

FCC Test Report

Product Name : Wireless Microphone
Model No. : WMIC2
FCC ID. : ZYJ-DukaneWMIC2

Applicant : EVEREST Display Inc.
Address : 4F, No. 1, Li-Hsin Rd. 6, Science Park,
300. Hsinchu, Taiwan

Date of Receipt : 2013/04/01
Issued Date : 2013/04/17
Report No. : 134088R-RFUSP43V01
Report Version : V1.0



The test results relate only to the samples tested.

The test report shall not be reproduced except in full without the written approval of QuieTek Corporation.

Test Report Certification

Issued Date : 2013/04/17

Report No. : 134088R-RFUSP43V01

QuiTek

Product Name : Wireless Microphone
Applicant : EVEREST Display Inc.
Address : 4F, No. 1, Li-Hsin Rd. 6, Science Park, 300. Hsinchu, Taiwan
Manufacturer : Everest Technology Ltd.
Model No. : WMIC2
FCC ID. : ZYJ-DukaneWMIC2
EUT Voltage : DC 5V (Power by PC)
Trade Name : Dukane
Applicable Standard : FCC CFR Title 47 Part 15 Subpart C Section 15.247: 2012
Test Result : Complied

The test results relate only to the samples tested.

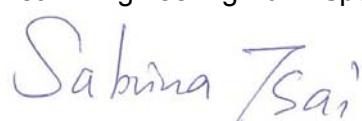
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Documented By :



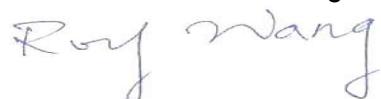
(Carol Tsai / Engineering Adm. Specialist)

Reviewed By :



(Sabrina Tsai / Assistant Engineer)

Approved By :



(Roy Wang / Manager)

Laboratory Information

We, **QuiTek Corporation**, are an independent RF consultancy that was established the whole facility in our laboratories. The test facility has been accredited/accepted (audited or listed) by the following related bodies in compliance with ISO 17025 specified testing scopes:

Taiwan R.O.C.	:	TAF, Accreditation Number: 1313
Germany	:	TUV Rheinland, Certificate No.: 10011438-2-2010
USA	:	FCC, Registration Number: 365520
Canada	:	IC, Submission No: 150981

The related certificate for our laboratories about the test site and management system can be downloaded from QuiTek Corporation's Web Site:<http://www.quietek.com/tw/ctg/cts/accreditations.htm>

The address and introduction of QuiTek Corporation's laboratories can be founded in our Web site :
<http://www.quietek.com/>

If you have any comments, Please don't hesitate to contact us. Our contact information is as below:

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LinKou Testing Laboratory:

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TEL : 886-2-8601-3788 / FAX : 886-2-8601-3789 E-Mail : service@quietek.com

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TABLE OF CONTENTS

Description	Page
1. General Information.....	6
1.1. EUT Description	6
1.2. Operational Description.....	8
1.3. Test Mode	9
1.4. Tested System Details	10
1.5. Configuration of tested System	10
1.6. EUT Exercise Software	10
1.7. Test Facility.....	11
2. Conducted Emission	12
2.1. Test Equipment.....	12
2.2. Test Setup	12
2.3. Limits	13
2.4. Test Procedure	13
2.5. Test Specification.....	13
2.6. Uncertainty	13
2.7. Test Result.....	14
2.8. Test Photo	16
3. Peak Power Output	17
3.1. Test Equipment.....	17
3.2. Test Setup	17
3.3. Test procedures	17
3.4. Limits	17
3.5. Test Specification.....	17
3.6. Uncertainty	17
3.7. Test Result.....	18
4. Radiated Emission	22
4.1. Test Equipment.....	22
4.2. Test Setup	22
4.3. Limits	23
4.4. Test Procedure	23
4.5. Test Specification.....	23
4.6. Uncertainty	23
4.7. Test Result.....	24
4.8. Test Photo	32

5.	RF antenna conducted test	34
5.1.	Test Equipment.....	34
5.2.	Test Setup	34
5.3.	Limits	35
5.4.	Test Procedure	35
5.5.	Test Specification.....	35
5.6.	Uncertainty	35
5.7.	Test Result.....	36
6.	Radiated Emission Band Edge.....	40
6.1.	Test Equipment.....	40
6.2.	Test Setup	40
6.3.	Limits	40
6.4.	Test Procedure	41
6.5.	Test Specification.....	41
6.6.	Uncertainty	41
6.7.	Test Result.....	42
7.	Occupied Bandwidth	50
7.1.	Test Equipment.....	50
7.2.	Test Setup	50
7.3.	Test Procedures	50
7.4.	Limits	50
7.5.	Test Specification.....	50
7.6.	Uncertainty	50
7.7.	Test Result.....	51
8.	Power Density	55
8.1.	Test Equipment.....	55
8.2.	Test Setup	55
8.3.	Limits	55
8.4.	Test Procedures	55
8.5.	Test Specification.....	56
8.6.	Uncertainty	56
8.7.	Test Result.....	57
	Attachement.....	61
	EUT Photograph.....	61

1. General Information**1.1. EUT Description**

Product Name	Wireless Microphone
Model No.	WMIC2
Trade Name	Dukane
Frequency Range / Channel Number	2409MHz~2476MHz / 40 channels
Antenna Gain	-4.24dBi
Type of Modulation	GFSK
Antenna Type	PCB Antenna

Component	
External Microphone	Non-Shielded, 1.0m
Audio Cable	Non-Shielded, 1.5m
USB Cable	Non-Shielded, 1.0m

Working Frequency of Each Channel					
Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 1	2409MHz	Channel 2	2411MHz	Channel 3	2413MHz
Channel 4	2415MHz	Channel 5	2417MHz	Channel 6	2419MHz
Channel 7	2421MHz	Channel 8	2423MHz	Channel 9	2425MHz
Channel 10	2427MHz	Channel 11	2429MHz	Channel 12	2431MHz
Channel 13	2433MHz	Channel 14	2435MHz	Channel 15	2437MHz
Channel 16	2439MHz	Channel 17	2441MHz	Channel 18	2443MHz
Channel 19	2445MHz	Channel 20	2447MHz	Channel 21	2449MHz
Channel 22	2451MHz	Channel 23	2453MHz	Channel 24	2455MHz
Channel 25	2457MHz	Channel 26	2459MHz	Channel 27	2461MHz
Channel 28	2463MHz	Channel 29	2464MHz	Channel 30	2465MHz
Channel 31	2466MHz	Channel 32	2467MHz	Channel 33	2468MHz
Channel 34	2469MHz	Channel 35	2471MHz	Channel 36	2472MHz
Channel 37	2473MHz	Channel 38	2474MHz	Channel 39	2475MHz
Channel 40	2476MHz				

Note:

1. This device is a Wireless Microphone included a 2.4GHz transmitting function, and 2.4GHz receiving function.
2. These test results on a sample of the device are for the purpose of demonstrating Compliance with Part 15 Subpart C Paragraph 15.247.
3. Regards to the frequency band operation; the lowest、middle and highest frequency of channel were selected to perform the test, and then shown on this report.
4. This device is a composite device in accordance with Part 15 regulations. The receiving function receiving was tested and its test report number is 134088R-RFUSP37V02 & 134088R-RFUSP37V02-A under Declaration of Conformity.

1.3. Test Mode

QuiTek has verified the construction and function in typical operation. The preliminary tests were performed in different data rate, and to find the worst condition, which was shown in this test report. The following table is the final test mode.

TX	Mode 1: Transmit	
----	------------------	--

Test Items	Channel	Result
Conducted Emission	20	Complies
Peak Power Output	1/ 20/ 40	Complies
Radiated Emission (Under 1GHz)	20	Complies
Radiated Emission (Above 1GHz)	1/ 20/ 40	Complies
RF antenna conducted test	1/ 40	Complies
Radiated Emission Band Edge	1/ 40	Complies
Occupied Bandwidth	1/ 20/ 40	Complies
Power Density	1/ 20/ 40	Complies

1.4. Tested System Details

The types for all equipments, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	FCC ID	Power Cord
1 Notebook PC	DELL	PP37L	CD8BNG1	DoC	Non-Shielded, 1.8m

1.5. Configuration of tested System

Connection Diagram		
A	Notebook PC (1)	
		
Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 3.0m

1.6. EUT Exercise Software

1	Setup the EUT as shown in Section 1.5.
2	Execute the button on the EUT.
3	Configure the test mode, and the test channel
4	Press "Start TX" to start the continuous transmitting.
5	Verify that the EUT works properly.

1.7. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC PART 15 C 15.207	15 - 35	20
Humidity (%RH)	Conducted Emission	25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247	15 - 35	25
Humidity (%RH)	Peak Power Output	25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247	15 - 35	25
Humidity (%RH)	Radiated Emission	25 - 75	65
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247	15 - 35	25
Humidity (%RH)	RF antenna conducted test	25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247	15 - 35	25
Humidity (%RH)	Band Edge	25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247	15 - 35	25
Humidity (%RH)	Occupied Bandwidth	25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247	15 - 35	25
Humidity (%RH)	Power Density	25 - 75	45
Barometric pressure (mbar)		860 - 1060	950-1000

2. Conducted Emission

2.1. Test Equipment

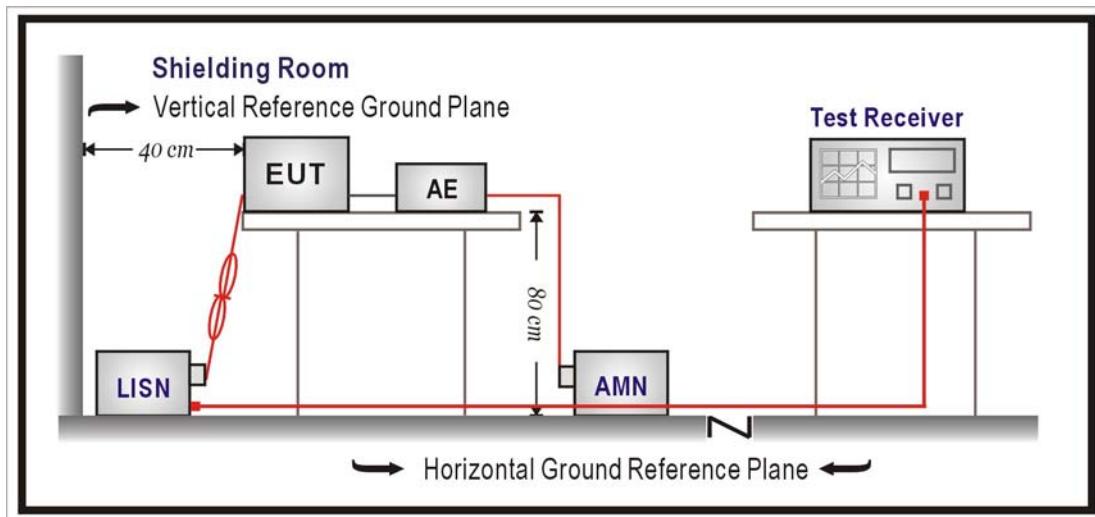
The following test equipments are used during the test:

Conducted Emission / SR2

Instrument	Manufacturer	Model No.	Serial No	Next Cal.
Artificial Mains Network	R&S	ENV4200	848411/010	2014/01/24
LISN	R&S	ENV216	100092	2013/08/21
Test Receiver	R&S	ESCS 30	825442/014	2013/08/07

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

2.2. Test Setup



2.3. Limits

FCC Part 15 Subpart C Paragraph 15.207 Limits (dBuV)		
Frequency MHz	QP	AV
0.15 - 0.50	66-56	56-46
0.50 - 5.0	56	46
5.0 - 30	60	50

Remarks: In the above table, the tighter limit applies at the band edges.

2.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2009 and tested according to DTS test procedure of Jan. 2012 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

The EUT was placed on a platform of nominal size, 1 m by 1.5 m, raised 80 cm above the conducting ground plane. The vertical conducting plane was located 40 cm to the rear of the EUT. All other surfaces of EUT were at least 80 cm from any other grounded conducting surface. The EUT and simulators are connected to the main power through a line impedance stabilization network (LISN). The LISN provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN. (Please refer to the block diagram of the test setup and photographs.)

Each current-carrying conductor of the EUT power cord, except the ground (safety) conductor, was individually connected through a LISN to the input power source.

The excess length of the power cord between the EUT and the LISN receptacle were folded back and forth at the center of the lead to form a bundle not exceeding 40 cm in length.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

2.5. Test Specification

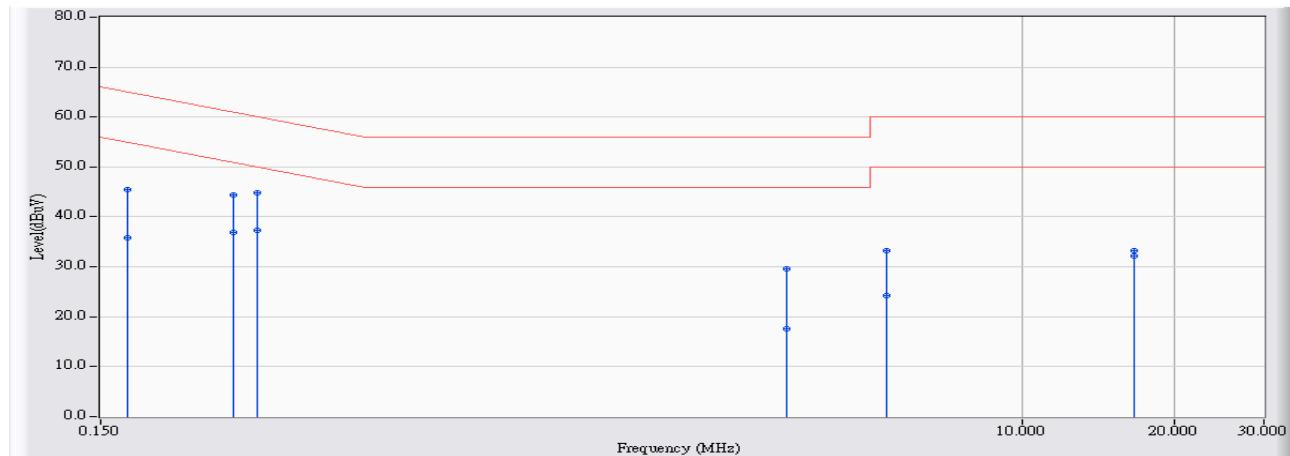
According to FCC Part 15 Subpart C Paragraph 15.207: 2012

2.6. Uncertainty

The measurement uncertainty is defined as \pm 2.26 dB.

