GESTEK _{Lab}

No.3, Baodoucuokeng, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)

Report No: 1302018R-01

Tel:886-2-2603-5321 Fax:886-2-2603-5325

Test Report
Application for
Certification
on Behalf of

GLOBAL DIGITECH CO., LTD.

EUT:
Bluetooth Speaker
Model Number:
BT2000

FCC ID:
O6TGDMALLBT2000

Prepared for:
GLOBAL DIGITECH CO., LTD.
No.25 Alley 56 Lane 245 Sec.4 Bade Rd, Taipei, Taiwan

Report By : **Global EMC Standard Tech. Corp.**

No.3, Baodoucuokeng, Linkou Dist.,

New Taipei City 244, Taiwan(R.O.C.)

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1.   CERTIFICATION

Applicant	**: GLOBAL DIGITECH CO., LTD.**
Applicant Address	: No.25 Alley 56 Lane 245 Sec.4 Bade Rd, Taipei, Taiwan
EUT Description	: Bluetooth Speaker
Model Number	: BT2000
Serial Number	: N/A
Brade Name	: GDMALL
FCC ID	: O6TGDMALLBT2000
Tested Power Supply	: DC 5V
Manufacturer	: GLOBAL DIGITECH CO., LTD.
Manufacturer Address	: No7 Xialian Road, Xiagang, Changan Town, Dongguan, PRC

MEASUREMENT PROCEDURES USED:

☑ **CFR 47, Part 15**   Radio Frequency Device Subpart C Intentional Radiators

☑ **ANSI C63.4**   Methods of Measurements of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9kHz To 40GHz: 2009

☑**FCC Public Notice DA 00-705**

THE MEASUREMENT SHOWN IN THE ATTACHMENT WAS MADE IN ACCORDANCE WITH THE PROCEDURES INDICATED, AND THE MAXIMUM ENERGY EMITTED BY THE EQUIPMENT WAS FOUND TO BE WITHIN THE ABOVE LIMITS APPLICABLE.
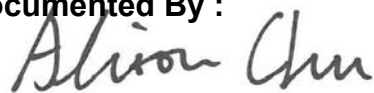
Sample Received Date : <u>March 06, 2013</u>
Date of Test   : <u>March 07, 2013</u> –<u>March 27, 2013</u>
Issue Date   : <u>April 03, 2013</u>

In order to ensure the quality and accuracy of this document, the contents have been thoroughly reviewed by the following qualified personnel from GesTek Lab.

Documented By :
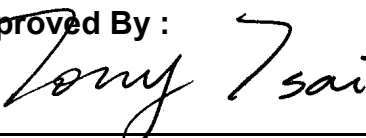
Alison Chu / Report Author

Tested By :

Albert Tzeng / Eng. Dept. Engineer

Approved By :

Tony Tsai / eng. Dept. Manager

2.   GENERAL INFORMATION

2.1 PRODUCTION DESCRIPTION

Product Name	: Bluetooth Speaker
Model Number	: BT2000
Serial Number	: N/A
Brade Name	: GDMALL
FCC ID	: O6TGDMALLBT2000
Modulation Type	: GFSK (This EUT supports GFSK modulation type only without other further modulation type)
Antenna Gain	: 0.22dBi
Antenna Type	: Printed on PCB
Frequencg Range	: 2402MHz to 2480MHz
Channel Number	: 79 Channel
Channel Control	: Control by Software
Working Voltage	: DC 5V

Frequency of Each Channel:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	55	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

Note:

1. This device is a Bluetooth Speaker include Bluetooth function and this report is for transmitter.
2. Test of channel was included the lowest、middle and highest frequency in highest data rate and to perform the test, then record on this report.
3. These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15 Subpart C Paragraph 15.247 for spread spectrum devices.

2.2 OPERATIONAL DESCRIPTION

The device is Bluetooth Speaker have Bluetooth function and can link with Bluetooth dongle for control PC.

Another information please refer to users manual.

2.3 TEST MODES & EUT COMPONENTS DESCRIPTION

EUT: Bluetooth Speaker, M/N: BT2000, The EUT tested with Notebook PC.	
Test Mode	**Mode 1- GFSK**

2.4 SUMMARY OF TEST PROCEDURE AND TEST RESULTS

Test Item	Applied Standard Section	Test Resut
Conducted Emisson	15.207 ANSI C63.4 Section 7, 13, Annex I	Pass (refer to section 3.7)
Radiated Emission	15.209,15.247(d) ANSI C63.4 Section 8,13 Annex I	Pass (refer to section 4.7)
Peak Power Output	15.247(b), ANSI C63.4 Section 13 & Annex I	Pass (refer to section 5.4)
Band Edge	15.247(d) , ANSI C63.4 Section 13 & Annex I	Pass (refer to section 6.6)
Occupied Bandwidth	15.247(a) , ANSI C63.4 Section 13 & Annex I	Pass (refer to section 7.4)
Channel Separation	15.247(a) , ANSI C63.4 Section 13 & Annex I	Pass (refer to section 8.4)
Dwell Time	15.247(a) , ANSI C63.4 Section 13 & Annex I	Pass (refer to section 9.4)
Hopping Channel	15.247(b) , ANSI C63.4 Section 13 & Annex I	Pass (refer to section 10.4)

2.5 CONFIGURATION OF THE TESTED SYSTEM

The FCC IDs/Types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards, which have grants) are:

Item	Device	No.	Configuration	
1	NOTEBOOK	DELL NB 1	Model Number	: Latitude D600 PPO5L
			BSMI ID	: R33002
			FCC ID	E2K24CLNS
			Serial Number	: 10826163280
			C.P.U	: Intel Pentium M 1.4G HZ
			DDR	: PC2100 256MB
			WIRELESS LAN CARD	: Manufacturer :INTEL M/N:WM3A2100 FCC ID: E2K24CLNS
			H.D.D.	: Manufacturer : FUJITSU 30G M/N: MHT2030AT S/N:NN15T421E09C BSMI ID:D33073
			DVD-ROM	: Manufacturer :DELL M/N:5W299-A01
			BATTERY MODULE	: Manufacturer :DELL Li-ion M/N:6Y270 RATING:14.8V 220mAh
			AC ADAPTOR	: Manufacturer :DELL M/N: PA-1650-05D S/N:CN-05U092-48010-39N-227C INPUT:AC 100-240 V~1.5A 50-60HZ Shielded, Undetachable, 2.5m

Note: All the peripherals above were selected specifically after confirming that there is no impact on test results.

2.6 LAB AMBIENT

Items	Range Requirement
Temperature (°C)	10-40
Humidity (%RH)	10-90
Barometric pressure (mbar)	860-1060

2.7 TEST FACILITY AUTHORIZATION AND ACCREDITATION

Global EMC Standard Tech. Corp. is accredited in respect of laboratory and the accreditation criteria is ISO/IEC 17025: 2005.

AUTHORIZATION	
FCC SITE DESCRIPTION	Aug. 10, 1995 /Aug. 25, 1998 File on FCC Engineering Laboratory Federal Communication Commission 7435 Oakland Mills Road Columbia, MD 21046 Reference 31040/SIT1300F2 Designation Number: TW1031 (No. 15, Neighborhood 3, Ruishukeng, Linkou Dist., New Taipei City, Taiwan) Designation Number: TW1032 (No.3, Baodoucuokeng, Linkou Dist., New Taipei City, Taiwan)

ACCREDITATION	
Taiwan Accreditation Foundation (TAF)	Recognized by the Council of Taiwan Accreditation Foundation and confirmed to meet the requirements of ISO/IEC 17025. Registration No.: 1082 Registration on TAF effective through Sep. 19, 2015

2.8 TEST SETUP

BLOCK DIAGRAM OF CONNECTIONS BETWEEN EUT AND SIMULATORS

Bluetooth Tx Mode + AC Conducted Emission Mode
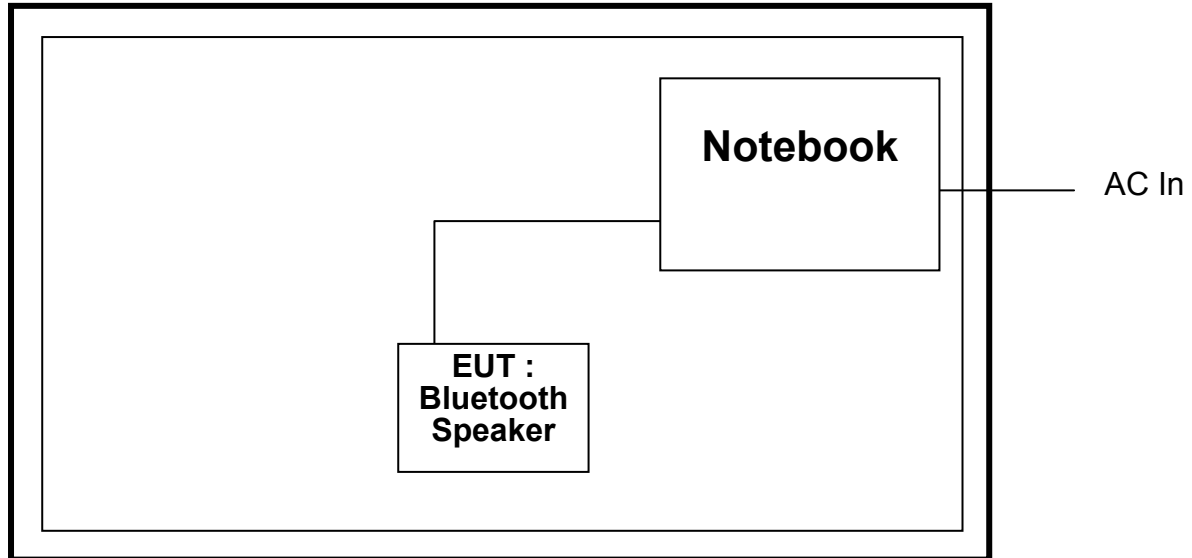
2.9 EUT OPERATING CONDITIONS

The EUT exercise program used during conducted testing was designed to exercise the EUT in a manner similar to a typical use. The exercise sequence is listed as below:

1. Setup the EUT as shown on 2.7.
2. Turn on the power of all equipments.
3. Execute the test program (Bluetest).
4. Choose the test mode and setup the parameter.
5. Test it.
6. Repeat the above steps.

3. CONDUCTED EMISSION MEASUREMENT
3.1   TEST EQUIPMENTS

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	TEST RECEIVER	RS	ESCS30	100392	2014.02.04
2	L.I.S.N.(EUT)	RS	ENV216	100108	2013.05.14
3	L.I.S.N.(AE)	ROLF HEINE	NNB-2/16Z	98091	2013.08.12
4	CABLE	GTK	N/A	GTK-E-A154-01	2014.01.11
5	50 Ohm Terminator	JYEBAO	BNC 0/3GHz	GTK-E-A424-01	2013.06.06
6	Software	FARAD	EZ-EMC	2A1.1(USB)	N/A

Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

2. The test was performed at GTK Shielded Room B5.

3.2   BLOCK DIAGRAM OF TEST SETUP
3.2.1   TEST SETUP FOR EMISSION MEASUREMENT AT MAINS TERMINAL
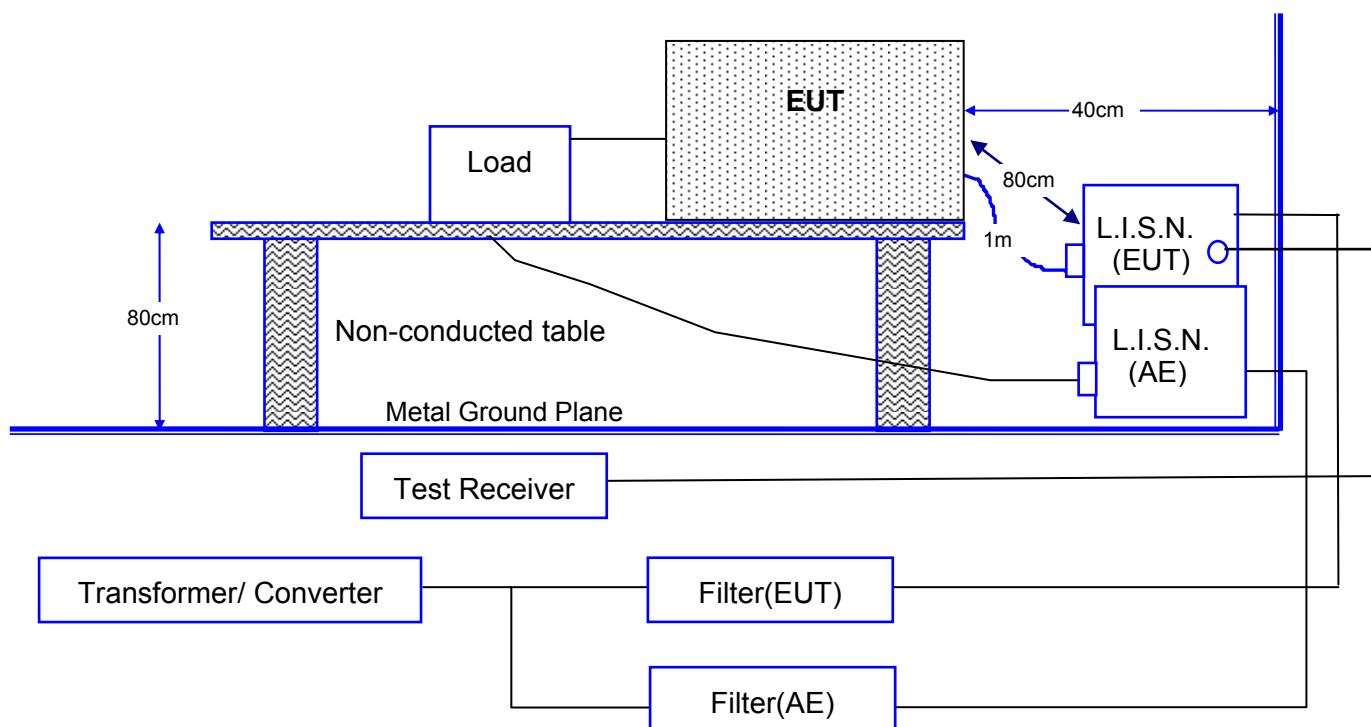
Note: This is a representative setup diagram for Table-top EUT.
For Floor-standing EUT, the table will be removed with all others setup condition remain the same.

3.3   CONDUCTED EMISSION LIMITS
3.3.1   CONDUCTED EMISSION LIMITS (MAINS TERMINAL)

Frequency	Voltage dB(µV)	
	Class B	
MHz	QUASI-PEAK	AVERAGE
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5.0	56	46
5.0 to 30	60	50

Remarks: In the Above Table, the tighter limit applies at the band edges.

3.4   TEST CONFIGURATION ON MEASUREMENT

The equipments that are listed in section 4.1 are installed on Conducted Power Line Test in order to meet the requirement of the Commission and operating in a manner, which tends to maximize its emission characteristics in a normal application.

The device under test, installed in a representative system as described in section 4.3, was placed on a non-conductive table whose total height equal to 80cm. Powered from one L.I.S.N. which signal output to receiver, and the other peripherals was powered from another L.I.S.N. which signal output was terminated by 50Ω.

3.5   CONDUCTED EMISSION MEASURED PROCEDURE AND DATA

3.5.1   CONDUCTED EMISSION (MAINS TERMINAL)

The measurement range of conducted emission, which is from <u>0.15 MHz to 30 MHz</u>, was scan for peak emission curve of all the test modes. The worst mode is then measured using an average and/or quasi peak detector and record at least the disturbance levels and the frequencies of the six highest disturbances. The final measurement value is equal to the receiver reading plus the correction factor. If AMN insertion loss is more than 0.5dB, automatically the receiver will add the correction factor to the reading level.

3.6   OPERATING CONDITIONS OF THE EUT

Same as conducted emission measurement, which is listed in 2.9

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3.7 CONDUCTED EMISSION MEASUREMENT RESULTS

Date of Test	March 06, 2013	Temperature	20 ℃
EUT	Bluetooth Speaker	Humidity	59 %
Test Mode	Mode 1:Bluetooth Link + USB Cable	Display Pattern	Program
Test Power Supply	DC 5V POWER BY NOTEBOOK		

Line

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV	Limit dBµV	Over Limit dB	Detector
1	0.1737	47.45	9.65	57.10	64.78	-7.68	QP
2	0.1737	16.31	9.65	25.96	54.78	-28.82	AVG
3	0.2469	41.22	9.65	50.87	61.86	-10.99	QP
4	0.2469	13.79	9.65	23.44	51.86	-28.42	AVG
5	0.2870	39.61	9.65	49.26	60.61	-11.35	QP
6	★0.2870	35.95	9.65	45.60	50.61	-5.01	AVG
7	0.3557	34.80	9.65	44.45	58.83	-14.38	QP
8	0.3557	6.12	9.65	15.77	48.83	-33.06	AVG
9	0.4310	35.69	9.65	45.34	57.23	-11.89	QP
10	0.4310	32.40	9.65	42.05	47.23	-5.18	AVG
11	19.2263	25.08	9.67	34.75	60.00	-25.25	QP
12	19.2263	12.31	9.67	21.98	50.00	-28.02	AVG

Remarks :

1. All readings are Quasi-peak and Average values.

2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).

3. Over Limit (Margin Value)=Measurement level-Limit value.

4. Factor = L.I.S.N. insertion loss + cable loss

5. " ★ " means that this data is the worst case measurement level.

6. The measurement uncertainty is 4.47 dB.

Line

Remark: 1. The Limit (The red line of the graph indicates the quasi-peak measurements).

2. The AVG (The purple line of the graph indicates the average measurements).

3. The scan curve indicates peak detector measurement.

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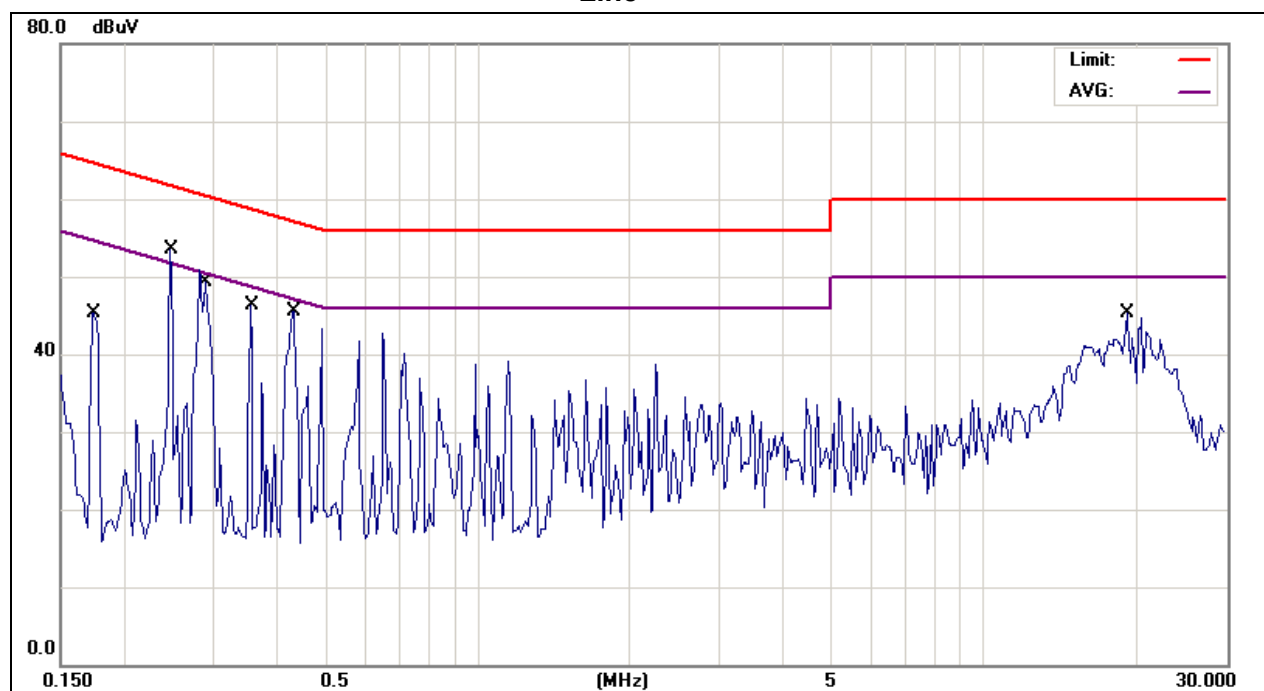| Date of Test	March 06, 2013	Temperature	20 ℃
EUT	Bluetooth Speaker	Humidity	59 %
Test Mode	Mode 1:Bluetooth Link + USB Cable	Display Pattern	Program
Test Power Supply	DC 5V POWER BY NOTEBOOK		

Neutral

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV	Limit dBμV	Over Limit dB	Detector
1	0.1805	47.40	9.68	57.08	64.46	-7.38	QP
2	0.1805	12.67	9.68	22.35	54.46	-32.11	AVG
3	0.2788	39.00	9.68	48.68	60.85	-12.17	QP
4	0.2788	21.63	9.68	31.31	50.85	-19.54	AVG
5	0.3370	32.86	9.69	42.55	59.28	-16.73	QP
6	0.3370	4.44	9.69	14.13	49.28	-35.15	AVG
7	0.4305	34.65	9.69	44.34	57.24	-12.90	QP
8	★0.4305	31.61	9.69	41.30	47.24	-5.94	AVG
9	0.6585	24.49	9.69	34.18	56.00	-21.82	QP
10	0.6585	10.26	9.69	19.95	46.00	-26.05	AVG
11	0.9891	19.52	9.69	29.21	56.00	-26.79	QP
12	0.9891	1.52	9.69	11.21	46.00	-34.79	AVG

Remarks :

1. All readings are Quasi-peak and Average values.

2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).

3. Over Limit (Margin Value)=Measurement level-Limit value.

4. Factor = L.I.S.N. insertion loss + cable loss

5. " ★ " means that this data is the worst case measurement level.

6. The measurement uncertainty is 4.47 dB.

Neutral
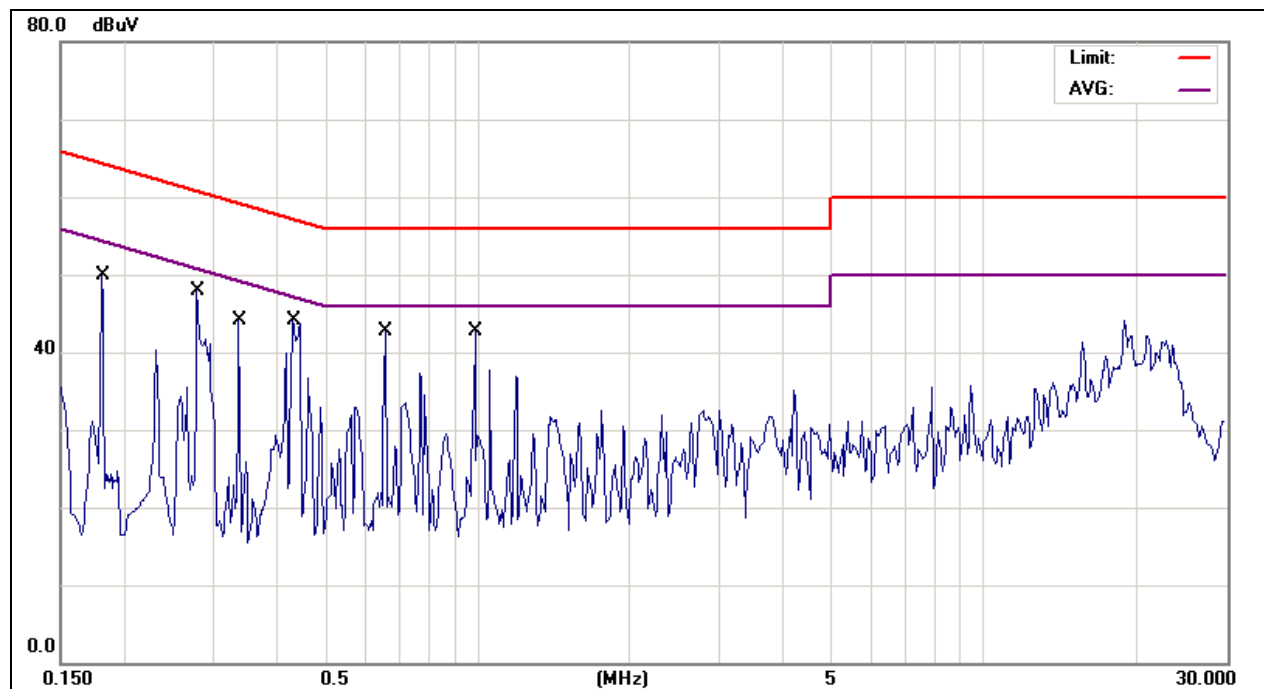
Remark:　1. The Limit (The red line of the graph indicates the quasi-peak measurements).

