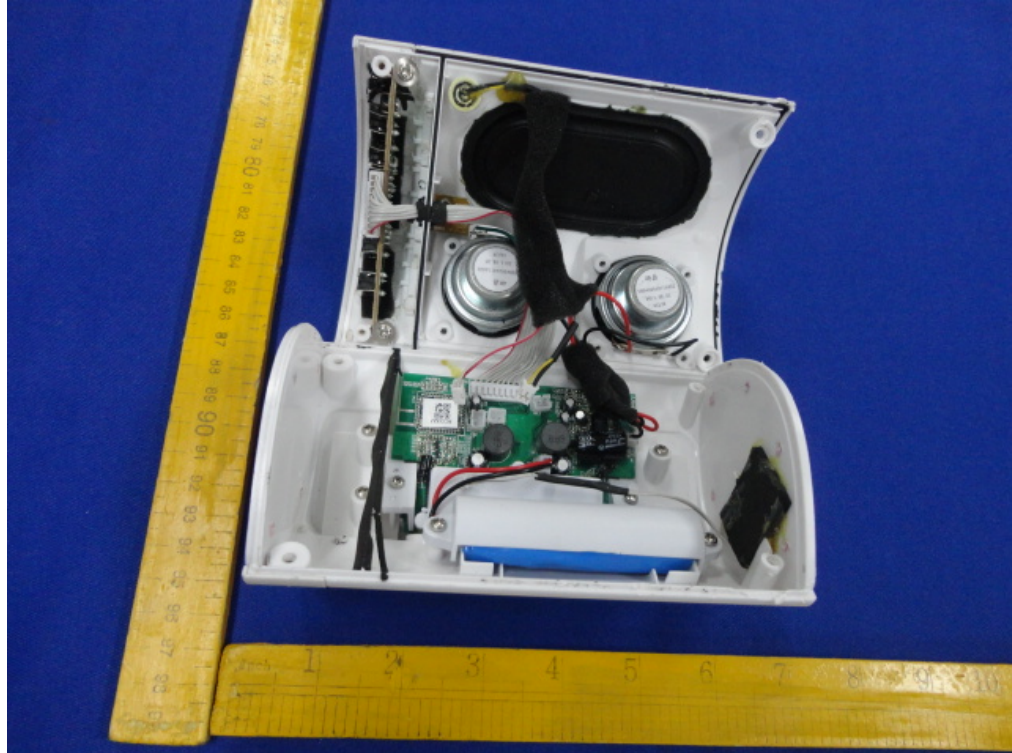
External Photos
M/N: NYNE Cruiser



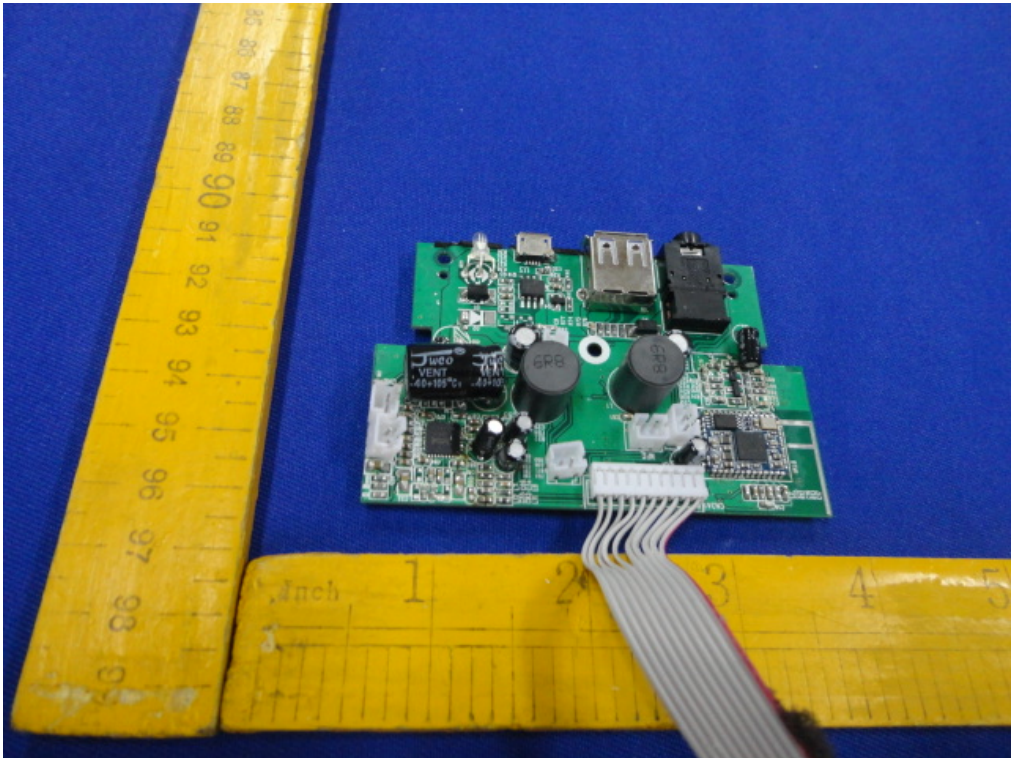