2.7. Test Result

Site : SR2	Time : 2013/03/11 - 18:56
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR2_LISN(16A)-3_0822 - Line1	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note :

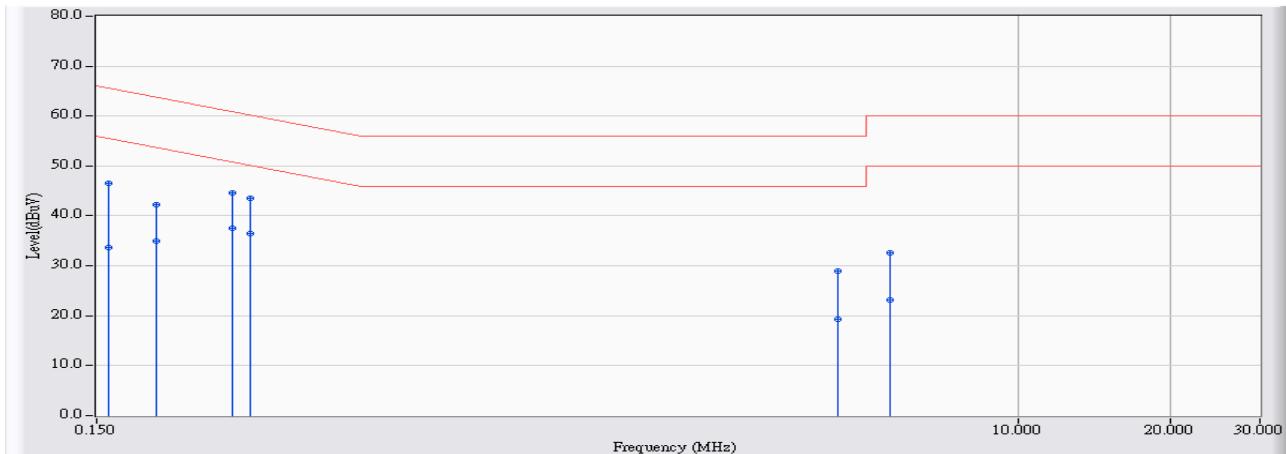


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.170	9.638	35.910	45.548	-19.435	64.983	QUASIPEAK
2		0.170	9.638	26.150	35.788	-19.195	54.983	AVERAGE
3		0.275	9.665	34.680	44.345	-16.620	60.966	QUASIPEAK
4		0.275	9.665	27.210	36.875	-14.090	50.966	AVERAGE
5		0.306	9.674	35.120	44.794	-15.283	60.077	QUASIPEAK
6	*	0.306	9.674	27.670	37.344	-12.733	50.077	AVERAGE
7		3.404	9.904	19.730	29.634	-26.366	56.000	QUASIPEAK
8		3.404	9.904	7.680	17.584	-28.416	46.000	AVERAGE
9		5.380	9.980	23.310	33.289	-26.711	60.000	QUASIPEAK
10		5.380	9.980	14.350	24.329	-25.671	50.000	AVERAGE
11		16.611	10.176	23.060	33.236	-26.764	60.000	QUASIPEAK
12		16.611	10.176	22.070	32.246	-17.754	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : SR2	Time : 2013/03/11 - 19:01
Limit : CISPR_B_00M_QP	Margin : 10
Probe : SR2_LISN(16A)-3_0822 - Line2	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note :



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.158	9.622	36.890	46.512	-19.064	65.577	QUASIPEAK
2		0.158	9.622	24.050	33.672	-21.904	55.577	AVERAGE
3		0.197	9.633	32.650	42.283	-21.458	63.741	QUASIPEAK
4		0.197	9.633	25.330	34.963	-18.778	53.741	AVERAGE
5		0.279	9.653	34.920	44.573	-16.276	60.848	QUASIPEAK
6	*	0.279	9.653	27.920	37.573	-13.276	50.848	AVERAGE
7		0.302	9.658	33.820	43.478	-16.700	60.178	QUASIPEAK
8		0.302	9.658	26.880	36.538	-13.640	50.178	AVERAGE
9		4.384	9.934	19.110	29.045	-26.955	56.000	QUASIPEAK
10		4.384	9.934	9.430	19.365	-26.635	46.000	AVERAGE
11		5.556	9.982	22.650	32.632	-27.368	60.000	QUASIPEAK
12		5.556	9.982	13.250	23.232	-26.768	50.000	AVERAGE

Note:

1. All Reading Levels are Quasi-Peak and average value.
2. " * ", means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

3. Peak Power Output

3.1. Test Equipment

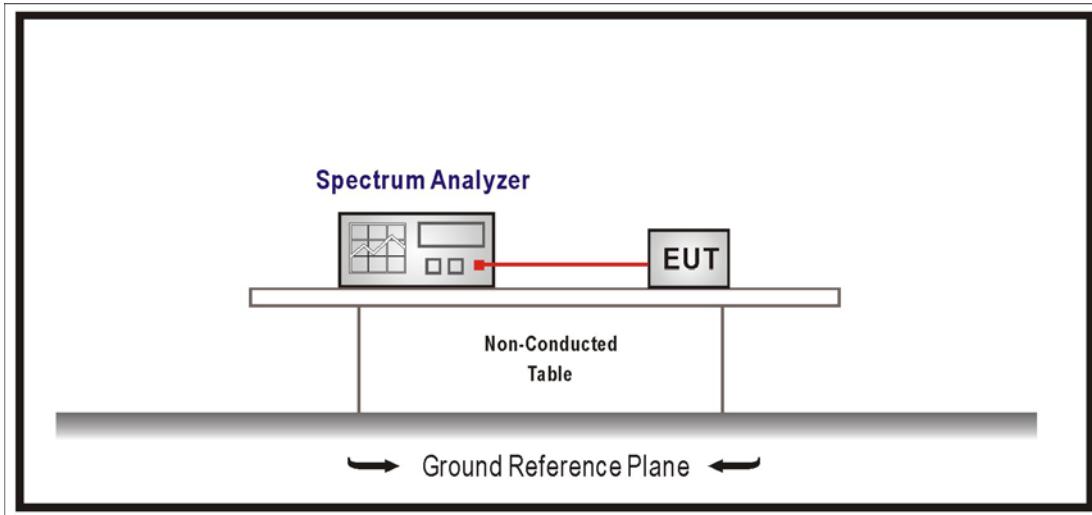
The following test equipments are used during the test:

Peak Power Output / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
EXA Signal Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

3.2. Test Setup



3.3. Test procedures

The EUT was tested according to DTS test procedure of Jan. 2012 KDB558074, Section 5.2.1.2 Measurement Procedure PK2 for compliance to FCC 47CFR 15.247 requirements.

3.4. Limits

The maximum peak power shall be less 1 Watt.

3.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

3.6. Uncertainty

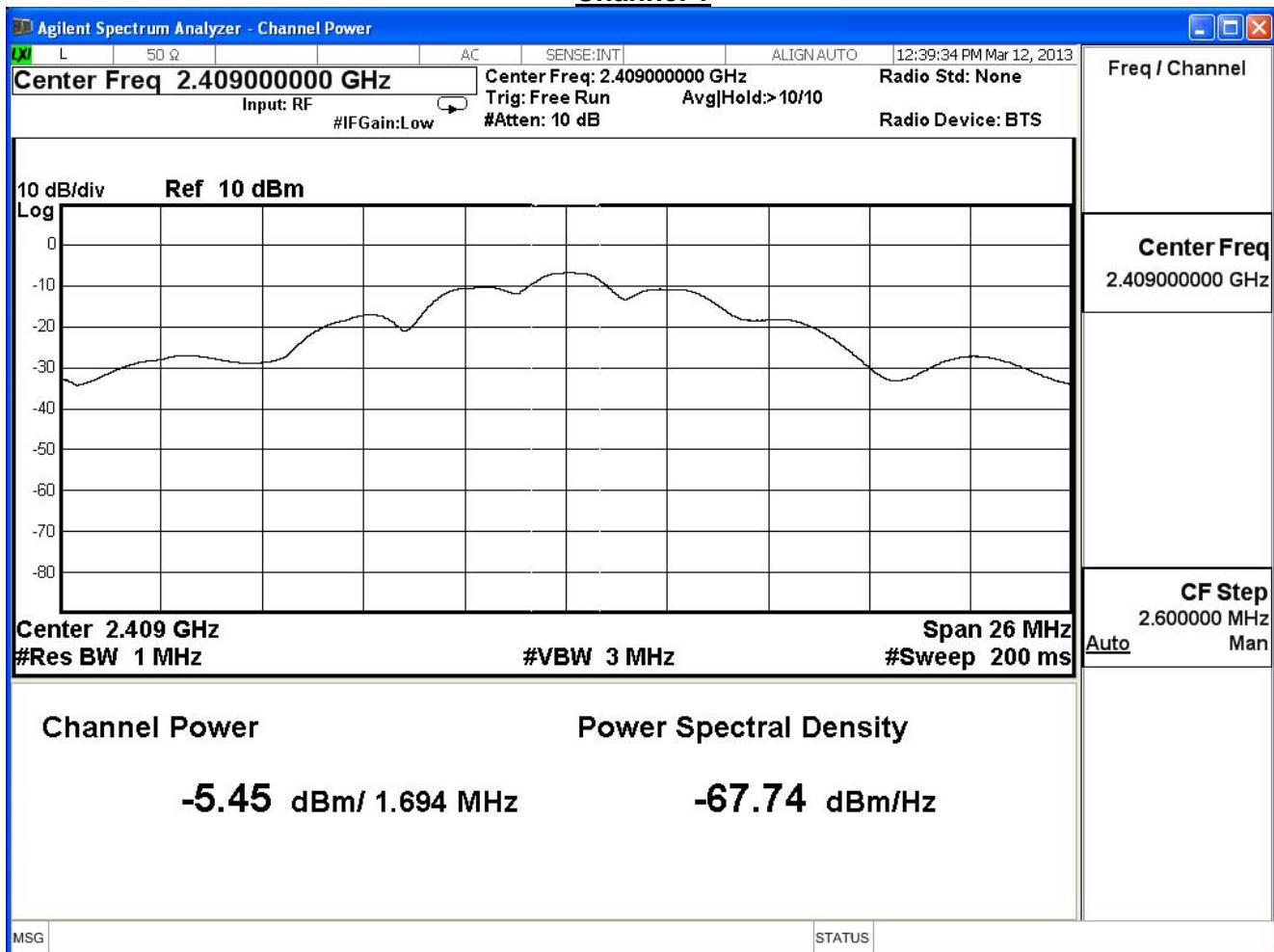
The measurement uncertainty is defined as \pm 1.27 dB.

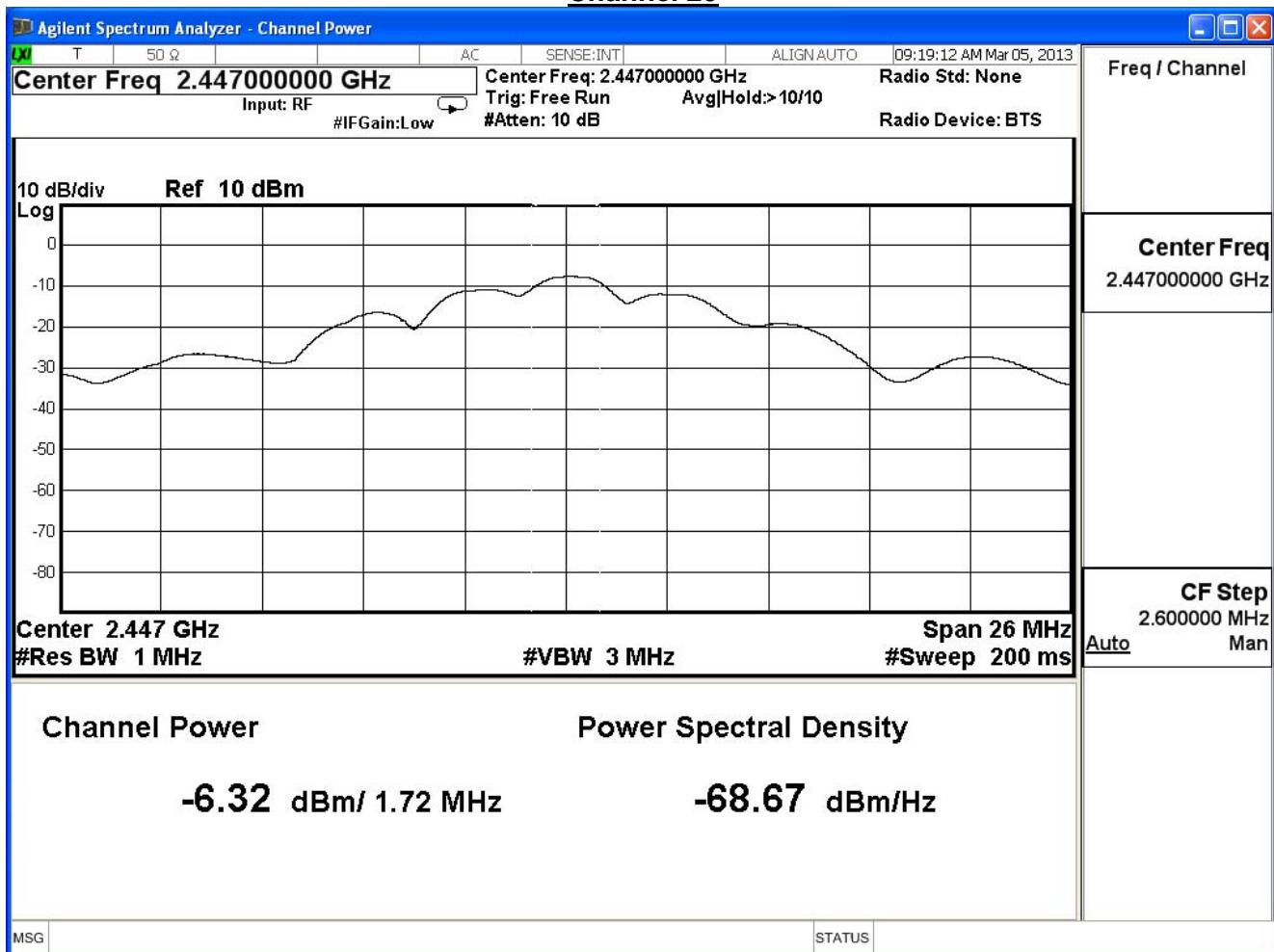
3.7. Test Result

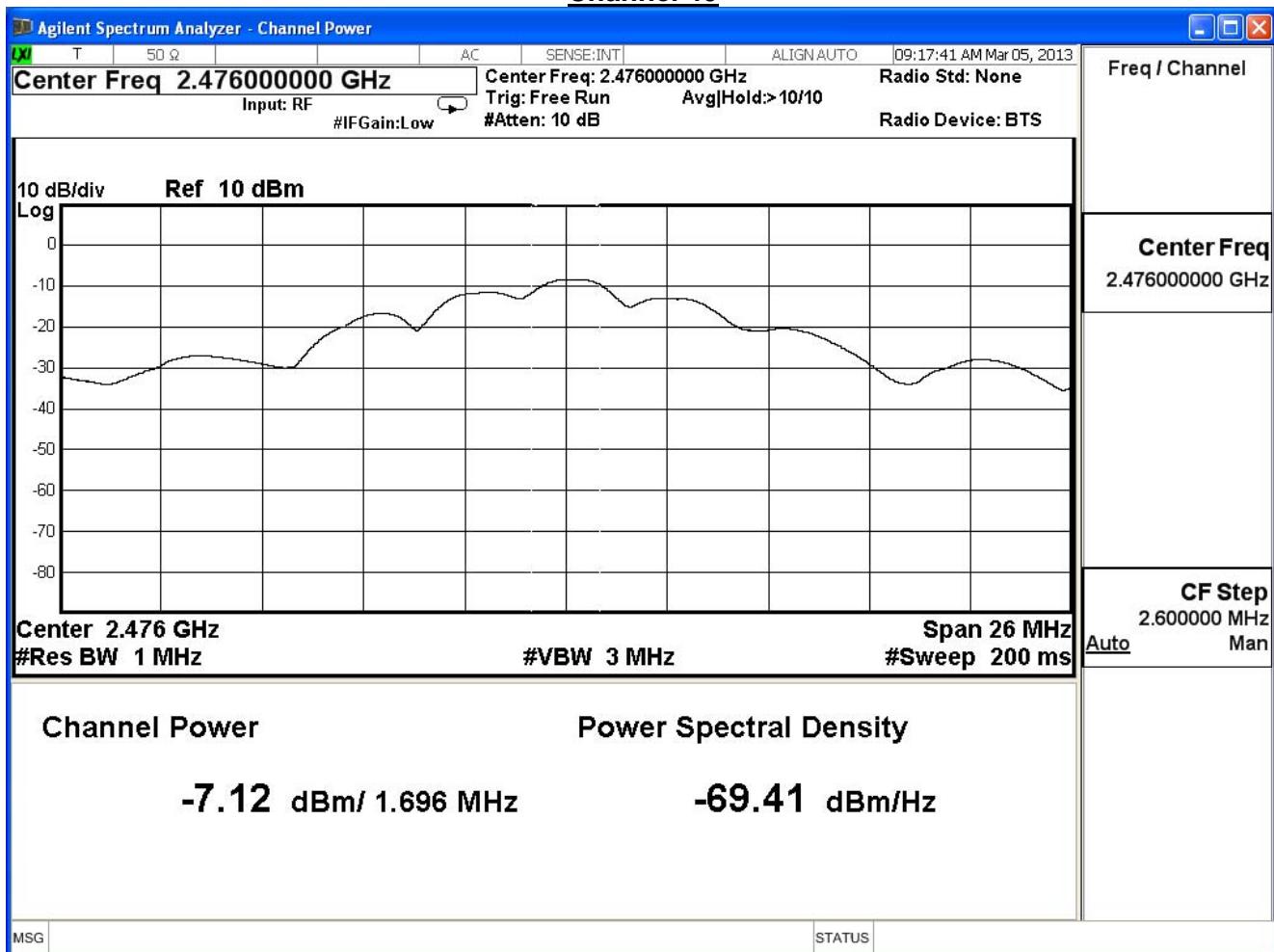
Product	Wireless Microphone		
Test Item	Peak Power Output		
Test Mode	Mode 1: Transmit		
Date of Test	2013/03/12	Test Site	SR7