2. The AVG (The purple line of the graph indicates the average measurements).

3. The scan curve indicates peak detector measurement.

4.   RADIATION EMISSION DATA

4.1 TEST EQUIPMENT

The following test equipments are used during the radiated emission tests:

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Spectrum Analyzer	RS	FSU26	200882	2013.09.19
2	Active Loop	EMCO	6507	95101353	2013.11.18
3	Pre-Amplifier	EMV-Technik	PA303	GTK-E-A339-01	2013.04.13
4	Pre-Amplifier	HP	8449B	3008A01264	2013.06.04
5	BILOG ANTENNA	SCHWARZBECK	VULB 9168	9168-253	2013.03.01
6	HORN ANTENNA	SCHWARZBECK	BBHA 9120	D243	2014.01.23
7	BOARD-BAND ANTENNA	SCHWARZBECK	BBHA 9170	BBHA9170164	2014.01.27
8	CABLE	INSULATED WIRE INC.	SPS-2801-3940-NPS	03262012	2013.04.11
9	CABLE	SUHNER	SUCOFLEX 104PEA	MY3501/4PEA	2013.10.08
10	CABLE	SUHNER	SUCOFLEX 102	23538/2	2013.06.26
11	CABLE	SUHNER	SUCOFLEX 102	28523/2	2013.09.19
12	Test Program Software	Hotlife	CSR BC4	N/A	N/A

Note: 1. All equipments are calibrated and will be valid only for a period of 1 year.

2. The test was performed at GTK Chamber A6 (Under 1GHz) and Chamber A6 (Above 1GHz).

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4.2 OPEN TEST SITE SETUP DIAGRAM
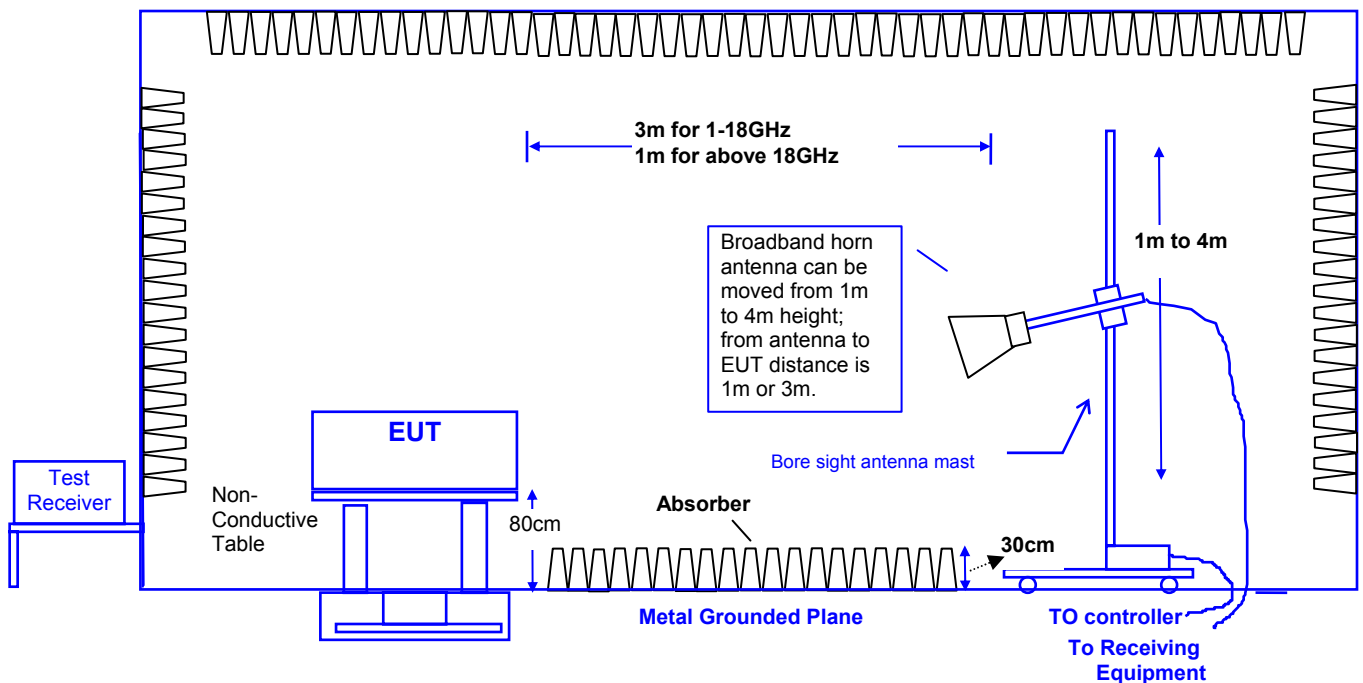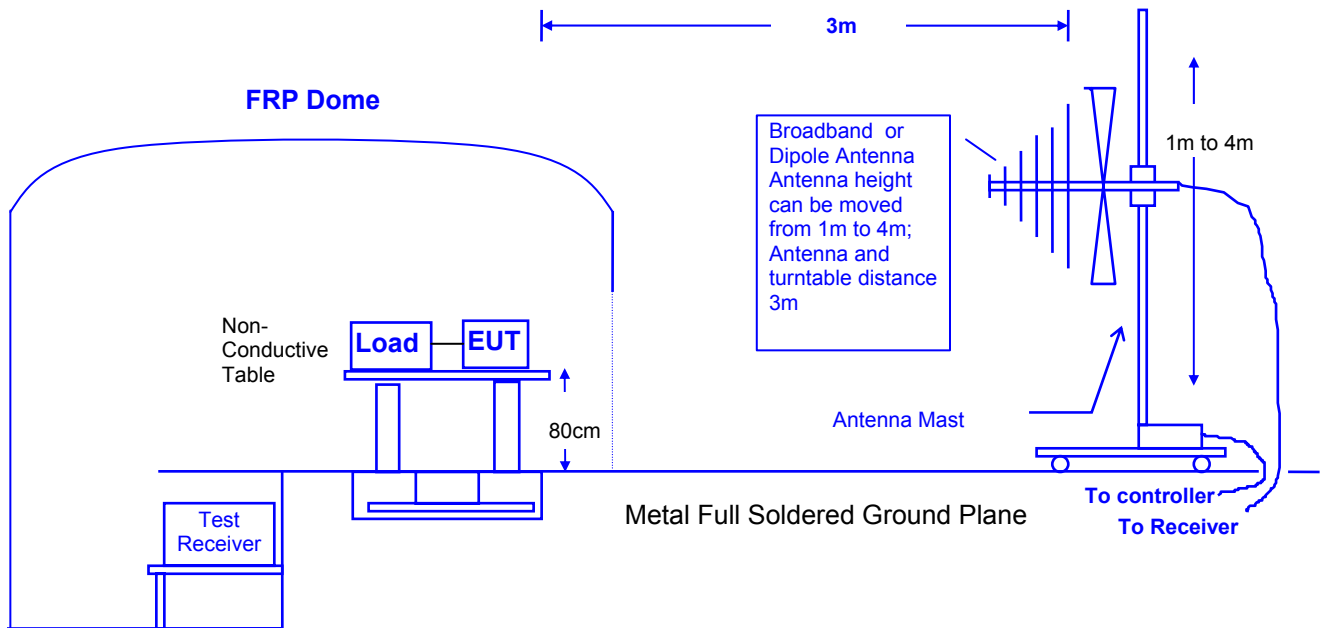
Note: This is a representative setup diagram for Table-top EUT.
For Floor-standing EUT, the table will be removed with all the other setup conditions remain the same.

4.3 RADIATED EMISSION LIMIT

In any 100KHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209 (a) (see Section 15.205(c)).

☒FCC 15.209 Limit

Frequency	Distance	Field Strength	
MHz	Meter	μV/M	dBμV/M
0.009 – 0.490	300	2400/F (KHz)	97.0 – 27.6
0.490 – 1.705	30	24000/F (KHz)	67.6 – 45.9
1.705 – 30.0	30	30	59.0
30 to 88	3	100	40.0
88 to 216	3	150	43.5
216 to 960	3	200	46.0
Above 960	3	500	54.0

Note：The frequencies above 1000MHz, as measured using instrumentation with a peak detector function was corresponding to 20dB above the maximum permitted average limit.

4.4 TEST CONFIGURATION

The equipment which is listed 4.1 are installed on Radiated Emission Test to meet the Commission requirement and operating in a manner which tends to maximize its emission characteristics in a normal application.

The device under test, installed in a representative system as described in section 4.2, was placed on a non-conductive table whose total height equaled 80 cm. This table can be rotated 360 degree. The measurement antenna was mounted to a non-conductive mast capable of moving the antenna vertically. Antenna height was varied from 1 meter to 4 meters and the system under test was rotated from 0 degree through 360 degrees relative to the antenna position and polarization (Horizontal and Vertical). Also the I/O cable position was investigated to find the maximum emission condition.

4.5 OPERATING CONDITION OF EUT

Same as section 2.9.

4.6 RADIATED EMISSION DATA

The measurement range of radiated emission, which is from **9 kHz to 10th Harmonics,** was investigated. All readings below 1GHz are quasi-peak values with a resolution bandwidth of 120 KHz. Above 1GHz are peak and avg. values with a resolution bandwidth of 1MHz. The initial step in collecting radiated emission data is a spectrum analyzer peak scans of the measurement range for all the test modes and then use test receiver for final measurement. Then the worst modes were reported the following data pages.

The measured results between 9kHz and 30MHz are 20dB lower than the allowed limit already, therefore the test results are not recorded in this report.
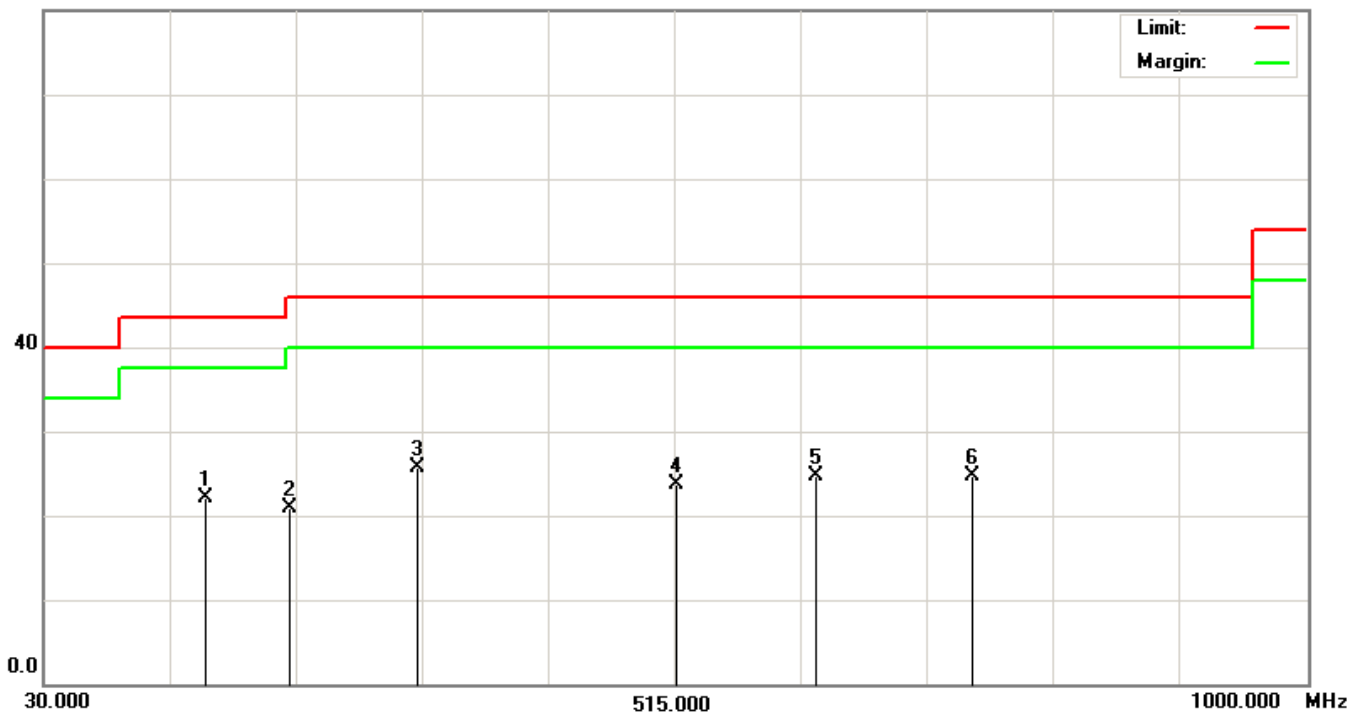
4.7 RADIATED EMISSIONS MEASUREMENT RESULTS

Date of Test	March 07, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode1-CH00 (2402MHz)	Display Pattern	Program
Antenna distance	3m at **Horizontal**	Test Frequency Range	30-1000MHz
Test Power Supply	DC 5V POWER BY NOTEBOOK		

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV/m	Limit dBµV/m	Over Limit dB	Detector
1	153.0470	36.87	-14.71	22.16	43.50	-21.34	QP
2	218.2900	37.34	-16.44	20.90	46.00	-25.10	QP
3	★316.4500	38.61	-12.90	25.71	46.00	-20.29	QP
4	515.9400	31.54	-7.82	23.72	46.00	-22.28	QP
5	622.3300	30.34	-5.55	24.79	46.00	-21.21	QP
6	744.8500	28.47	-3.78	24.69	46.00	-21.31	QP

Remarks:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. " ★ " means that this data is the worse case measurement level.
6. The antenna height could have ±1cm tolerance and the turn table degree could have ±1˚ tolerance.
7. The measurement uncertainty is 4.61 dB.

Remark: 1. The Limit (The red line of the graph indicates the quasi -peak measurements).

2. The Margin (The green line of the graph indicates the 6dB margin).

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Date of Test	March 07, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode1-CH 00 (2402MHz)	Display Pattern	Program
Antenna distance	3m at **Vertical**	Test Frequency Range	30-1000MHz
Test Power Supply	DC 5V POWER BY NOTEBOOK		

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV/m	Limit dBμV/m	Over Limit dB	Detector
1	★186.5500	45.38	-16.39	28.99	43.50	-14.51	QP
2	254.1840	44.95	-15.12	29.83	46.00	-16.17	QP
3	337.1000	38.18	-12.34	25.84	46.00	-20.16	QP
4	495.6200	31.41	-8.31	23.10	46.00	-22.90	QP
5	551.0700	31.39	-6.98	24.41	46.00	-21.59	QP
6	725.4800	30.09	-4.15	25.94	46.00	-20.06	QP

Remarks:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. " ★ " means that this data is the worse case measurement level.
6. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
7. The measurement uncertainty is 4.61 dB.

Remark: 1. The Limit (The red line of the graph indicates the quasi -peak measurements).
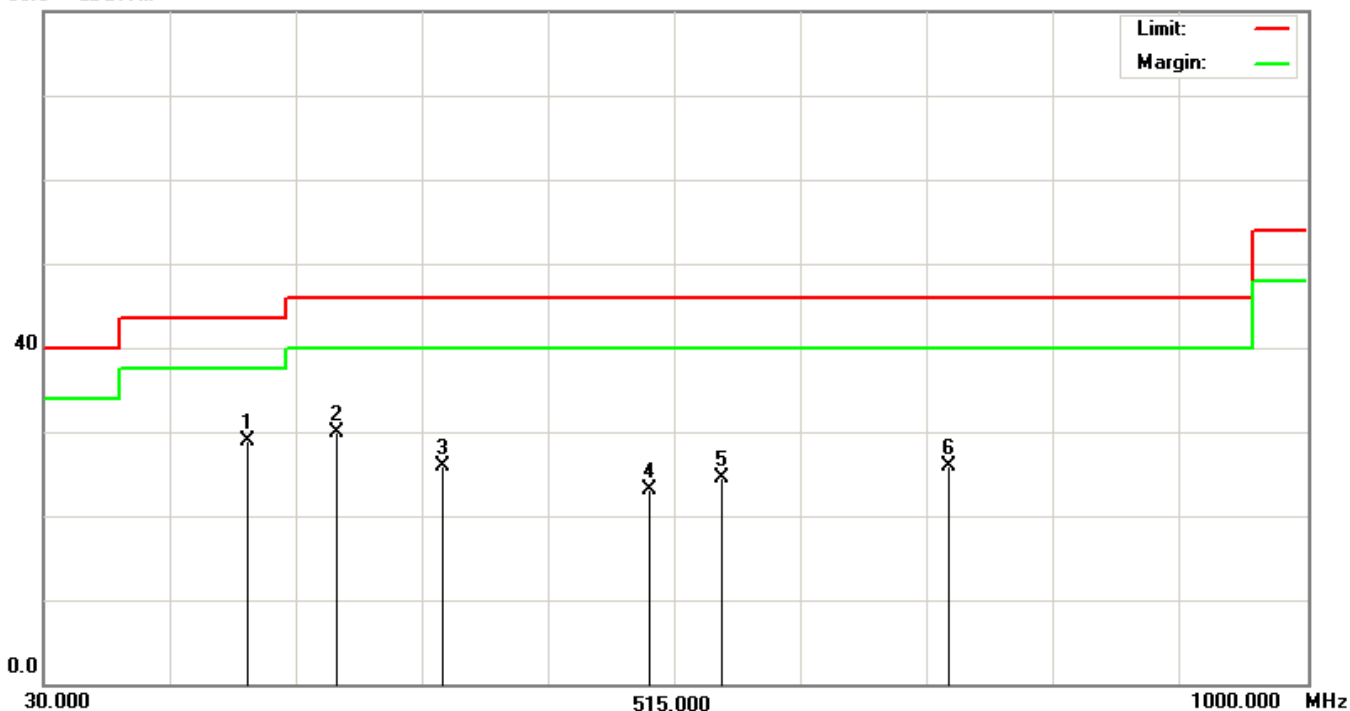2. The Margin (The green line of the graph indicates the 6dB margin).

Date of Test	March 07, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode1-CH38 (2440MHz)	Display Pattern	Program
Antenna distance	3m at **Horizontal**	Test Frequency Range	30-1000MHz
Test Power Supply	DC 5V POWER BY NOTEBOOK		

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV/m	Limit dBμV/m	Over Limit dB	Detector
1	103.0609	47.12	-19.66	27.46	43.50	-16.04	QP
2	★149.6955	42.64	-14.85	27.79	43.50	-15.71	QP
3	235.1923	42.83	-15.82	27.01	46.00	-18.99	QP
4	438.8301	34.24	-9.69	24.55	46.00	-21.45	QP
5	639.3590	29.69	-5.35	24.34	46.00	-21.66	QP
6	869.4231	27.66	-1.82	25.84	46.00	-20.16	QP

Remarks:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. " ★ " means that this data is the worse case measurement level.
6. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
7. The measurement uncertainty is 4.61 dB.

Remark: 1. The Limit (The red line of the graph indicates the quasi -peak measurements).
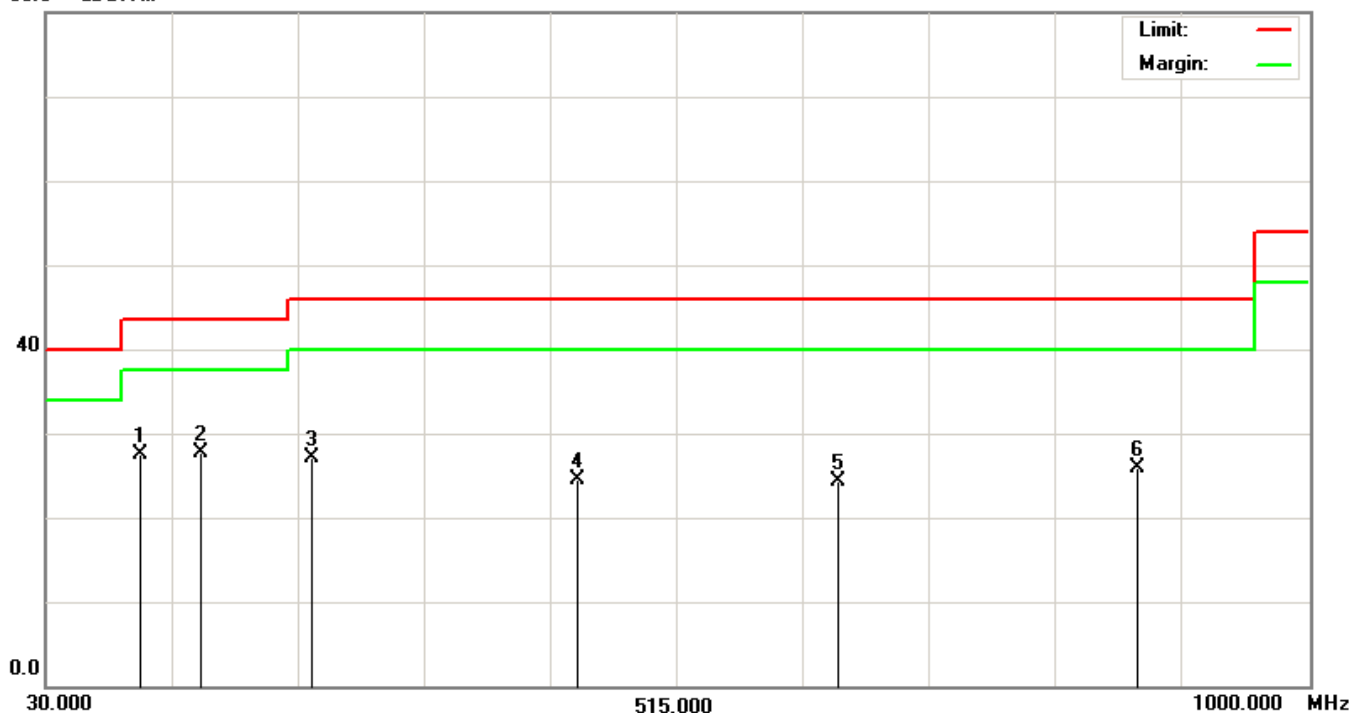2. The Margin (The green line of the graph indicates the 6dB margin).

Date of Test	March 07, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode 1-CH38 (2440MHz)	Display Pattern	Program
Antenna distance	3m at **Vertical**	Test Frequency Range	30-1000MHz
Test Power Supply	DC 5V POWER BY NOTEBOOK		

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV/m	Limit dBμV/m	Over Limit dB	Detector
1	249.1827	43.68	-15.31	28.37	46.00	-17.63	QP
2	281.8269	43.88	-14.05	29.83	46.00	-16.17	QP
3	438.8301	31.83	-9.69	22.14	46.00	-23.86	QP
4	★522.7724	37.75	-7.66	30.09	46.00	-15.91	QP
5	561.6346	33.75	-6.73	27.02	46.00	-18.98	QP
6	699.9840	28.02	-4.63	23.39	46.00	-22.61	QP

Remarks:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. " ★ " means that this data is the worse case measurement level.
6. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
7. The measurement uncertainty is 4.61 dB.