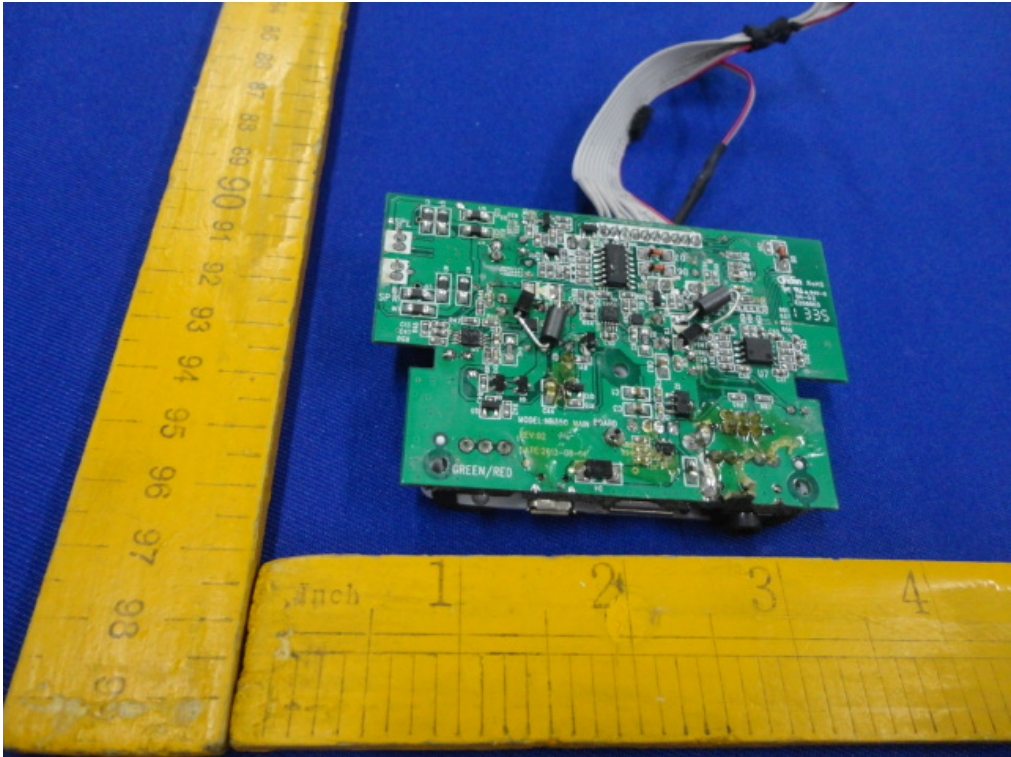
External Photos
M/N: NYNE Cruiser



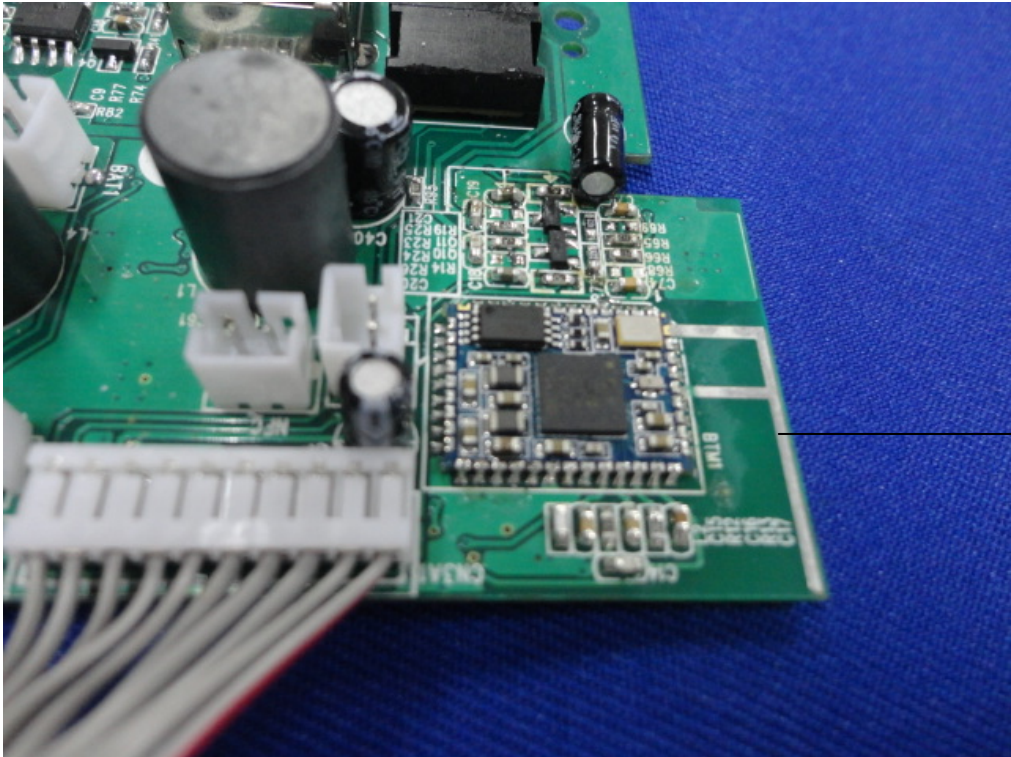
Internal Photos