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
1	2409	-5.45	1Watt= 30 dBm	Pass
20	2447	-6.32	1Watt= 30 dBm	Pass
40	2476	-7.12	1Watt= 30 dBm	Pass

Note: Measure Level =Reading value + cable loss

Channel 1

Channel 20

Channel 40

4. Radiated Emission

4.1. Test Equipment

The following test equipments are used during the test:

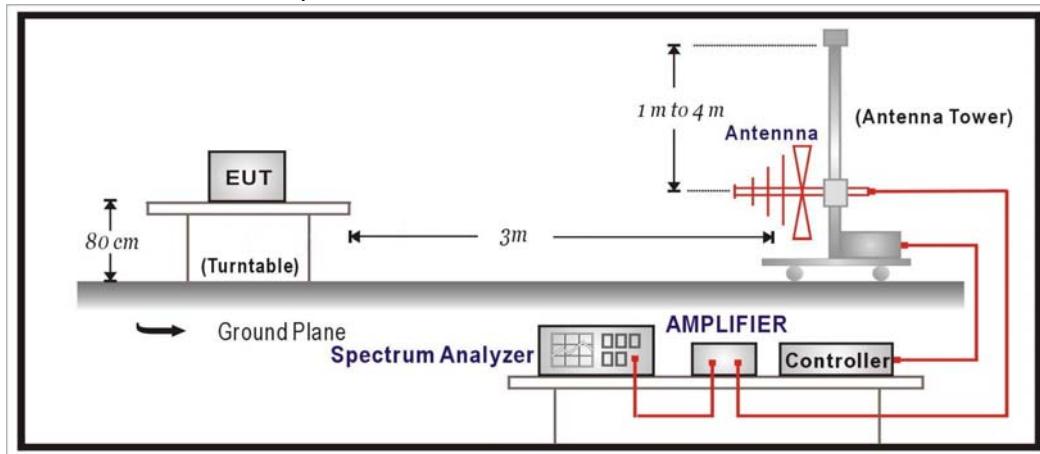
Radiated Emission / CB1

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Bilog Antenna	SCHAFFNER	CBL6112B	2895	2013/08/14
Double Ridged Guide Horn Antenna	Schwarzback	BBHA 9120	D743	2014/02/17
Pre-Amplifier	MITEQ	AMF-4D-005180-24-10P	888003	2013/12/02
Pre-Amplifier	QuiTek	AP-025C	CHM-0706049	2014/02/19
Spectrum Analyzer	Agilent	E4440A	MY46187335	2014/01/27
k Type Cable	Huber Suhner	Sucoflex 102	25623/2	2014/02/21

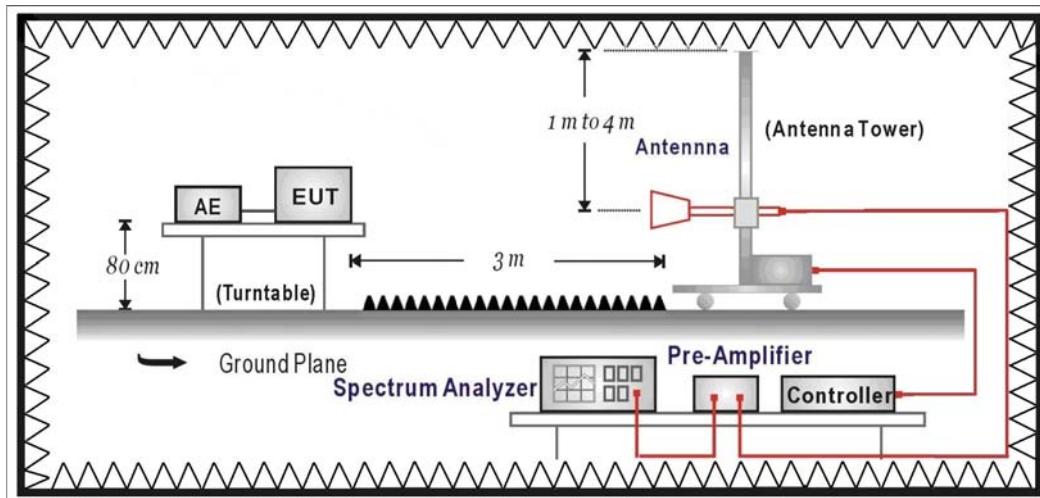
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

4.2. Test Setup

Under 1GHz Test Setup:



Above 1GHz Test Setup:



4.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209 Limits		
Frequency MHz	dBuV/m	dBuV/m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks: E field strength (dBuV/m) = 20 log E field strength (uV/m)

4.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2009 and tested according to DTS test procedure of Jan. 2012 KDB558074 for compliance to FCC 47CFR 15.247 requirements. 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 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: 2009 on radiated measurement.

On any frequency or frequencies below or equal to 1000 MHz, the limits shown are based on measuring equipment employing a quasi-peak detector function and on any frequency or frequencies above 1000 MHz the radiated limits shown are based upon the use of measurement instrumentation employing an average detector function. When average radiated emission measurement are included emission measurement below 1000 MHz, there also is a limit on the radio frequency emissions, as measured using instrumentation with a peak detector function, corresponding to 20 dB above the maximum permitted average limit. The bandwidth below 1GHz setting on the field strength meter is 120 kHz and above 1GHz is 1MHz.

4.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

4.6. Uncertainty

The measurement uncertainty

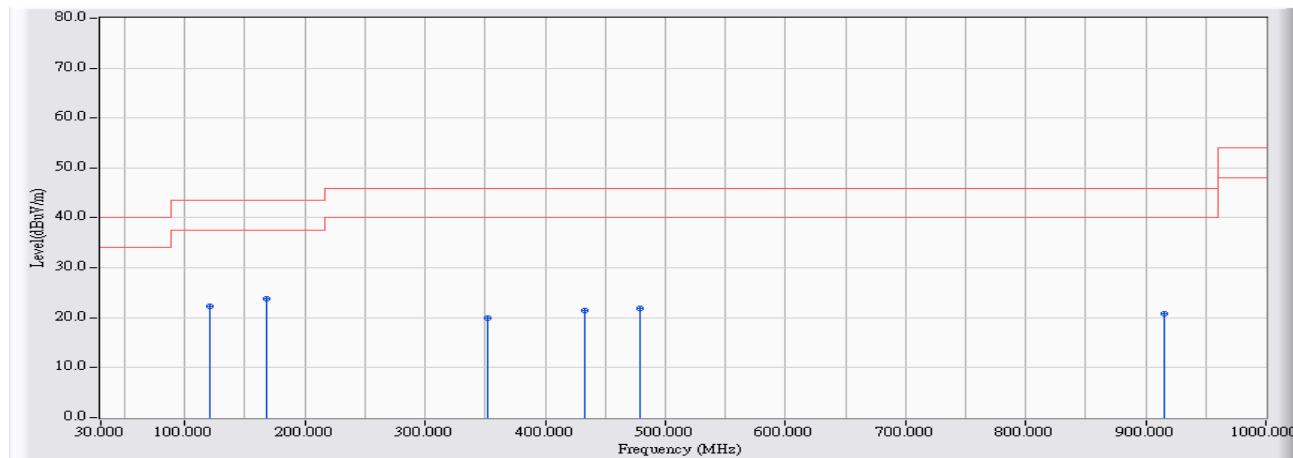
30MHz~1GHz as $\pm 3.43\text{dB}$

1GHz~26.5Ghz as $\pm 3.65\text{dB}$

4.7. Test Result

30MHz-1GHz Spurious

Site : CB1	Time : 2013/03/06 - 21:19
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB1_FCC_EFS_30-1G-2_1011 - HORIZONTAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : 2447MHz

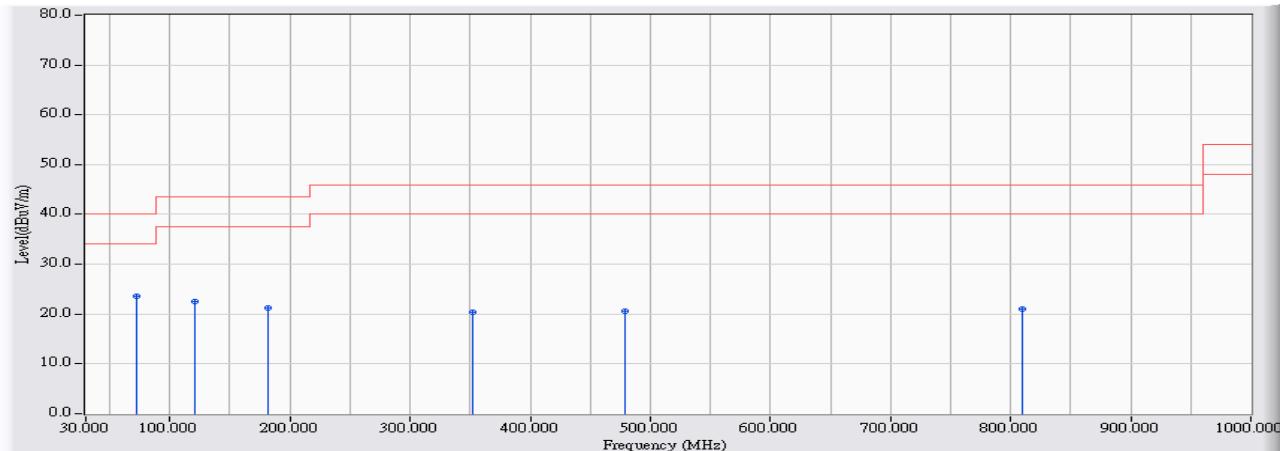


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	120.533	-11.842	34.166	22.324	-21.176	43.500	QUASIPEAK
2	* 167.417	-13.935	37.690	23.754	-19.746	43.500	QUASIPEAK
3	351.717	-8.651	28.564	19.913	-26.087	46.000	QUASIPEAK
4	432.550	-6.678	28.153	21.474	-24.526	46.000	QUASIPEAK
5	479.433	-5.585	27.520	21.936	-24.064	46.000	QUASIPEAK
6	915.933	-2.275	23.172	20.897	-25.103	46.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Site : CB1	Time : 2013/03/06 - 21:22
Limit : FCC_CLASS_B_03M_QP	Margin : 6
Probe : CB1_FCC_EFS_30-1G-2_1011 - VERTICAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : 2447MHz



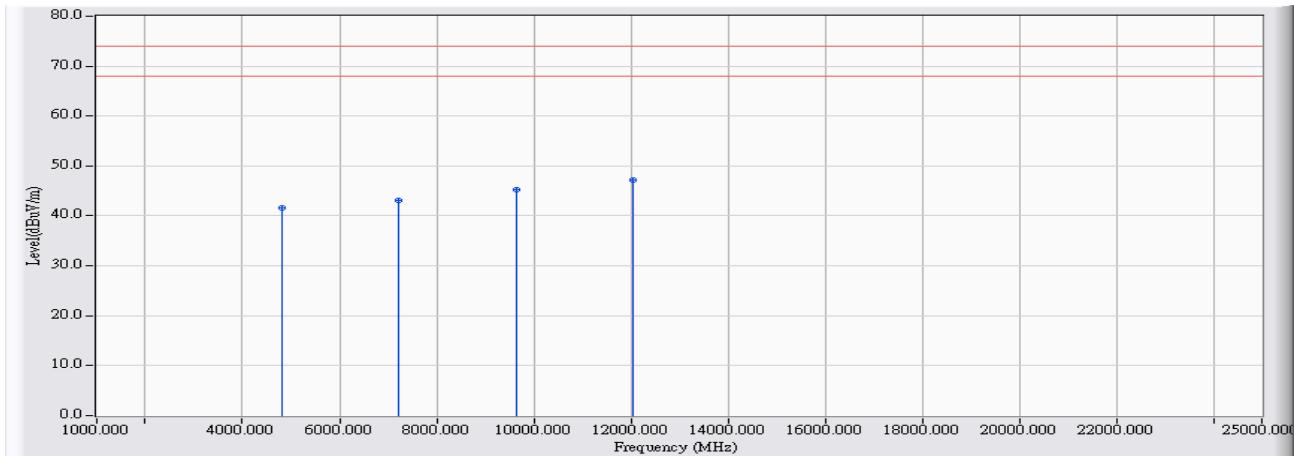
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	72.033	-16.859	40.345	23.487	-16.513	40.000	QUASIPEAK
2		120.533	-11.842	34.311	22.469	-21.031	43.500	QUASIPEAK
3		181.967	-14.535	35.747	21.213	-22.287	43.500	QUASIPEAK
4		351.717	-8.651	28.996	20.345	-25.655	46.000	QUASIPEAK
5		479.433	-5.585	26.257	20.673	-25.327	46.000	QUASIPEAK
6		809.233	-2.934	23.911	20.976	-25.024	46.000	QUASIPEAK

Note:

1. All Reading Levels are Quasi-Peak value.
2. “ * ”, means this data is the worst emission level.
3. Measurement Level = Reading Level + Correct Factor.