Remark: 1. The Limit (The red line of the graph indicates the quasi -peak measurements).
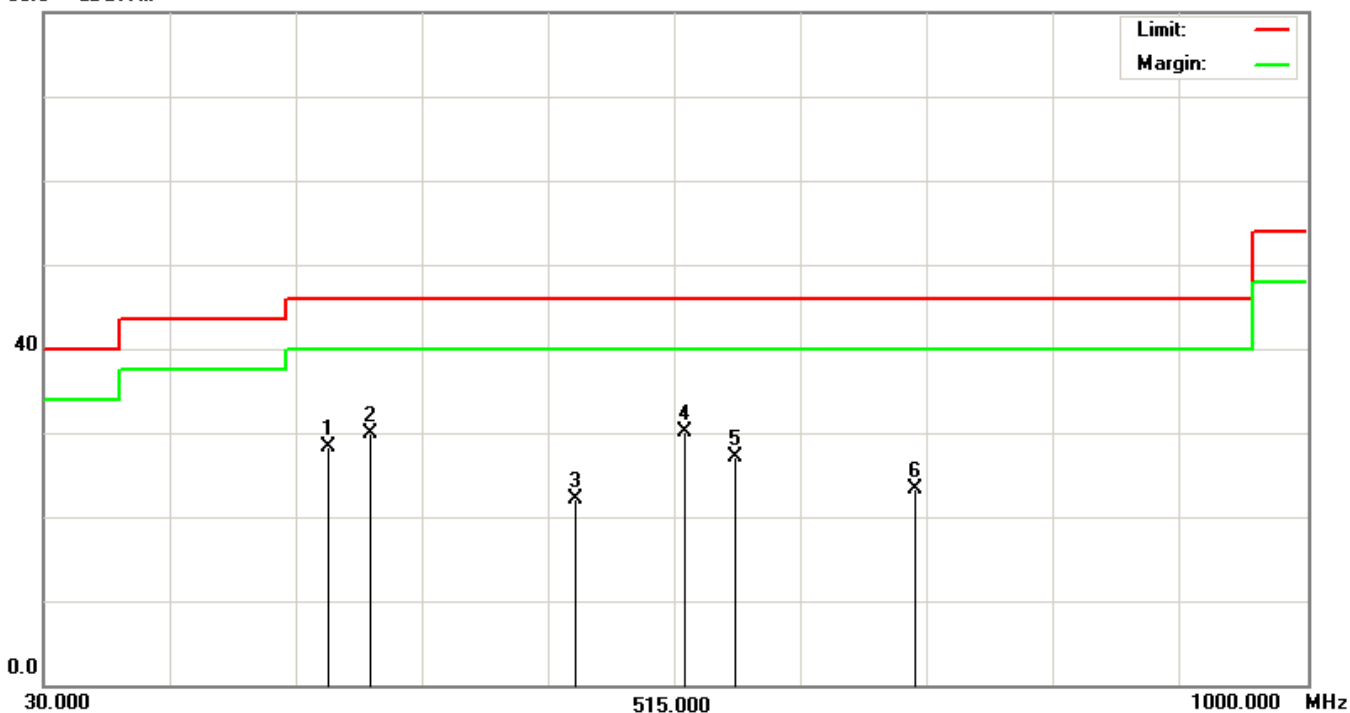   2. The Margin (The green line of the graph indicates the 6dB margin).

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Date of Test	March 07, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode 1-CH 78 (2480MHz)	Display Pattern	Program
Antenna distance	3m at **Horizontal**	Test Frequency Range	30-1000MHz
Test Power Supply	DC 5V POWER BY NOTEBOOK		

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV/m	Limit dBµV/m	Over Limit dB	Detector
1	★281.8269	41.47	-14.05	27.42	46.00	-18.58	QP
2	367.3237	33.56	-11.52	22.04	46.00	-23.96	QP
3	510.3365	31.04	-7.95	23.09	46.00	-22.91	QP
4	546.0897	32.61	-7.10	25.51	46.00	-20.49	QP
5	642.4679	29.83	-5.31	24.52	46.00	-21.48	QP
6	726.4103	28.82	-4.13	24.69	46.00	-21.31	QP

Remarks:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. " ★ " means that this data is the worse case measurement level.
6. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
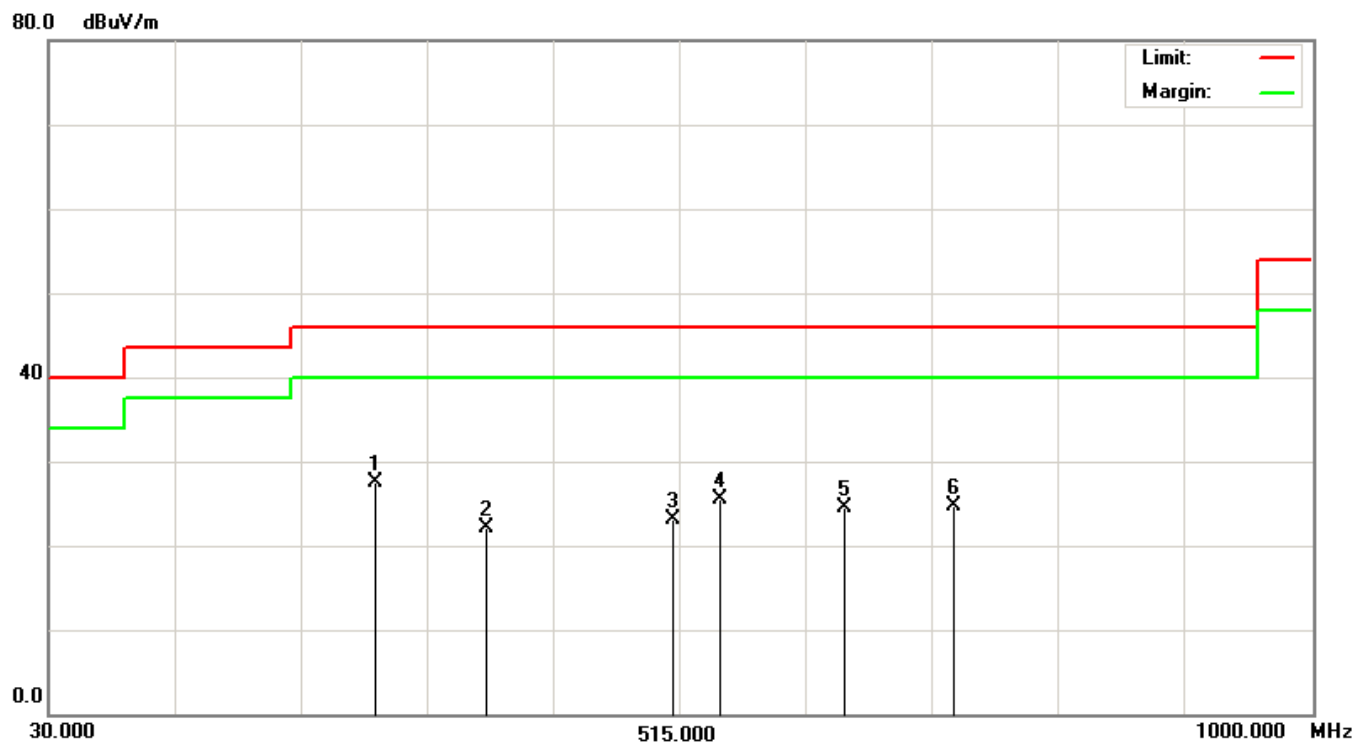7. The measurement uncertainty is 4.61 dB.

Remark: 1. The Limit (The red line of the graph indicates the quasi -peak measurements).
          2. The Margin (The green line of the graph indicates the 6dB margin).

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Date of Test	March 07, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode 1-CH 78 (2480MHz)	Display Pattern	Program
Antenna distance	3m at **Vertical**	Test Frequency Range	30-1000MHz
Test Power Supply	DC 5V POWER BY NOTEBOOK		

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV/m	Limit dBµV/m	Over Limit dB	Detector
1	196.3301	46.85	-16.92	29.93	43.50	-13.57	QP
2	★306.6987	46.19	-13.17	33.02	46.00	-12.98	QP
3	368.8782	33.09	-11.48	21.61	46.00	-24.39	QP
4	462.1474	36.86	-9.12	27.74	46.00	-18.26	QP
5	558.5256	37.51	-6.80	30.71	46.00	-15.29	QP
6	726.4103	27.75	-4.13	23.62	46.00	-22.38	QP

Remarks:

1. All Readings below 1GHz are Quasi-Peak.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. " ★ " means that this data is the worse case measurement level.
6. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
7. The measurement uncertainty is 4.61 dB.

Remark: 1. The Limit (The red line of the graph indicates the quasi -peak measurements).

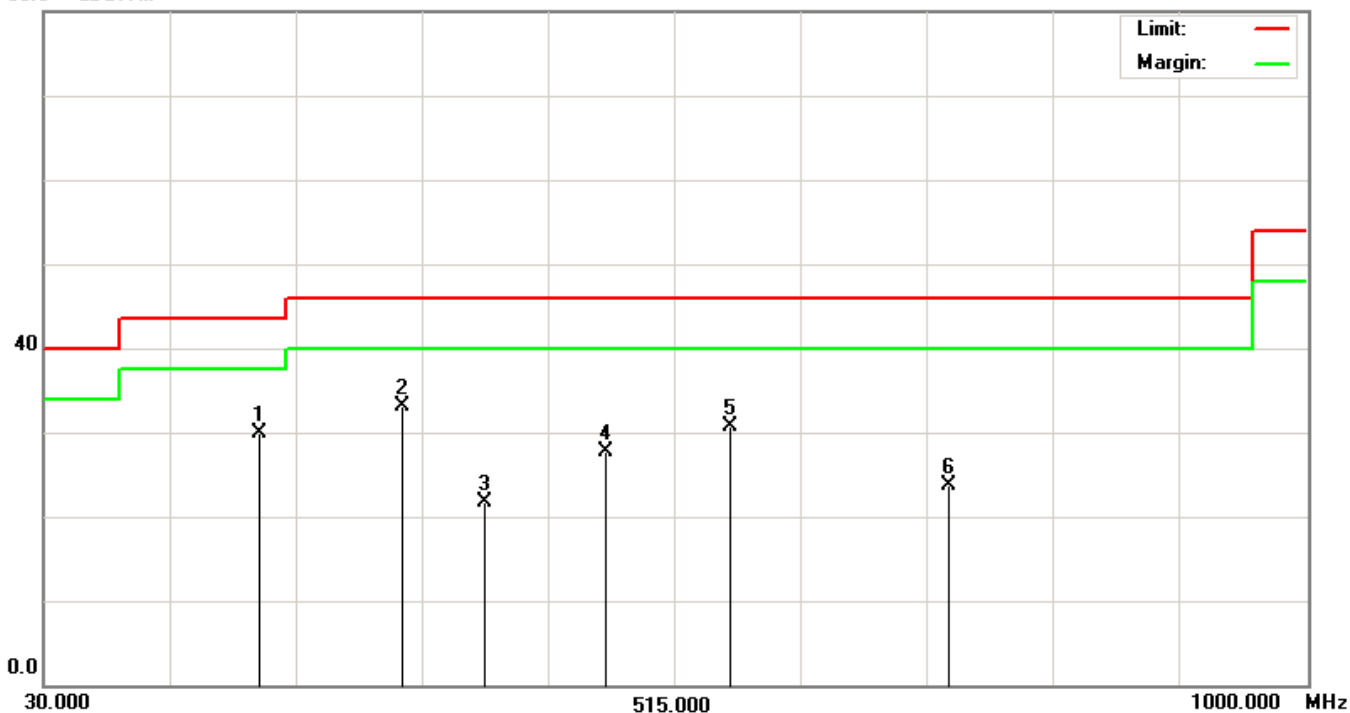2. The Margin (The green line of the graph indicates the 6dB margin).

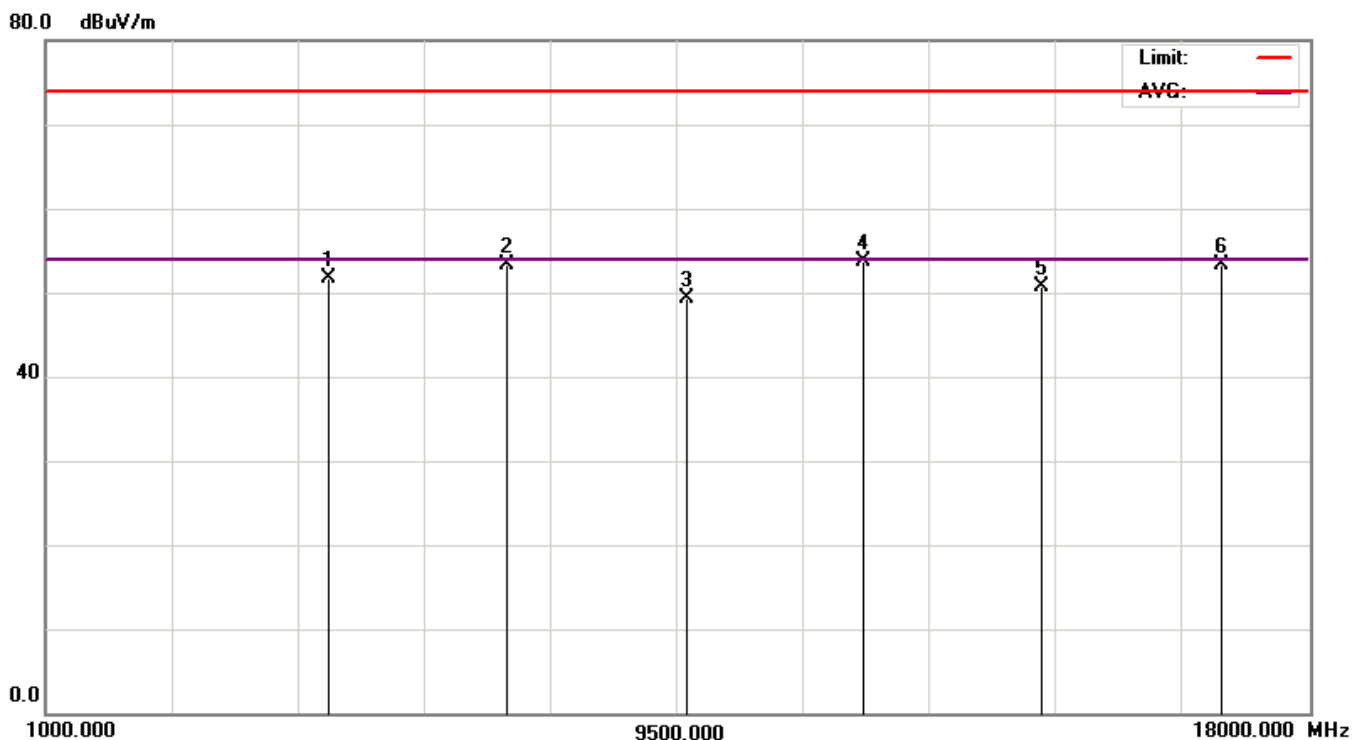| Date of Test	March 11, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode1-CH00 (2402MHz)	Display Pattern	Program
Antenna distance	3m at **Horizontal**	Test Frequency Range	1GHz~25GHz
Test Power Supply	DC 5V POWER BY NOTEBOOK		

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV/m	Limit dBμV/m	Over Limit dB	Detector
1	4804.0000	42.63	9.12	51.75	74.00	-22.25	peak
2	7206.0000	38.86	14.38	53.24	74.00	-20.76	peak
3	9608.0000	38.27	10.98	49.25	74.00	-24.75	peak
4	12010.0000	38.05	15.70	53.75	74.00	-20.25	peak
5	14412.0000	40.37	10.39	50.76	74.00	-23.24	peak
6	16814.0000	39.60	13.64	53.24	74.00	-20.76	peak
7	19216.0000	43.13	-18.50	24.63	74.00	-49.37	peak
8	21618.0000	45.59	-18.50	27.09	74.00	-46.91	peak
9	24020.0000	43.71	-18.50	25.21	74.00	-48.79	peak

Remarks:

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
6. The measurement uncertainty is 4.35 dB.(1G-18G)
7. The measurement uncertainty is 4.37 dB.(18G-40G)

Horizontal

Remark: 1. The Peak (The red line of the graph indicates the peak measurements).
           2. The AVG (The purple line of the graph indicates the average measurements).
           3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.
              The tested frequency range is mention in above column of the test data table.

Horizontal
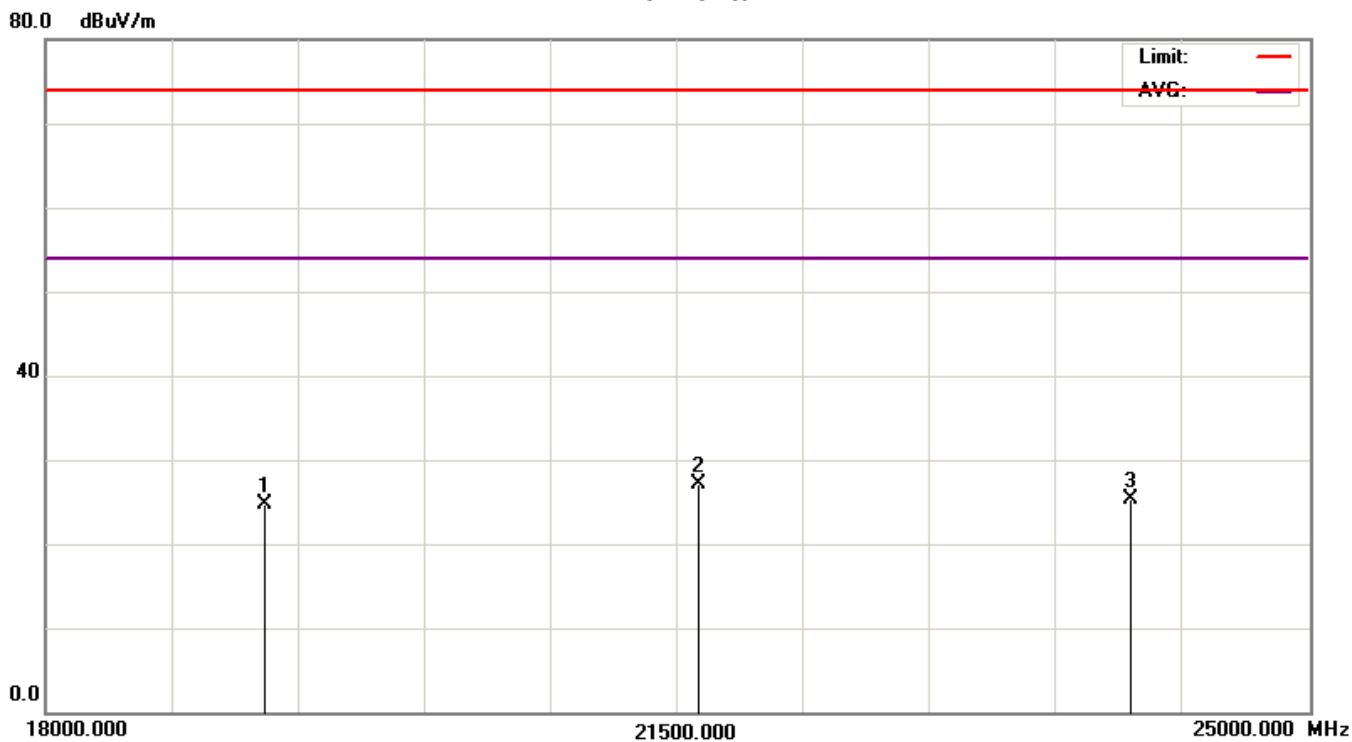

Remark: 1. The Peak (The red line of the graph indicates the peak measurements).
           2. The AVG (The purple line of the graph indicates the average measurements).
           3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.
              The tested frequency range is mention in above column of the test data table.
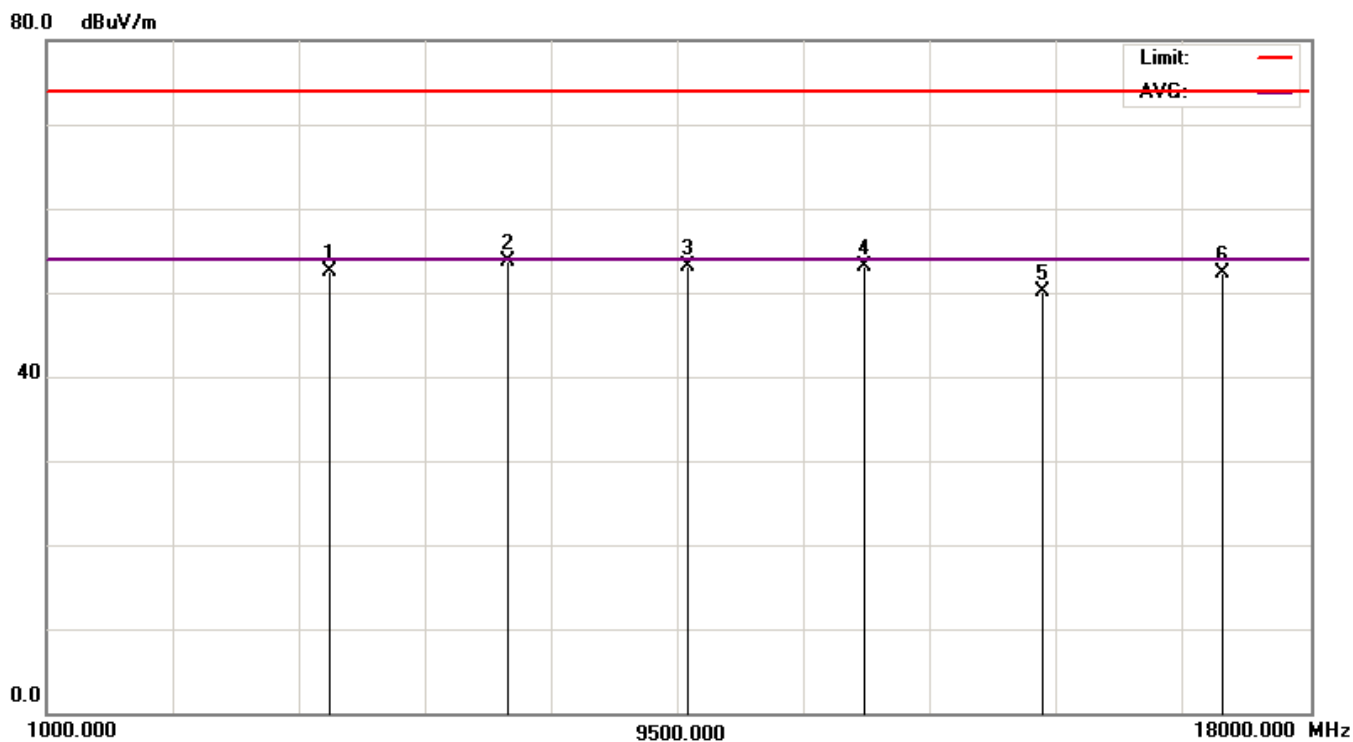
Date of Test	March 11, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode1-CH00 (2402MHz)	Display Pattern	Program
Antenna distance	3m at **Vertical**	Test Frequency Range	1GHz~25GHz
Test Power Supply	DC 5V POWER BY NOTEBOOK		

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV/m	Limit dBµV/m	Over Limit dB	Detector
1	4804.0000	43.18	9.42	52.60	74.00	-21.40	peak
2	7206.0000	39.35	14.27	53.62	74.00	-20.38	peak
3	9608.0000	40.03	13.12	53.15	74.00	-20.85	peak
4	12010.0000	35.68	17.37	53.05	74.00	-20.95	peak
5	14412.0000	40.47	9.66	50.13	74.00	-23.87	peak
6	16814.0000	37.79	14.56	52.35	74.00	-21.65	peak
7	19216.0000	43.81	-17.50	26.31	74.00	-47.69	peak
8	21618.0000	44.33	-17.50	26.83	74.00	-47.17	peak
9	24020.0000	44.07	-17.50	26.57	74.00	-47.43	peak

Remarks:

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
6. The measurement uncertainty is 4.35 dB.(1G-18G)
7. The measurement uncertainty is 4.37 dB.(18G-40G)

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Vertical

Remark: 1. The Peak (The red line of the graph indicates the peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.
   The tested frequency range is mention in above column of the test data table.