M/N: NYNE Cruiser



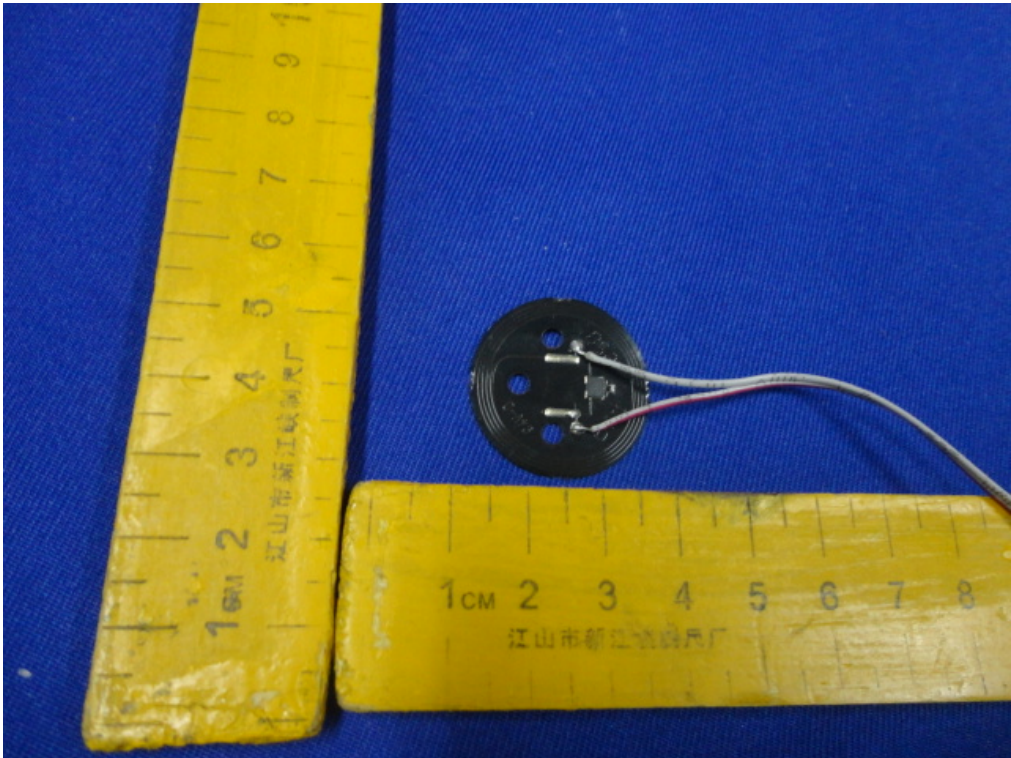
Internal Photos
M/N: NYNE Cruiser



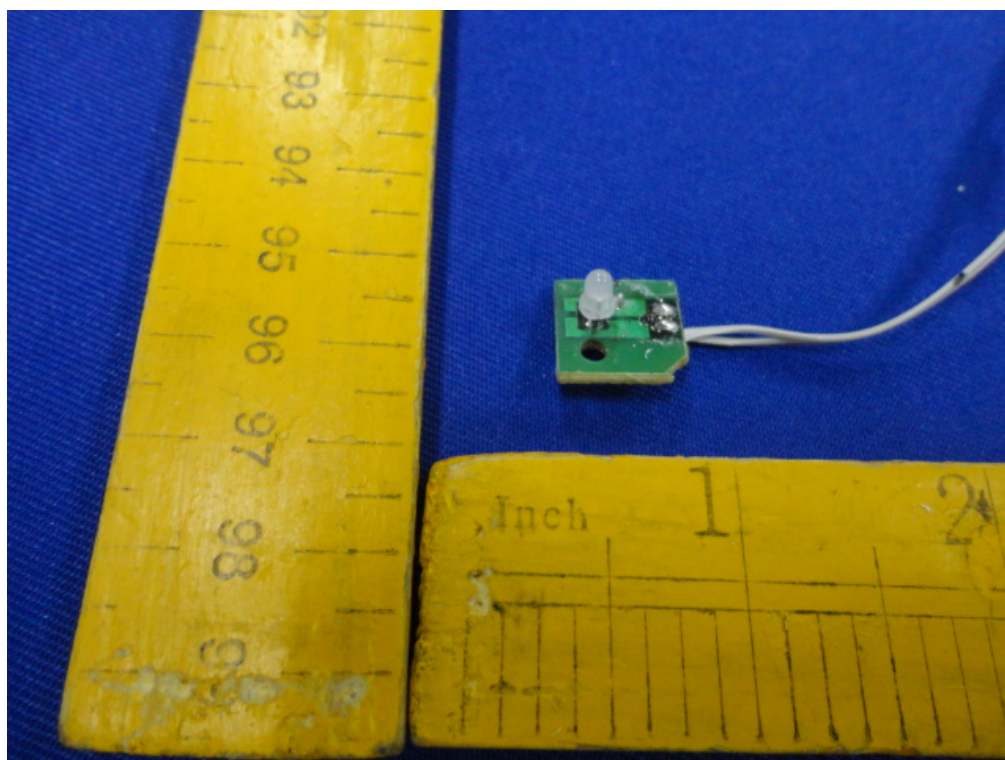