Harmonic & Spurious:

Site : CB1	Time : 2013/03/06 - 20:39
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : ;2409MHz

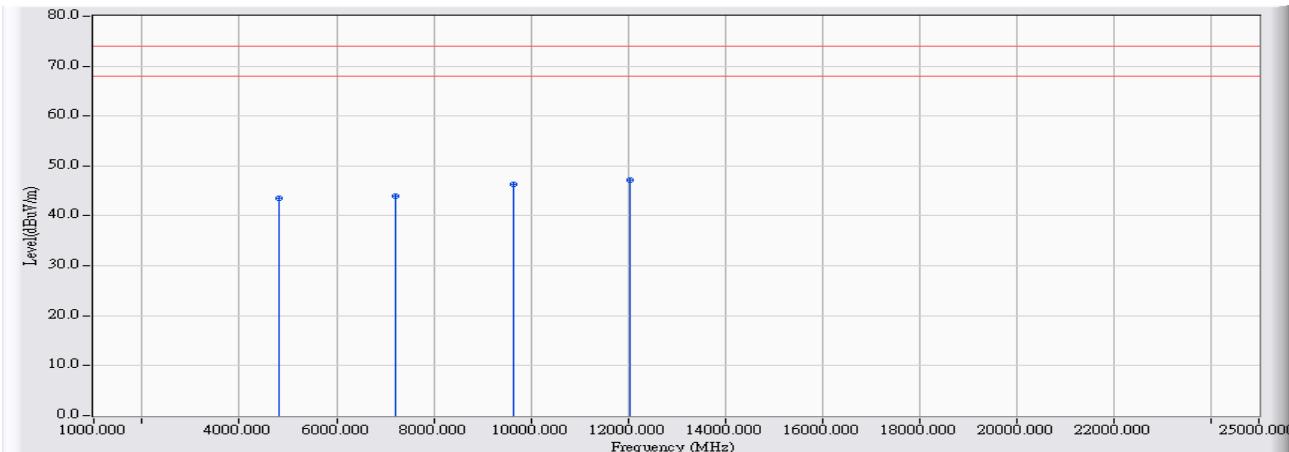


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Average Limit (dBuV/m)	Peak Limit (dBuV/m)	Detector Type
1		4818.000	-0.970	42.630	41.661	-32.339	54.000	74.000	PEAK
2		7217.000	6.403	36.800	43.204	-30.796	54.000	74.000	PEAK
3		9636.000	9.069	36.090	45.160	-28.840	54.000	74.000	PEAK
4	*	12050.000	10.756	36.390	47.146	-26.854	54.000	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB1	Time : 2013/03/06 - 20:46
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : ;2409MHz

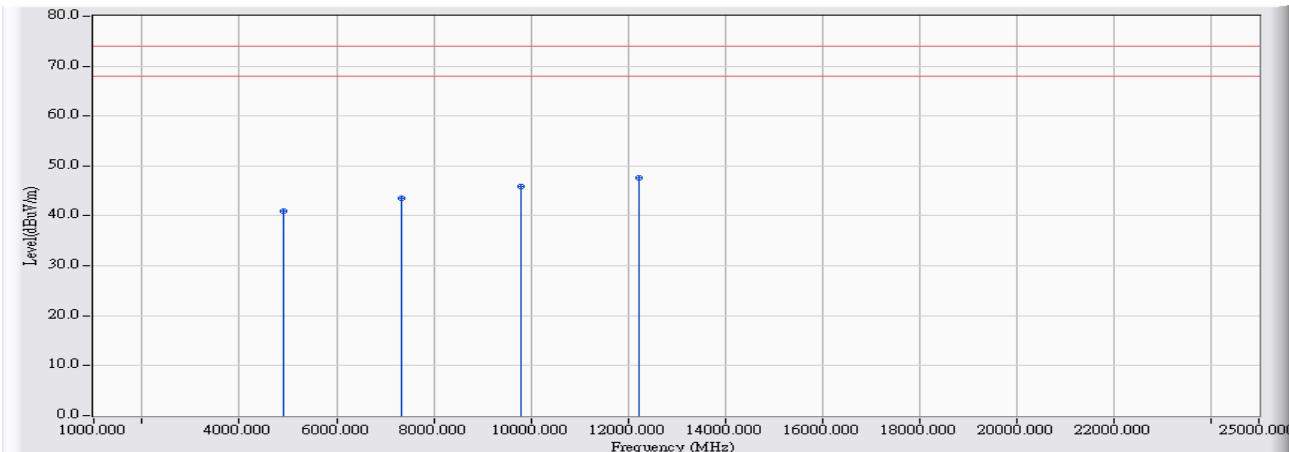


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Average Limit (dBuV/m)	Peak Limit (dBuV/m)	Detector Type
1		4818.000	-0.970	44.420	43.451	-30.549	54.000	74.000	PEAK
2		7227.000	6.443	37.430	43.874	-30.126	54.000	74.000	PEAK
3		9636.000	9.069	37.340	46.410	-27.590	54.000	74.000	PEAK
4	*	12045.000	10.751	36.490	47.241	-26.759	54.000	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB1	Time : 2013/03/06 - 20:54
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : ;2447MHz

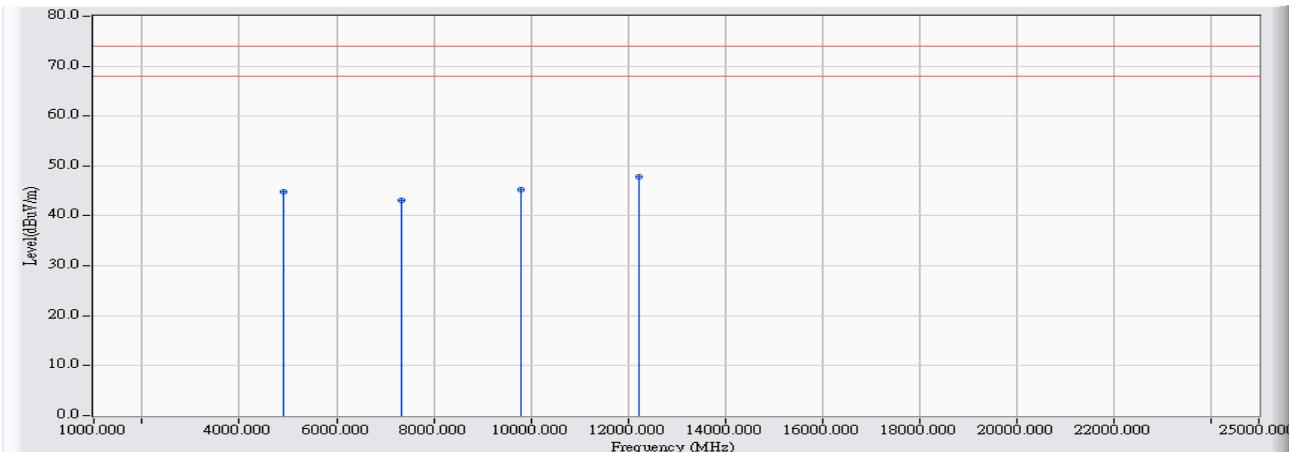


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Average Limit (dBuV/m)	Peak Limit (dBuV/m)	Detector Type
1		4894.000	-0.740	41.810	41.071	-32.929	54.000	74.000	PEAK
2		7341.000	6.897	36.710	43.606	-30.394	54.000	74.000	PEAK
3		9788.000	9.077	36.890	45.968	-28.032	54.000	74.000	PEAK
4	*	12235.000	10.946	36.770	47.716	-26.284	54.000	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB1	Time : 2013/03/06 - 20:56
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : ;2447MHz

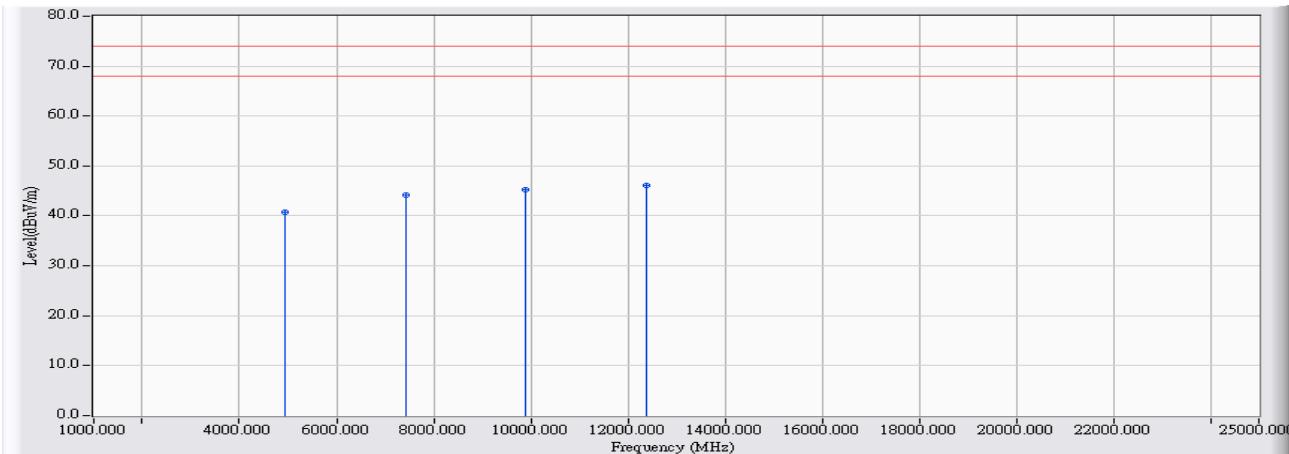


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Average Limit (dBuV/m)	Peak Limit (dBuV/m)	Detector Type
1		4894.000	-0.740	45.560	44.821	-29.179	54.000	74.000	PEAK
2		7341.000	6.897	36.230	43.126	-30.874	54.000	74.000	PEAK
3		9788.000	9.077	36.120	45.198	-28.802	54.000	74.000	PEAK
4	*	12235.000	10.946	36.880	47.826	-26.174	54.000	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB1	Time : 2013/03/06 - 21:01
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : ;2476MHz

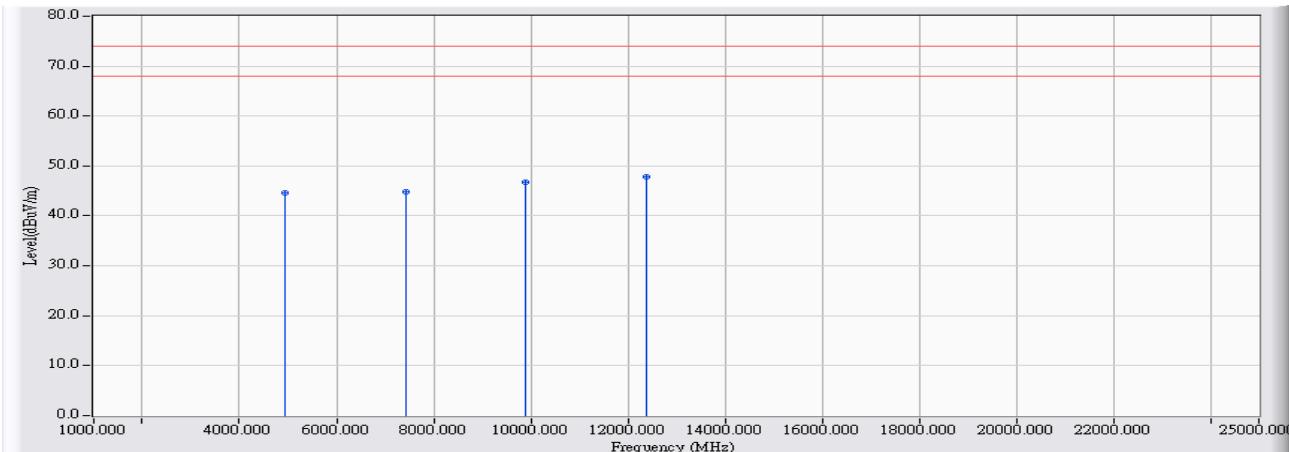


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Average Limit (dBuV/m)	Peak Limit (dBuV/m)	Detector Type
1		4952.000	-0.563	41.390	40.826	-33.174	54.000	74.000	PEAK
2		7428.000	7.242	36.940	44.182	-29.818	54.000	74.000	PEAK
3		9904.000	9.084	36.080	45.164	-28.836	54.000	74.000	PEAK
4	*	12380.000	11.094	35.030	46.125	-27.875	54.000	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

Site : CB1	Time : 2013/03/06 - 21:07
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : ;2476MHz



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Average Limit (dBuV/m)	Peak Limit (dBuV/m)	Detector Type
1		4952.000	-0.563	45.200	44.636	-29.364	54.000	74.000	PEAK
2		7428.000	7.242	37.480	44.722	-29.278	54.000	74.000	PEAK
3		9904.000	9.084	37.730	46.814	-27.186	54.000	74.000	PEAK
4	*	12380.000	11.094	36.760	47.855	-26.145	54.000	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.
7. The Emission above 13GHz were not included is because their levels are too low.

5. RF antenna conducted test

5.1. Test Equipment

The following test equipments are used during the test:

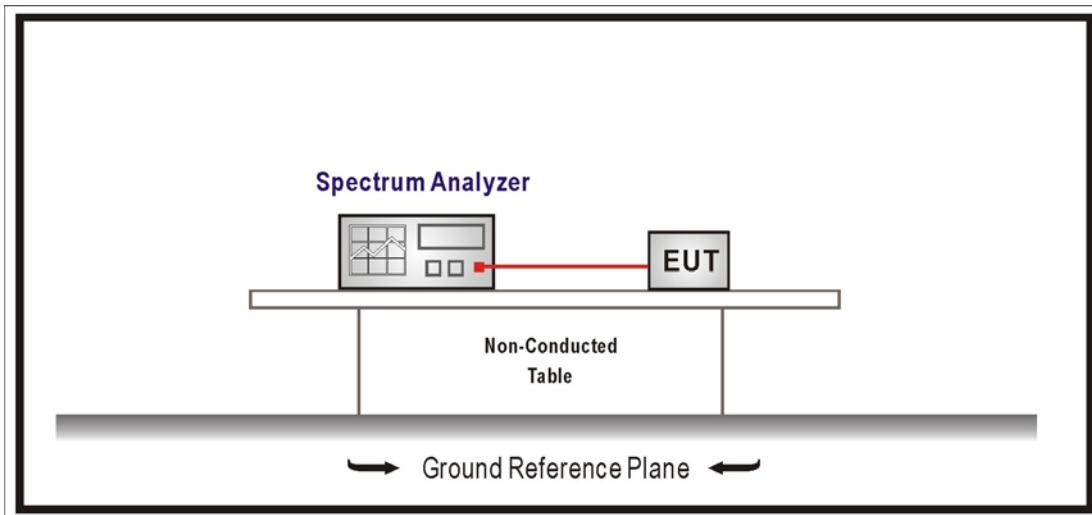
RF antenna conducted test / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
EXA Signal Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

5.2. Test Setup

RF Antenna Conducted Measurement:



5.3. Limits

In any 100 kHz 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 100 kHz bandwidth within the band that contains the highest level of the desired power, based on an RF conducted or 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)).