Vertical

Remark: 1. The Peak (The red line of the graph indicates the peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.
   The tested frequency range is mention in above column of the test data table.
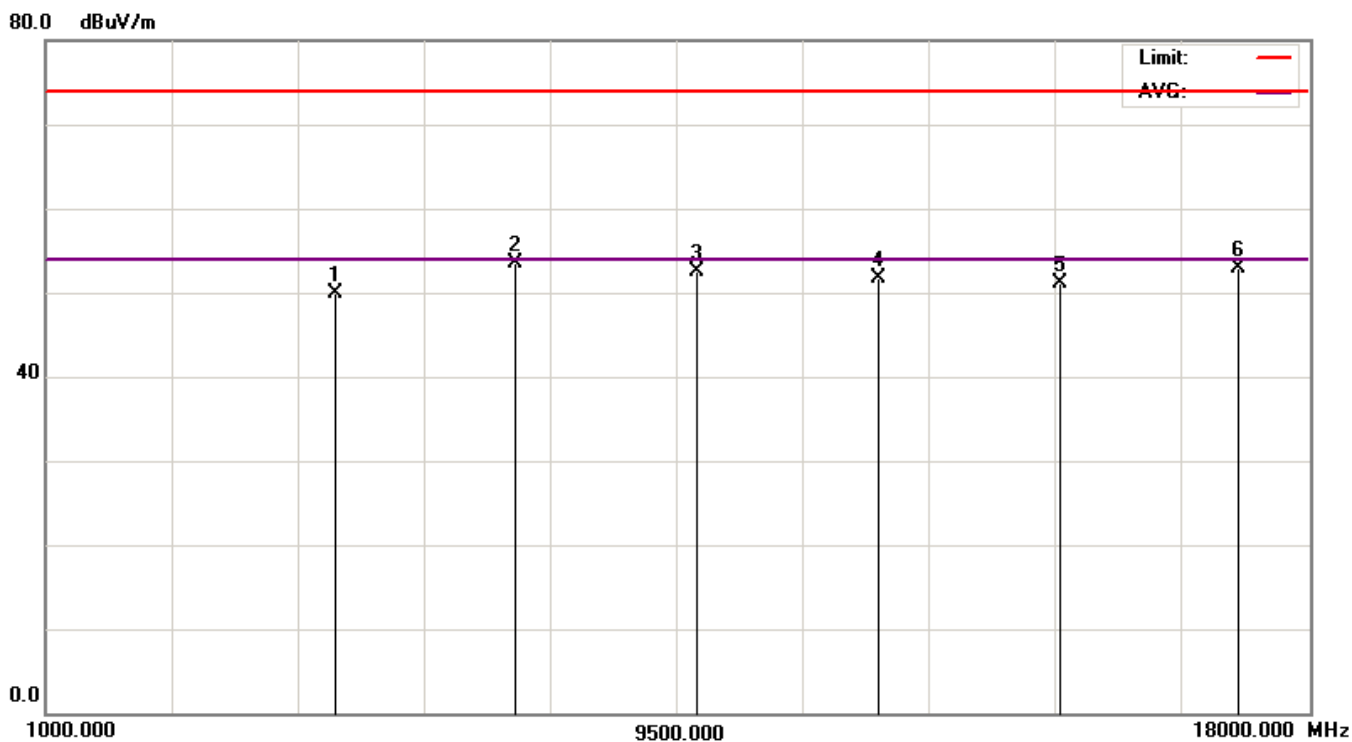
Date of Test	March 11, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode1-CH38 (2440MHz)	Display Pattern	Program
Antenna distance	3m at **Horizontal**	Test Frequency Range	1GHz~25GHz
Test Power Supply	DC 5V POWER BY NOTEBOOK		

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV/m	Limit dBμV/m	Over Limit dB	Detector
1	4880.0000	40.35	9.46	49.81	74.00	-24.19	peak
2	7320.0000	38.67	14.74	53.41	74.00	-20.59	peak
3	9760.0000	41.28	11.24	52.52	74.00	-21.48	peak
4	12200.0000	35.54	16.10	51.64	74.00	-22.36	peak
5	14640.0000	39.41	11.61	51.02	74.00	-22.98	peak
6	17080.0000	38.66	14.24	52.90	74.00	-21.10	peak
7	19520.0000	44.59	-18.50	26.09	74.00	-47.91	peak
8	21960.0000	43.27	-18.50	24.77	74.00	-49.23	peak
9	24400.0000	45.18	-18.50	26.68	74.00	-47.32	peak

Remarks:

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
6. The measurement uncertainty is 4.35 dB.(1G-18G)
7. The measurement uncertainty is 4.37 dB.(18G-40G)

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Horizontal

Remark: 1. The Peak (The red line of the graph indicates the peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.
The tested frequency range is mention in above column of the test data table.
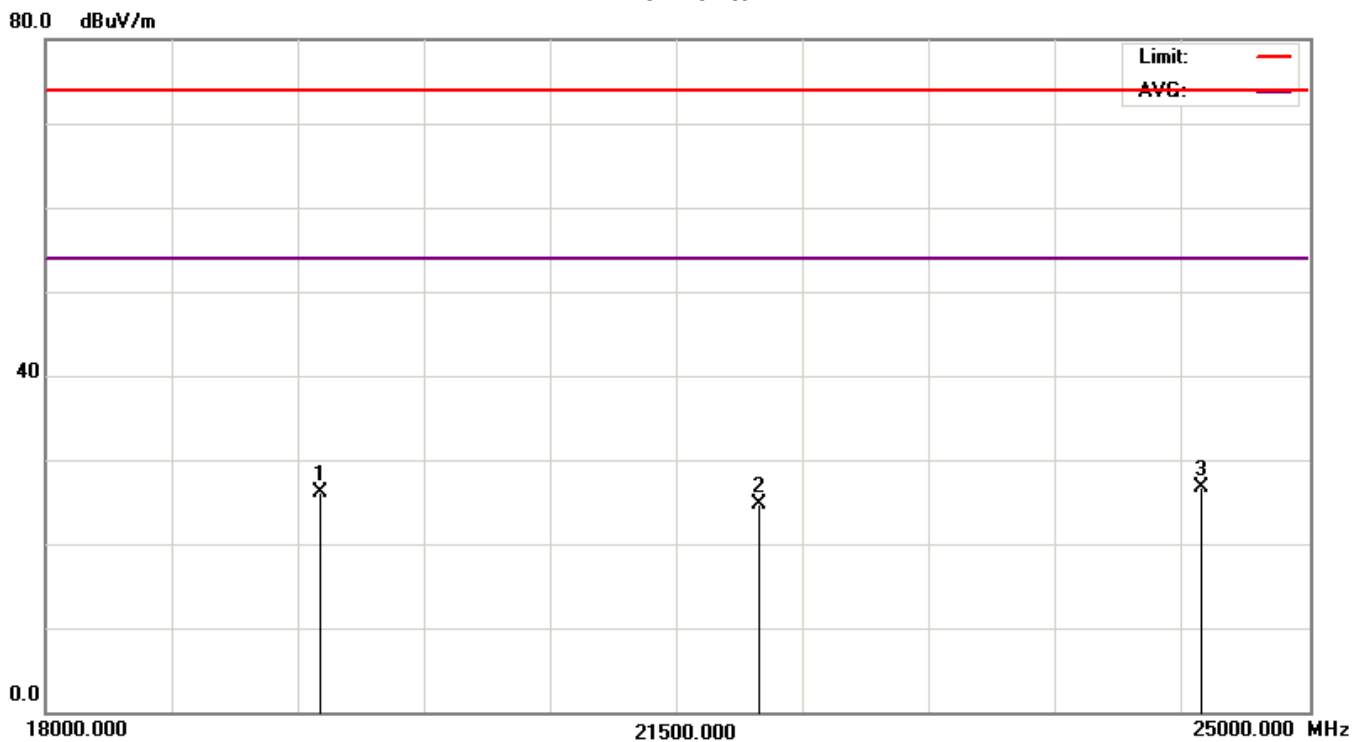
Horizontal

Remark: 1. The Peak (The red line of the graph indicates the peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.
The tested frequency range is mention in above column of the test data table.
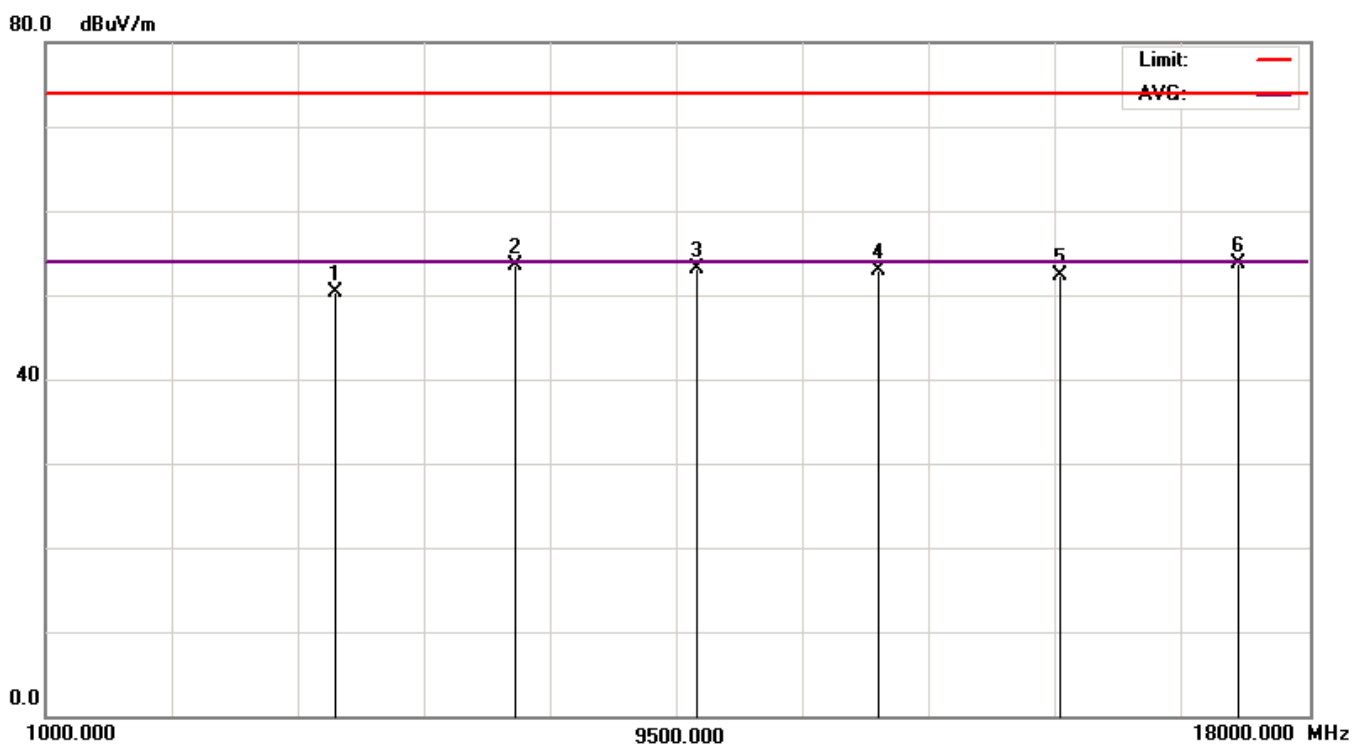
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Date of Test	March 11, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode1-CH38 (2440MHz)	Display Pattern	Program
Antenna distance	3m at **Vertical**	Test Frequency Range	1GHz~25GHz
Test Power Supply	DC 5V POWER BY NOTEBOOK		

No.	Frequency MHz	Reading Level dBµV	Factor dB	Measurement dBµV/m	Limit dBµV/m	Over Limit dB	Detector
1	4880.0000	40.08	10.28	50.36	74.00	-23.64	peak
2	7320.0000	38.91	14.51	53.42	74.00	-20.58	peak
3	9760.0000	39.81	13.37	53.18	74.00	-20.82	peak
4	12200.0000	35.04	17.83	52.87	74.00	-21.13	peak
5	14640.0000	42.29	10.03	52.32	74.00	-21.68	peak
6	17080.0000	38.70	15.07	53.77	74.00	-20.23	peak
7	19520.0000	43.13	-17.50	25.63	74.00	-48.37	peak
8	21960.0000	44.57	-17.50	27.07	74.00	-46.93	peak
9	24400.0000	44.29	-17.50	26.79	74.00	-47.21	peak

Remarks:

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
6. The measurement uncertainty is 4.35 dB.(1G-18G)
7. The measurement uncertainty is 4.37 dB.(18G-40G)

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Vertical

Remark: 1. The Peak (The red line of the graph indicates the peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.
The tested frequency range is mention in above column of the test data table.

Vertical

Remark: 1. The Peak (The red line of the graph indicates the peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.
The tested frequency range is mention in above column of the test data table.

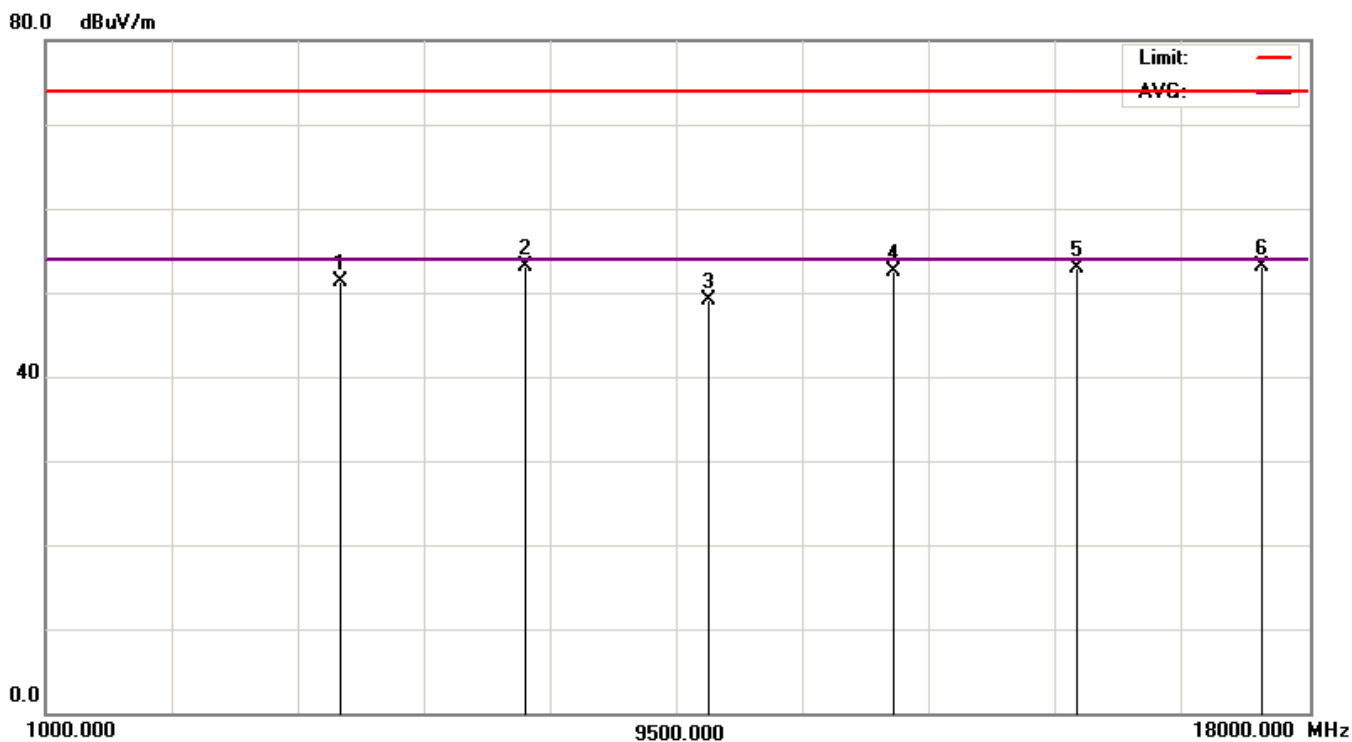| Date of Test	March 11, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode 1-CH 78 (2480MHz)	Display Pattern	Program
Antenna distance	3m at **Horizontal**	Test Frequency Range	1GHz~25GHz
Test Power Supply	DC 5V POWER BY NOTEBOOK		

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV/m	Limit dBμV/m	Over Limit dB	Detector
1	4960.0000	41.01	10.26	51.27	74.00	-22.73	peak
2	7440.0000	38.71	14.40	53.11	74.00	-20.89	peak
3	9920.0000	40.49	8.67	49.16	74.00	-24.84	peak
4	12400.0000	40.07	12.45	52.52	74.00	-21.48	peak
5	14880.0000	40.48	12.52	53.00	74.00	-21.00	peak
6	17360.0000	37.39	15.80	53.19	74.00	-20.81	peak
7	19840.0000	45.95	-18.50	27.45	74.00	-46.55	peak
8	22320.0000	44.37	-18.50	25.87	74.00	-48.13	peak
9	24800.0000	45.09	-18.50	26.59	74.00	-47.41	peak

Remarks:

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
6. The measurement uncertainty is 4.35 dB.(1G-18G)
7. The measurement uncertainty is 4.37 dB.(18G-40G)

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Horizontal

Remark: 1. The Peak (The red line of the graph indicates the peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.
   The tested frequency range is mention in above column of the test data table.
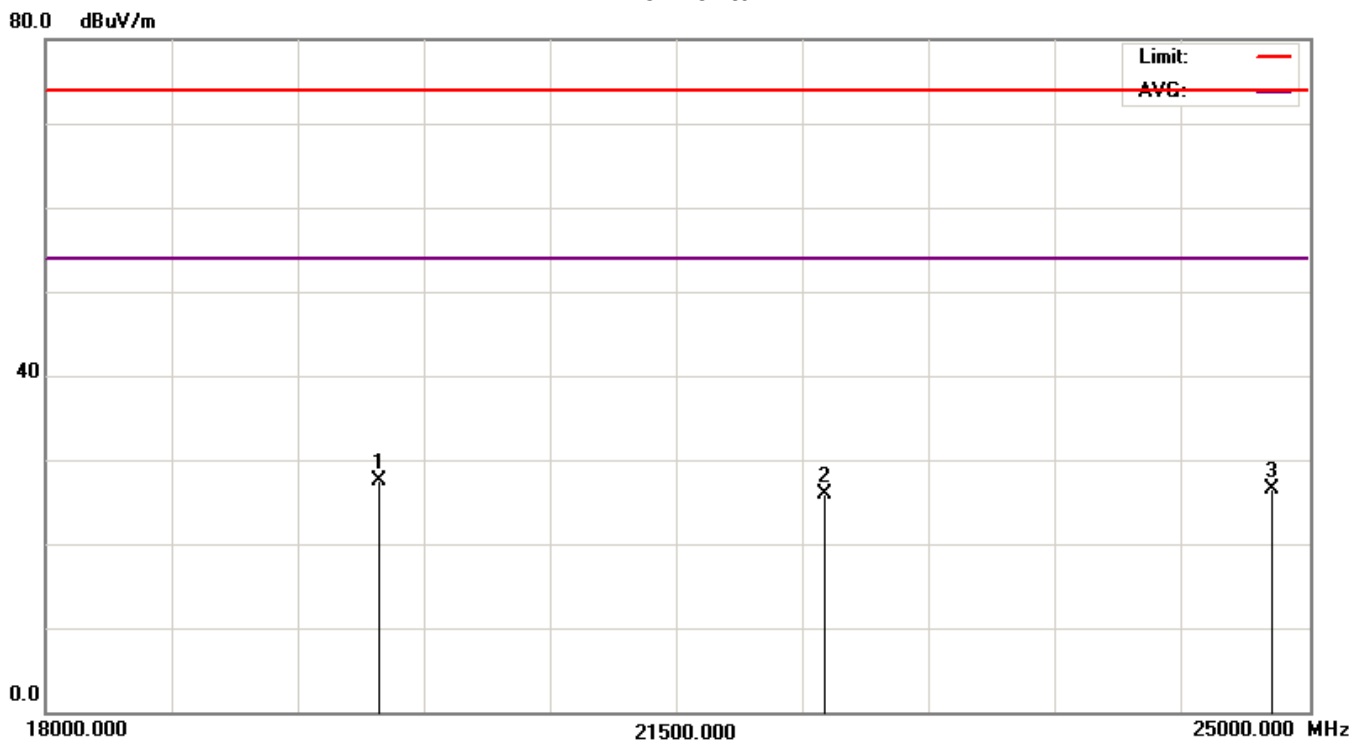
Horizontal

Remark: 1. The Peak (The red line of the graph indicates the peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.
   The tested frequency range is mention in above column of the test data table.
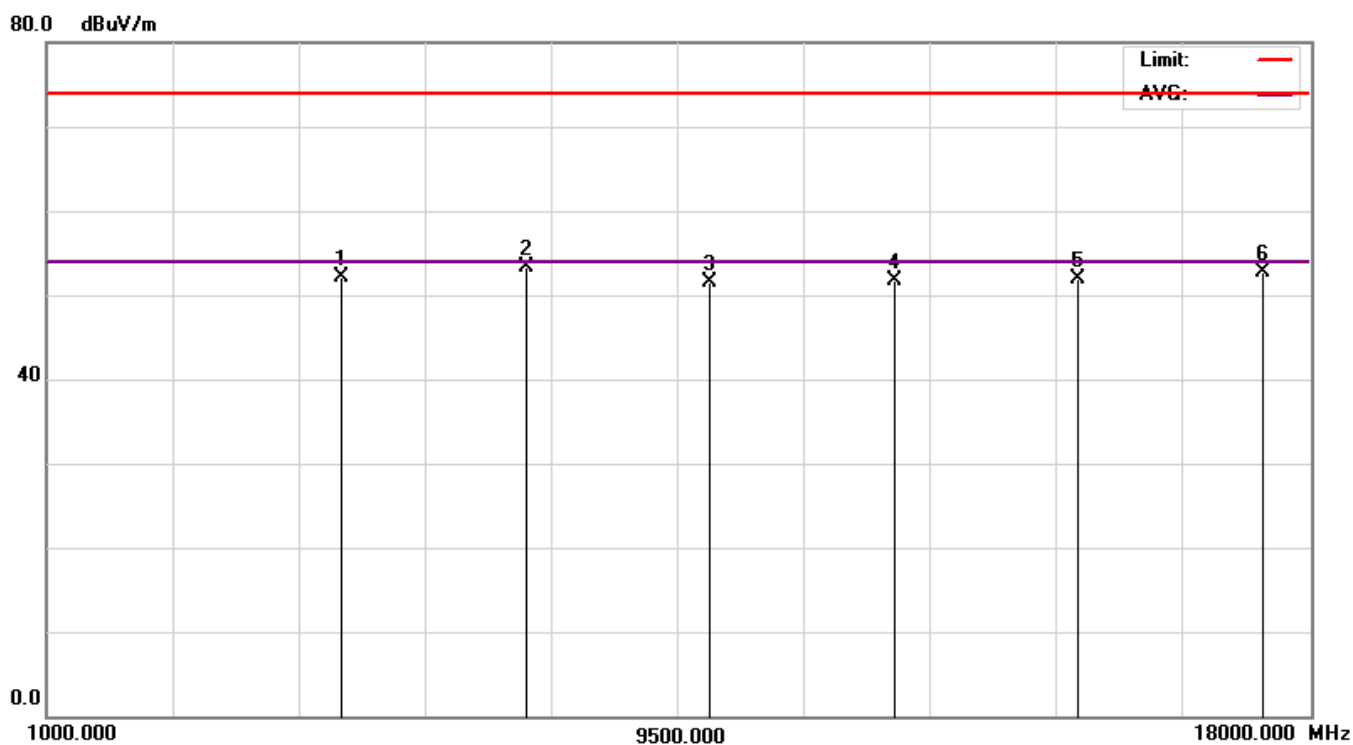
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Tel:886-2-2603-5321 Fax:886-2-2603-5325

Date of Test	March 11, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode 1-CH 78 (2480MHz)	Display Pattern	Program
Antenna distance	3m at **Vertical**	Test Frequency Range	1GHz~25GHz
Test Power Supply	DC 5V POWER BY NOTEBOOK		

