Test Report

Product Name ： Wire-to-Air

Model No. ： AWS8112, AWS811T, AWS812R, AM8112, AM811T, AM812R, AWS8156, AWS815, AWS816, AWS8178, AWS817, AWS818

FCC ID. ： NGVAWD8112

Applicant ： AIRWAVE Technologies Inc.

Address ： 4F, NO.9, Industry E. 9th Road Science-based Industrial Park, Hsinchu, Taiwan, R.O.C.

Date of Receipt ： 2012/01/13

Issued Date ： 2012/02/17

Report No. ： 121271R-RFUSP43V01

Report Version ： V1.0

Test Report Certification

Issued Date : 2012/02/17
Report No. : 121271R-RFUSP43V01

QuieTek

Product Name	:	Wire-to-Air
Applicant	:	AIRWAVE Technologies Inc.
Address	:	4F, NO.9, Industry E. 9th Road Science-based Industrial Park, Hsinchu, Taiwan, R.O.C.
Manufacturer	:	AIRWAVE Technologies Inc.
Model No.	:	AWS8112, AWS811T, AWS812R, AM8112, AM811T, AM812R, AWS8156, AWS815, AWS816, AWS8178, AWS817, AWS818
FCC ID.	:	NGVAWD8112
EUT Voltage	:	DC 5V
Trade Name	:	AIRWAVE, audiomate
Applicable Standard	:	FCC CFR Title 47 Part 15 Subpart C Section 15.247: 2010
Test Result	:	Complied

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.

Documented By : Demi Chang

(Demi Chang / Engineering Adm. Specialist)

Reviewed By : Chris Liu

(Chris Liu / Engineer)

Approved By : Roy Wang

(Roy Wang / Manager)

TABLE OF CONTENTS

1. General Information

1.1. EUT Description

Product Name	Wire-to-Air
Trade Name	AIRWAVE, audiomate
Model No.	AWS8112, AWS811T, AWS812R, AM8112, AM811T, AM812R, AWS8156, AWS815, AWS816, AWS8178, AWS817, AWS818
Frequency Range	2406 ~ 2472MHz
Channel Number	31
Type of Modulation	GFSK
Channel Control	Auto
Antenna Type	Printed
Antenna Gain	2.58dBi

Component	
USB Cable	Shielded, 0.8m

Working Frequency of Each Channel							
Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01	2406 MHz	Channel 09	2422 MHz	Channel 17	2444 MHz	Channel 25	2460 MHz
Channel 02	2408 MHz	Channel 10	2424 MHz	Channel 18	2446 MHz	Channel 26	2462 MHz
Channel 03	2410 MHz	Channel 11	2426 MHz	Channel 19	2448 MHz	Channel 27	2464 MHz
Channel 04	2412 MHz	Channel 12	2428 MHz	Channel 20	2450 MHz	Channel 28	2466 MHz
Channel 05	2414 MHz	Channel 13	2430 MHz	Channel 21	2452 MHz	Channel 29	2468 MHz
Channel 06	2416 MHz	Channel 14	2432 MHz	Channel 22	2454 MHz	Channel 30	2470 MHz
Channel 07	2418 MHz	Channel 15	2438 MHz	Channel 23	2456 MHz	Channel 31	2472 MHz
Channel 08	2420 MHz	Channel 16	2440 MHz	Channel 24	2458 MHz		

Note:

1. This device is a Wire-to-Air included a 2.4GHz transmitting function, and 2.4GHz receiving function.
2. This device use FHSS technology to transmit and receive data. There are total 31 hopping channel which were divided to 4 hopping groups. Each hopping group has 15 channels.
   Group 1: 2406 MHz, 2420 MHz, 2422 MHz, 2424 MHz, 2426 MHz, 2428 MHz, 2444 MHz, 2446MHz, 2448 MHz, 2450 MHz, 2452 MHz, 2456 MHz, 2468 MHz, 2470 MHz, 2472 MHz
   Group 2: 2406 MHz, 2408 MHz, 2410 MHz, 2412 MHz, 2414 MHz, 2416 MHz, 2418 MHz, 2420 MHz, 2422 MHz, 2424 MHz, 2426 MHz, 2428 MHz, 2430 MHz, 2438 MHz, 2446 MHz
   Group 3: 2432 MHz, 2440 MHz, 2448 MHz, 2450 MHz, 2452 MHz, 2454 MHz, 2456 MHz, 2458 MHz, 2460 MHz, 2462 MHz, 2464 MHz, 2466 MHz, 2468 MHz, 2470 MHz, 2472 MHz
   Group 4: 2406 MHz, 2408 MHz, 2410 MHz, 2412 MHz, 2414 MHz, 2416 MHz, 2418 MHz, 2426 MHz, 2454 MHz, 2462 MHz, 2464 MHz, 2466 MHz, 2468 MHz, 2470 MHz, 2472 MHz
3. Regards to the frequency band operations; three channels were selected to perform the test, and then show on this report.
4. The difference between each model number will be shown as below:
   Package name (Transmitter and Receiver)：AWS8112, AM8112,AWS8156, AWS8178
   Transmitter：AWS811T, AM811T,AWS815, AWS817
   Receiver：AWS812R, AM812R, AWS816, AWS818
5. This device is a composite device in accordance with Part 15 regulations. The function receiving was measured and made a test report that the report number is 121271R-RFUSP37V02 under Declaration of Conformity.

1.2. Test Mode

QuieTek has verified the construction and function in typical operation. All the test modes were carried out with the EUT in transmitting operation, which was shown in this test report and defined as follows:

Pre-Test Mode	
EMI	Mode 1: Transmit
Final Test Mode	
EMI	Mode 1: Transmit

Test Items	Mode 1
Conducted Emission	Yes
Peak Power Output	Yes
Radiated Emission	Yes
RF antenna conducted test	Yes
Band Edge	Yes
Channel of Number	Yes
Channel Separation	Yes
Occupied Bandwidth	Yes
Dwell Time	Yes

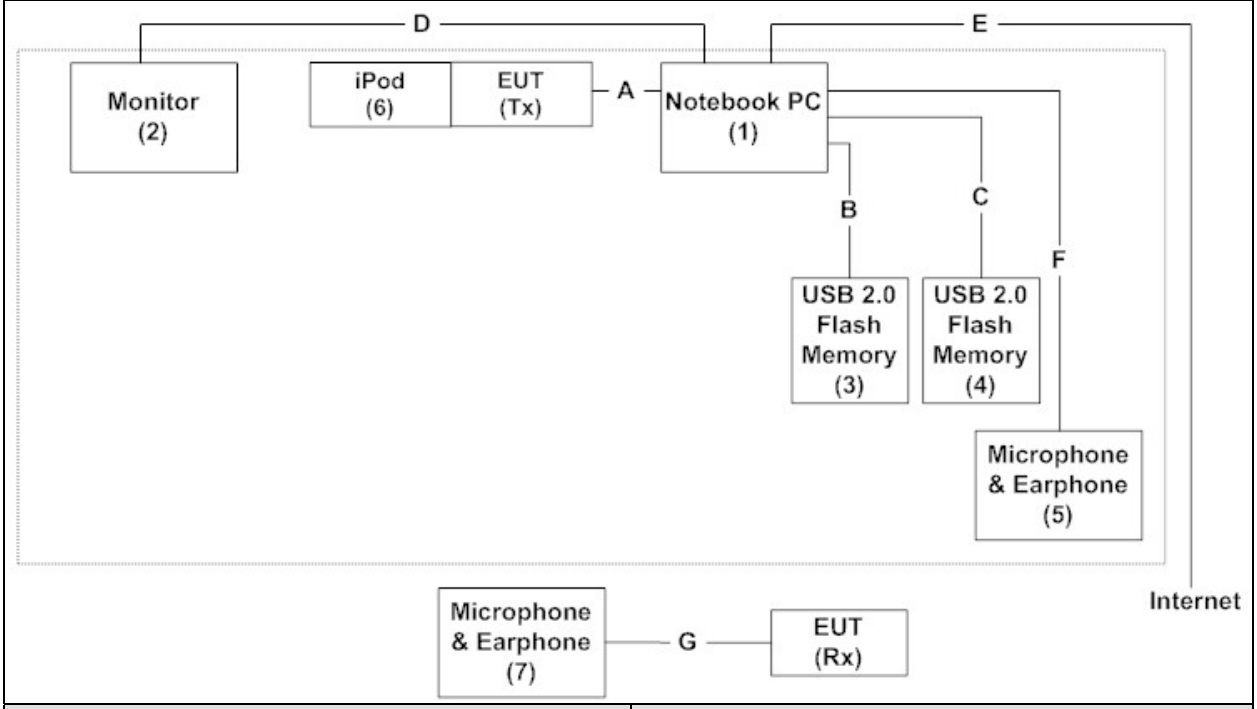
1.3. Tested System Details

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	ACER	PAV70	LUSEW0D0371105 FE221601	DoC	Non-Shielded, 2.5m a ferrite core bonded
2	Monitor	CHI MEI	A170E1-09	3UC120955SA1227	DoC	Non-Shielded, 1.8m
3	USB 2.0 Flash Memory	Sony	USM2GJX	N/A	DoC	--
4	USB 2.0 Flash Memory	Sony	USM2GJX	N/A	DoC	--
5	Microphone & Earphone	Fujiei	SBZ-38	N/A	DoC	--
6	iPod	Apple	A1136	9C724G7MV9M	DoC	--
7	Microphone & Earphone	Fujiei	SBZ-38	N/A	DoC	--

1.4. Configuration of tested System

Connection Diagram



Signal Cable Type		Signal cable Description
A	USB Cable	Shielded, 0.8m
B	USB Cable	Shielded, 1.5m
C	USB Cable	Shielded, 1.5m
D	VGA Cable	Shielded, 1.6m
E	LAN Cable	Non-Shielded, 3m
F	Microphone & Earphone Cable	Non-Shielded, 1.2m
G	Microphone & Earphone Cable	Non-Shielded, 1.2m

1.5. EUT Exercise Software

1	Test system is in accord with EUT user manual (refer to 1.4 configuration of tested system).
2	Turn on the power of all equipment.
3	Using ipod to play to music..
4	The EUT(TX) will transmit to music to EUT(RX).
5	Repeat the above procedure (2) to (3)

1.6. Test Facility

Ambient conditions in the laboratory:

Items	Test Item	Required (IEC 68-1)	Actual
Temperature (°C)	FCC PART 15 C 15.247 Peak Power Output (FHSS)	15 - 35	23
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Radiated Emission (FHSS)	15 - 35	25
Humidity (%RH)		25 - 75	54
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Band Edge (FHSS)	15 - 35	25
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Channel Of Number (FHSS)	15 - 35	23
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Channel Separation (FHSS)	15 - 35	23
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Occupied Bandwidth (FHSS)	15 - 35	24
Humidity (%RH)		25 - 75	48
Barometric pressure (mbar)		860 - 1060	950-1000
Temperature (°C)	FCC PART 15 C 15.247 Dwell Time (FHSS)	15 - 35	23
Humidity (%RH)		25 - 75	50
Barometric pressure (mbar)		860 - 1060	950-1000

Site Description: September 27, 2010 File on
Federal Communications Commission
Laboratory Division
7435 Oakland Mills Road
Columbia, MD 21046
Registration Number: 365520

Accredited by TAF
Accreditation Number: 1313
Effective through: December 27, 2013

Accredited by NVLAP
NVLAP Lab Code: 200347-0
Effective through: September 30, 2012

Site Name: Quietek Corporation
Site Address: No. 75-2, 3rd Lin, Wangye Keng, Yonghxing
Tsuen, Qionglin Shiang, Hsinchu County 307, Taiwan
TEL : 886-3-5928858 / FAX : 886-3-5928859
E-Mail : service@quietek.com

2. Conducted Emission

2.1. Test Equipment

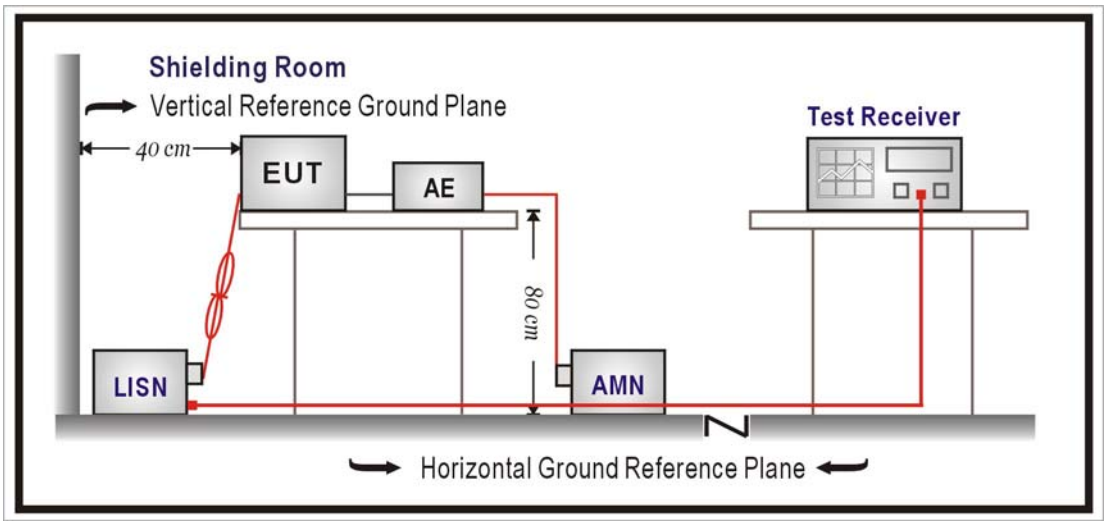
The following test equipments are used during the test:

Conducted Emission / SR2

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Artificial Mains Network	R&S	ENV4200	848411/010	2012/02/29
LISN	R&S	ENV216	100092	2012/08/30
Test Receiver	R&S	ESCS 30	825442/014	2012/08/16

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 and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs.)
Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2009 on conducted measurement.
Conducted emissions were invested over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9 kHz.