5.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2009 and tested according to DTS test procedure of Jan. 2012 KDB558074 for compliance to FCC 47CFR 15.247 requirements
Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

5.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

5.6. Uncertainty

Conducted is defined as \pm 1.27dB

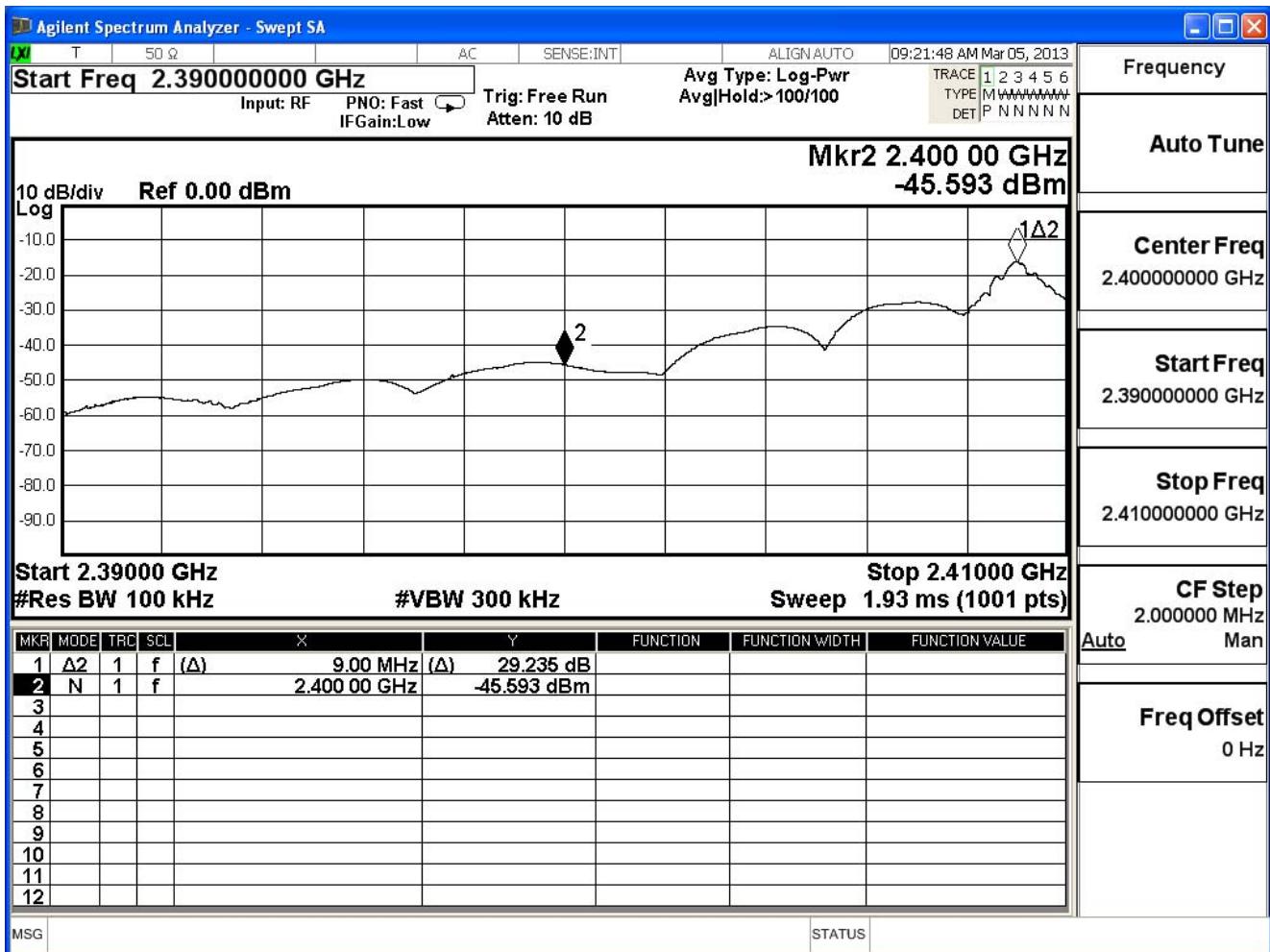
5.7. Test Result

Product	Wireless Microphone		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: Transmit		
Date of Test	2013/03/05	Test Site	SR7

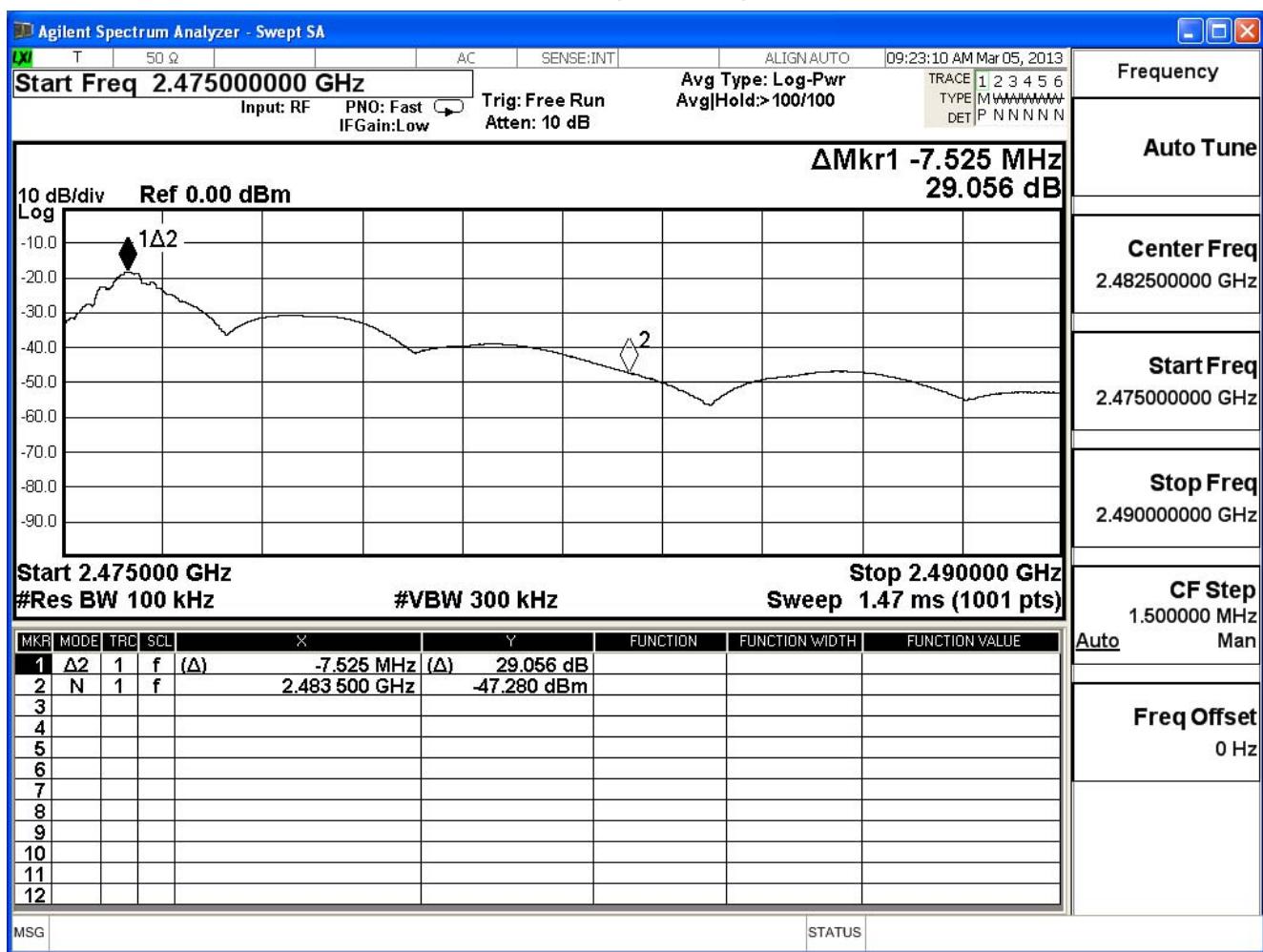
Antenna Gain: 2dBi Duty Cycle: 1

Channel No.	Frequency (MHz)	Measure Level (dBc)	Limit (dBc)	Result
1	2409	29.235	≥20	Pass
40	2447	29.056	≥20	Pass

CH 1 (2409MHz)

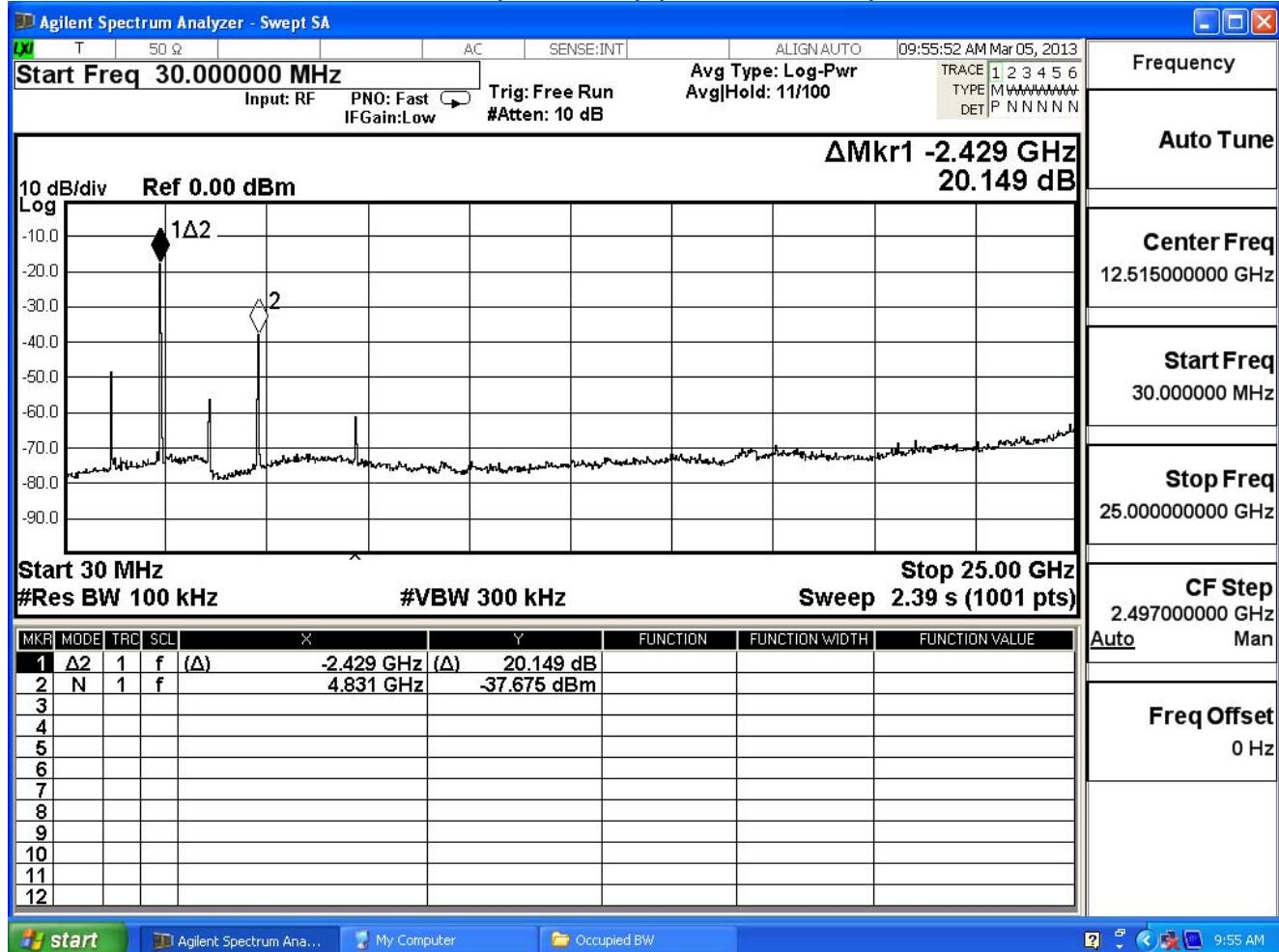


CH 40 (2476MHz)

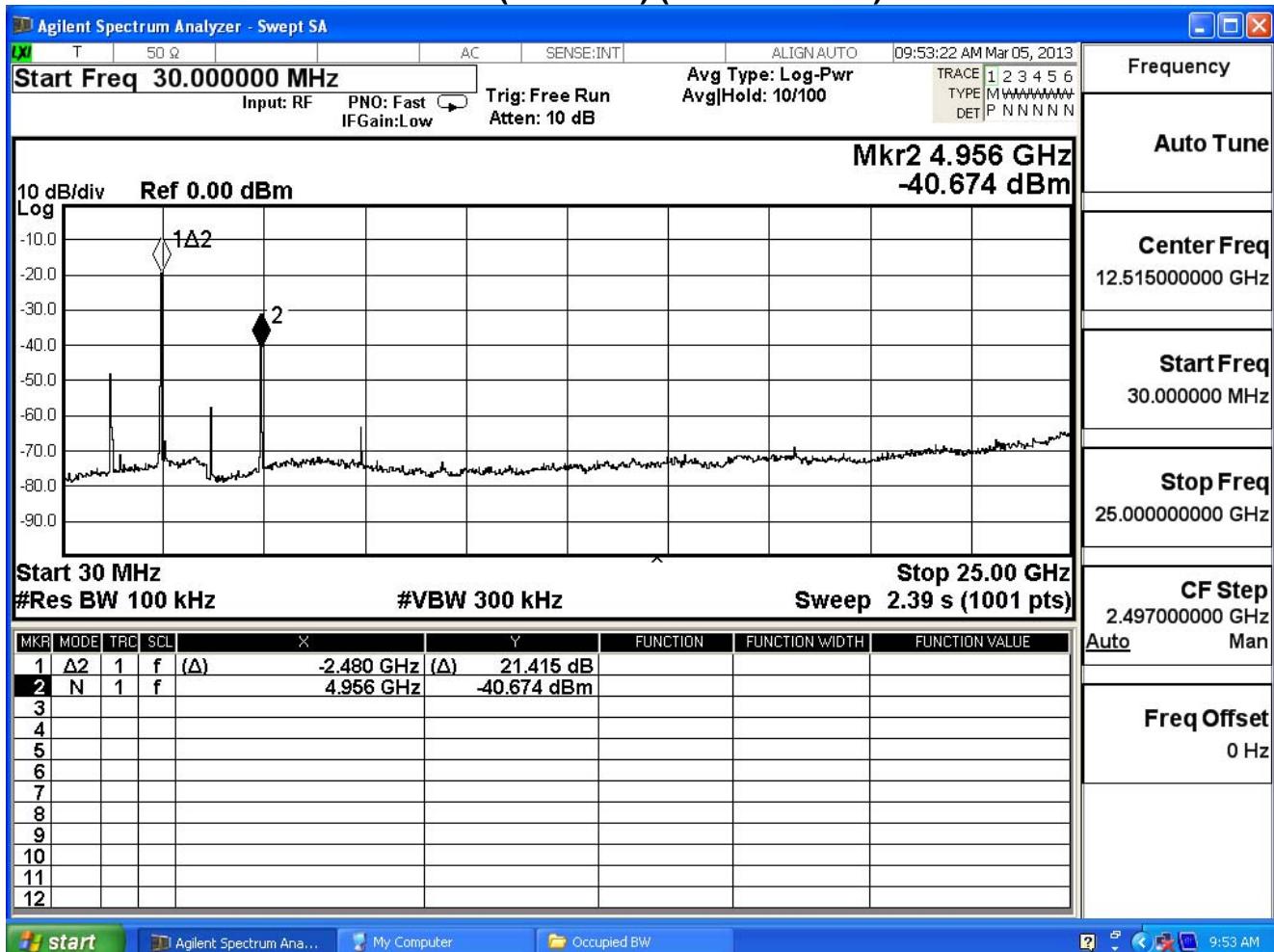


Product	Wireless Microphone		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: Transmit		
Date of Test	2013/03/07	Test Site	SR7

CH 1 (2409MHz) (30MHz-25GHz)



CH 40 (2476MHz) (30MHz-25GHz)



6. Radiated Emission Band Edge

6.1. Test Equipment

The following test equipments are used during the test:

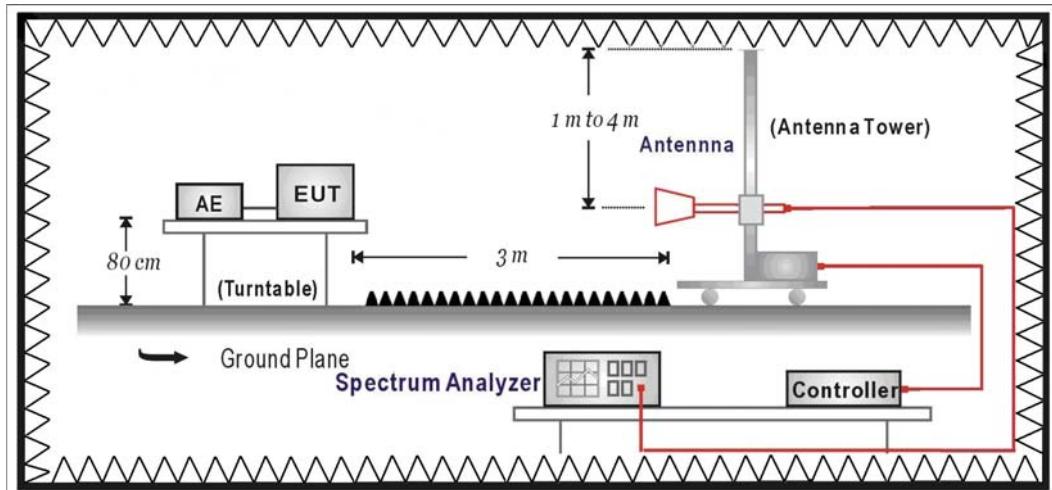
Radiated Emission Band Edge / CB1

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Double Ridged Guide Horn Antenna	Schwarzback	BBHA 9120	D743	2014/02/17
Spectrum Analyzer	Agilent	E4440A	MY46187335	2014/01/27
l _k Type Cable	Huber Suhner	Sucoflex 102	25623/2	2014/02/21

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

6.2. Test Setup

RF Radiated Measurement:



6.3. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

6.4. Test Procedure

The EUT was setup according to ANSI C63.4: 2009 and tested according to DTS test procedure of Jan. 2012 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

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: 2009 on radiated measurement.