No.	Frequency MHz	Reading Level dBμV	Factor dB	Measurement dBμV/m	Limit dBμV/m	Over Limit dB	Detector
1	4960.0000	40.18	11.92	52.10	74.00	-21.90	peak
2	7440.0000	39.23	14.07	53.30	74.00	-20.70	peak
3	9920.0000	38.64	12.91	51.55	74.00	-22.45	peak
4	12400.0000	38.41	13.39	51.80	74.00	-22.20	peak
5	14880.0000	40.06	11.77	51.83	74.00	-22.17	peak
6	17360.0000	35.43	17.25	52.68	74.00	-21.32	peak
7	19840.0000	45.18	-17.50	27.68	74.00	-46.32	peak
8	22320.0000	45.59	-17.50	28.09	74.00	-45.91	peak
9	24800.0000	44.05	-17.50	26.55	74.00	-47.45	peak

Remarks:

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
6. The measurement uncertainty is 4.35 dB.(1G-18G)
7. The measurement uncertainty is 4.37 dB.(18G-40G)

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Vertical

Remark: 1. The Peak (The red line of the graph indicates the peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.
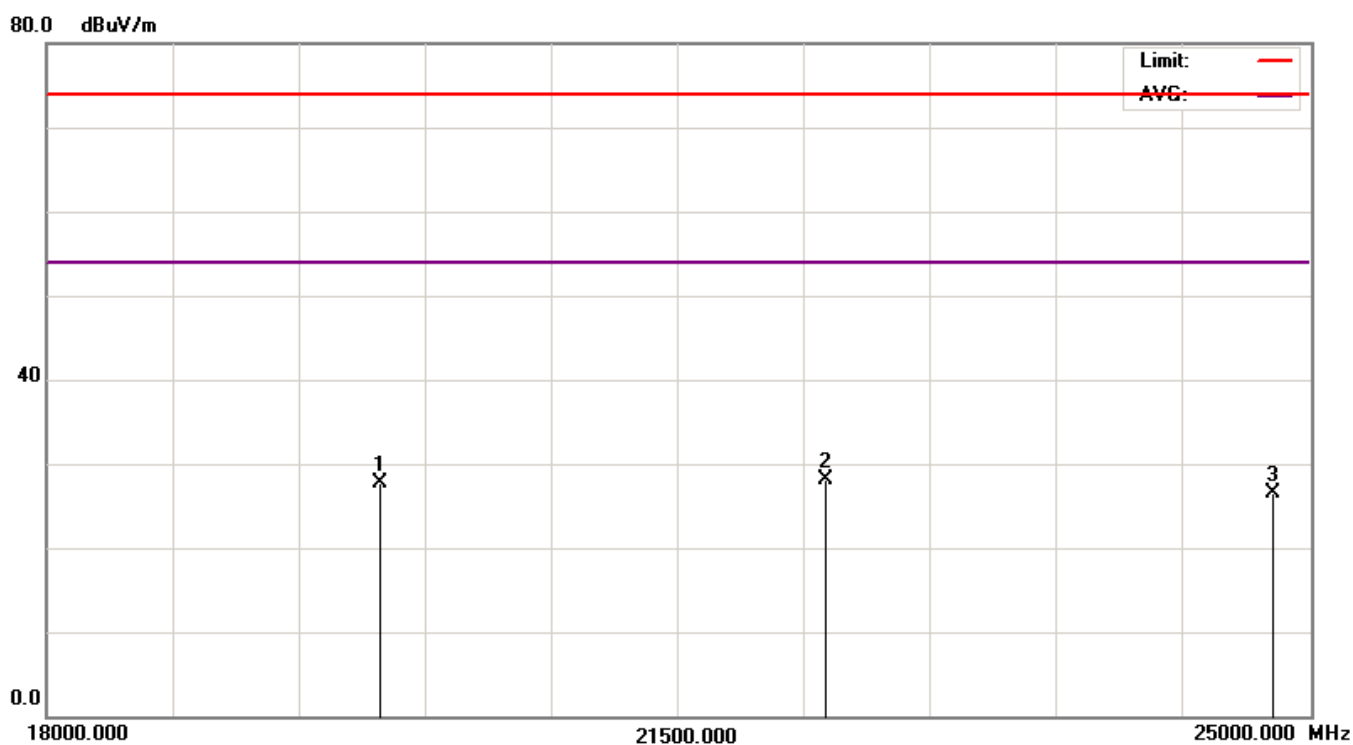The tested frequency range is mention in above column of the test data table.

Vertical

Remark: 1. The Peak (The red line of the graph indicates the peak measurements).
2. The AVG (The purple line of the graph indicates the average measurements).
3. The frequency range indicated in this graph is just a frequency range set automatically by the test equipment.
The tested frequency range is mention in above column of the test data table.

5.   PEAK POWER OUTPUT

5.1 TEST EQUIPMENT

The following test equipments are used during the Conduct tests:

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Spectrum Analyzer	RS	FSL6	100517	2013.08.26

Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.

5.2 BLOCK DIAGRAM OF TEST SETUP
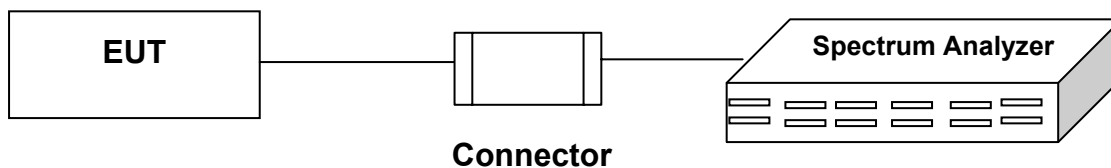
5.3 PEAK POWER OUTPUT LIMIT

The maximum peak power shall be less 1W.

5.4 TEST RESULT

Date of Test	March 11, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Test Mode	Mode 1		

Channel No.	Frequency (MHz)	Reading Level (dBm)	Antenna Gain (dBi)	Cable loss (dB)	Measurement (dBm)	Required Limit	Result
0	2402	-13.34	0.22	0.59	-12.53	1W(30dBm)	Pass
38	2440	-13.33	0.22	0.69	-12.42	1W(30dBm)	Pass
78	2480	-14.20	0.22	0.73	-13.25	1W(30dBm)	Pass

Note :

Measurement = Reading Level+Antenna Gain+Cable loss

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* Att 10 dB	* RBW 1 MHz		
Ref 0.00 dBm	* VBW 1 MHz	M1[1]	−13.33 dBm
	* SWT 300ms		2.440000000 GHz

1Pk View

-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm

M1

CF 2.44 GHz   Span 10.0 MHz

* Att 10 dB	* RBW 1 MHz		
Ref 0.00 dBm	* VBW 1 MHz	M1[1]	−14.20 dBm
	* SWT 300ms		2.480000000 GHz

1Pk View

-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
-70 dBm
-80 dBm
-90 dBm

M1

CF 2.48 GHz   Span 10.0 MHz

6. BAND EDGE

6.1 TEST EQUIPMENT

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Spectrum Analyzer	RS	FSL6	100517	2013.08.26

6.2 BLOCK DIAGRAM OF TEST SETUP

RF Radiated Measurement:

Refer to Section 4.2

RF Couductive Measurement:

Refer to Section 5.2

6.3 BAND EDGE LIMIT

In any 100KHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100KHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209 (a) (see Section 15.205(c)).

6.4 EUT CONFIGURATION

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level.
The EUT was positioned such that the distance from antenna to the EUT was 3 meters.
The antenna can move 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 measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2000 on radiated measurement.
The bandwidth below 1GHz setting on the field strength meter is 120KHz, above 1GHz are 1MHz.
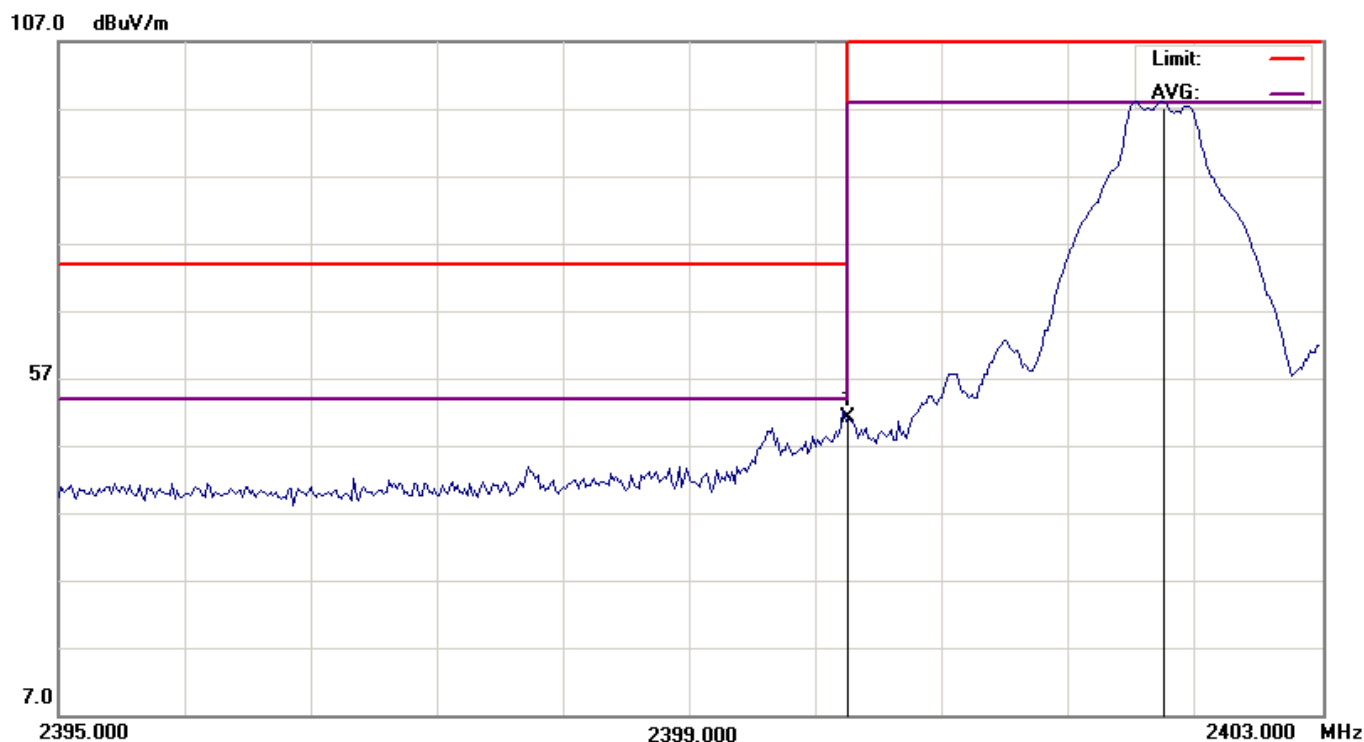
6.5 OPERATING CONDITION OF EUT

Same as section 2.9.

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6.6   TEST RELULT

Date of Test	March 27, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode1-CH00 (2402MHz)	Display Pattern	Program
Antenna distance	3m at **Horizontal**	Test Frequency Range	2395MHz~2489MHz
Test Power Supply	DC 5V		

No.	Frequency MHz	Reading Level dBμV	Factor dB/m	Measurement dBμV/m	Limit dBμV/m	Over Limit dB	Detector
1	2400.0000	48.30	2.82	51.12	74.00	-22.88	peak
2	★2402.0000	95.18	2.80	97.98	118.00	-20.02	peak

Remarks:

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
6. The measurement uncertainty is 4.35 dB.(1G-18G)

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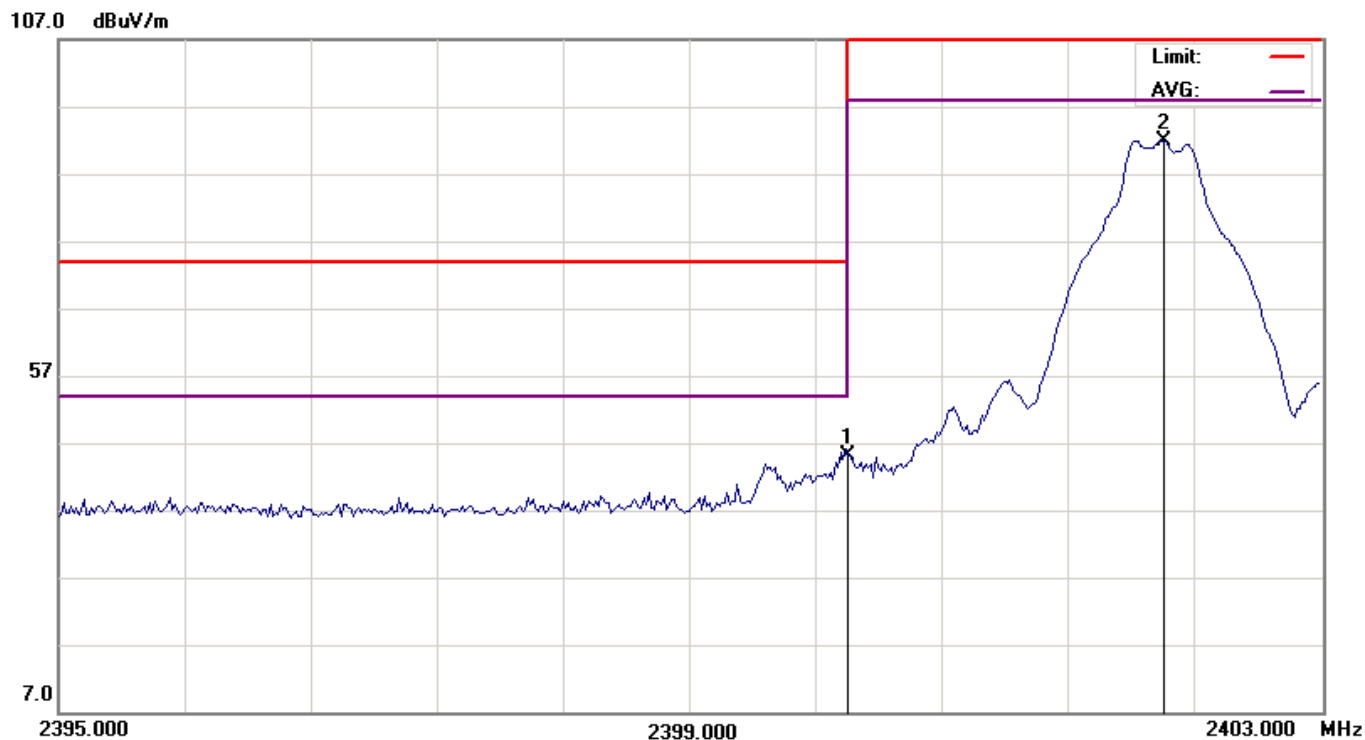
No.3, Baodoucuokeng, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)

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Date of Test	March 27, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode1-CH00 (2402MHz)	Display Pattern	Program
Antenna distance	3m at **Vertical**	Test Frequency Range	2395MHz~2489MHz
Test Power Supply	DC 5V		

No.	Frequency MHz	Reading Level dBμV	Factor dB/m	Measurement dBμV/m	Limit dBμV/m	Over Limit dB	Detector
1	2400.0000	45.56	-0.55	45.01	74.00	-28.99	peak
2	★2402.0000	92.53	-0.59	91.94	118.00	-26.06	peak

Remarks:

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
6. The measurement uncertainty is 4.35 dB.(1G-18G)

GESTEK *Lab*
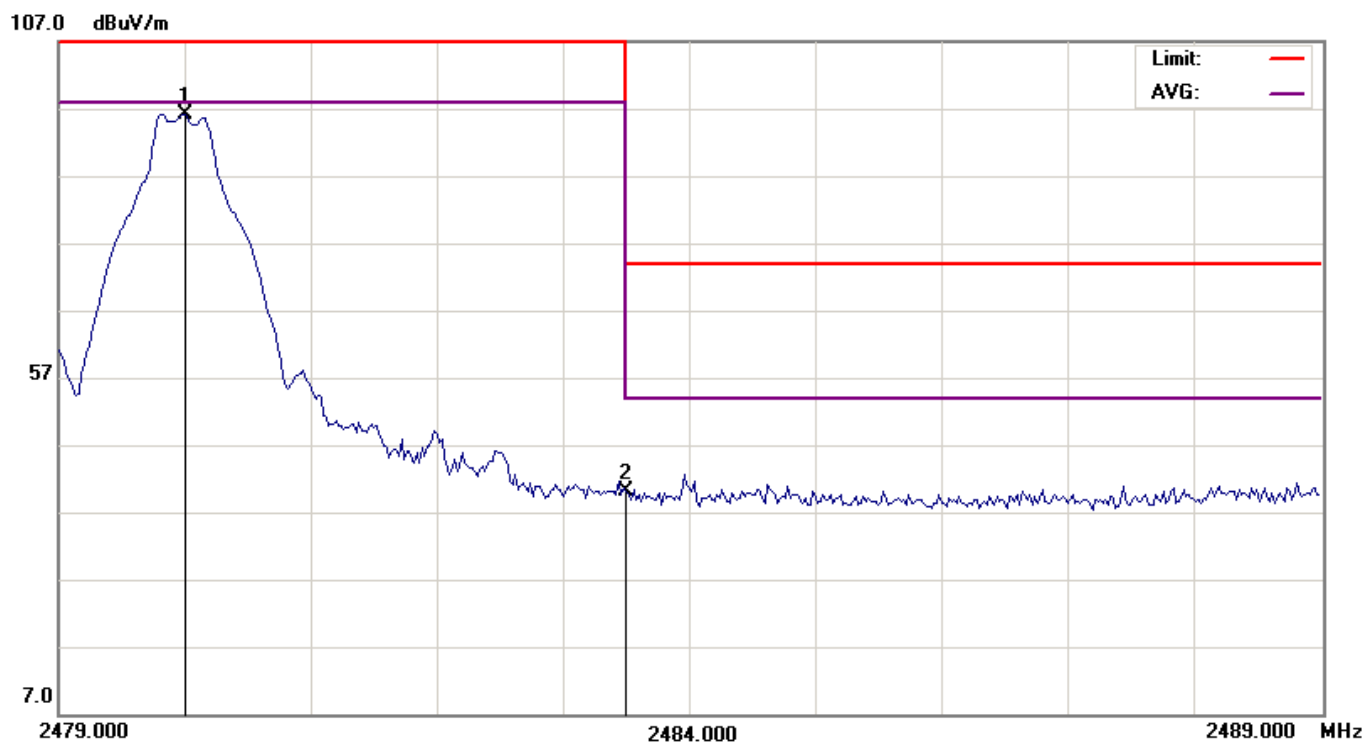
No.3, Baodoucuokeng, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)

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Date of Test	March 27, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode1-CH78 (2480MHz)	Display Pattern	Program
Antenna distance	3m at **Horizontal**	Test Frequency Range	2395MHz~2489MHz
Test Power Supply	DC 5V		

No.	Frequency MHz	Reading Level dBµV	Factor dB/m	Measurement dBµV/m	Limit dBµV/m	Over Limit dB	Detector
1	★2480.0000	94.01	2.18	96.19	118.00	-21.81	peak
2	2483.5000	37.98	2.15	40.13	74.00	-33.87	peak

Remarks:

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
6. The measurement uncertainty is 4.35 dB.(1G-18G)

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Date of Test	March 27, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode1-CH78 (2480MHz)	Display Pattern	Program
Antenna distance	3m at **Vertical**	Test Frequency Range	2395MHz~2489MHz
Test Power Supply	DC 5V		

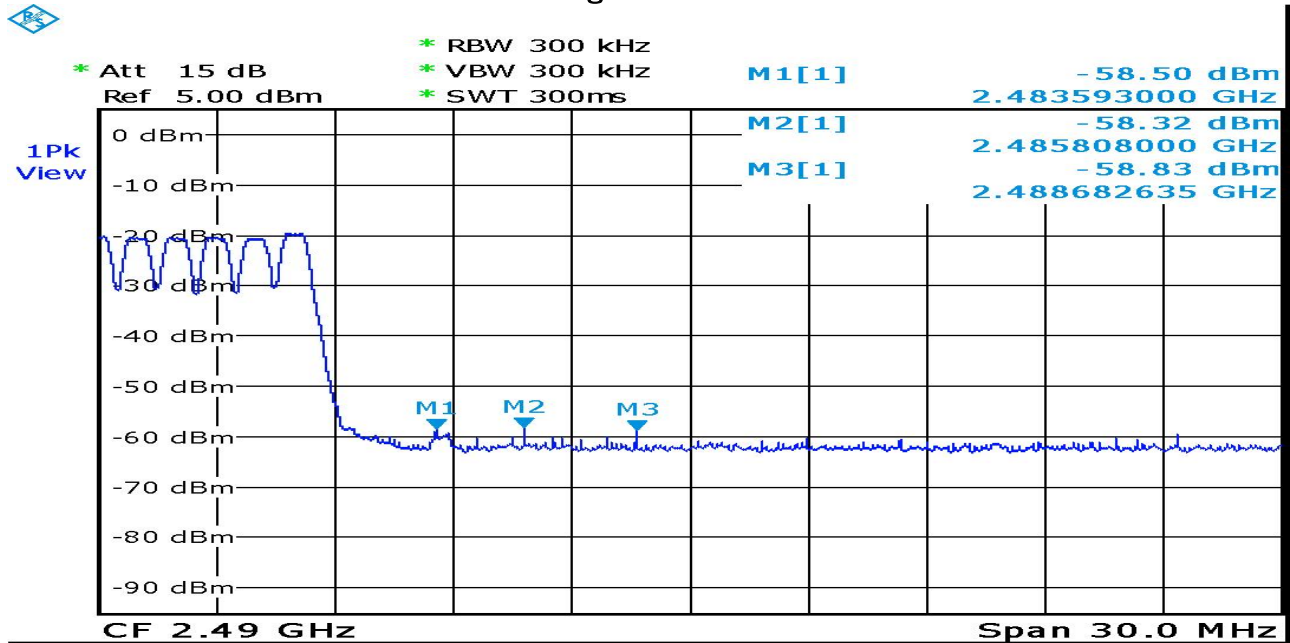| No.	Frequency MHz	Reading Level dBµV	Factor dB/m	Measurement dBµV/m	Limit dBµV/m	Over Limit dB	Detector
1	★2480.0000	88.36	-1.79	86.57	118.00	-31.43	peak
2	2483.5000	36.40	-1.84	34.56	74.00	-39.44	peak

Remarks:

1. All Readings are Peak and Average value.
2. Measurement = Reading + Factor (Could have ±0.01 tolerance due to computer automatically round off calculation).
3. Over Limit (Margin Value)=Measurement level-Limit value.
4. Factor = antenna factor + cable loss – amplifier gain.
5. The antenna height could have ±1cm tolerance and the turn table degree could have ±1° tolerance.
6. The measurement uncertainty is 4.35 dB.(1G-18G)

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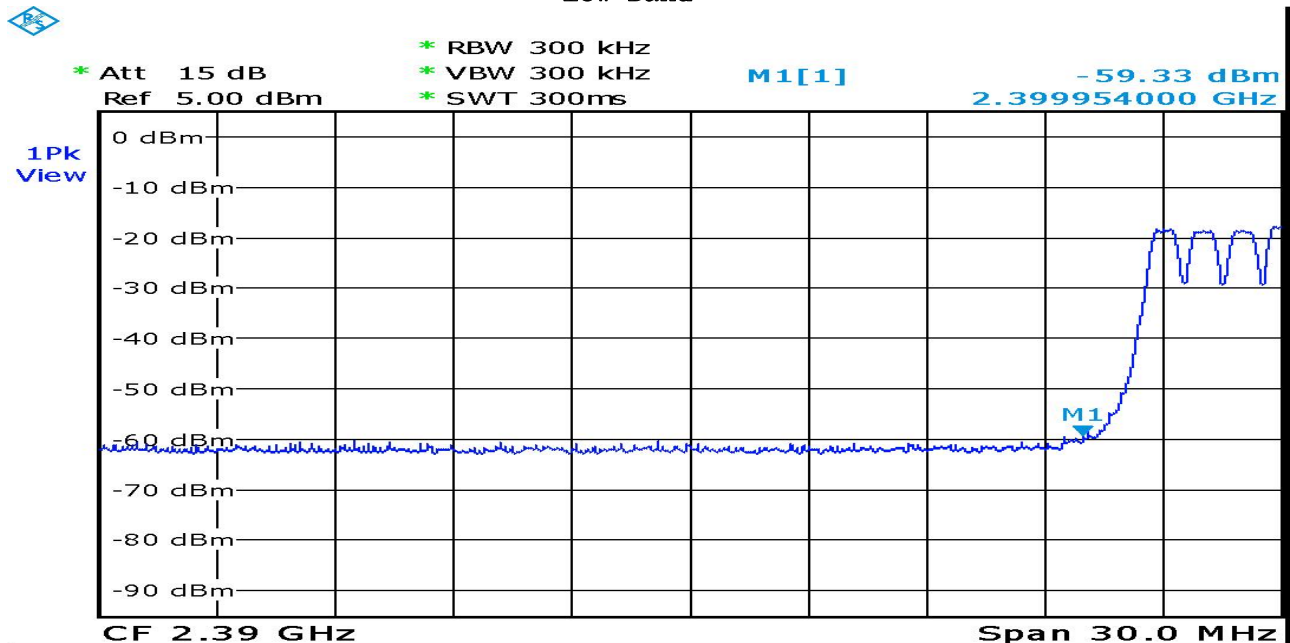
No.3, Baodoucuokeng, Linkou Dist., New Taipei City 244, Taiwan(R.O.C.)