2.5. Test Specification

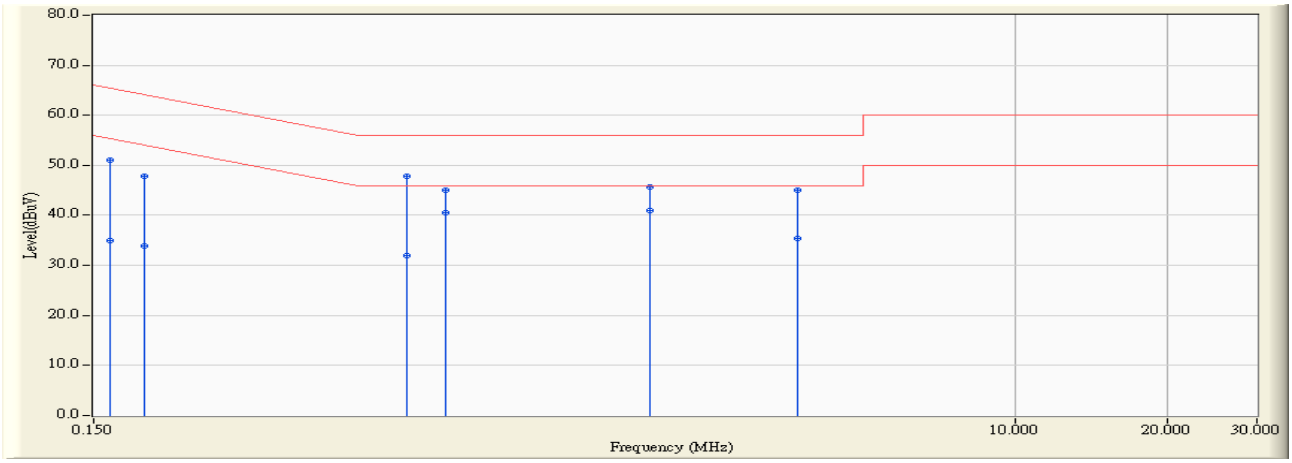
According to FCC Part 15 Subpart C Paragraph 15.207: 2010

2.6. Uncertainty

The measurement uncertainty is defined as ± 2.26 dB.

2.7. Test Result

Site : SR2	**Time : 2012/01/17 - 16:21**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-1_0831 - Line1	**Power : AC120V/60Hz**
EUT : Wire-to-Air	**Note : Mode 1: Transmit**

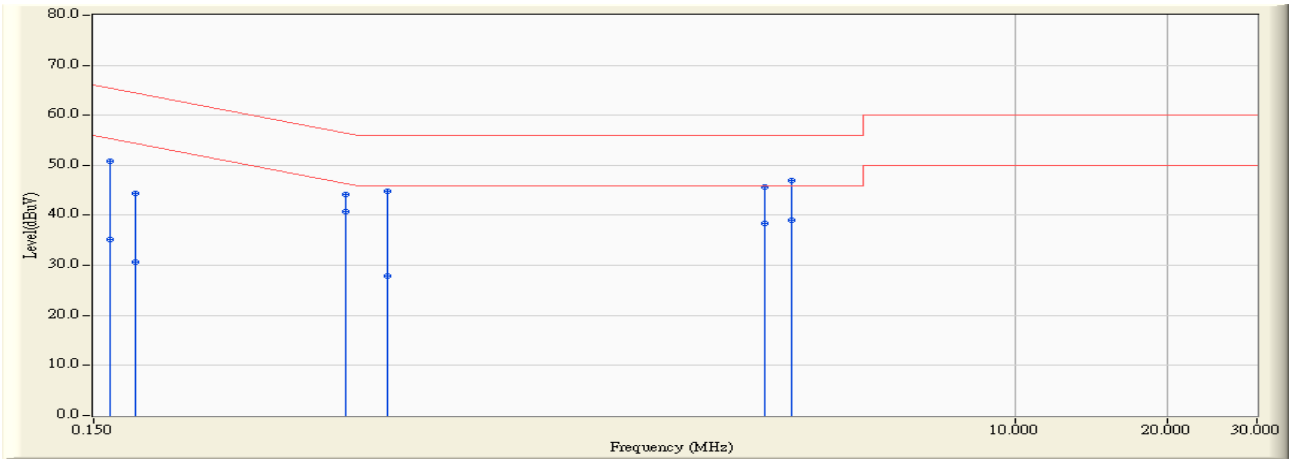


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.162	9.631	41.410	51.041	-14.335	65.375	QUASIPEAK
2		0.162	9.631	25.410	35.041	-20.335	55.375	AVERAGE
3		0.189	9.632	38.240	47.872	-16.206	64.078	QUASIPEAK
4		0.189	9.632	24.180	33.812	-20.266	54.078	AVERAGE
5		0.627	9.669	38.160	47.829	-8.171	56.000	QUASIPEAK
6		0.627	9.669	22.320	31.989	-14.011	46.000	AVERAGE
7		0.744	9.685	35.270	44.955	-11.045	56.000	QUASIPEAK
8		0.744	9.685	30.940	40.625	-5.375	46.000	AVERAGE
9		1.896	9.774	36.010	45.784	-10.216	56.000	QUASIPEAK
10	*	1.896	9.774	31.150	40.924	-5.076	46.000	AVERAGE
11		3.697	9.820	35.140	44.960	-11.040	56.000	QUASIPEAK
12		3.697	9.820	25.500	35.320	-10.680	46.000	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 : 2012/01/17 - 16:24**
Limit : CISPR_B_00M_QP	**Margin : 10**
Probe : SR2_LISN(16A)-1_0831 - Line2	**Power : AC120V/60Hz**
EUT : Wire-to-Air	**Note : Mode 1: Transmit**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV)	Margin (dB)	Limit (dBuV)	Detector Type
1		0.162	9.641	41.240	50.881	-14.495	65.375	QUASIPEAK
2		0.162	9.641	25.560	35.201	-20.175	55.375	AVERAGE
3		0.181	9.642	34.690	44.332	-20.096	64.428	QUASIPEAK
4		0.181	9.642	21.030	30.672	-23.756	54.428	AVERAGE
5		0.474	9.658	34.430	44.088	-12.351	56.440	QUASIPEAK
6	*	0.474	9.658	31.070	40.728	-5.711	46.440	AVERAGE
7		0.572	9.669	35.090	44.759	-11.241	56.000	QUASIPEAK
8		0.572	9.669	18.220	27.889	-18.111	46.000	AVERAGE
9		3.185	9.812	35.960	45.772	-10.228	56.000	QUASIPEAK
10		3.185	9.812	28.600	38.412	-7.588	46.000	AVERAGE
11		3.591	9.819	37.100	46.919	-9.081	56.000	QUASIPEAK
12		3.591	9.819	29.110	38.929	-7.071	46.000	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

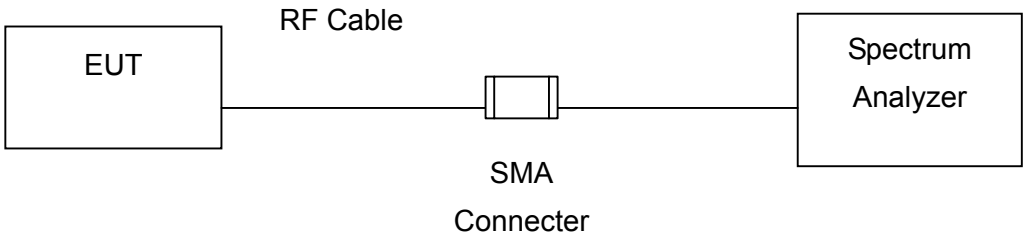
The following test equipment is used during the test:

Peak Power Output / No.7 Shielding Room

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2013/01/16

Note: All equipment upon which need to calibrated are with calibration period of 1 year.

3.2. Test Setup



3.3. Test procedures

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements

3.4. Limits

For frequency hopping systems operating in the 902-928 MHz band: 1 Watt for systems employing at least 50 hopping channels; and, 0.25 Watts for systems employing less than 50 hopping channels.

For frequency hopping systems in the 2400-2483.5 MHz band employing at least 75 hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1Watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 Watt.

3.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2010

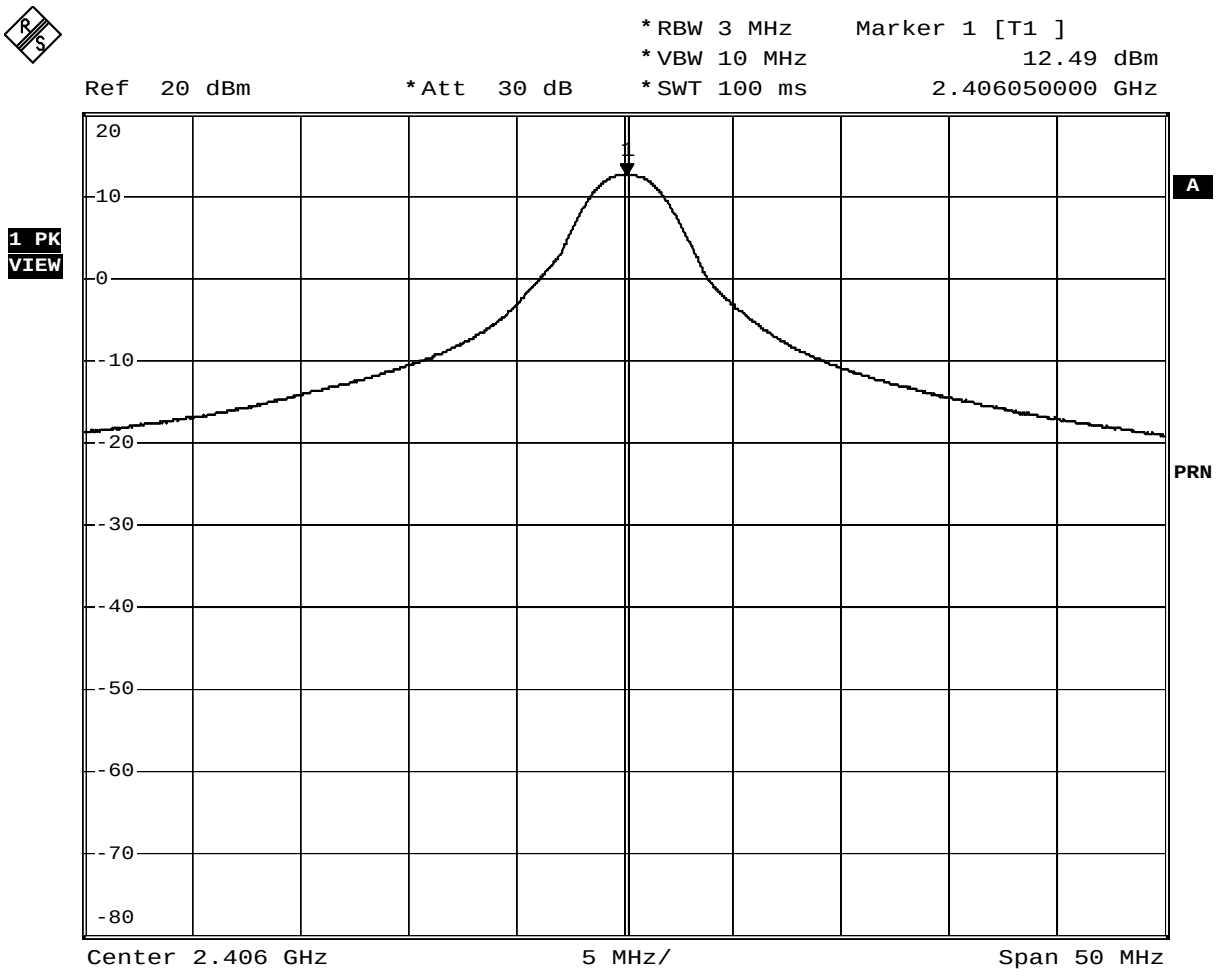
3.6. Test Result

Product	Wire-to-Air		
Test Item	Peak Power Output		
Test Mode	Mode 1: Transmit		
Date of Test	2012/01/18	Test Site	No.7 Shielding Room