6.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

6.6. Uncertainty

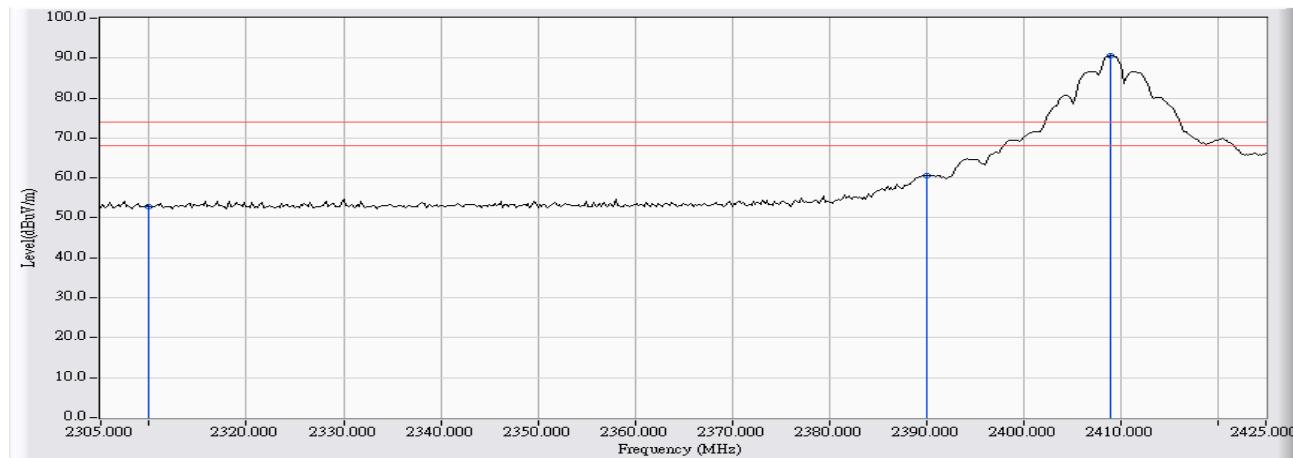
The measurement uncertainty

± 3.9 dB above 1GHz

6.7. Test Result

Radiated is defined as

Site : CB1	Time : 2013/01/09 - 17:43
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB3_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : 2409MHz

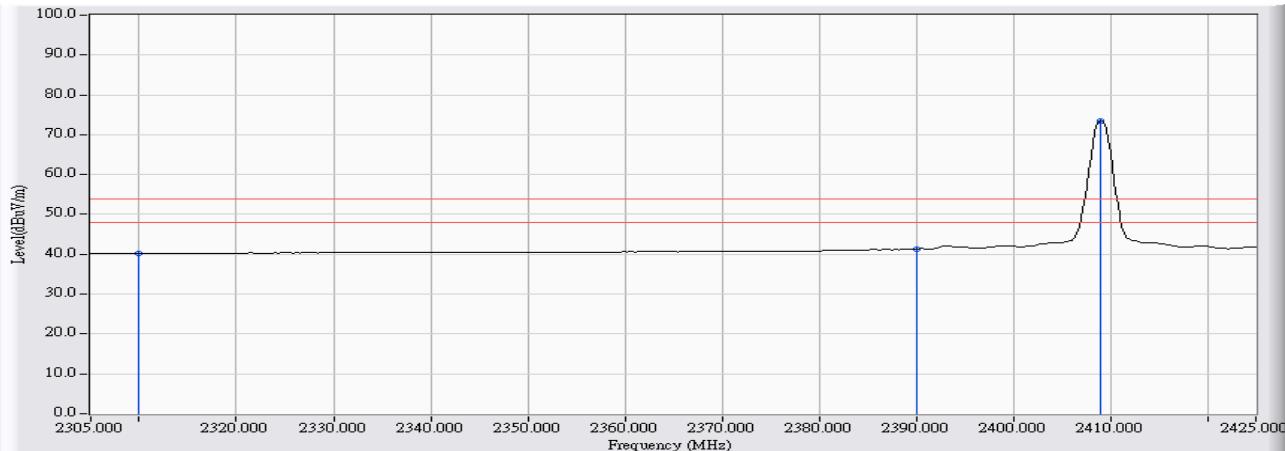


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	28.462	24.389	52.851	-21.149	74.000	PEAK
2		2390.000	28.783	31.757	60.540	-13.460	74.000	PEAK
3	*	2409.000	28.854	61.770	90.624	16.624	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2013/01/09 - 17:45
Limit : FCC_SpartC_15.247_H_03M_AV	Margin : 6
Probe : CB3_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : 2409MHz

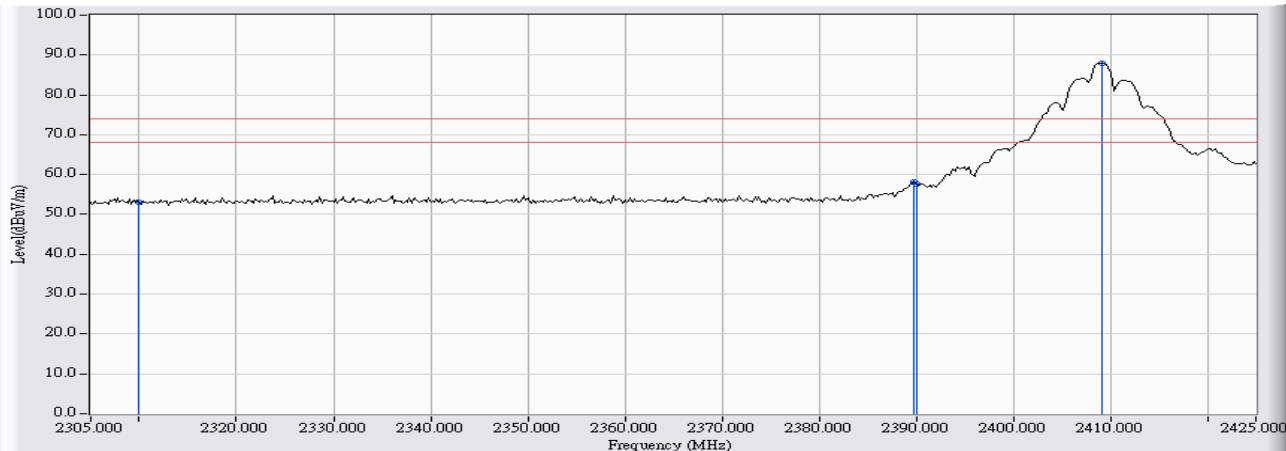


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	28.462	11.862	40.324	-13.676	54.000	AVERAGE
2	2390.000	28.783	12.606	41.389	-12.611	54.000	AVERAGE
3	* 2409.000	28.854	44.611	73.465	19.465	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2013/01/09 - 17:50
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB3_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : 2409MHz

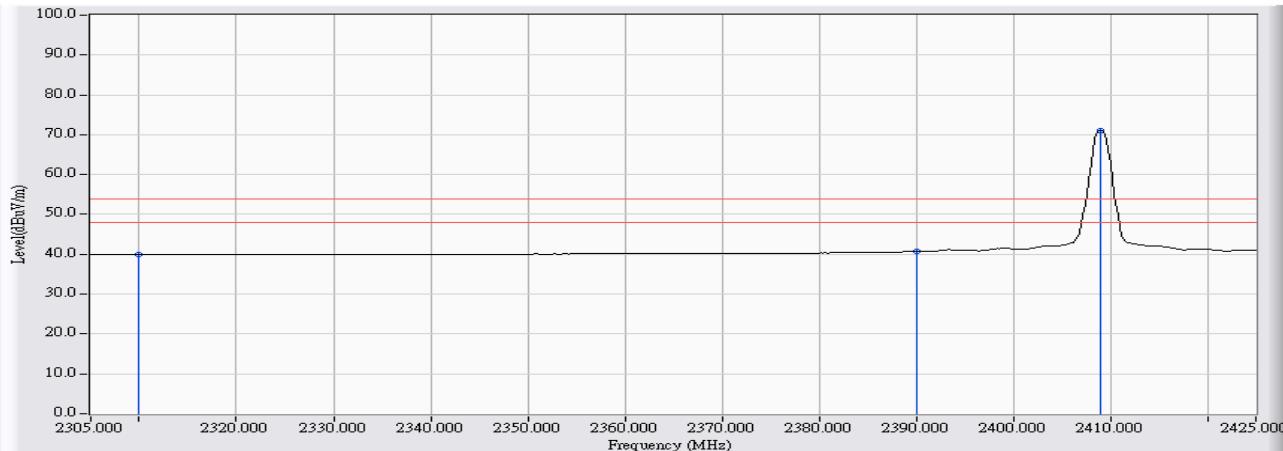


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	28.462	24.714	53.176	-20.824	74.000	PEAK
2	2389.800	28.782	29.293	58.076	-15.924	74.000	PEAK
3	2390.000	28.783	28.834	57.617	-16.383	74.000	PEAK
4	* 2409.200	28.855	59.120	87.975	13.975	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2013/01/09 - 17:51
Limit : FCC_SpartC_15.247_H_03M_AV	Margin : 6
Probe : CB3_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : 2409MHz

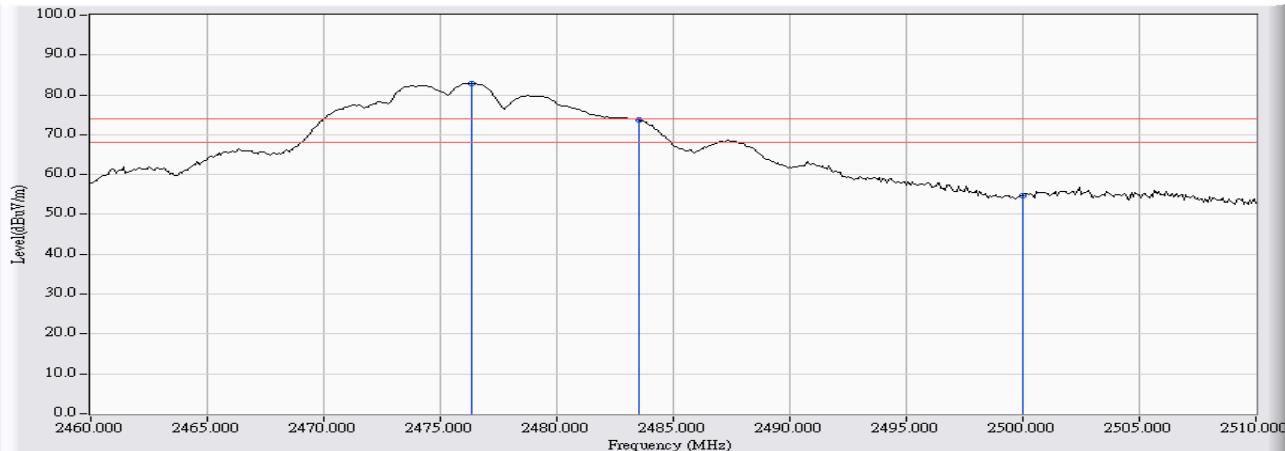


	Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	2310.000	28.462	11.415	39.877	-14.123	54.000	AVERAGE
2	2390.000	28.783	11.970	40.753	-13.247	54.000	AVERAGE
3	* 2409.000	28.854	42.303	71.157	17.157	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2013/03/06 - 20:21
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB3_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : 2409MHz Bandedge X

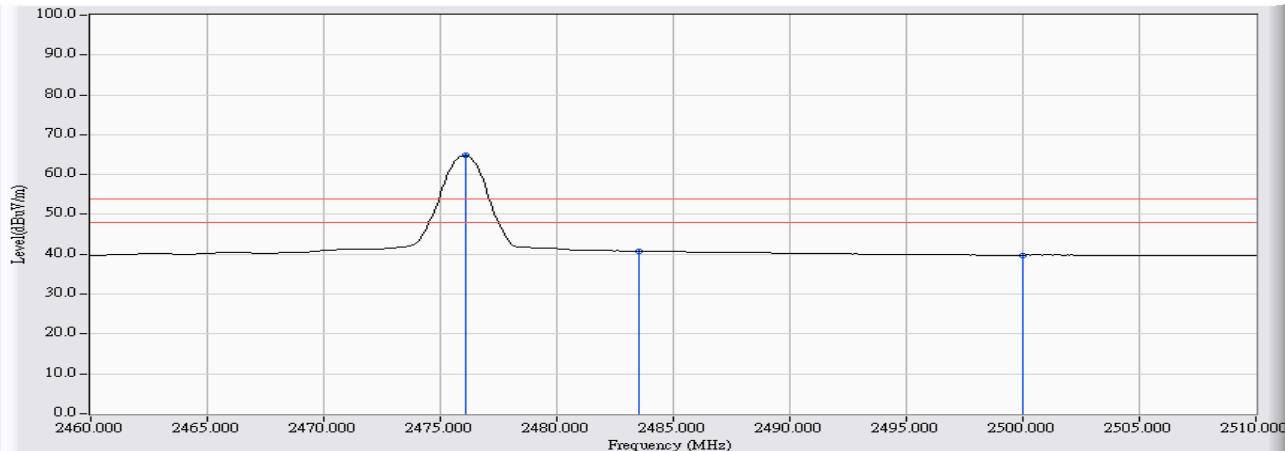


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2476.333	27.635	55.301	82.936	8.936	74.000	PEAK
2		2483.500	27.663	45.940	73.603	-0.397	74.000	PEAK
3		2500.000	27.724	27.066	54.789	-19.211	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2013/03/06 - 20:21
Limit : FCC_SpartC_15.247_H_03M_AV	Margin : 6
Probe : CB3_FCC_EFS_1-18G-1_0901 - HORIZONTAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : 2409MHz Bandedge X