Report No: 1302018R-01

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Date of Test	March 27, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Hopping Mode (2402~2480MHz)		

High Band

Low Band

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Date of Test	March 27, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	CH-00 and CH-78 (2402~2480MHz)		

High Band
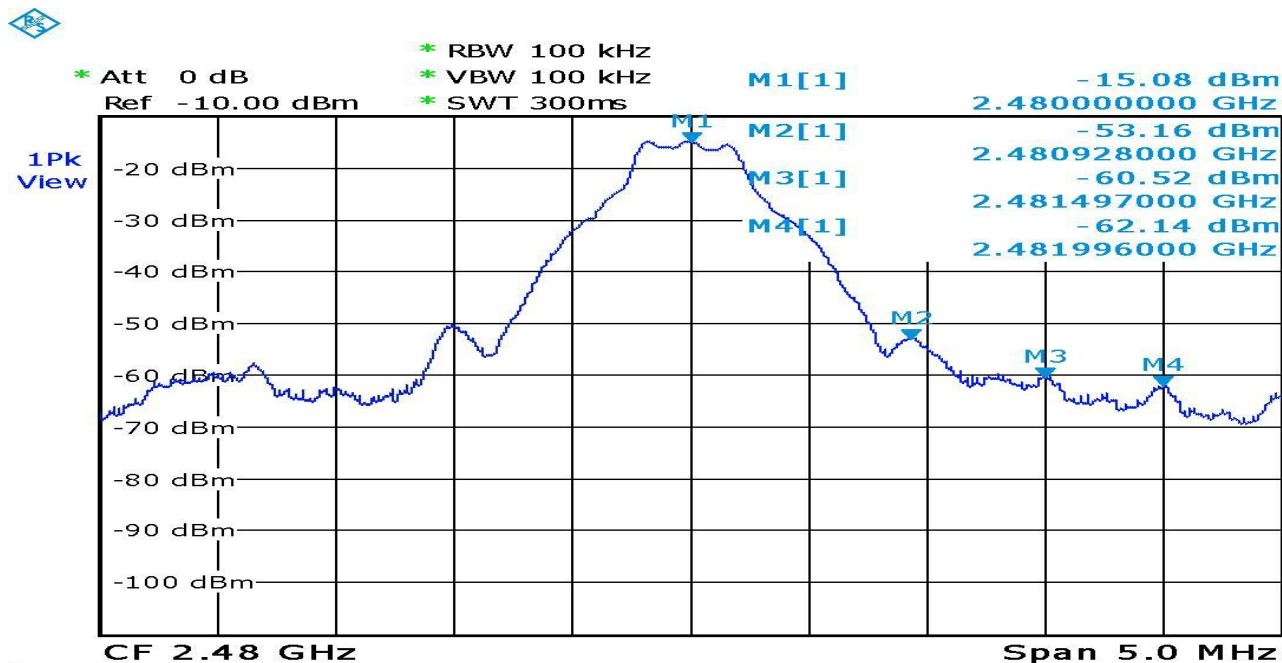
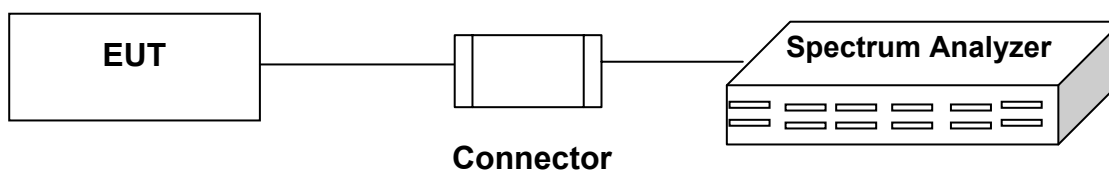## Low Band
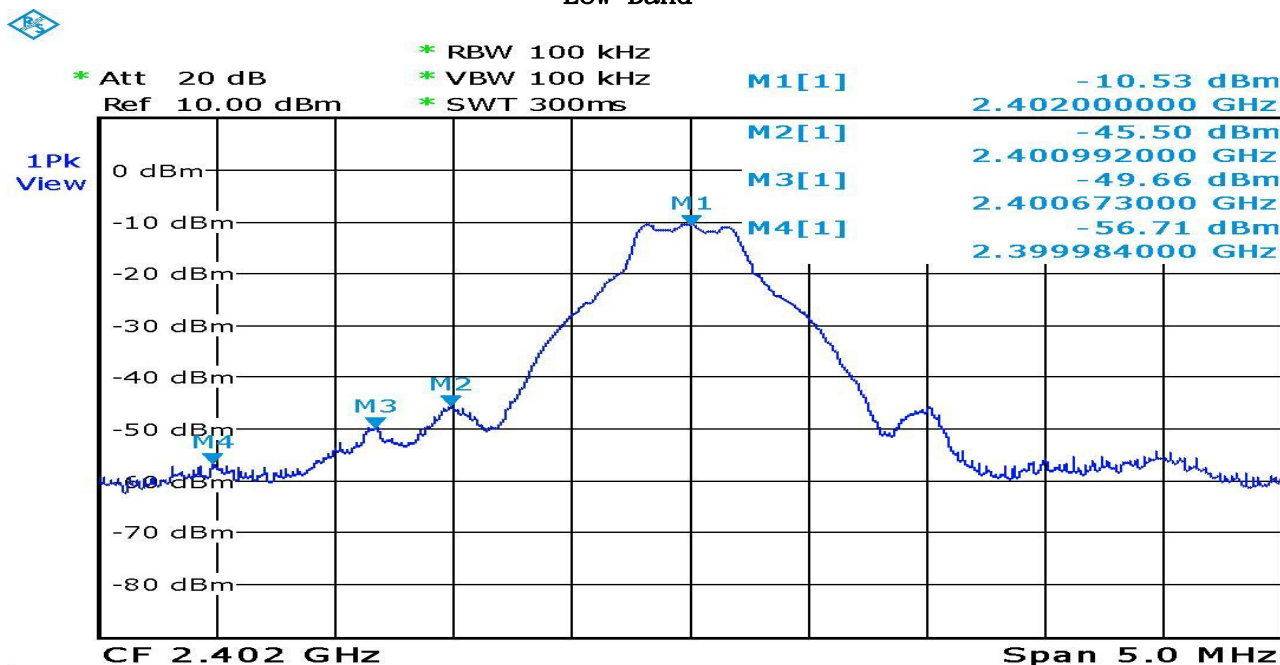
7.   OCCUPIED BANDWIDTH

7.1 TEST EQUIPMENT

The following test equipments are used during the radiated emission tests:

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Spectrum Analyzer	RS	FSL6	100517	2013.08.26

Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.
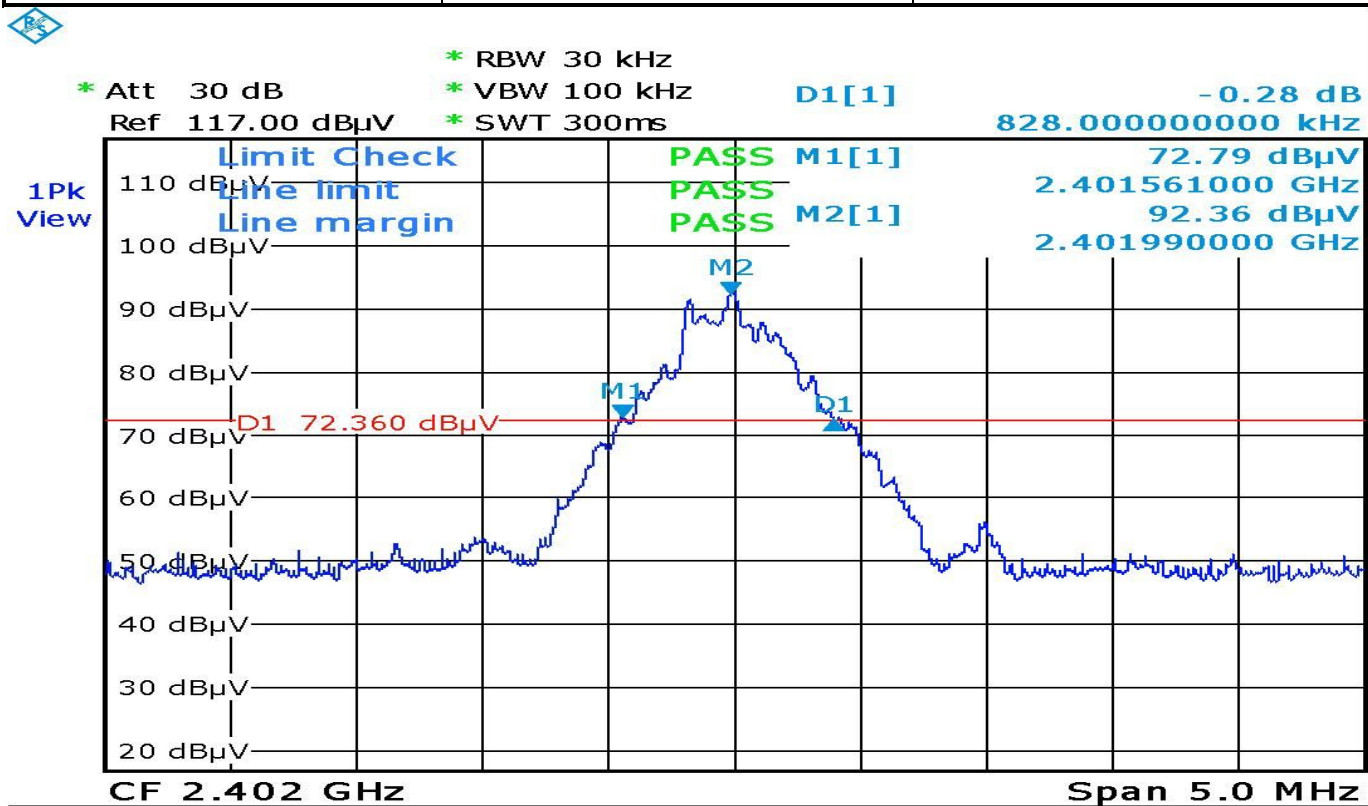
7.2 BLOCK DIAGRAM OF TEST SETUP

```
┌──────────┐          ┌────────┐          ┌─────────────────────┐
│          │          │        │          │  Spectrum Analyzer  │
│   EUT    │──────────│        │──────────│                     │
│          │          │        │          │                     │
└──────────┘          └────────┘          └─────────────────────┘
                      Connector
```

7.3 LIMIT

The maximum 20 dB bandwidth shall be muasurement.

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7.4 TEST RESULT

Date of Test	March 11, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode 1		

Channel No.	Frequency (MHz)	20dB Bandwidth (MHz)
00	2402	0.828
38	2440	0.838
78	2480	0.838

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Tel:886-2-2603-5321 Fax:886-2-2603-5325
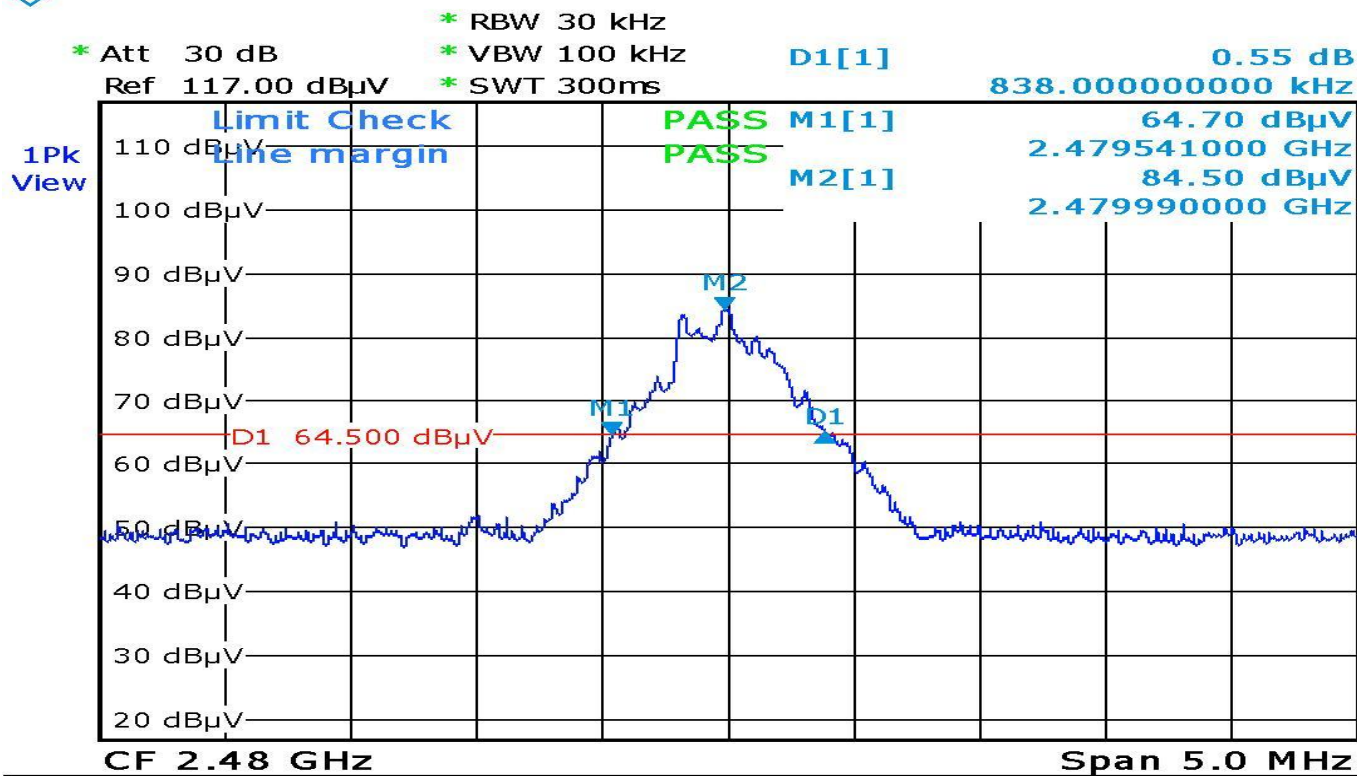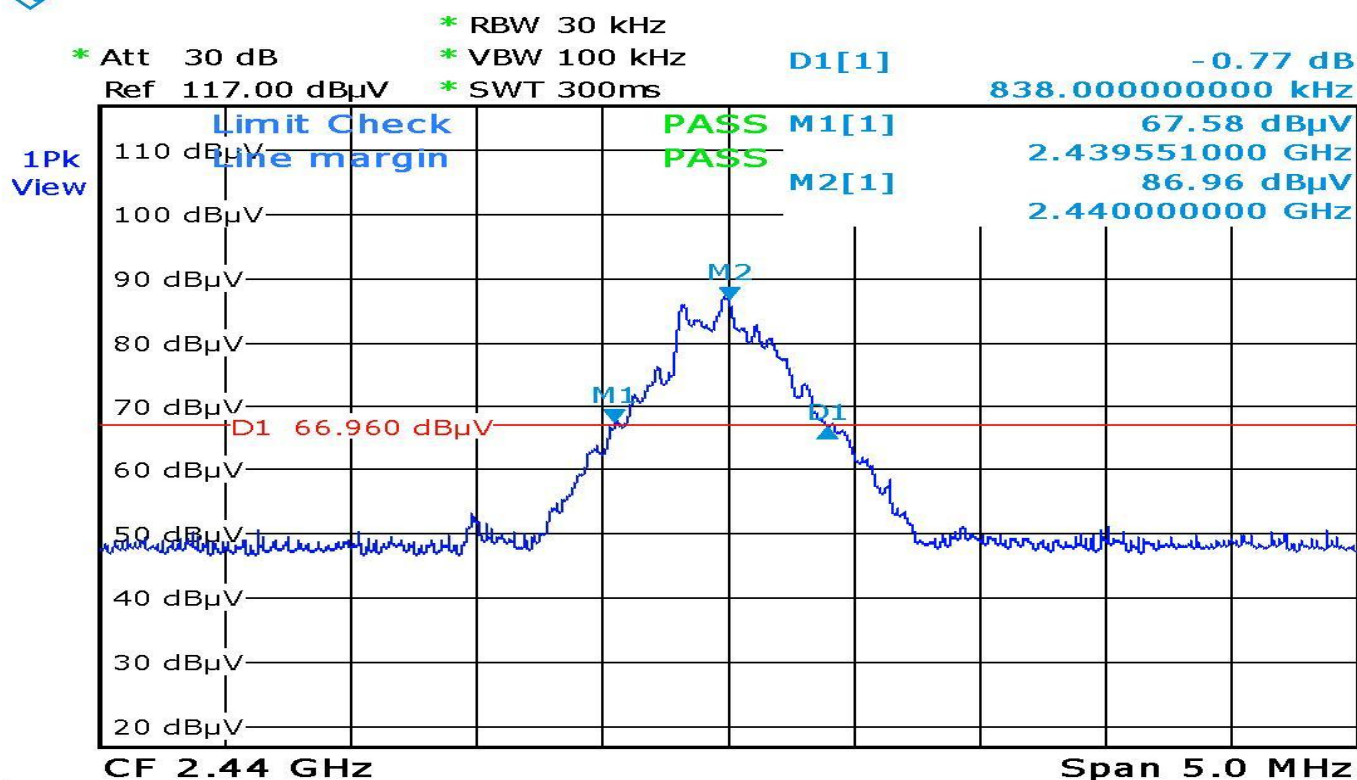
8.   CHANNEL SEPARATION

8.1 TEST EQUIPMENT
The following test equipments are used during the radiated emission tests:

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Spectrum Analyzer	RS	FSL6	100517	2013.08.26

Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.
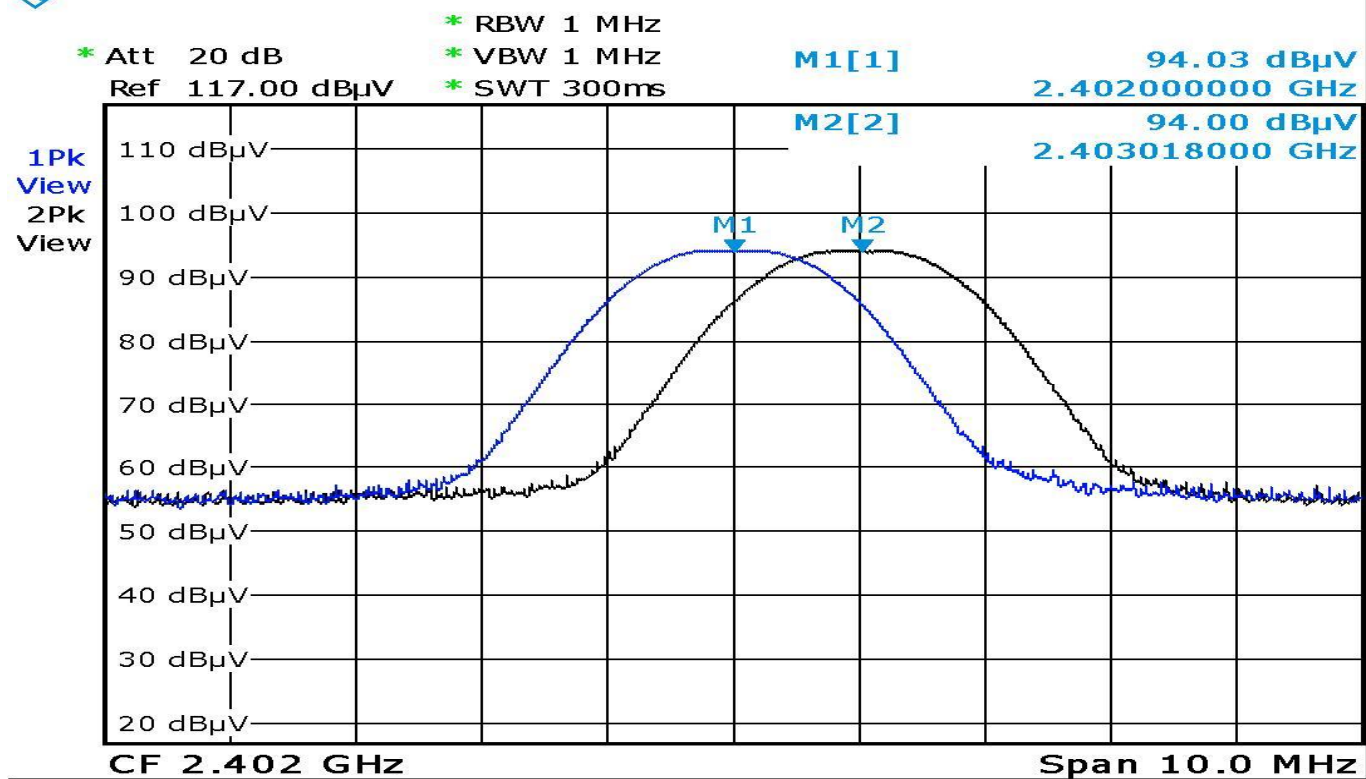
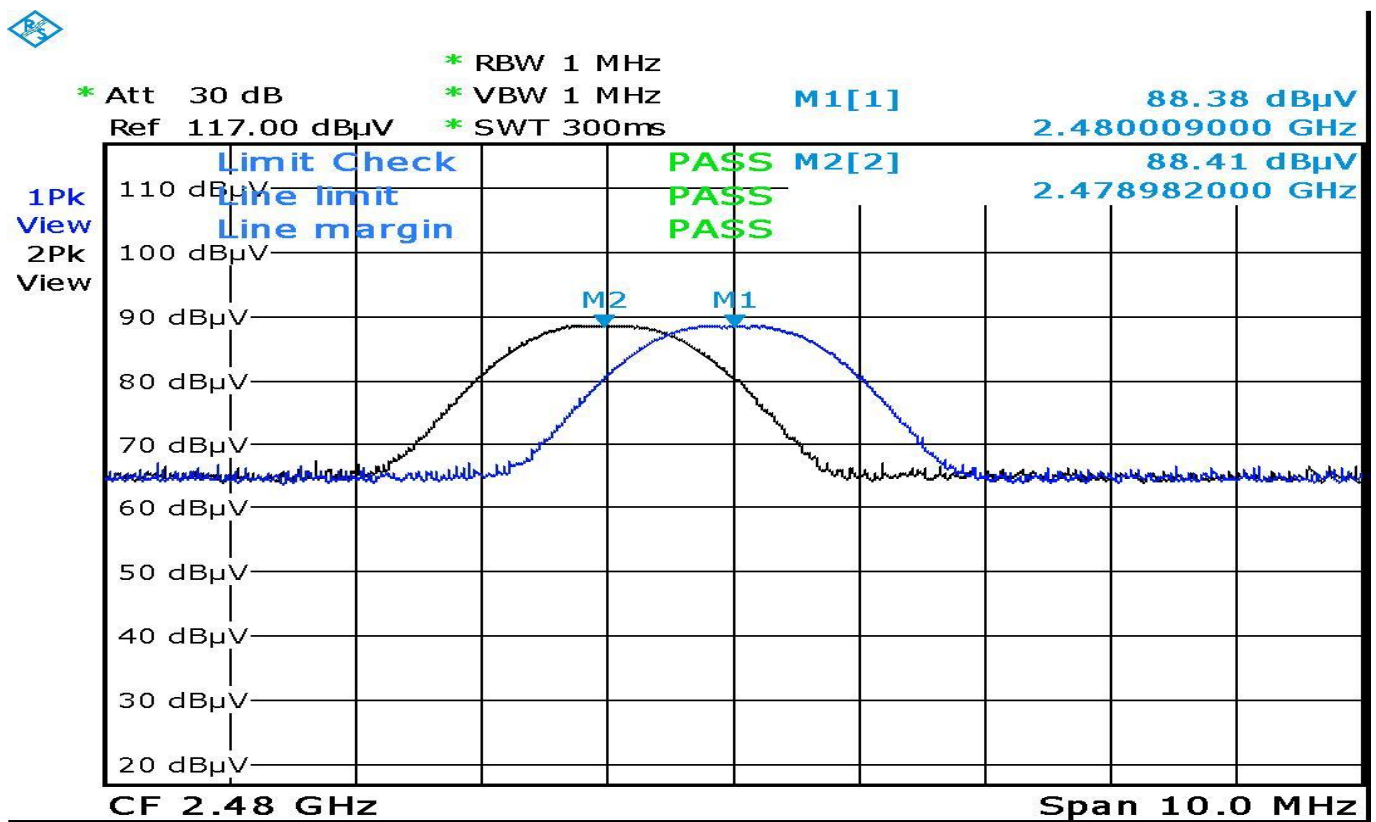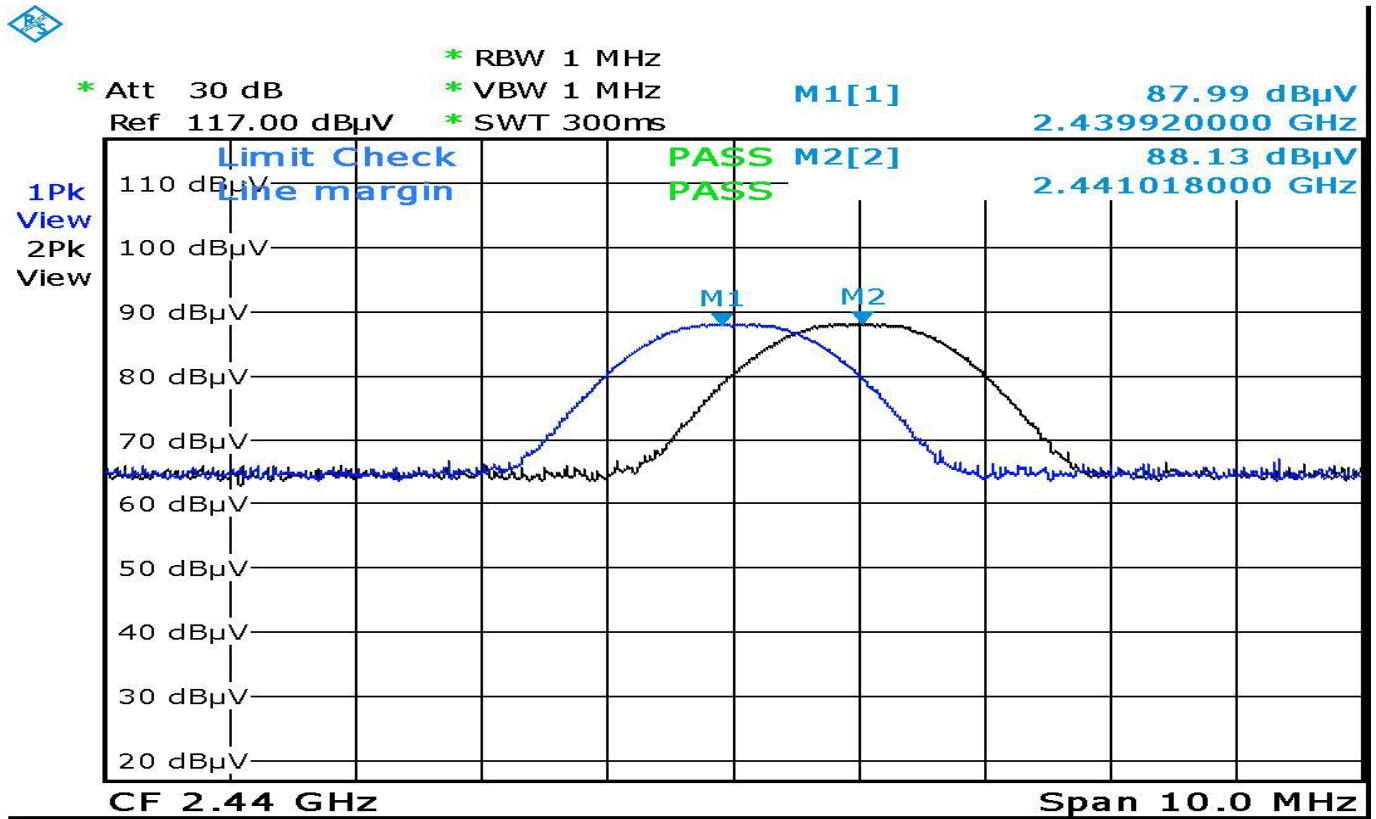### 8.2 BLOCK DIAGRAM OF TEST SETUP
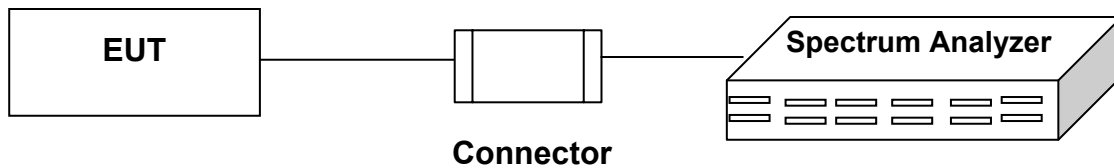
8.3 LIMIT
Frequency hopping systems shall have hopping channel carrier frequencies separated by minimum of 25kHz or the 20dB bandwidth of hopping channel, whichever is grester.

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8.4 TEST RESULT

Date of Test	March 11, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode 1		

Test Channel No.	Channel Separated (kHz)	Limit (kHz)	Limit of 20dB Bandwidth (kHz)	Result
00	1018	>25	>828	Pass
38	1098	>25	>838	Pass
78	1027	>25	>838	Pass

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* RBW 1 MHz
* Att 30 dB
Ref 117.00 dBµV
* VBW 1 MHz
* SWT 300ms

M1[1]   87.99 dBµV
                     2.439920000 GHz

Limit Check   PASS M2[2]   88.13 dBµV
Line margin   PASS   2.441018000 GHz

1Pk View
2Pk View

110 dBµV
100 dBµV
90 dBµV
80 dBµV
70 dBµV
60 dBµV
50 dBµV
40 dBµV
30 dBµV
20 dBµV

M1   M2

CF 2.44 GHz   Span 10.0 MHz

* RBW 1 MHz
* Att 30 dB
Ref 117.00 dBµV
* VBW 1 MHz
* SWT 300ms

M1[1]   88.38 dBµV
                     2.480009000 GHz

Limit Check   PASS M2[2]   88.41 dBµV
Line limit   PASS   2.478982000 GHz
Line margin   PASS

1Pk View
2Pk View

110 dBµV
100 dBµV
90 dBµV
80 dBµV
70 dBµV
60 dBµV
50 dBµV
40 dBµV
30 dBµV
20 dBµV

M2   M1

CF 2.48 GHz   Span 10.0 MHz
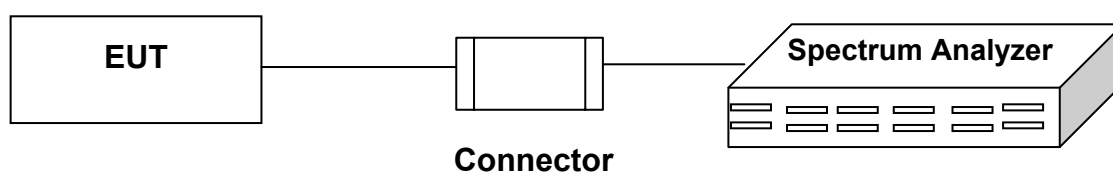
9.   DWELL TIME

9.1 TEST EQUIPMENT

The following test equipments are used during the radiated emission tests:

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Spectrum Analyzer	RS	FSL6	100517	2013.08.26

Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.

9.2 BLOCK DIAGRAM OF TEST SETUP

9.3 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 number of hopping channels employed.

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9.4 TEST RESULT

Date of Test	March 11, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode 1-CH 00 (2402MHz)		

DH1

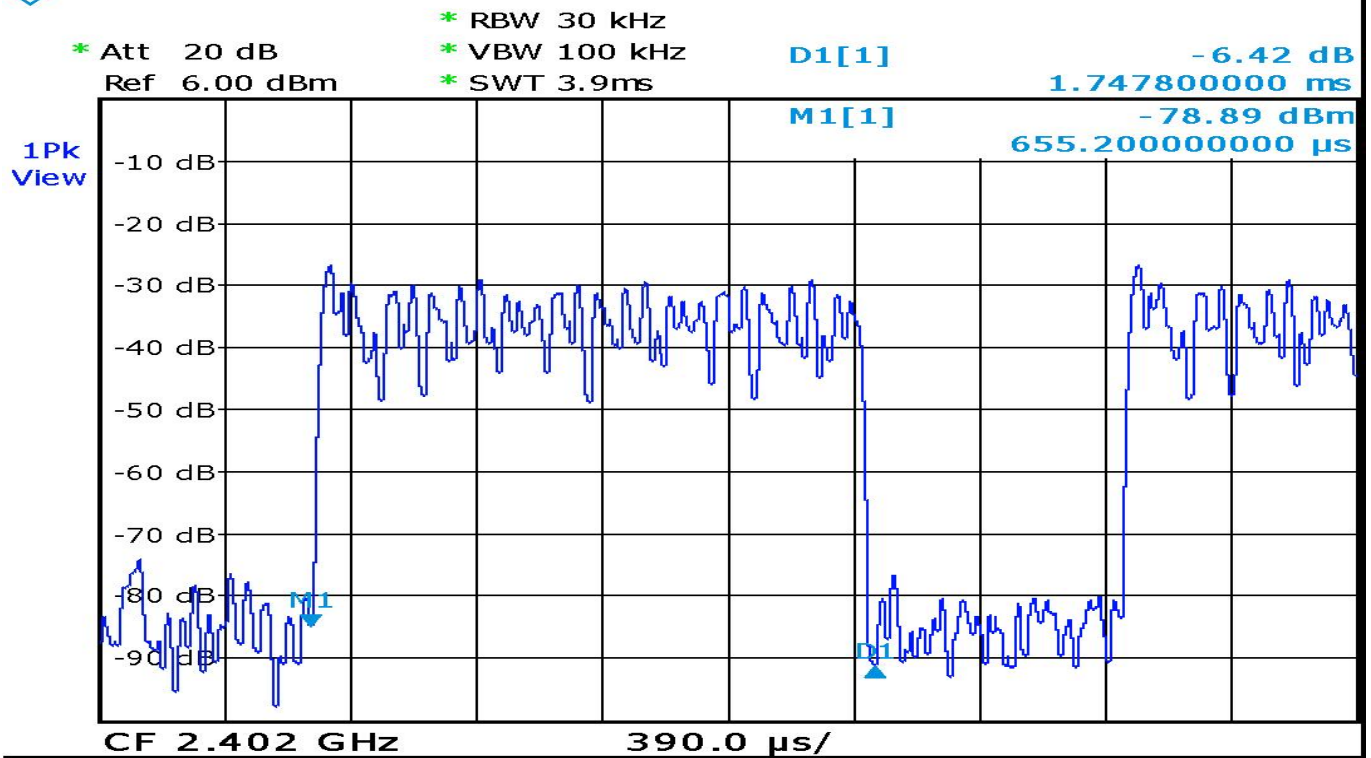| Measurement Level (sec)	Required Limit (sec)	Result

Period ＝ 0.4 (sec) * 79 (number of channel)
      ＝ 31.6 (sec)
Hop rate = (1600/ 2/ 79) (ms) x (0.4 * 79) (sec) = 320 (times)
Time slot length = 538 (µs) = 0.000538 (sec)
 	
※ Dwell Time = 0.000538 (sec) × 320 (times)
            = 0.17216 (sec)
	< 0.4	Pass

Note: Dwell time = time slot length * number of transmission in the period.

DH3

Measurement Level (sec)	Required Limit (sec)	Result

Period ＝ 0.4 (sec) * 79 (number of channel)
      ＝ 31.6 (sec)
Hop rate = (1600/ 4/ 79) (ms) x (0.4 * 79) (sec) = 160 (times)
Time slot length = 1747.8(µs) = 0.0017478 (sec)
 	
※ Dwell Time = 0.0017478 (sec) × 160 (times)
            = 0.279648 (sec)
	< 0.4	Pass

Note: Dwell time = time slot length * number of transmission in the period.

DH5

Measurement Level (sec)	Required Limit (sec)	Result

Period ＝ 0.4 (sec) * 79 (number of channel)
      ＝ 31.6 (sec)
Hop rate = (1600/ 6/ 79) (ms) x (0.4 * 79) (sec) = 106.67 (times)
Time slot length = 3019.2 (µs) = 0.0030192 (sec)
 	
※ Dwell Time = 0.0030192 (sec) × 106.67 (times)
            = 0.322058064 (sec)
	< 0.4	Pass
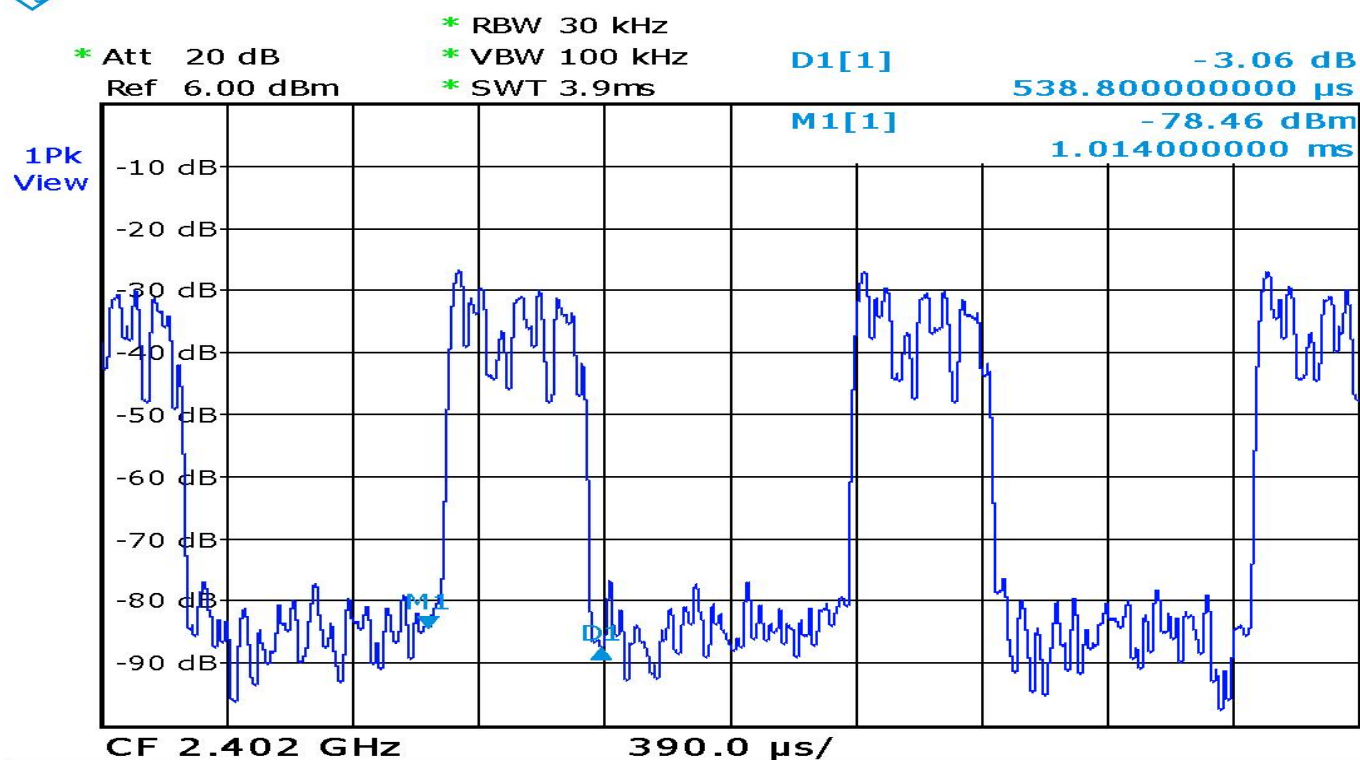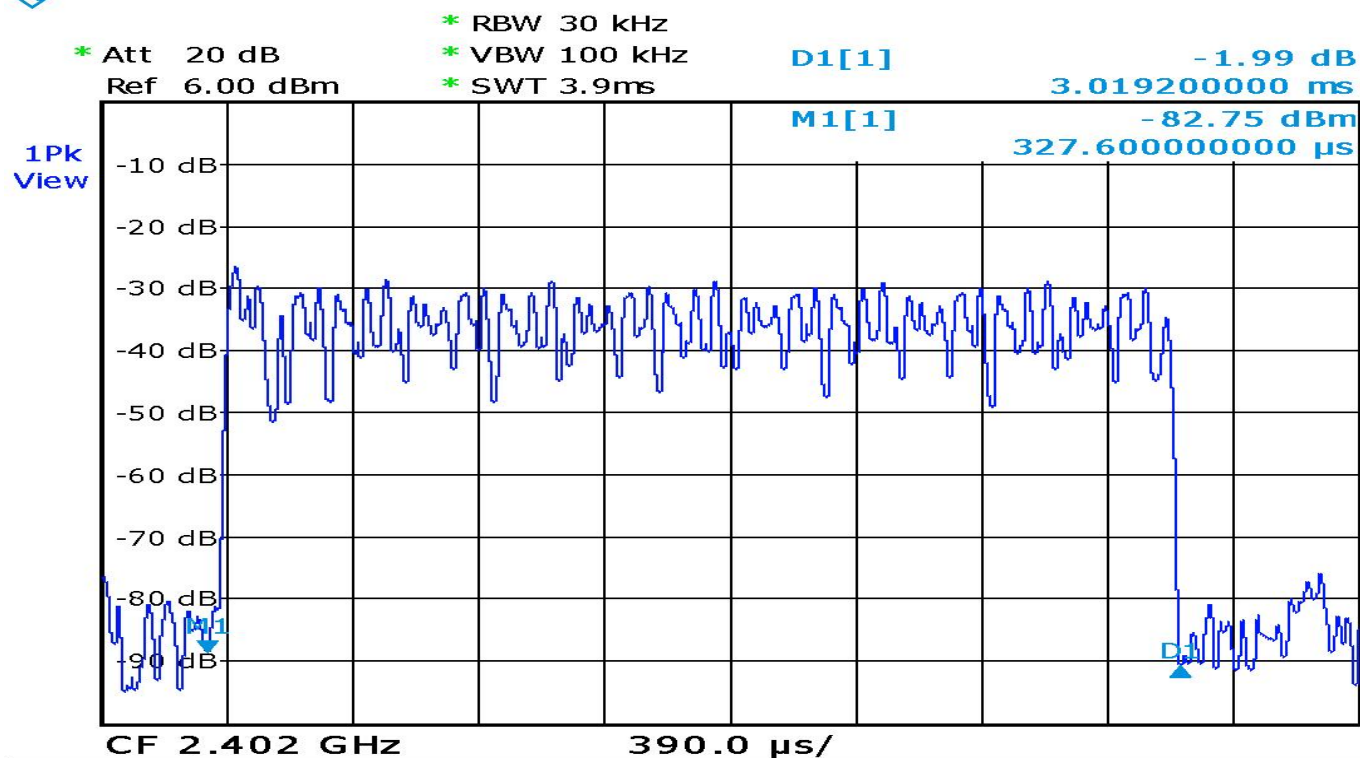
Note: Dwell time = time slot length * number of transmission in the period.

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Date of Test	March 11, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode 1-CH 38 (2440MHz)		

DH1

Measurement Level (sec)	Required Limit (sec)	Result
Period = 0.4 (sec) * 79 (number of channel) = 31.6 (sec) Hop rate = (1600/ 2/ 79) (ms) x (0.4 * 79) (sec) = 320 (times) Time slot length = 507.6 (µs) = 0.0005076 (sec)	< 0.4	Pass
※ Dwell Time = 0.0005076 (sec) × 320 (times) = 0.162432 (sec)		

   Note: Dwell time = time slot length * number of transmission in the period.

DH3

Measurement Level (sec)	Required Limit (sec)	Result
Period = 0.4 (sec) * 79 (number of channel) = 31.6 (sec) Hop rate = (1600/ 4/ 79) (ms) x (0.4 * 79) (sec) = 160 (times) Time slot length = 1771.2 (µs) = 0.0017712 (sec)	< 0.4	Pass
※ Dwell Time = 0.0017712 (sec) × 160 (times) = 0.283392 (sec)		

   Note: Dwell time = time slot length * number of transmission in the period.

DH5

Measurement Level (sec)	Required Limit (sec)	Result
Period = 0.4 (sec) * 79 (number of channel) = 31.6 (sec) Hop rate = (1600/ 6/ 79) (ms) x (0.4 * 79) (sec) = 106.67 (times) Time slot length = 3045.4 (µs) = 0.0030454 (sec)	< 0.4	Pass
※ Dwell Time = 0.0030454 (sec) × 106.67 (times) = 0.324852818 (sec)		

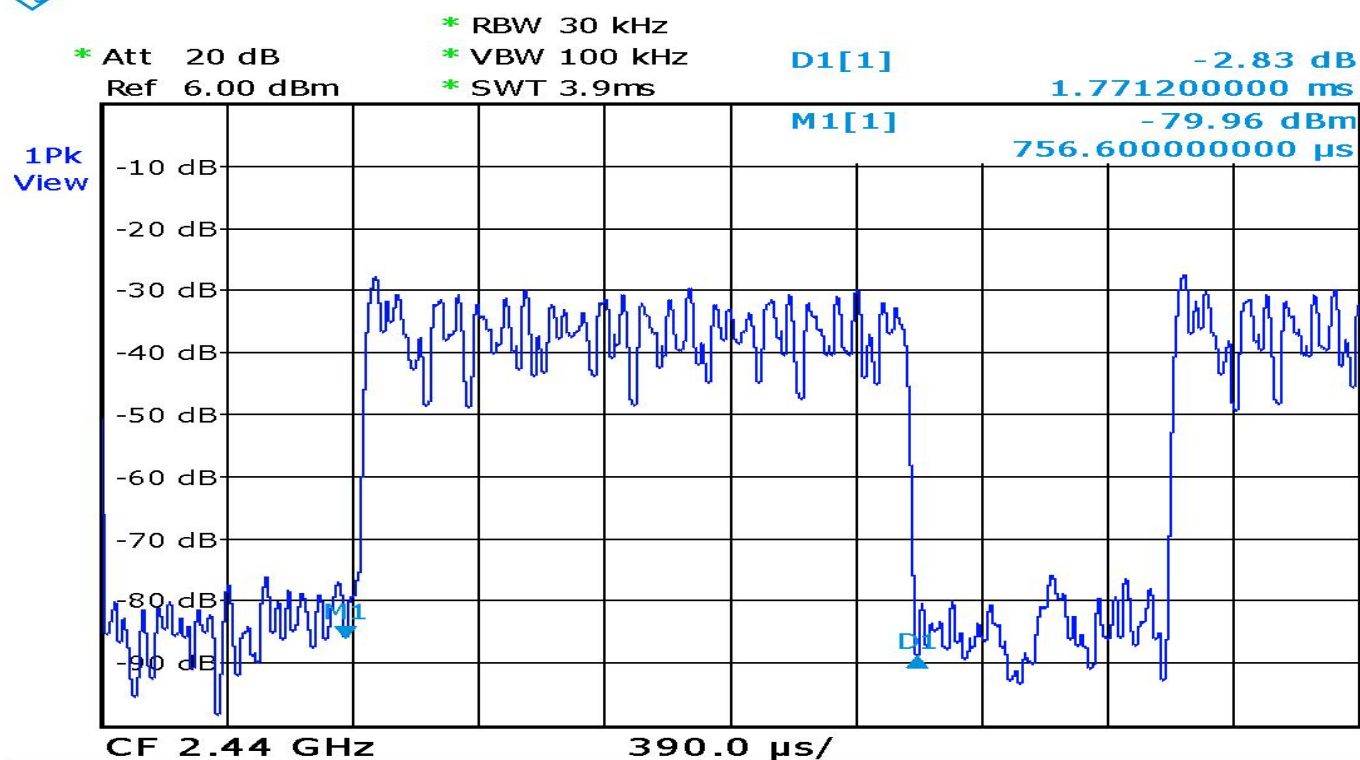   Note: Dwell time = time slot length * number of transmission in the period.