GFSK

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2406	12.49	1Watt= 30 dBm	Pass

Channel 01



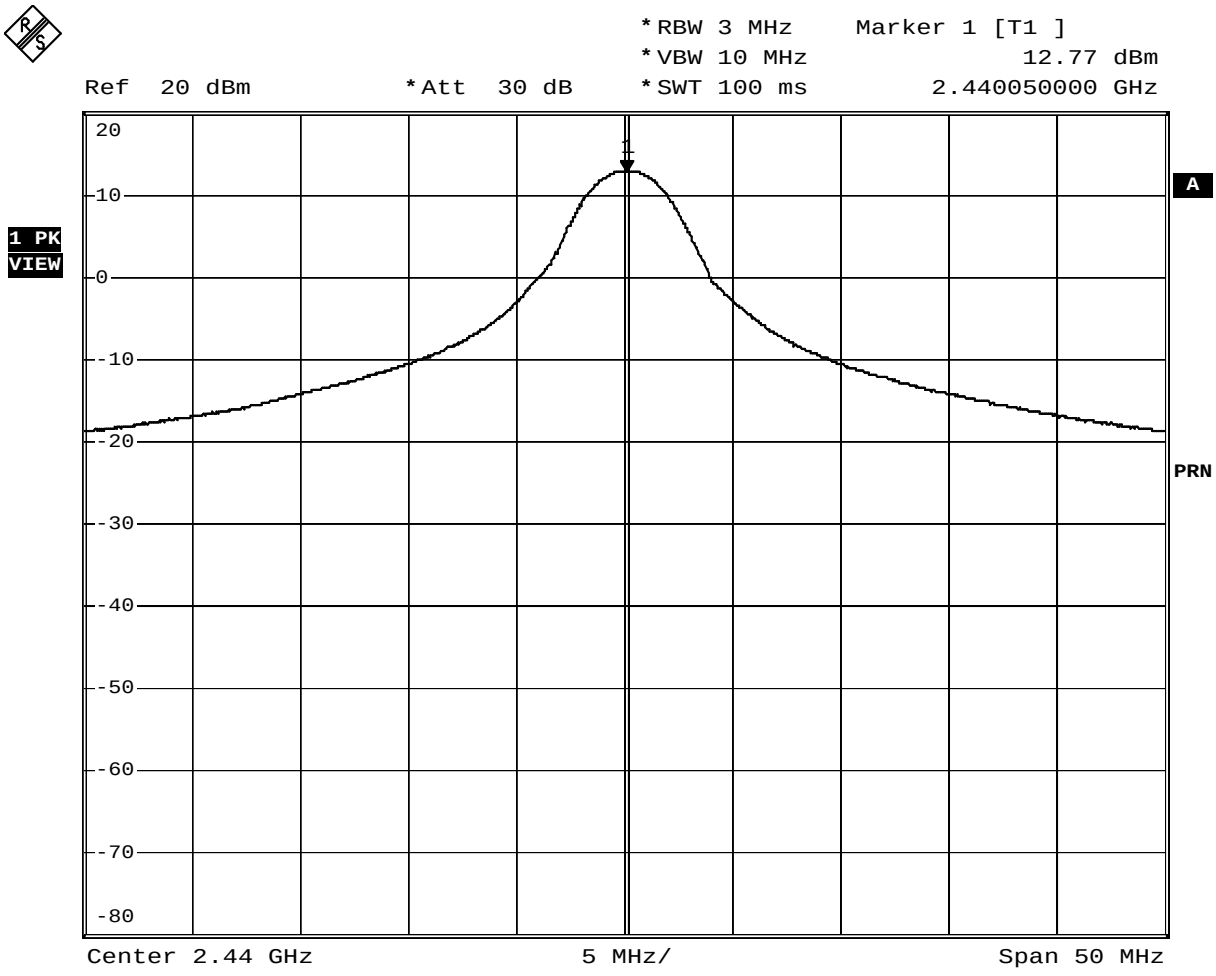
Comment: A:\2
Date: 18.JAN.2012 14:06:07

Product	Wire-to-Air		
Test Item	Peak Power Output		
Test Mode	Mode 1: Transmit		
Date of Test	2012/01/18	Test Site	No.7 Shielding Room

GFSK

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
16	2440	12.77	1Watt= 30 dBm	Pass

Channel 16



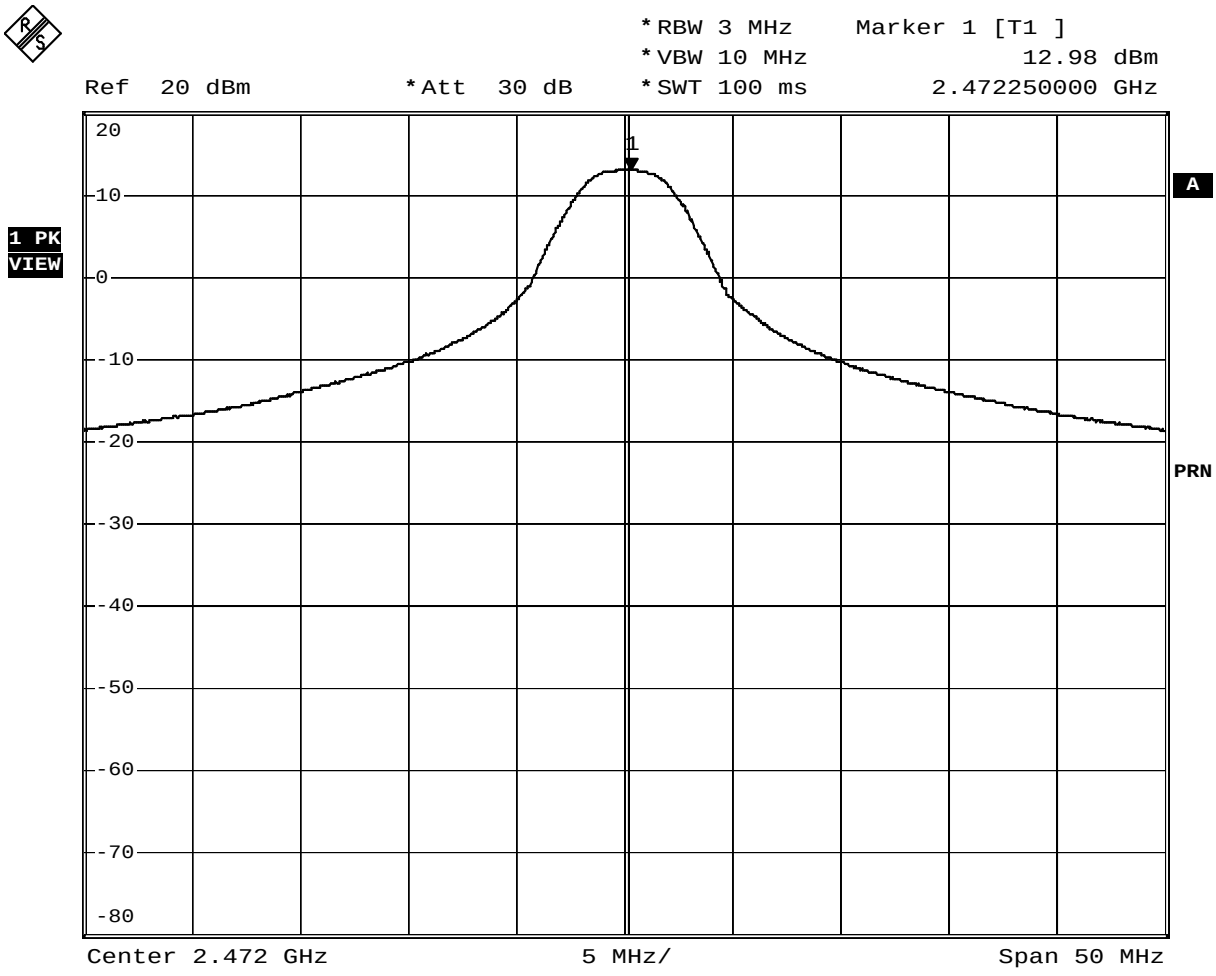
Comment: A:\2
Date: 18.JAN.2012 14:09:27

Product	Wire-to-Air		
Test Item	Peak Power Output		
Test Mode	Mode 1: Transmit		
Date of Test	2012/01/18	Test Site	No.7 Shielding Room

GFSK

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
31	2472	12.98	1Watt= 30 dBm	Pass

Channel 31



Comment: A:\2
Date: 18.JAN.2012 14:04:41

4. Radiated Emission

4.1. Test Equipment

The following test equipments are used during the test:

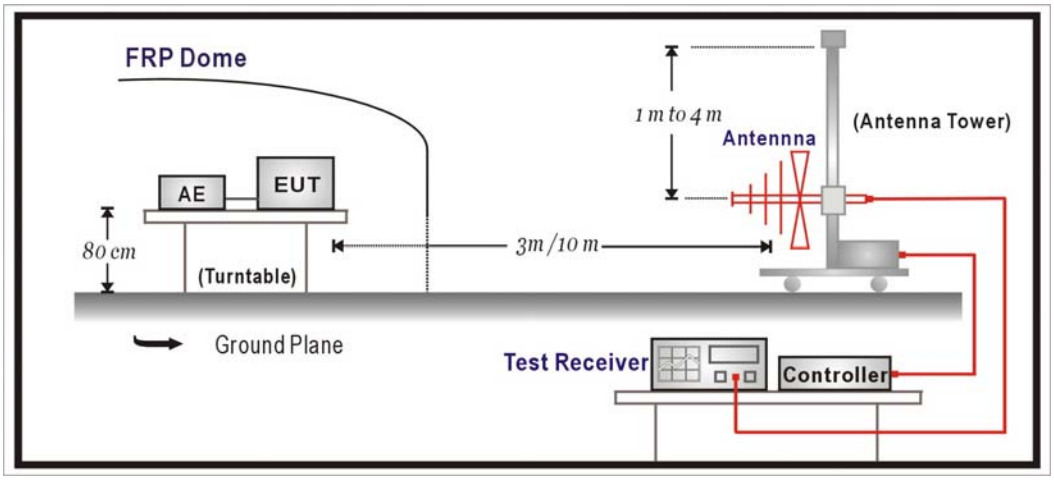
Radiated Emission / CB1

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Bilog Antenna	SCHAFFNER	CBL6112B	2895	2012/08/14
Double Ridged Guide Horn Antenna	Schwarzback	BBHA 9120D	743	2012/02/24
Pre-Amplifier	MITEQ	AMF-4D-005180-24-10P	888003	2012/12/16
Pre-Amplifier	QuieTek	AP-025C	CHM-0706049	2012/03/10
PSA Series Spectrum analyzer	Agilent	E4440A	MY46187335	2013/01/06
Coaxial Cable	Huber+Suhner AG	Sucoflex 102	25623/2	2012/03/21

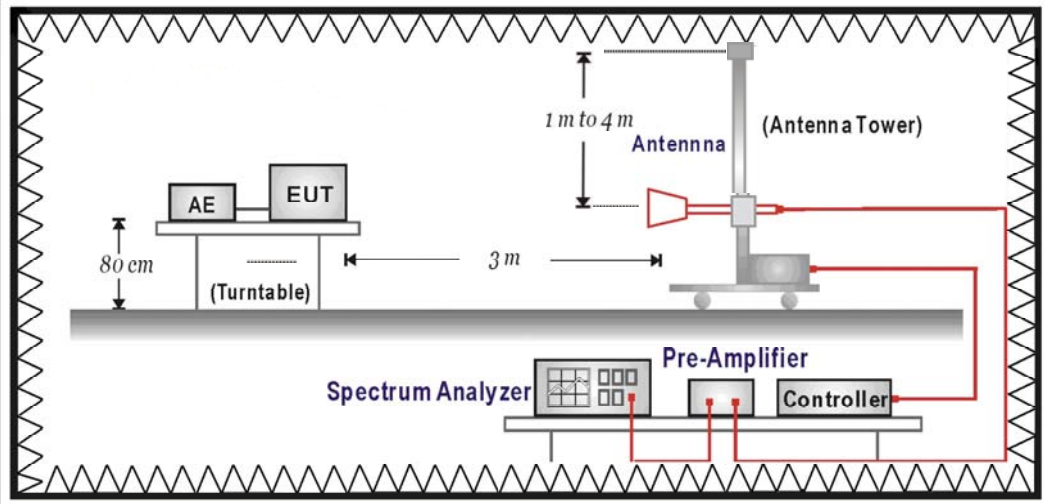
Note: 1. All equipments that need to calibrate are with calibration period of 1 year.