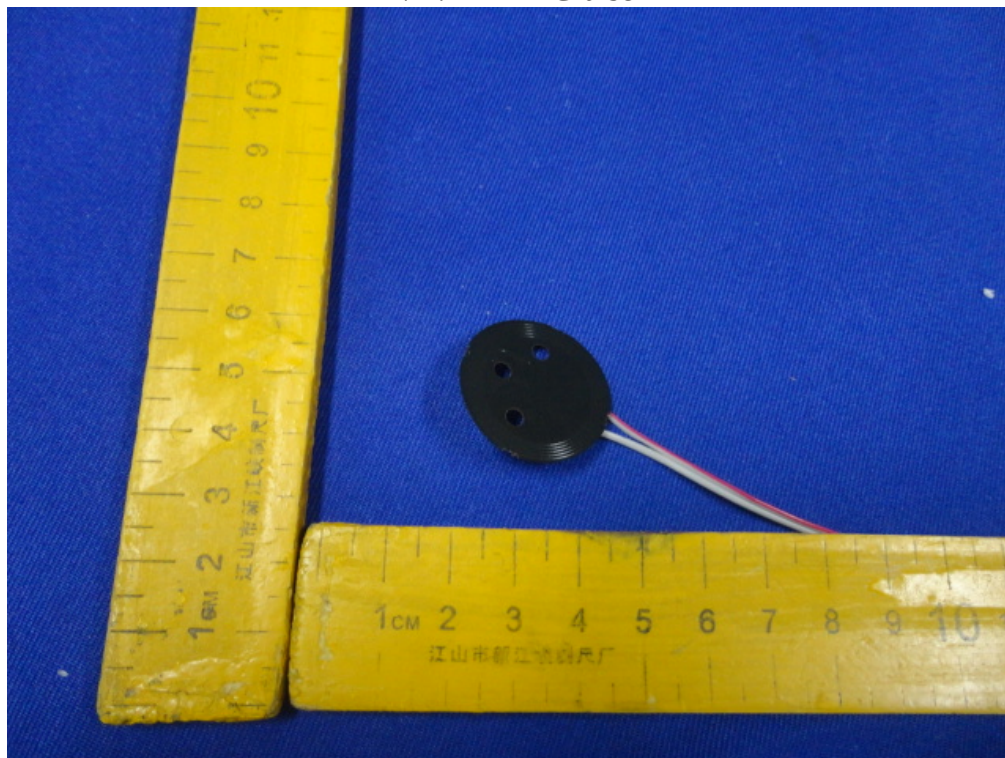
Internal Photos
M/N: NYNE Cruiser



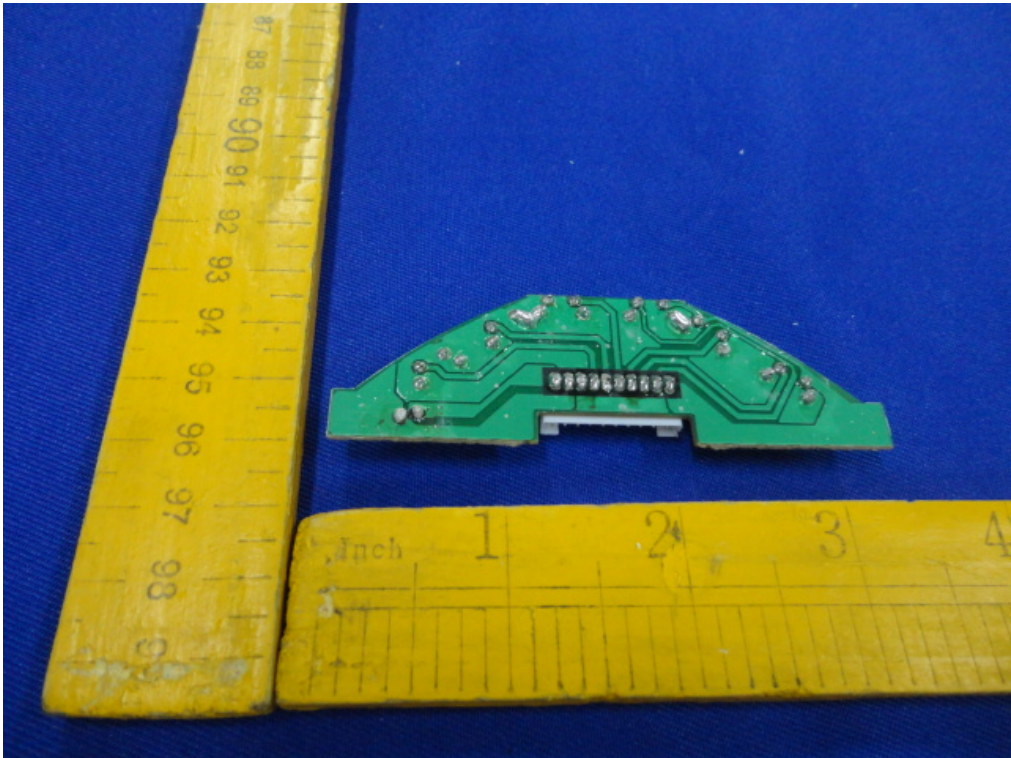