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Report No: 1302018R-01

Tel:886-2-2603-5321 Fax:886-2-2603-5325
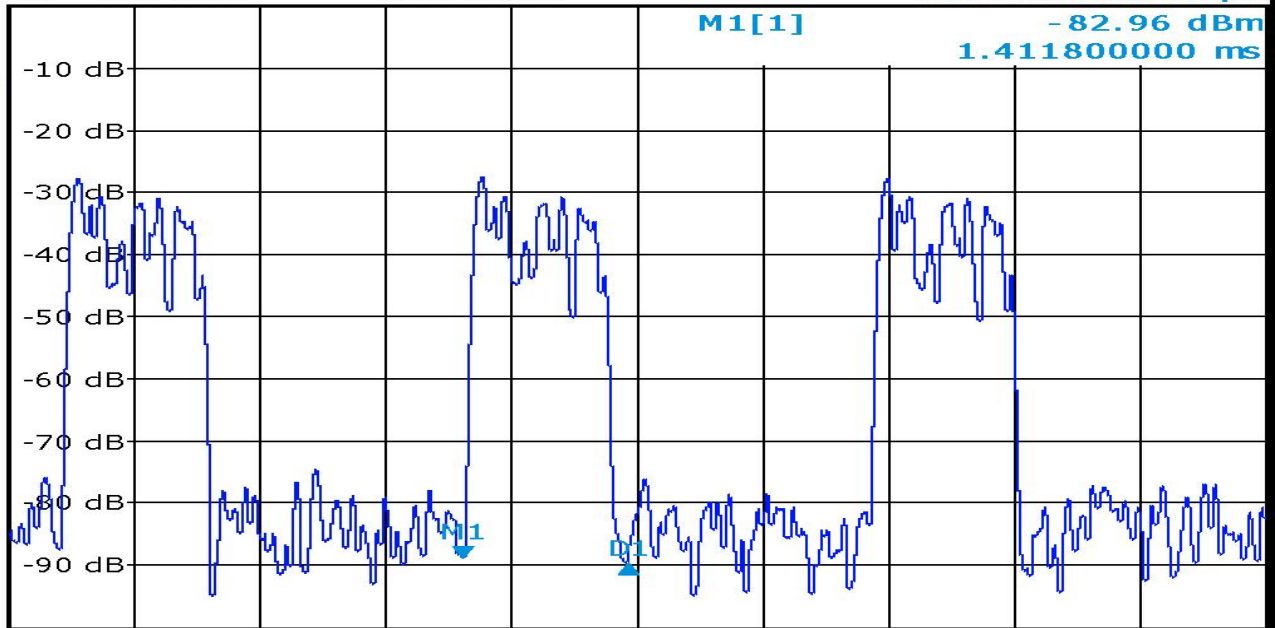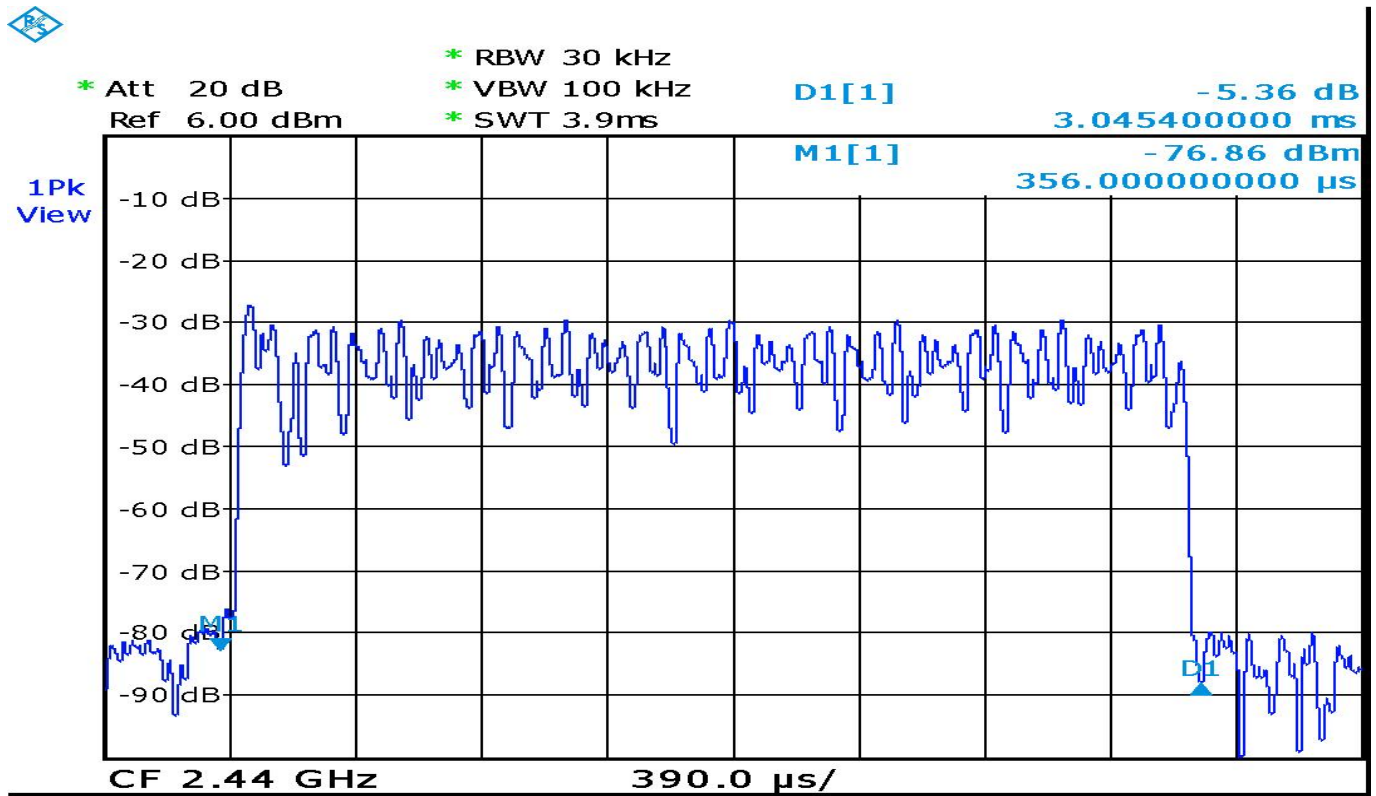
Date of Test	March 11, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode 1-CH 78 (2480MHz)		

DH1

Measurement Level (sec)	Required Limit (sec)	Result

Period = 0.4 (sec) * 79 (number of channel)
          = 31.6 (sec)
Hop rate = (1600/ 2/ 79) (ms) x (0.4 * 79) (sec) = 320 (times)
Time slot length = 494.8 (µs) = 0.0004948 (sec)
 	
※ Dwell Time = 0.0004948 (sec) $\times$ 320 (times)
          = 0.158336 (sec)
	< 0.4	Pass

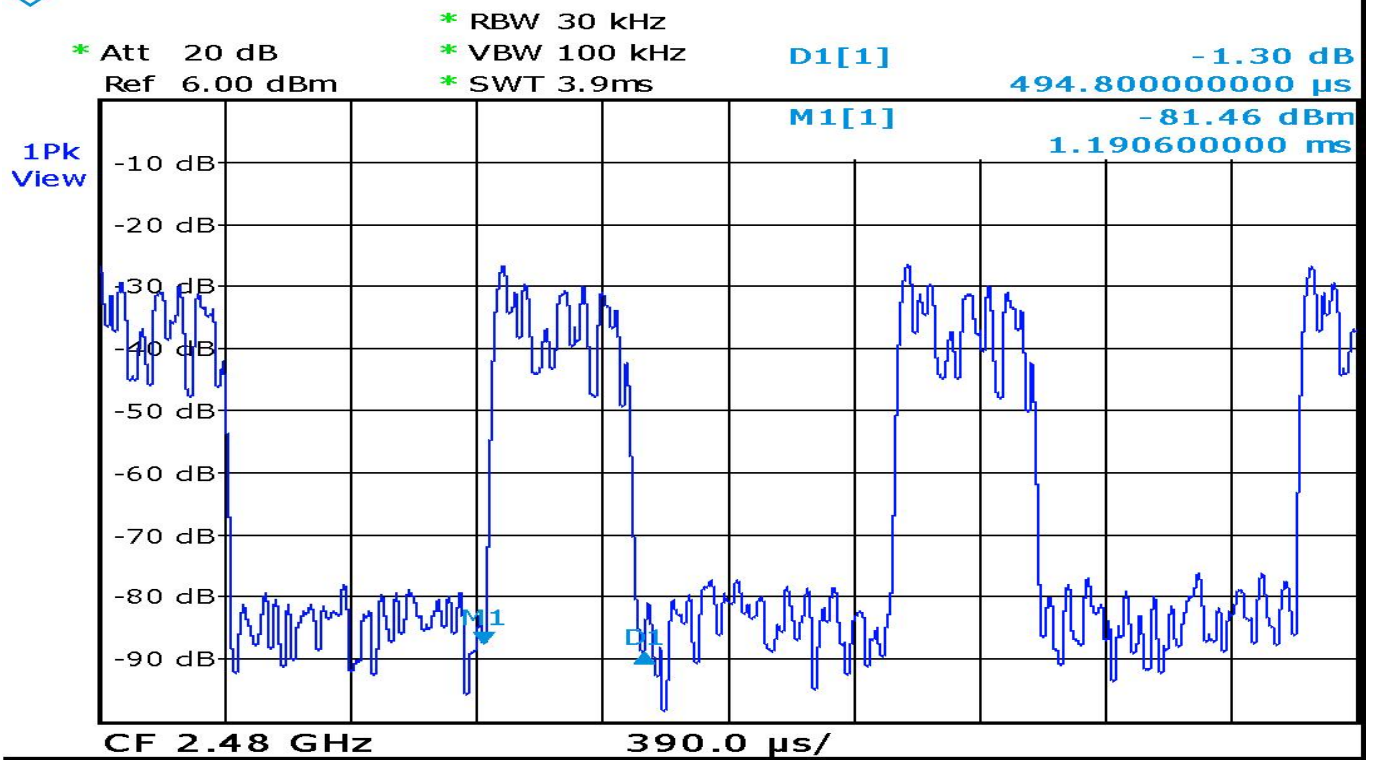   Note: Dwell time = time slot length * number of transmission in the period.

DH3

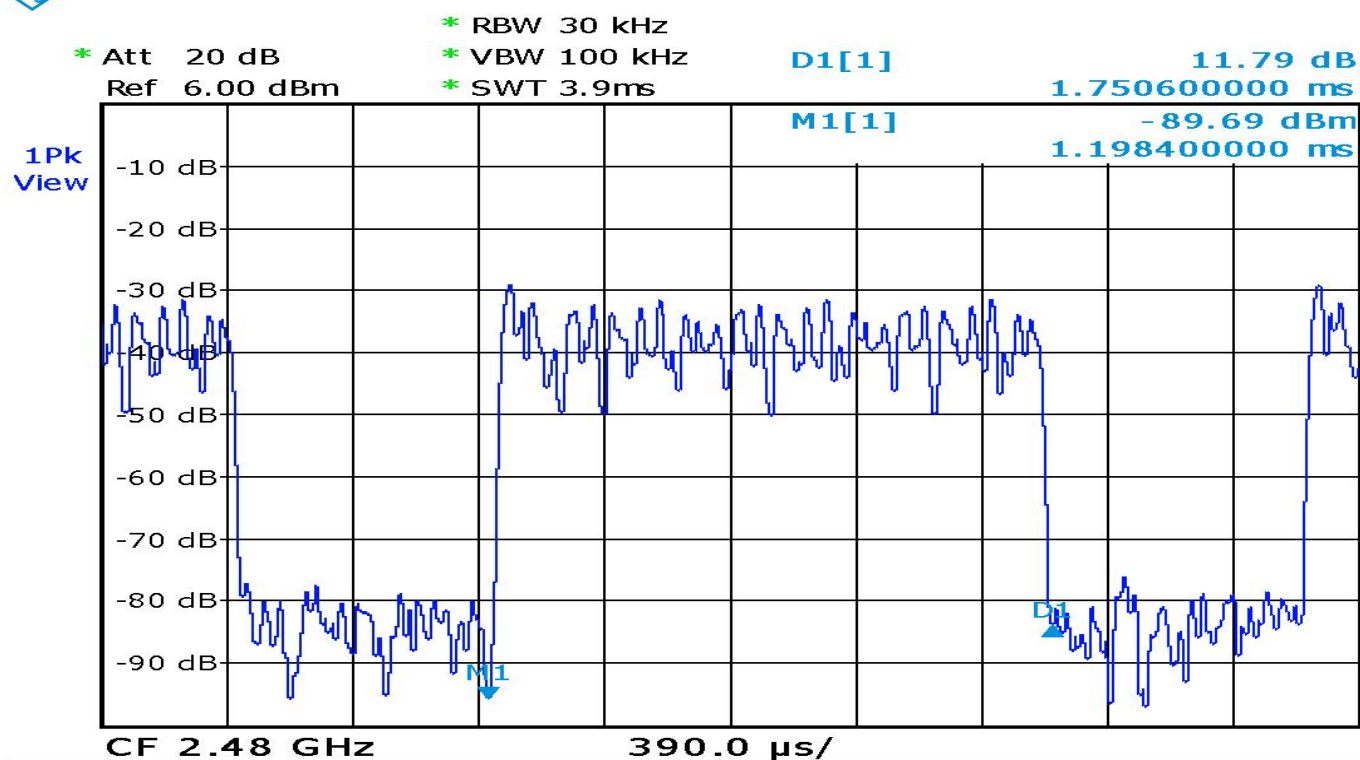| Measurement Level (sec)	Required Limit (sec)	Result

Period = 0.4 (sec) * 79 (number of channel)
          = 31.6 (sec)
Hop rate = (1600/ 4/ 79) (ms) x (0.4 * 79) (sec) = 160 (times)
Time slot length = 1750.6 (µs) = 0.0017506 (sec)
 	
※ Dwell Time = 0.0017506(sec) $\times$ 160 (times)
          = 0.280096 (sec)
	< 0.4	Pass

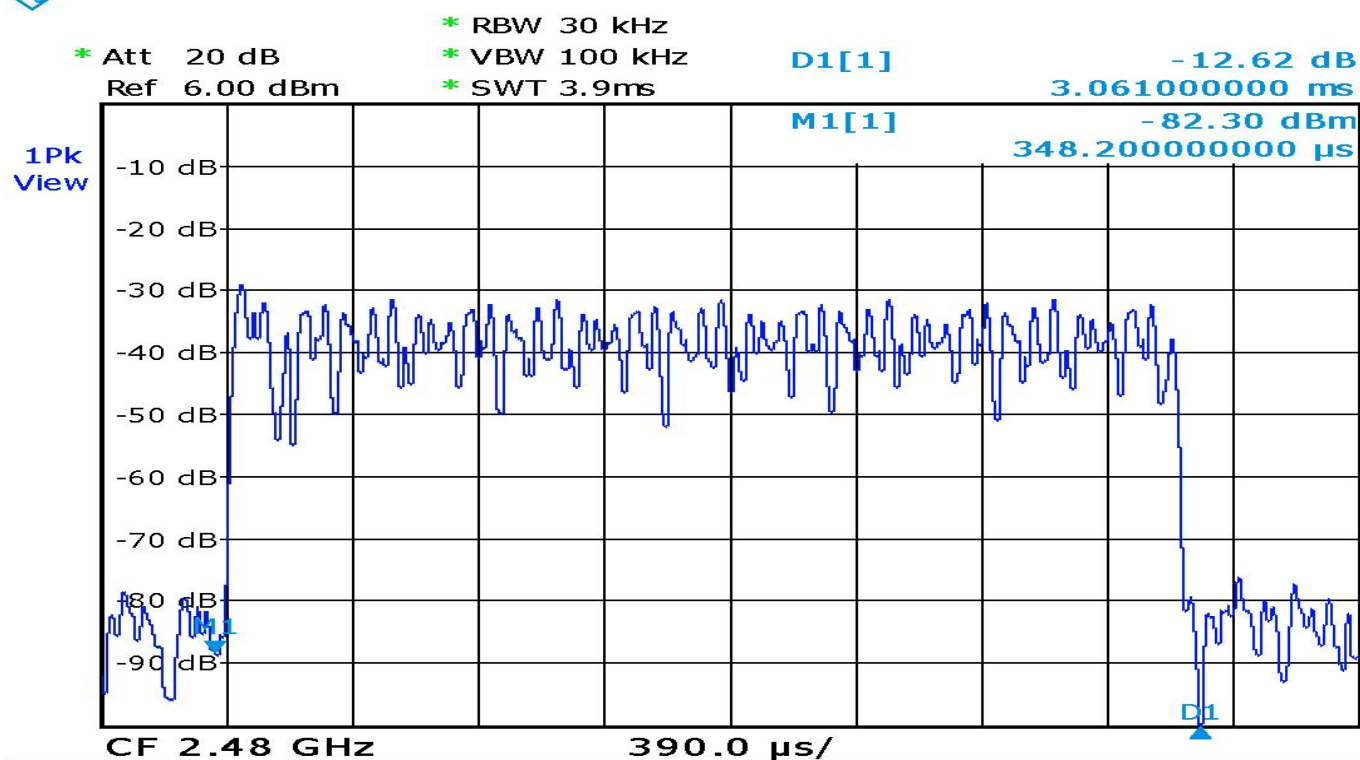   Note: Dwell time = time slot length * number of transmission in the period.

DH5

Measurement Level (sec)	Required Limit (sec)	Result

Period = 0.4 (sec) * 79 (number of channel)
          = 31.6 (sec)
Hop rate = (1600/ 6/ 79) (ms) x (0.4 * 79) (sec) = 106.67 (times)
Time slot length = 3061 (µs) = 0.003061 (sec)
 	
※ Dwell Time = 0.003061 (sec) $\times$ 106.67 (times)
          = 0.32651687 (sec)
	< 0.4	Pass

   Note: Dwell time = time slot length * number of transmission in the period.

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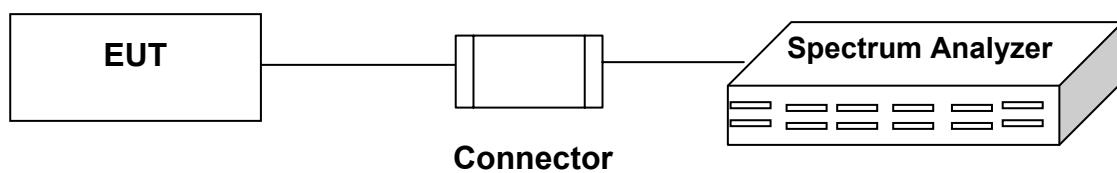
10. HOPPING CHANNEL

10.1 TEST EQUIPMENT

The following test equipments are used during the radiated emission tests:

Item	Instrument	Manufacturer	Model	S/N or Version	Next Cal. Date
1	Spectrum Analyzer	RS	FSL6	100517	2013.08.26

Note: All measurement critical items of test instrumentation were within their calibration period of 1 year.

10.2 BLOCK DIAGRAM OF TEST SETUP

10.3 LIMIT

Frequency hopping systems operating in the 2400-2483.5 MHz bands shall use at least 75 non-overlapping hopping channels.

10.4 TEST RELULT

Date of Test	March 11, 2013	Temperature	20 deg/C
EUT	Bluetooth Speaker	Humidity	60 %RH
Working Cond.	Mode 1		

Frequency Range (MHz)	Measurement (Hopping Channel)	Limit (Hopping Channel)	Result
2402 ~ 2480	79 Channel	>75 Channel	Pass
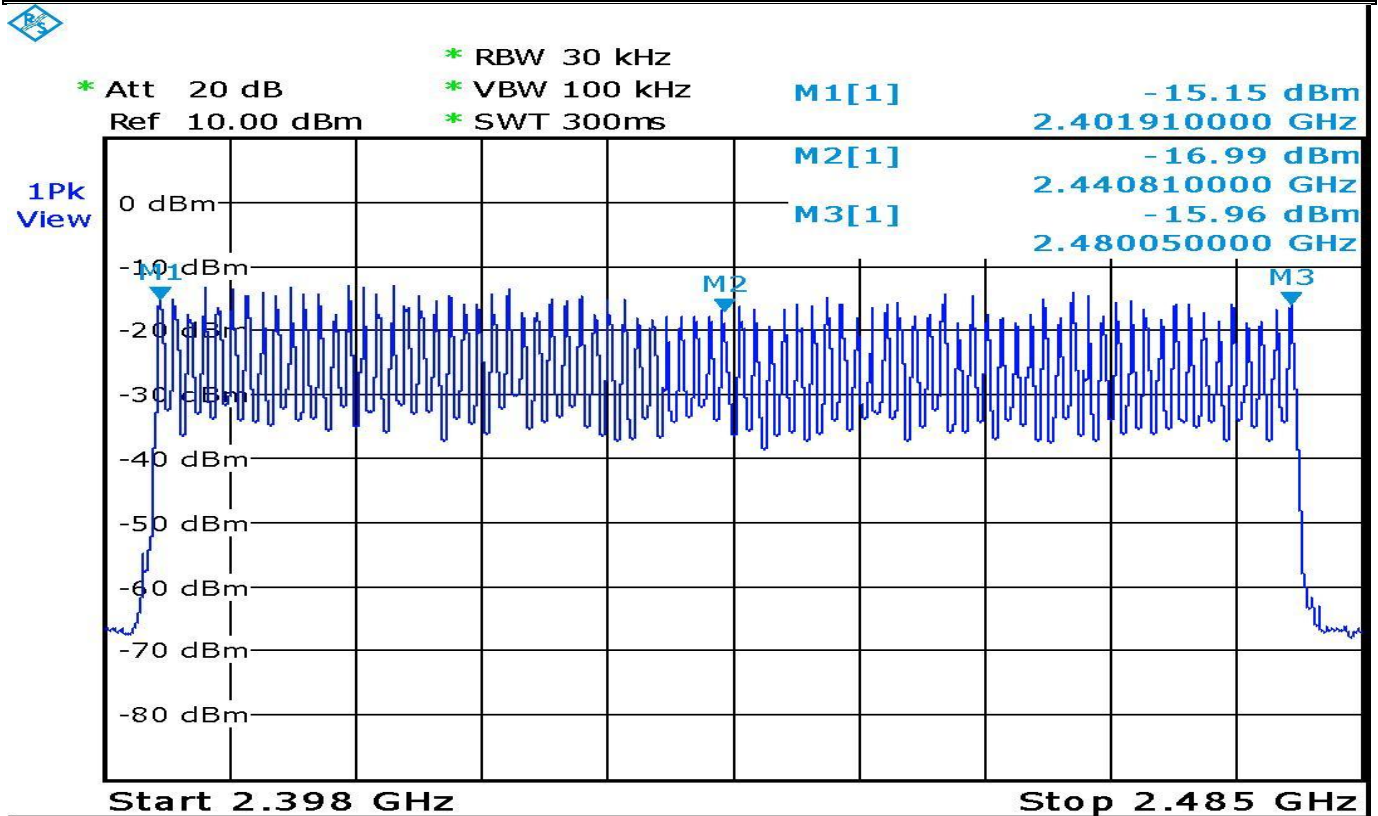
11.   EMI REDUCTION METHOD DURING COMPLIANCE TESTING

No modification was made during testing.