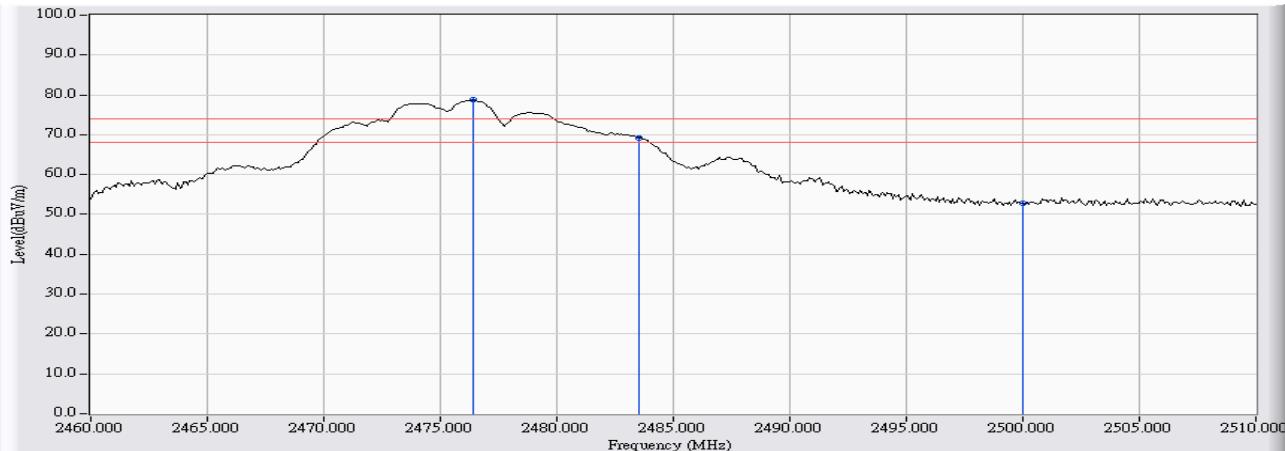


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2476.083	27.634	37.112	64.746	10.746	54.000	AVERAGE
2		2483.500	27.663	13.105	40.768	-13.232	54.000	AVERAGE
3		2500.000	27.724	12.073	39.796	-14.204	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2013/03/06 - 20:24
Limit : FCC_SpartC_15.247_H_03M_PK	Margin : 6
Probe : CB3_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : 2409MHz Bandedge X

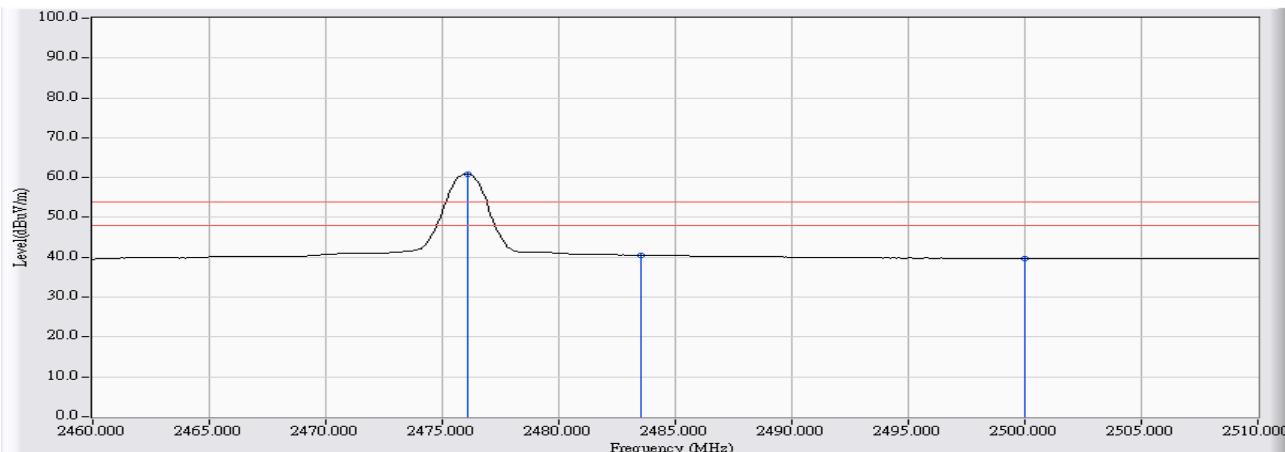


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2476.417	27.636	51.062	78.698	4.698	74.000	PEAK
2		2483.500	27.663	41.566	69.229	-4.771	74.000	PEAK
3		2500.000	27.724	25.047	52.770	-21.230	74.000	PEAK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

Site : CB1	Time : 2013/03/06 - 20:25
Limit : FCC_SpartC_15.247_H_03M_AV	Margin : 6
Probe : CB3_FCC_EFS_1-18G-1_0901 - VERTICAL	Power : DC 5V (Power by PC)
EUT : Wireless Microphone	Note : 2409MHz Bandedge X



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1	*	2476.083	27.634	33.342	60.976	6.976	54.000	AVERAGE
2		2483.500	27.663	12.873	40.536	-13.464	54.000	AVERAGE
3		2500.000	27.724	11.992	39.715	-14.285	54.000	AVERAGE

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Peak measurements: RBW = 1MHz, VBW = 3 MHz, Sweep: Auto.
3. Average measurements: RBW = 1MHz, VBW = 10 Hz, Sweep: Auto.
4. “ * ”, means this data is the worst emission level.
5. Measurement Level = Reading Level + Correct Factor.
6. The average measurement was not performed when the peak measured data under the limit of average detection.

7. Occupied Bandwidth

7.1. Test Equipment

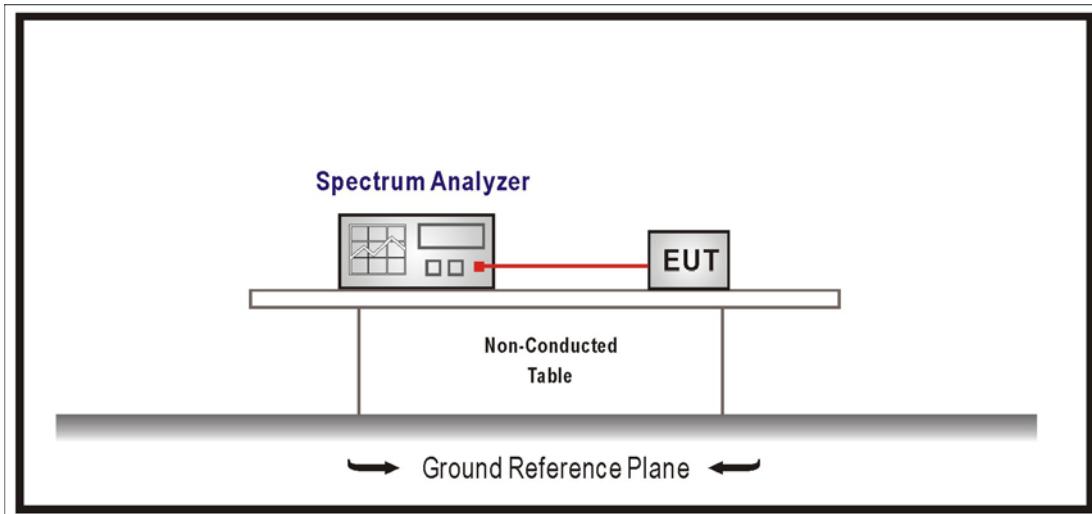
The following test equipments are used during the test:

Occupied Bandwidth / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
EXA Signal Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

7.2. Test Setup



7.3. Test Procedures

The EUT was setup according to ANSI C63.4: 2009; tested according to DTS test procedure of Jan. 2012 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 1% of EBW, Span greater than RBW.

7.4. Limits

The 6 dB bandwidth must be greater than 500 kHz.

7.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

7.6. Uncertainty

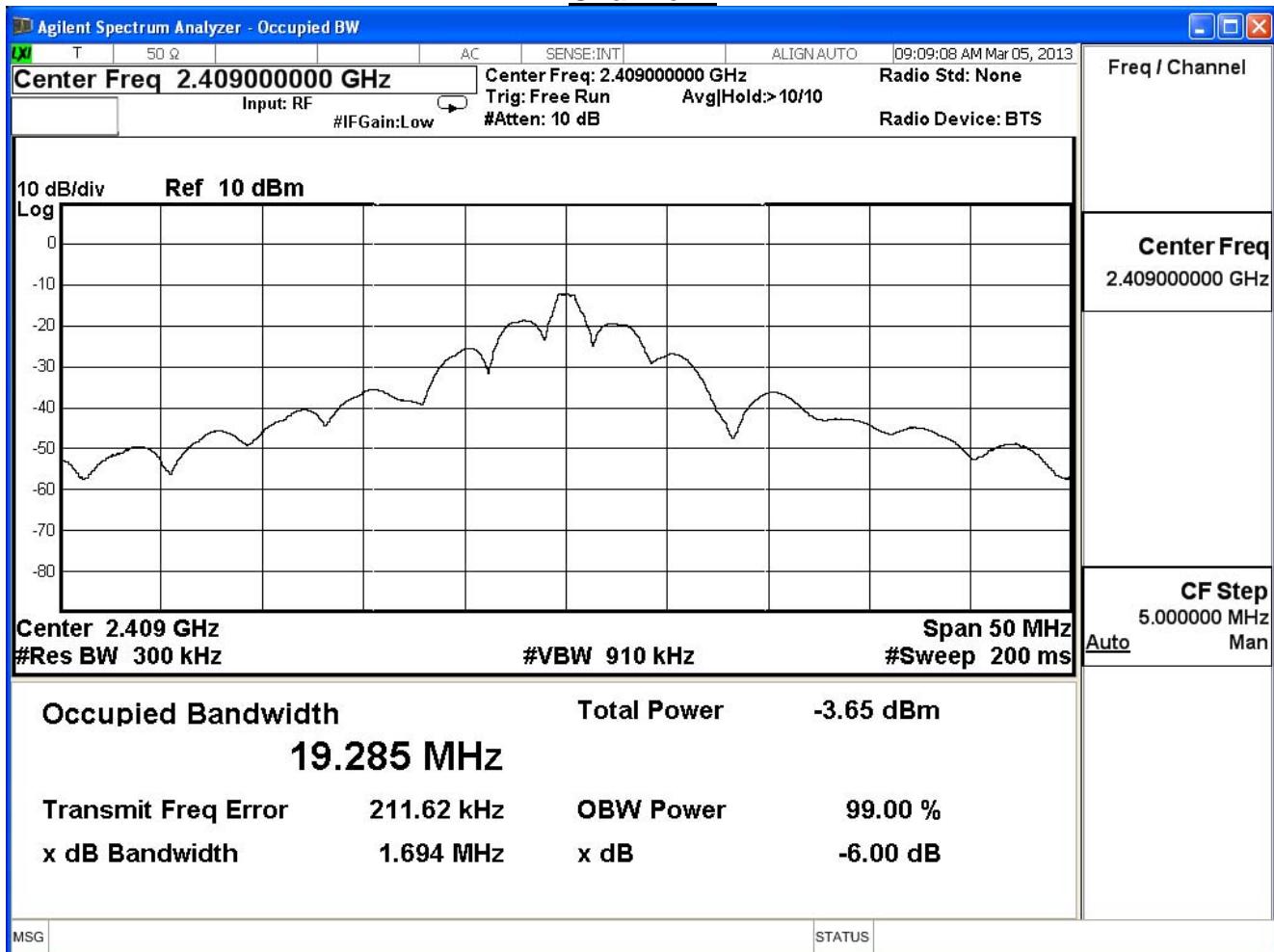
The measurement uncertainty is defined as $\pm 150\text{Hz}$

7.7. Test Result

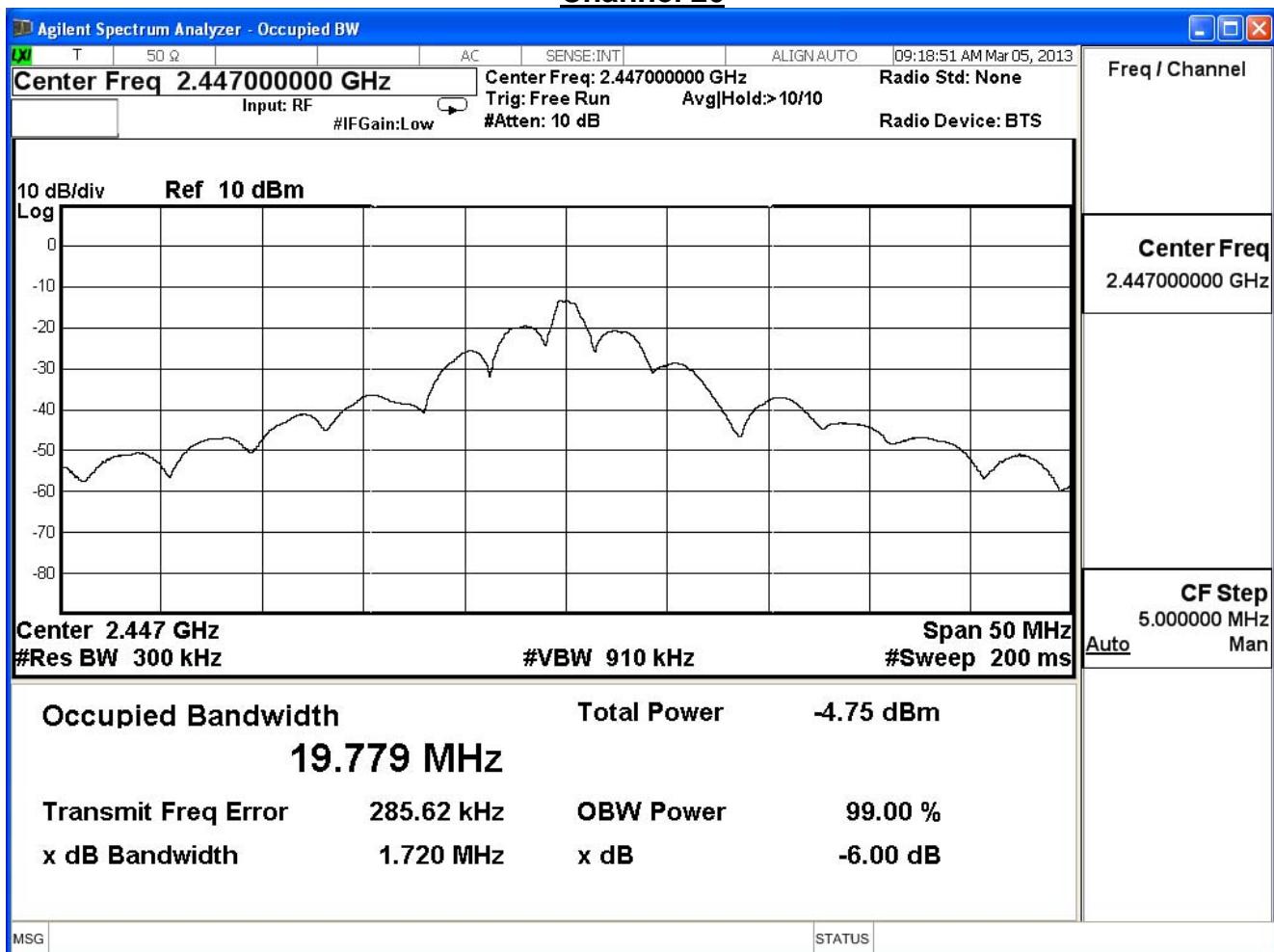
Product	Wireless Microphone		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Mode 1: Transmit		
Date of Test	2013/03/05	Test Site	SR7