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	uV/m	dBuV/m
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

Remarks : 1. RF Voltage (dBuV) = 20 log RF Voltage (uV)

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

3. Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the device or system.

4.4. Test Procedure

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 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.

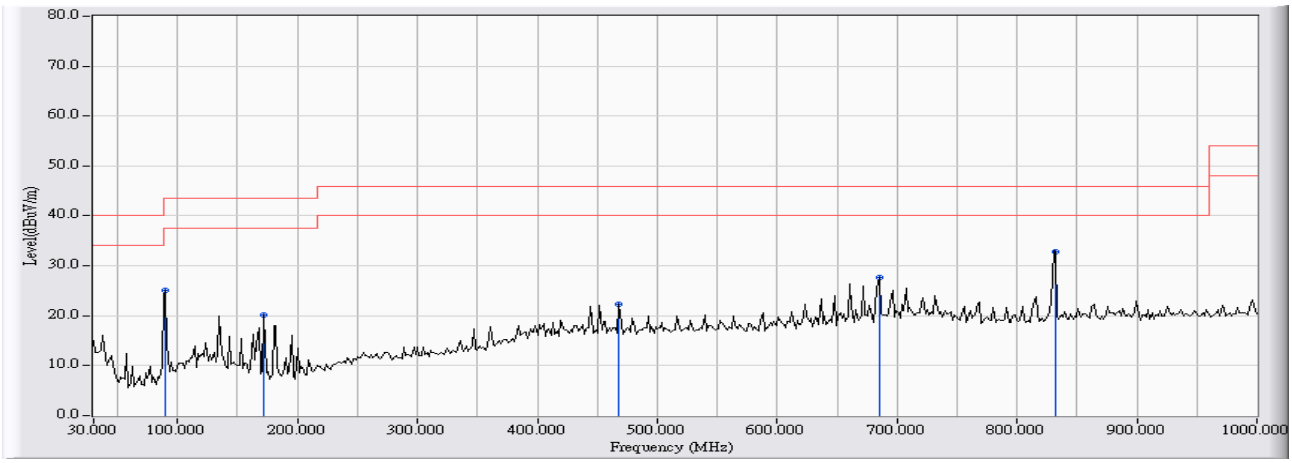
4.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2010

4.6. Test Result

30MHz-1GHz Spurious

Site : CB1	**Time : 2012/01/13 - 16:36**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-1_0901 - HORIZONTAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode 1: Transmit_2440MHz**

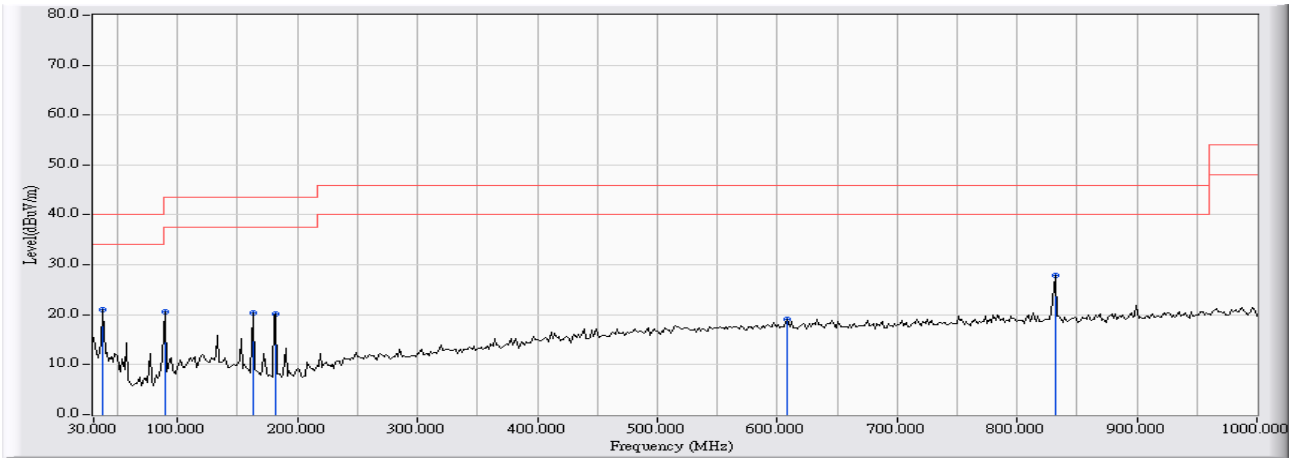


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		89.817	-15.688	40.798	25.110	-18.390	43.500	PEAK
2		172.267	-14.414	34.614	20.201	-23.299	43.500	PEAK
3		468.117	-5.987	28.330	22.343	-23.657	46.000	PEAK
4		684.750	-3.982	31.712	27.731	-18.269	46.000	PEAK
5	*	831.867	-2.441	35.311	32.869	-13.131	46.000	PEAK

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 : 2012/01/13 - 16:41**
Limit : FCC_CLASS_B_03M_QP	**Margin : 6**
Probe : CB1_FCC_EFS_30-1G-1_0901 - VERTICAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode 1: Transmit_2440MHz**



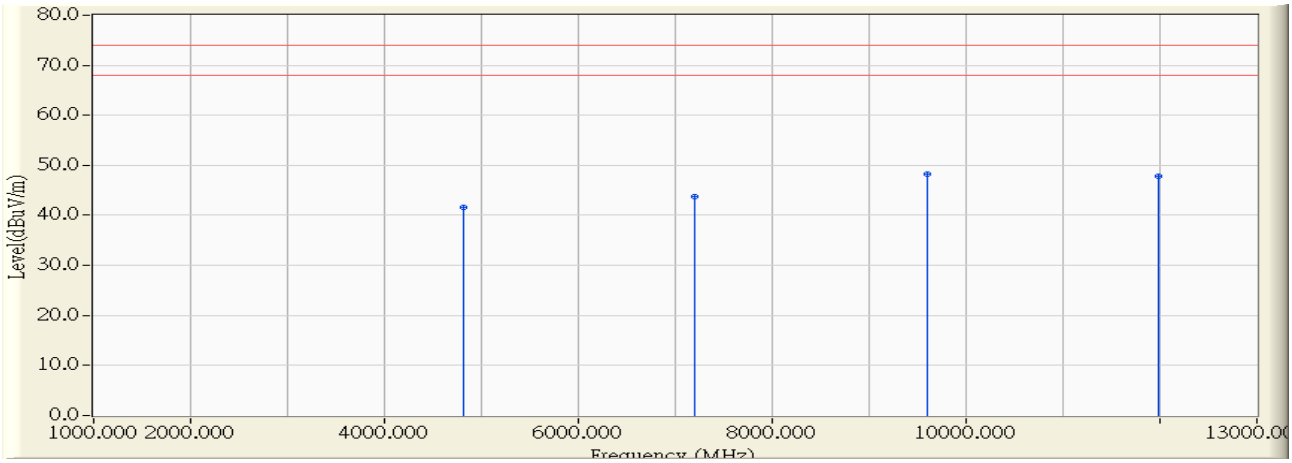
		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		38.083	-11.772	32.881	21.110	-18.890	40.000	PEAK
2		89.817	-15.688	36.340	20.652	-22.848	43.500	PEAK
3		162.567	-14.034	34.506	20.472	-23.028	43.500	PEAK
4		181.967	-14.715	34.861	20.146	-23.354	43.500	PEAK
5		608.767	-4.287	23.387	19.100	-26.900	46.000	PEAK
6	*	831.867	-2.441	30.278	27.836	-18.164	46.000	PEAK

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 : 2012/02/14 - 14:47**
Limit : FCC_SpartC_15.247_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode1:Transmit_2406MHz**

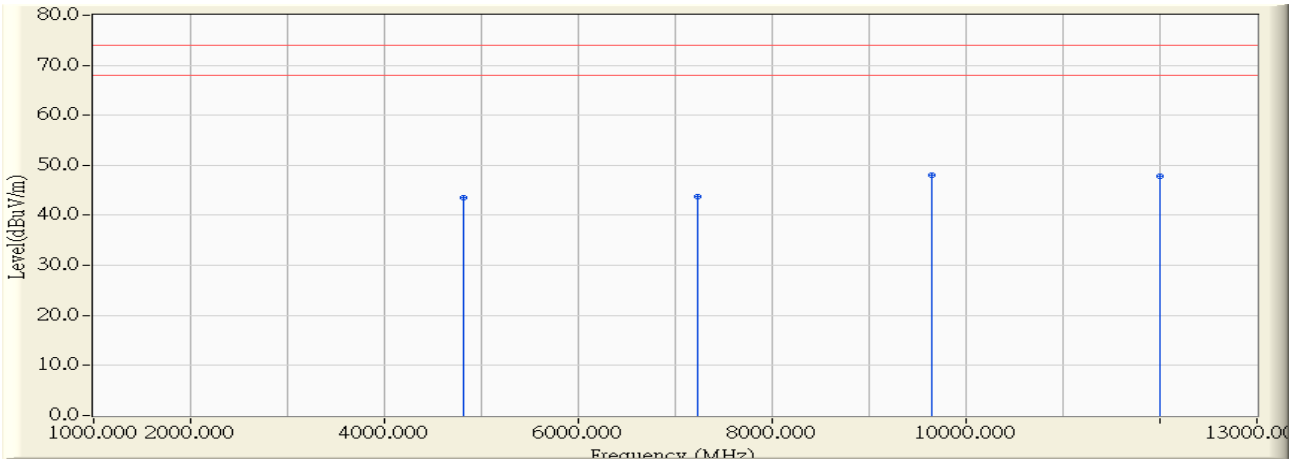


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4813.000	-0.832	42.380	41.548	-32.452	74.000	PEAK
2		7203.200	5.417	38.390	43.807	-30.193	74.000	PEAK
3	*	9605.400	8.921	39.300	48.222	-25.778	74.000	PEAK
4		11983.600	11.568	36.290	47.859	-26.141	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 : 2012/02/14 - 14:51**
Limit : FCC_SpartC_15.247_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode1:Transmit_2406MHz**

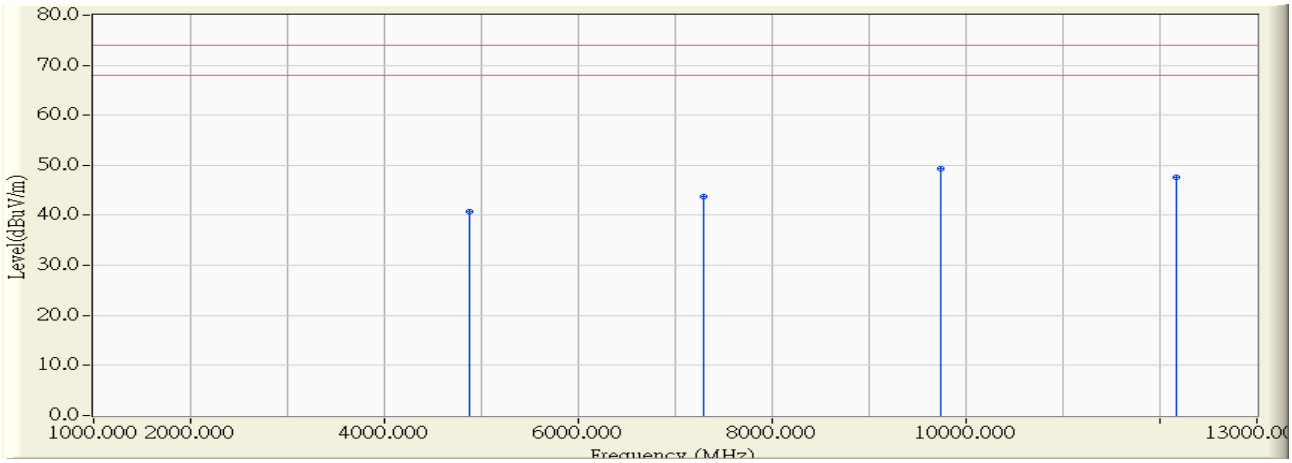


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4812.600	-0.832	44.280	43.447	-30.553	74.000	PEAK
2		7238.200	5.501	38.300	43.802	-30.198	74.000	PEAK
3	*	9639.400	9.168	38.980	48.148	-25.852	74.000	PEAK
4		11996.000	11.554	36.270	47.824	-26.176	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 : 2012/02/14 - 14:57**
Limit : FCC_SpartC_15.247_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode1:Transmit_2440MHz**