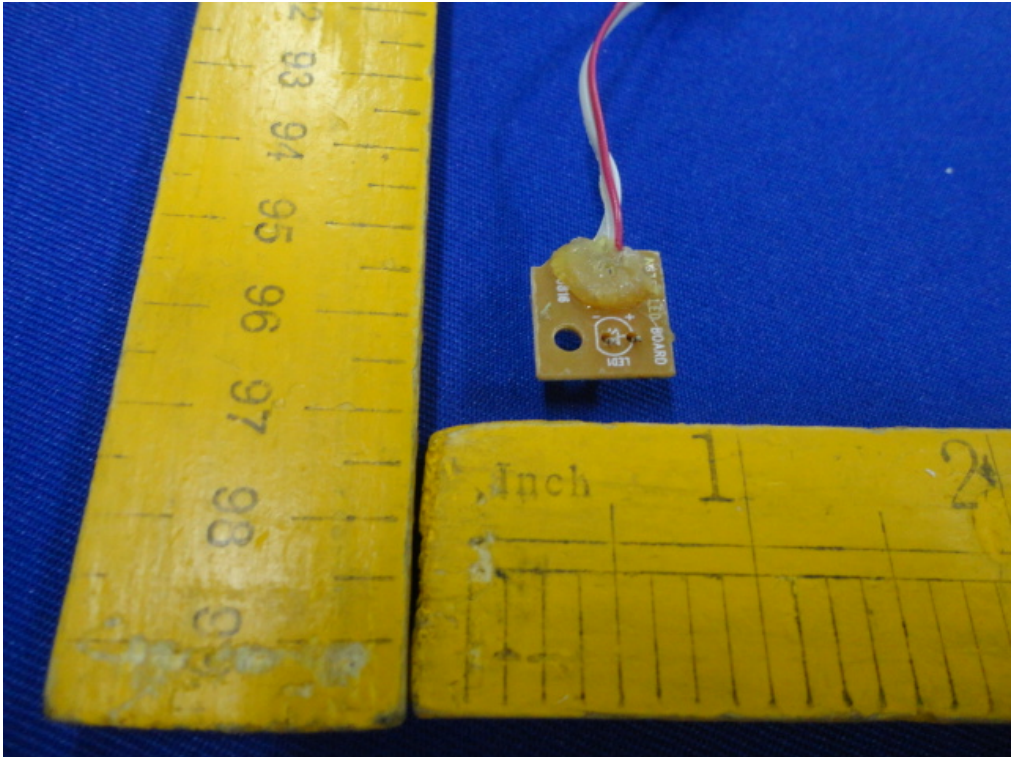
Bluetooth
Antenna



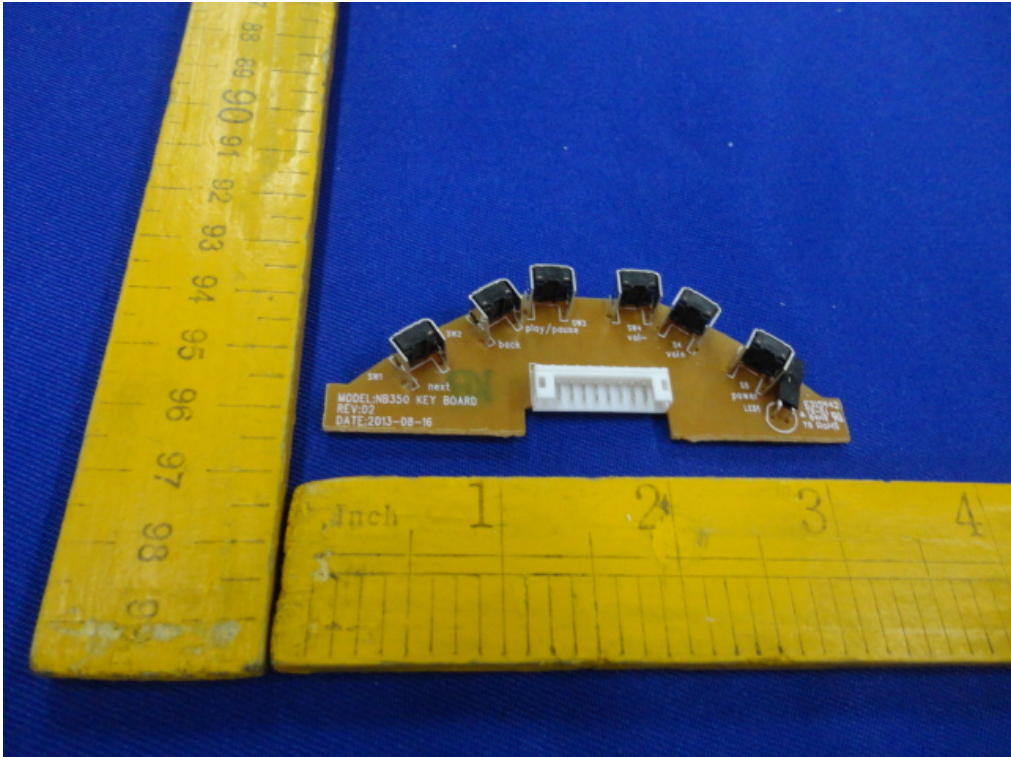
Internal Photos
M/N: NYNE Cruiser



Internal Photos
M/N: NYNE Cruiser



Internal Photos
M/N: NYNE Cruiser



Internal Photos
M/N: NYNE Cruiser