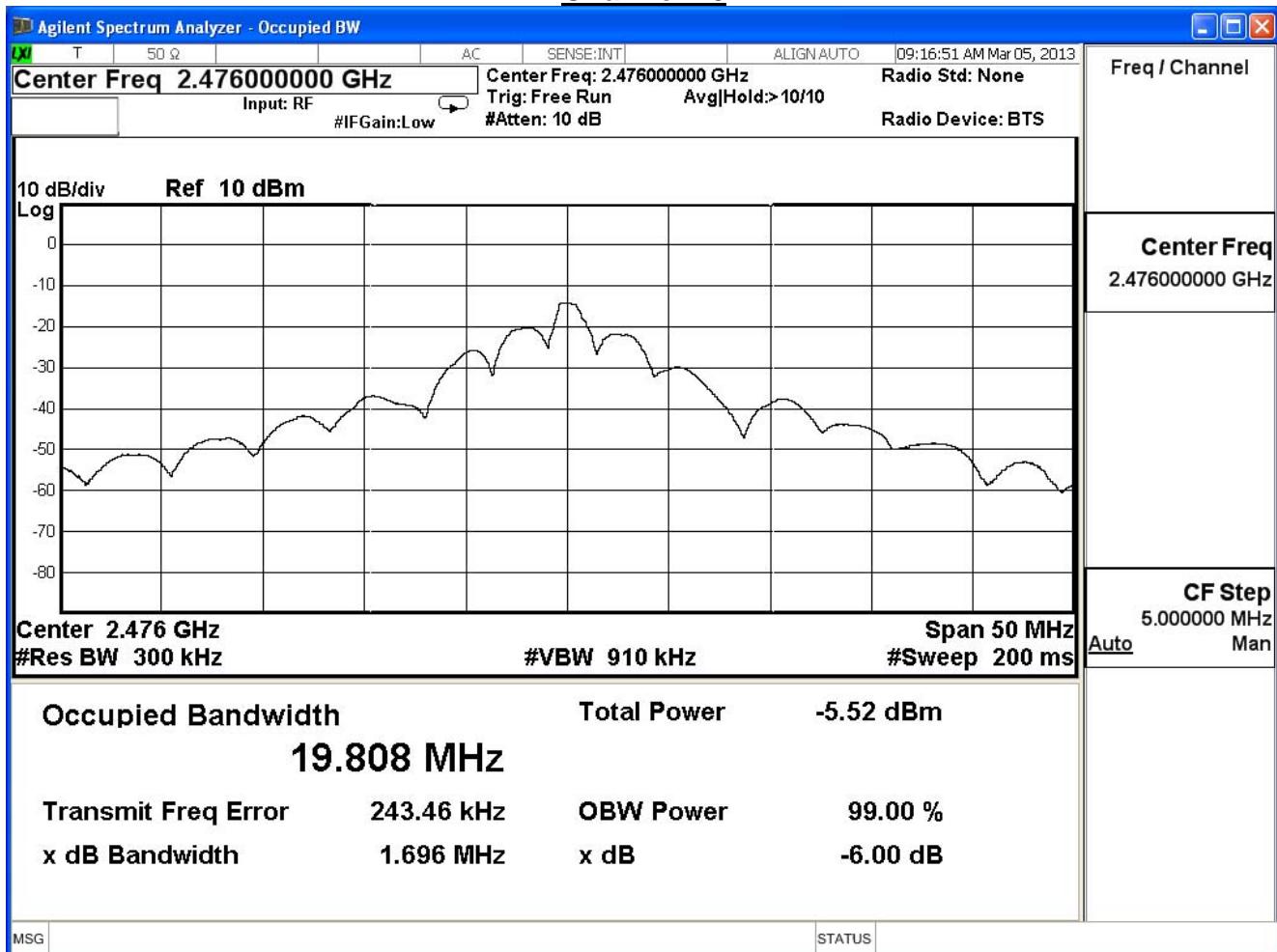
Channel No.	Frequency (MHz)	Measurement Level (MHz)	Required Limit (MHz)	Result
1	2409	1.694	≥0.5	Pass
20	2447	1.720	≥0.5	Pass
40	2476	1.696	≥0.5	Pass

Channel 1



Channel 20



Channel 40

8. Power Density

8.1. Test Equipment

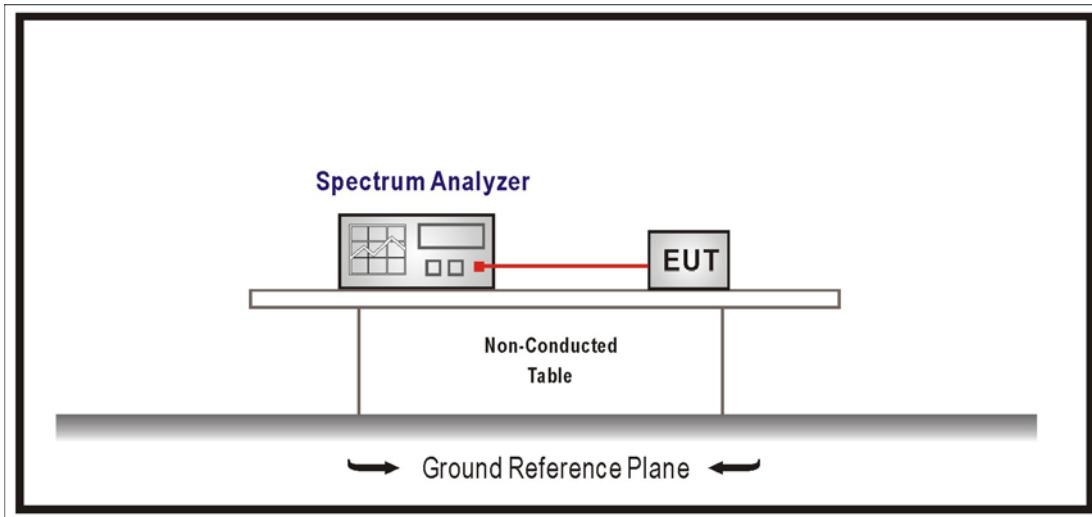
The following test equipment are used during the test:

Power Density / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
EXA Signal Analyzer	Agilent	N9010A-EXA	US47140172	2013/07/31

Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

8.2. Test Setup



8.3. Limits

The peak power spectral density conducted from the intentional radiated to the antenna shall not be greater than +8dBm in any 3kHz band during any time interval of continuous transmission.

8.4. Test Procedures

The EUT was setup according to ANSI C63.4: 2009; tested according to DTS test procedure of Jan. 2012 KDB558074 for compliance to FCC 47CFR 15.247 requirements.

Set RBW= 100 kHz, Set VBW= 300 kHz, Sweep time=Auto, Set detector=Peak detector.

Scale the observed power level to an equivalent value in 3 kHz by adjusting (reducing) the measured power by a bandwidth correction factor (BWCF) where $BWCF = 10\log (3 \text{ kHz}/100 \text{ kHz}) = -15.2 \text{ dB}$.

8.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2012

8.6. Uncertainty

The measurement uncertainty is defined as $\pm 1.27\text{dB}$.

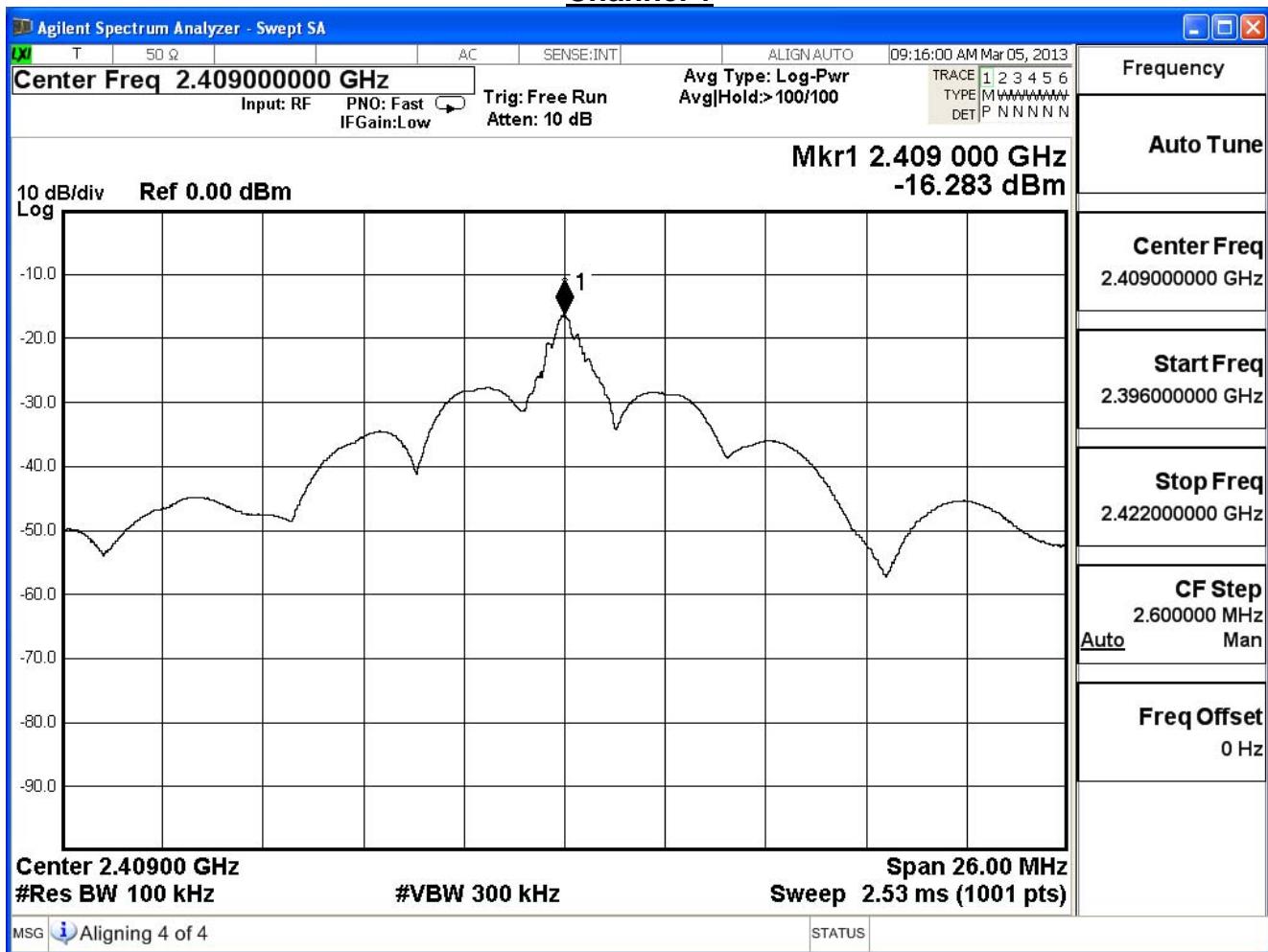
8.7. Test Result

Product	Wireless Microphone		
Test Item	Power Density		
Test Mode	Mode 1: Transmit		
Date of Test	2013/03/05	Test Site	SR7

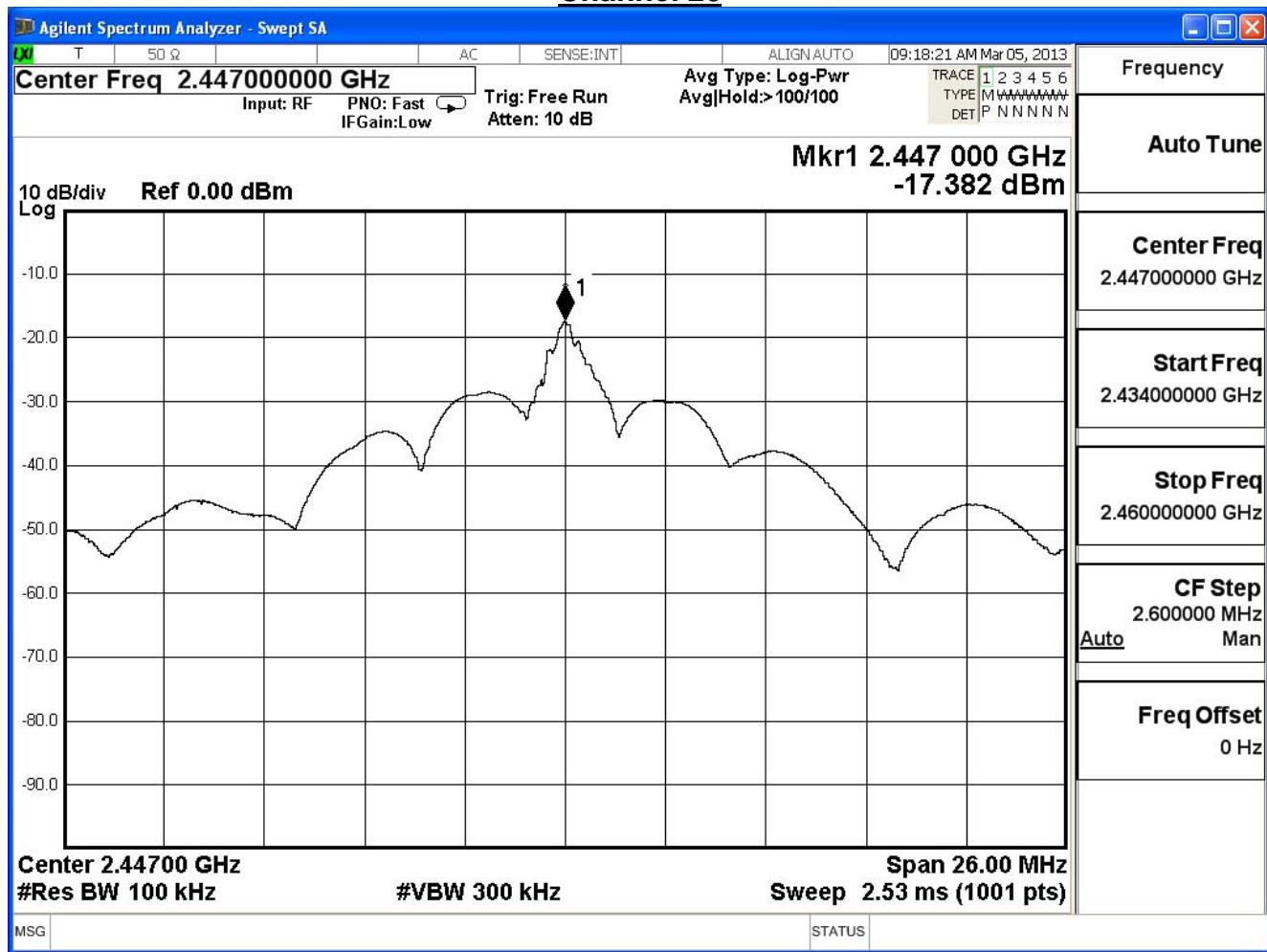
Channel No.	Frequency (MHz)	Reading Level(dBm)	Measure Level (dBm)	Limit (dBm)	Result
1	2409	-16.283	-31.483	≤8	Pass
20	2447	-17.382	-32.582	≤8	Pass
40	2476	-18.173	-33.373	≤8	Pass

Note: Measure Level (dBm) = Reading Level (dBm) + BWCF = Reading Level (dBm) -15.2 (dB)
Bandwidth correction factor (BWCF) = $10\log(3\text{kHz}/100\text{kHz})$

Channel 1



Channel 20



Channel 40