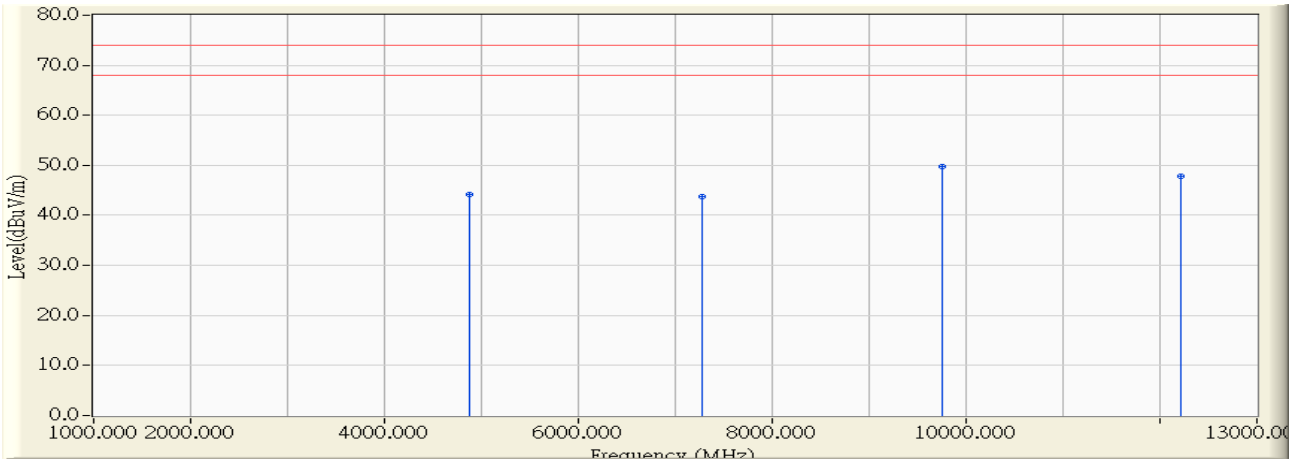


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4880.000	-0.656	41.390	40.734	-33.266	74.000	PEAK
2		7292.200	5.632	38.040	43.672	-30.328	74.000	PEAK
3	*	9736.200	9.869	39.510	49.380	-24.620	74.000	PEAK
4		12168.200	11.488	36.110	47.597	-26.403	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 : 2012/02/14 - 15:01**
Limit : FCC_SpartC_15.247_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode1:Transmit_2440MHz**

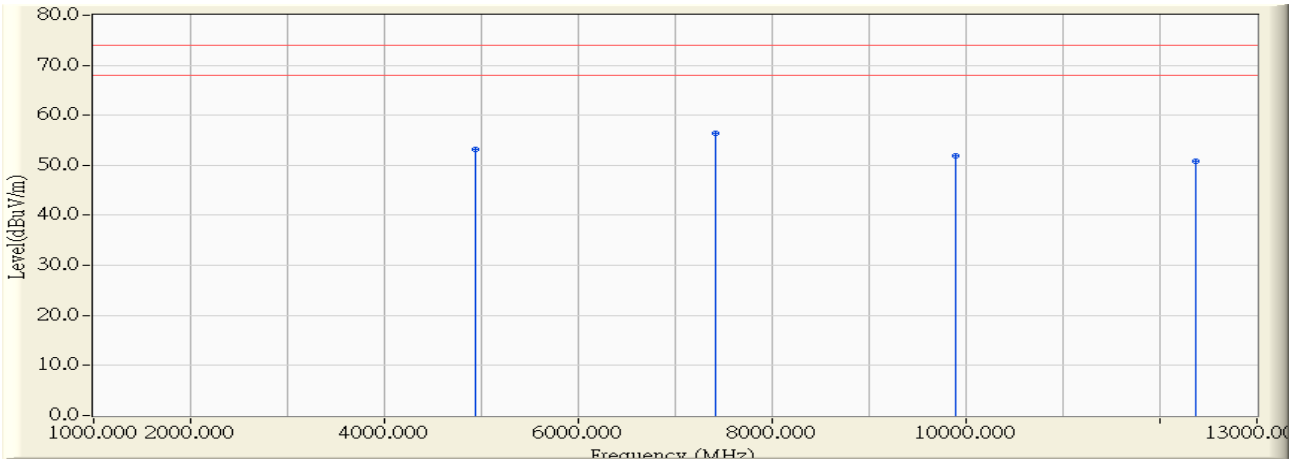


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4879.800	-0.656	44.910	44.253	-29.747	74.000	PEAK
2		7272.600	5.584	38.110	43.695	-30.305	74.000	PEAK
3	*	9755.400	10.009	39.720	49.729	-24.271	74.000	PEAK
4		12212.000	11.472	36.440	47.912	-26.088	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 : 2012/02/09 - 14:57**
Limit : FCC_SpartC_15.247_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode1:Transmit_2472MHz_**

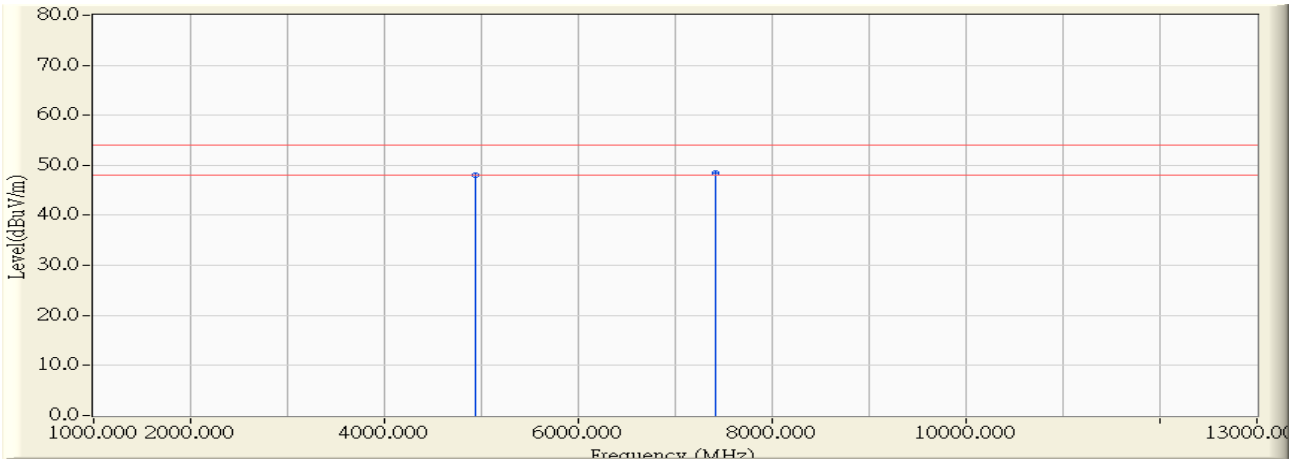


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4944.750	-0.486	53.650	53.164	-20.836	74.000	PEAK
2	*	7417.050	5.934	50.380	56.313	-17.687	74.000	PEAK
3		9888.000	10.970	40.980	51.950	-22.050	74.000	PEAK
4		12361.700	11.419	39.500	50.919	-23.081	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 : 2012/02/09 - 14:58**
Limit : FCC_SpartC_15.247_H_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode1:Transmit_2472MHz**

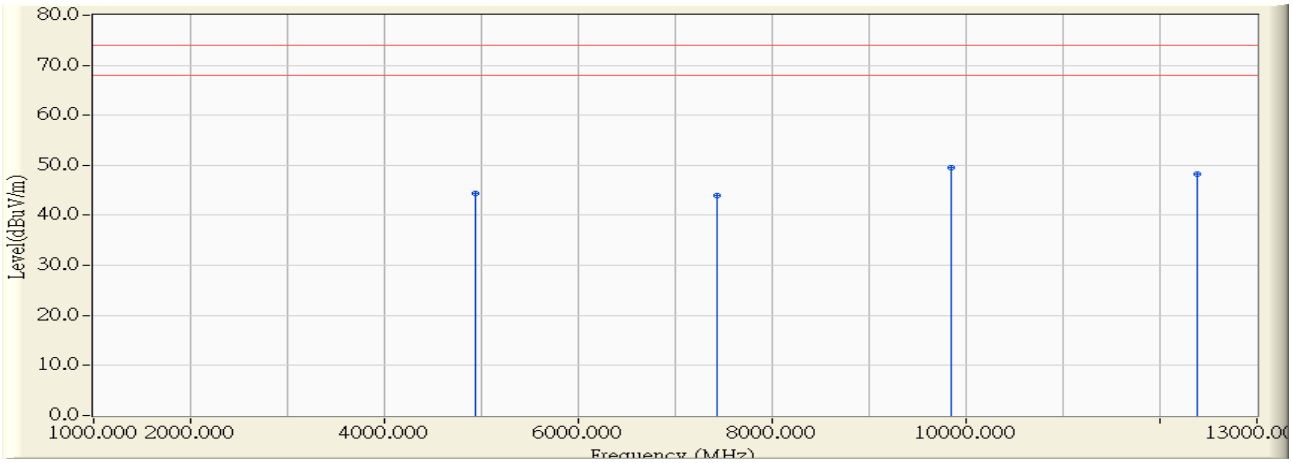


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4944.050	-0.488	48.500	48.012	-5.988	54.000	AVERAGE
2	*	7416.050	5.931	42.640	48.571	-5.429	54.000	AVERAGE

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. The Emission above 13GHz were not included is because their levels are too low.

Site : CB1	**Time : 2012/02/14 - 14:38**
Limit : FCC_SpartC_15.247_H_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode1:Transmit_2472MHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		4943.400	-0.490	44.820	44.330	-29.670	74.000	PEAK
2		7426.000	5.955	38.070	44.025	-29.975	74.000	PEAK
3	*	9853.000	10.716	38.870	49.587	-24.413	74.000	PEAK
4		12378.000	11.413	36.790	48.203	-25.797	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 equipment is used during the test:

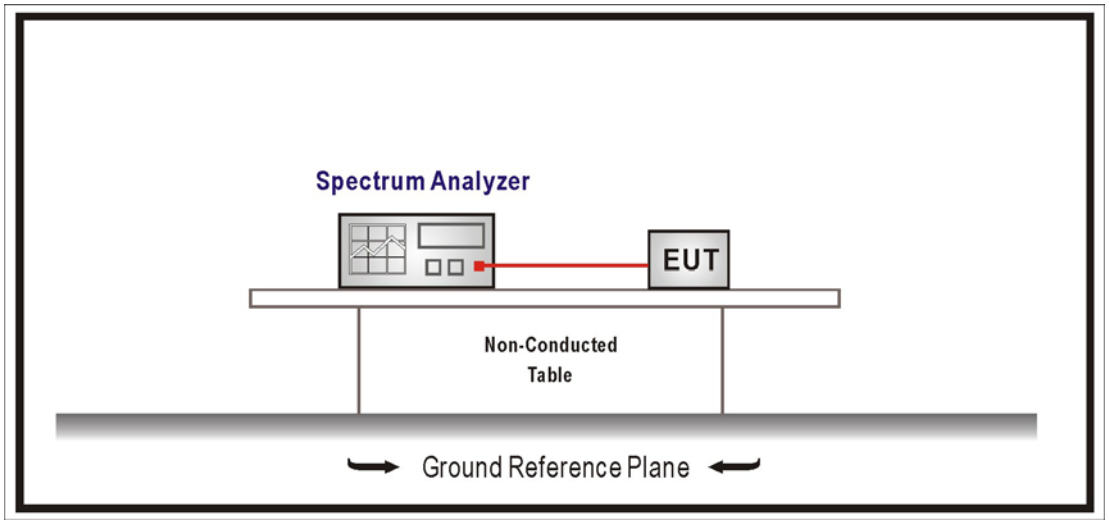
RF antenna conducted test / No.7 Shielding Room

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2013/01/16

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

5.2. Test Setup

RF 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 FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements

Set RBW = 100 kHz, Set VBW> RBW, scan up through 10th harmonic.

5.5. Test Specification

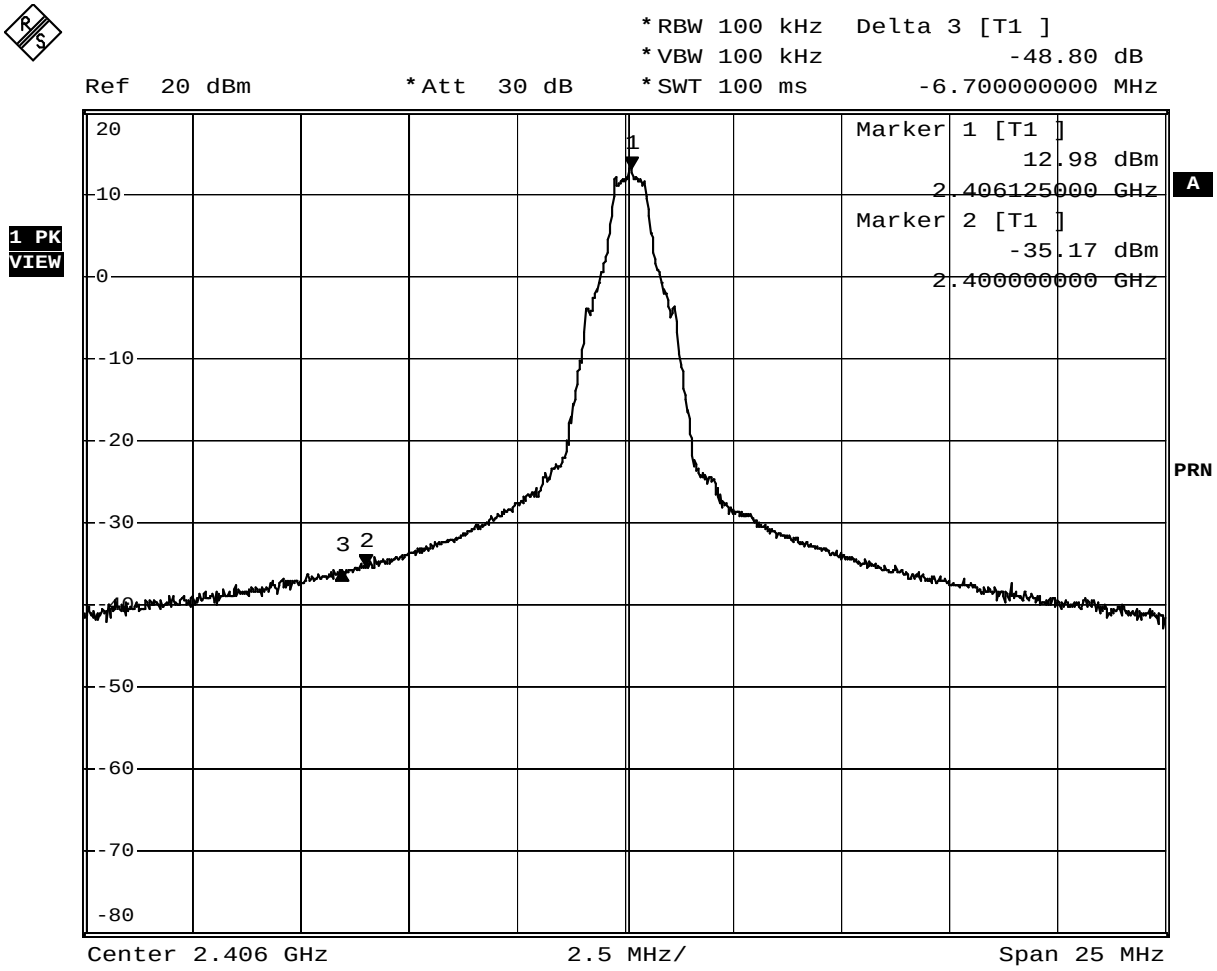
According to FCC Part 15 Subpart C Paragraph 15.247: 2010

5.6. Test Result

Product	Wire-to-Air		
Test Item	RF antenna conducted test		
Test Mode	Mode 1: Transmit		
Date of Test	2012/01/18	Test Site	No.7 Shielding Room

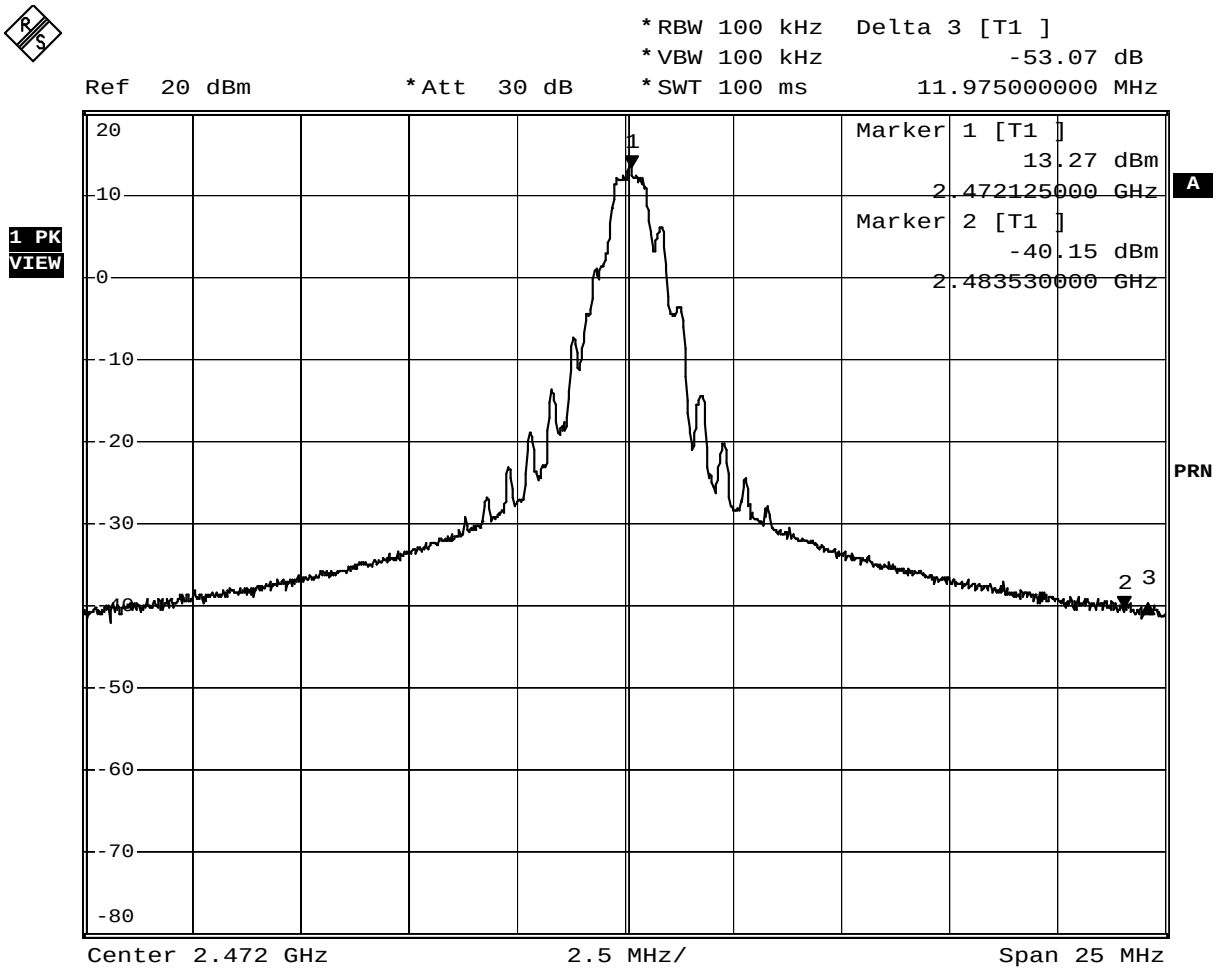
Channel No.	Frequency (MHz)	Measurement Level (dB)	Required Limit (dBc)	Result
01	2406	48.15	≧20	Pass
31	2472	53.07	≧20	Pass

Channel 01



Comment: A:\2
Date: 18.JAN.2012 14:24:59

Channel 31



Comment: A:\2
Date: 18.JAN.2012 14:21:26

6. Band Edge

6.1. Test Equipment

The following test equipments are used during the test:

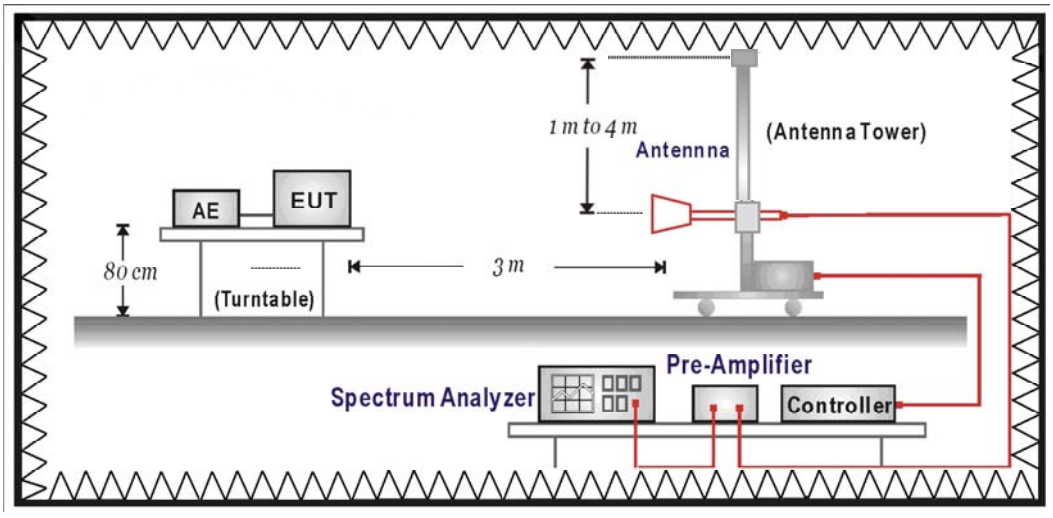
Band Edge / CB1

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Double Ridged Guide Horn Antenna	Schwarzback	BBHA 9120D	743	2012/02/24
PSA Series Spectrum analyzer	Agilent	E4440A	MY46187335	2013/01/06
Coaxial Cable	Huber+Suhner AG	Sucoflex 102	25623/2	2012/03/21

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 FHSS test procedure of FCC Public Notice DA 00-705 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.

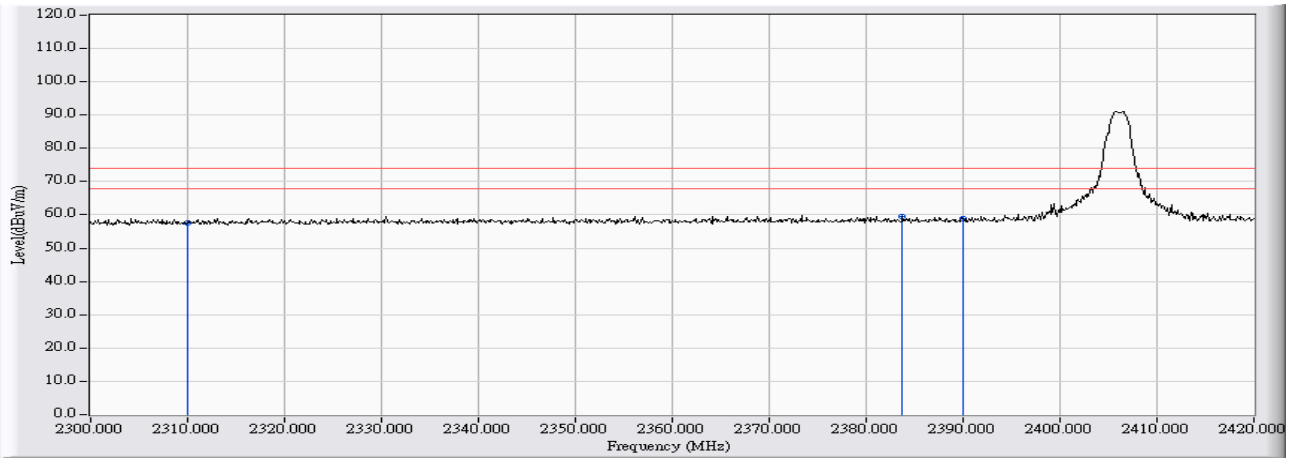
Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2009 on radiated measurement.

6.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2010

6.6. Test Result

Site : CB1	**Time : 2012/01/16 - 11:30**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode 1: Transmit_2406MHz**

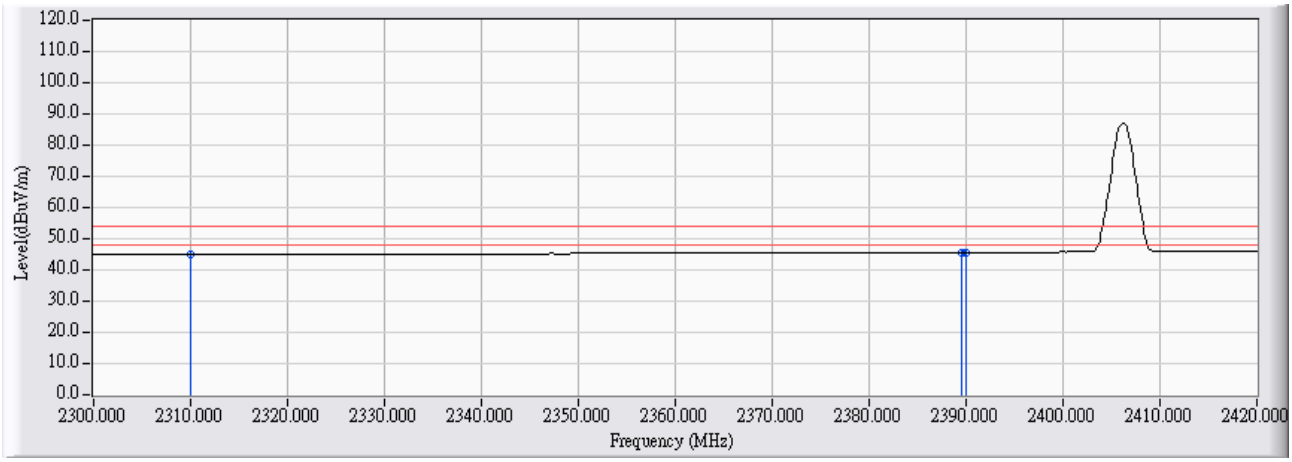


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	28.263	29.341	57.604	-16.396	74.000	PEAK
2	*	2383.760	28.551	31.017	59.568	-14.432	74.000	PEAK
3		2390.000	28.575	30.422	58.997	-15.003	74.000	PEAK

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. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2012/01/16 - 13:38**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode 1: Transmit_2406MHz**

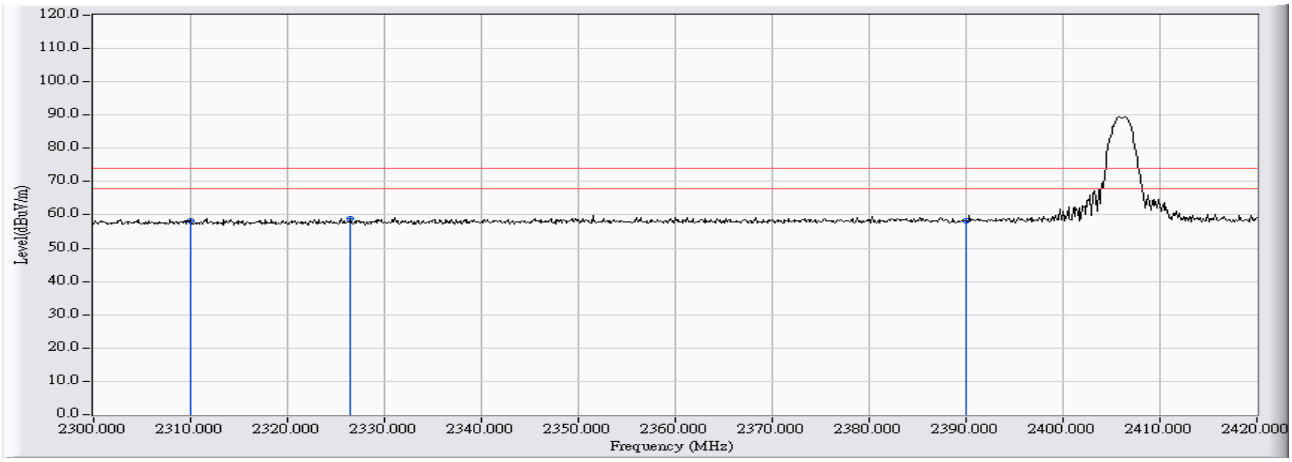


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	28.263	16.704	44.967	-9.033	54.000	AVERAGE
2	*	2389.520	28.573	17.091	45.664	-8.336	54.000	AVERAGE
3		2390.000	28.575	17.073	45.648	-8.352	54.000	AVERAGE

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. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2012/01/16 - 11:32**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode 1: Transmit_2406MHz**

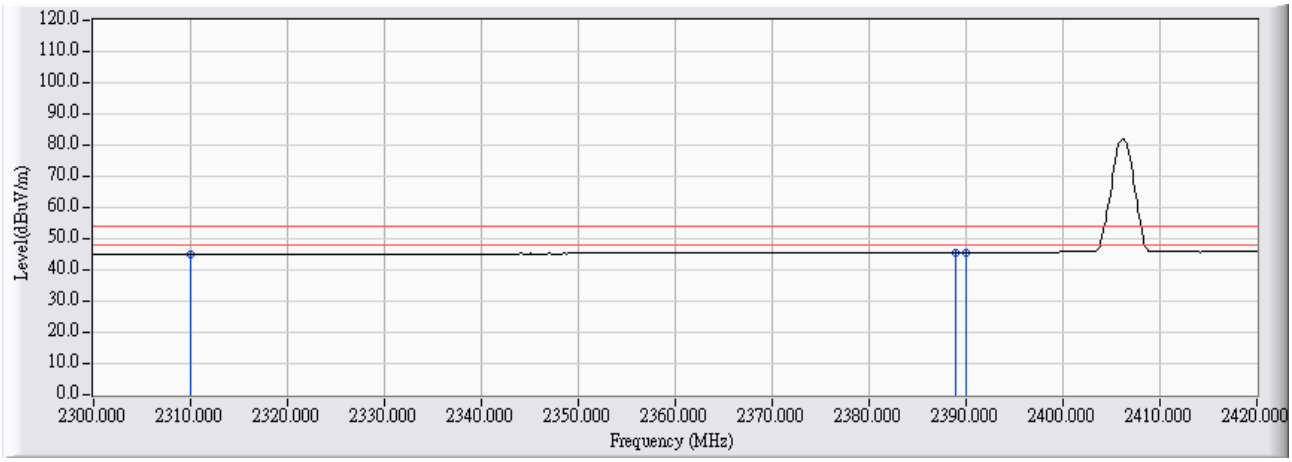


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	28.263	29.973	58.236	-15.764	74.000	PEAK
2	*	2326.520	28.327	30.682	59.010	-14.990	74.000	PEAK
3		2390.000	28.575	29.784	58.359	-15.641	74.000	PEAK

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. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2012/01/16 - 13:35**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode 1: Transmit_2406MHz**

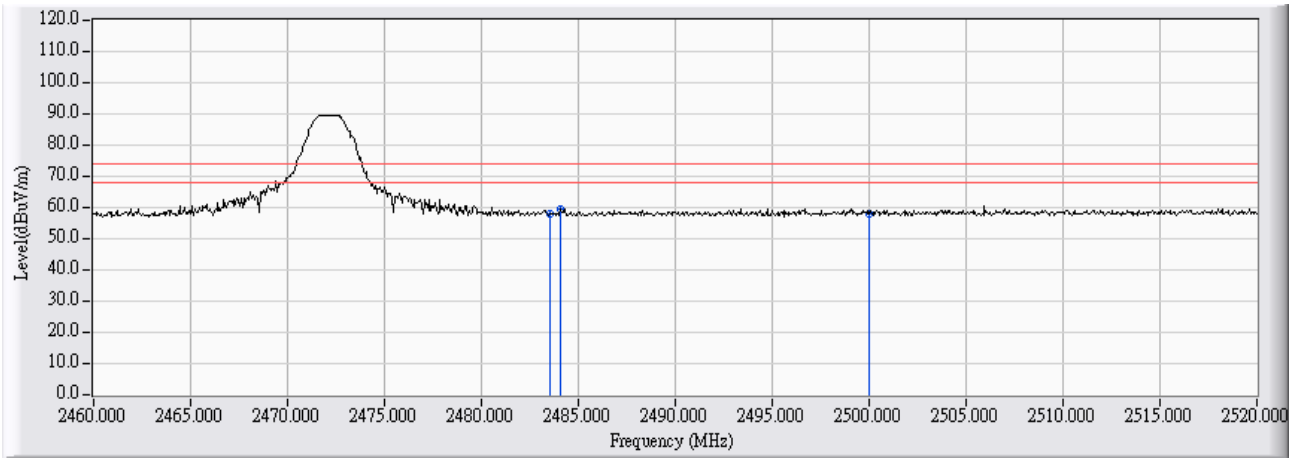


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2310.000	28.263	16.709	44.972	-9.028	54.000	AVERAGE
2		2388.920	28.571	17.080	45.651	-8.349	54.000	AVERAGE
3	*	2390.000	28.575	17.088	45.663	-8.337	54.000	AVERAGE

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. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2012/01/16 - 13:18**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode 1: Transmit_2472MHz**

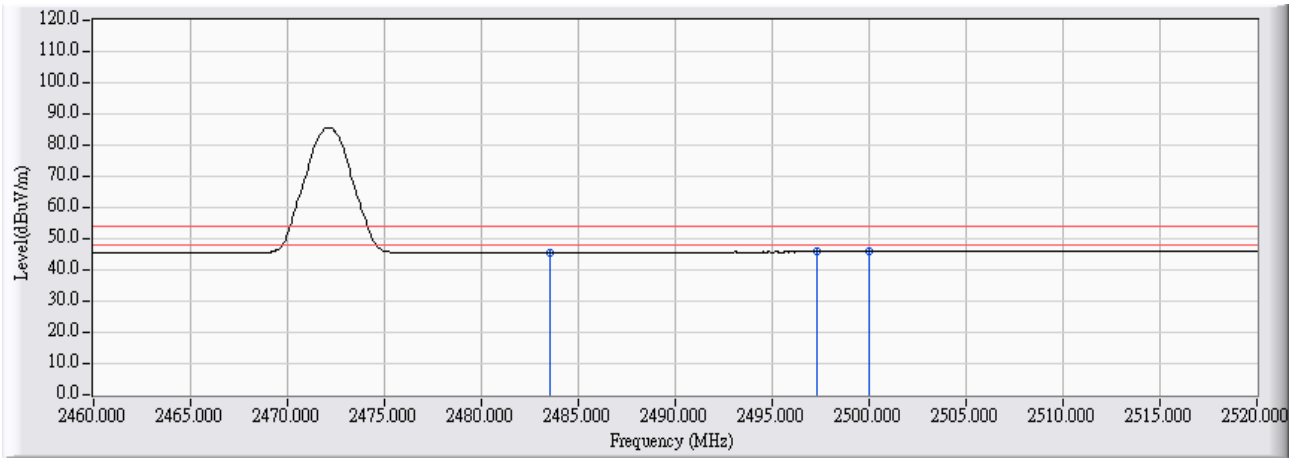


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2483.500	28.716	29.082	57.798	-16.202	74.000	PEAK
2	*	2484.060	28.716	30.547	59.264	-14.736	74.000	PEAK
3		2500.000	28.729	29.243	57.972	-16.028	74.000	PEAK

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. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2012/01/16 - 13:26**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - HORIZONTAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode 1: Transmit_2472MHz**

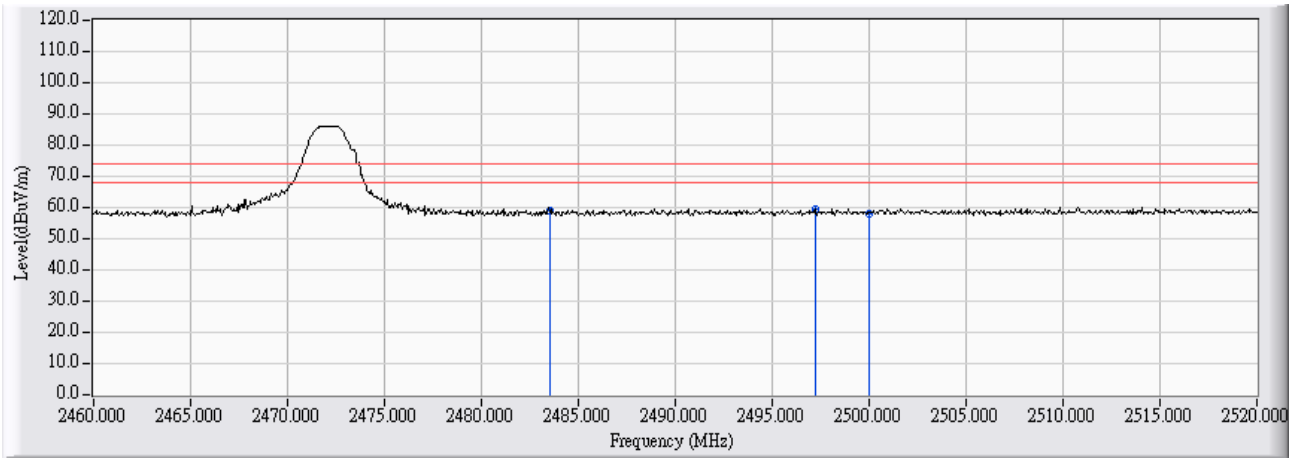


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2483.500	28.716	16.885	45.601	-8.399	54.000	AVERAGE
2		2497.320	28.727	17.076	45.803	-8.197	54.000	AVERAGE
3	*	2500.000	28.729	17.090	45.819	-8.181	54.000	AVERAGE

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. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2012/01/16 - 13:27**
Limit : FCC_SpartC_15.209_03M_PK	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode 1: Transmit_2472MHz**

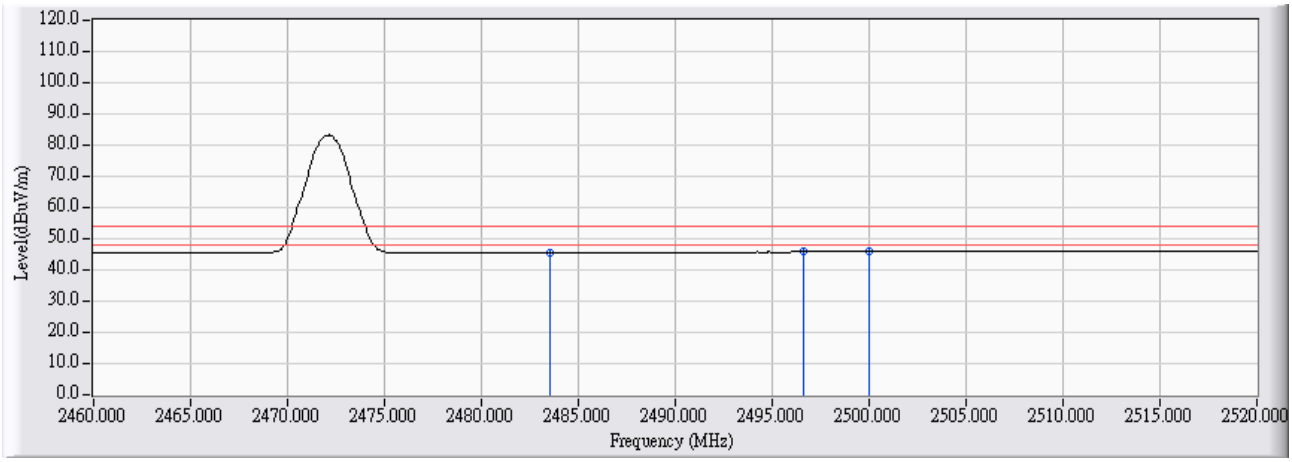


		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2483.500	28.716	30.331	59.047	-14.953	74.000	PEAK
2	*	2497.200	28.727	30.604	59.331	-14.669	74.000	PEAK
3		2500.000	28.729	29.456	58.185	-15.815	74.000	PEAK

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. If the readings given are average, peak measurement should also be supplied.

Site : CB1	**Time : 2012/01/16 - 13:30**
Limit : FCC_SpartC_15.209_03M_AV	**Margin : 6**
Probe : CB1_FCC_EFS_1-18G-1_0901 - VERTICAL	**Power : DC 5V**
EUT : Wire to Air	**Note : Mode 1: Transmit_2472MHz**



		Frequency (MHz)	Correct Factor (dB)	Reading Level (dBuV)	Measure Level (dBuV/m)	Margin (dB)	Limit (dBuV/m)	Detector Type
1		2483.500	28.716	16.896	45.612	-8.388	54.000	AVERAGE
2		2496.600	28.726	17.069	45.796	-8.204	54.000	AVERAGE
3	*	2500.000	28.729	17.098	45.827	-8.173	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. If the readings given are average, peak measurement should also be supplied.

7. Number of hopping frequency

7.1. Test Equipment

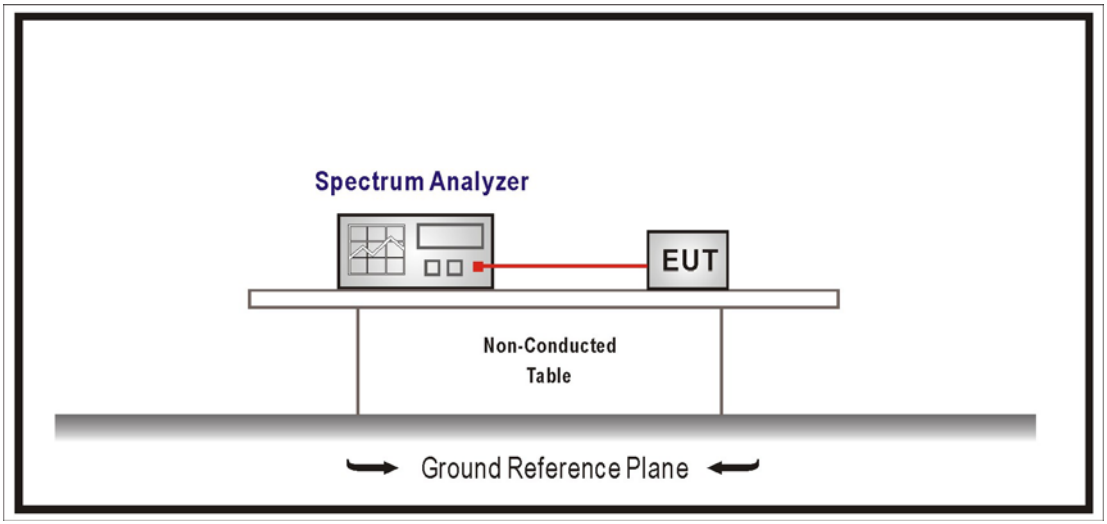
The following test equipment is used during the test:

Number of hopping frequency / No.7 Shielding Room

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2012/01/16

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

7.2. Test Setup



7.3. Limits

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.

For frequency hopping systems operating in the 2400-2483.5 MHz bands, which use fewer than 75 hopping frequencies, may employ intelligent hopping techniques to avoid interference to other transmissions. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 non-overlapping channels are used.

For frequency hopping systems operating in the 5725-5850 MHz band shall use at least 75 hopping frequencies.

7.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements

Span = the frequency band of operation

RBW ≥ 1% of the span ， VBW ≥ RBW

Sweep = auto, Detector function = peak, Trace = max hold

7.5. Test Specification

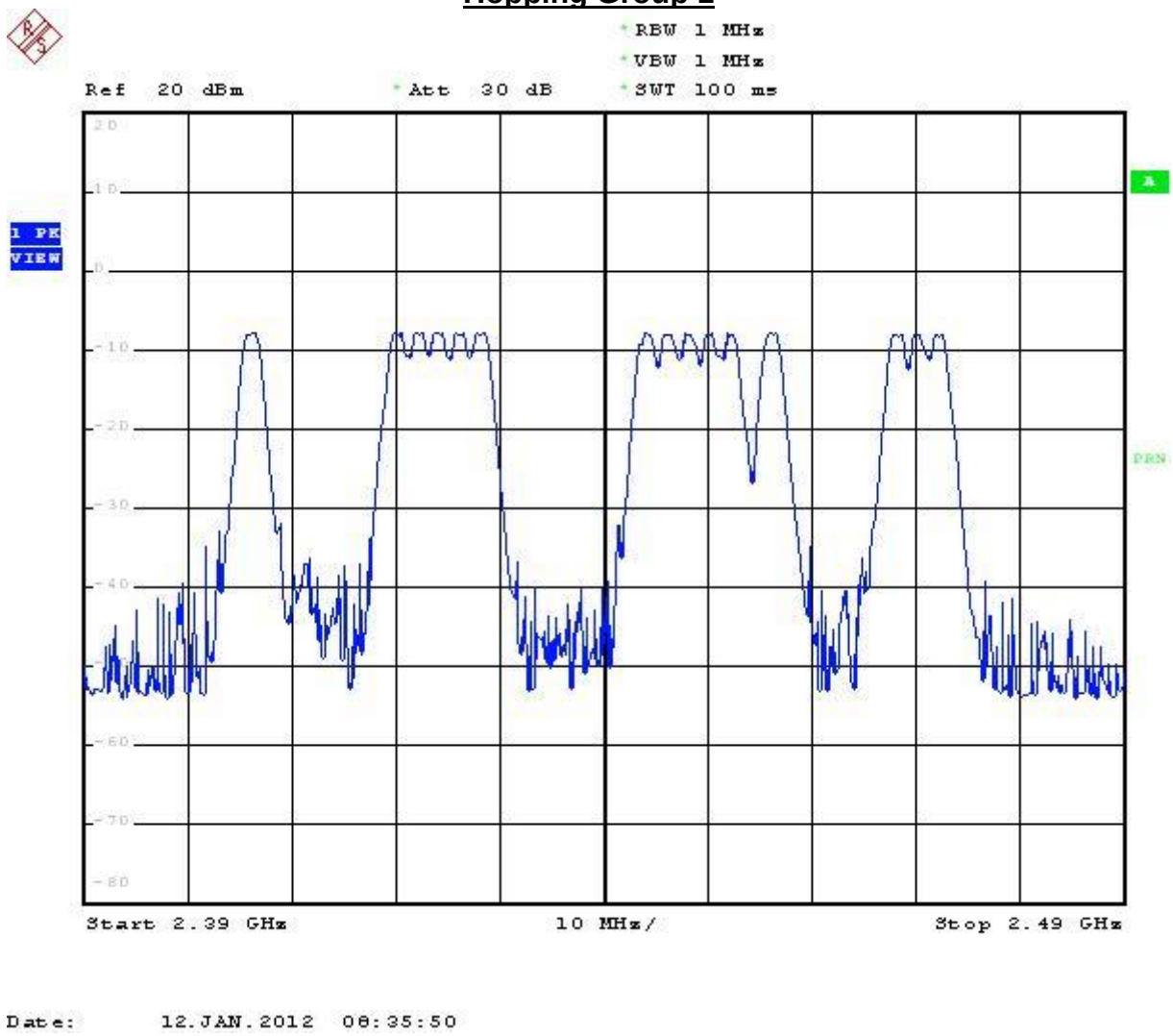
According to FCC Part 15 Subpart C Paragraph 15.247: 2010

7.6. Test Result

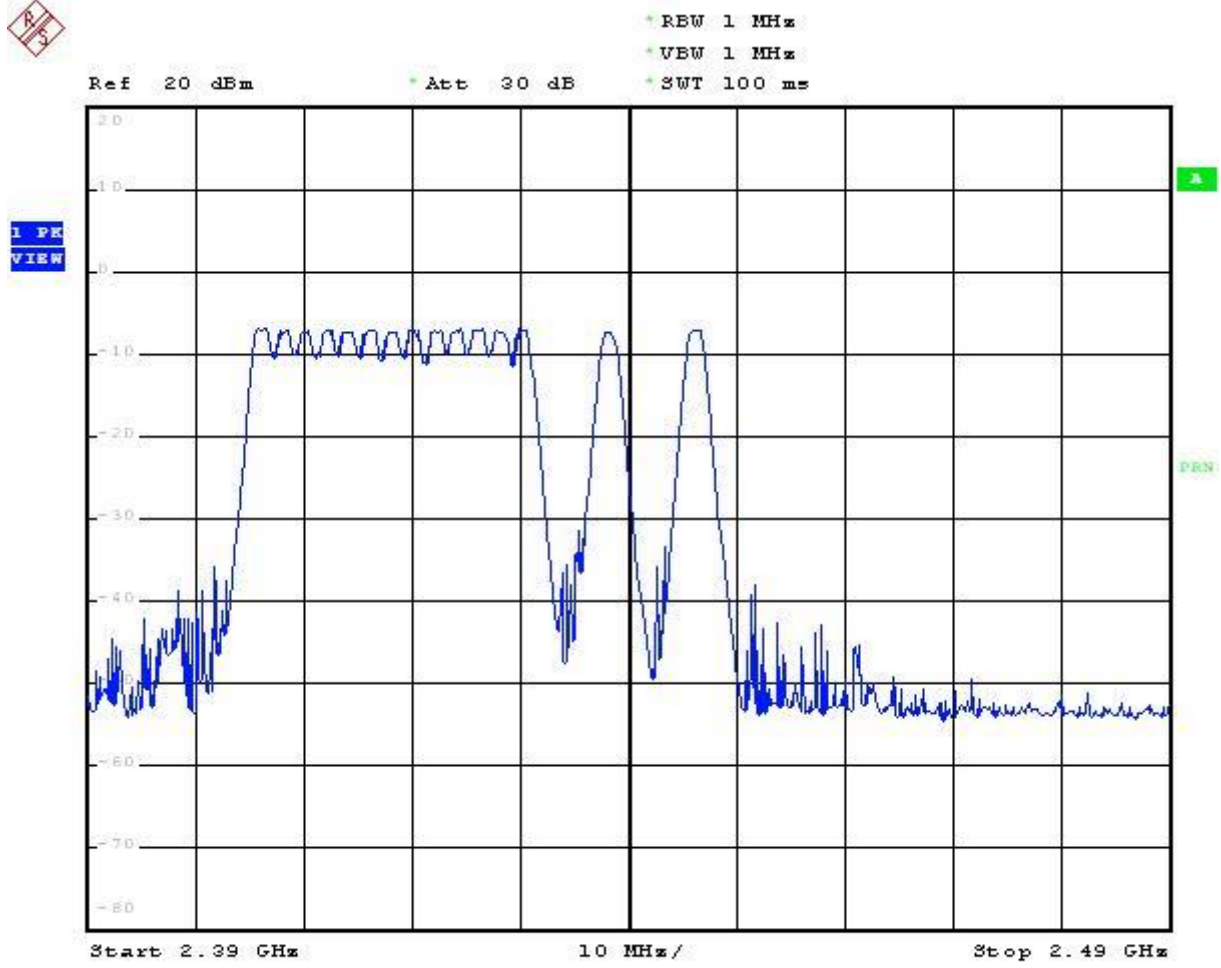
Product	Wire-to-Air		
Test Item	Number of hopping frequency		
Test Mode	Mode 1: Transmit		
Date of Test	2012/01/12	Test Site	No.7 Shielding Room

Frequency Range (MHz)	Measure Level (Channels)	Limit (Channels)	Result
2406 ~ 2472	15	≥15	Pass

Hopping Group 1

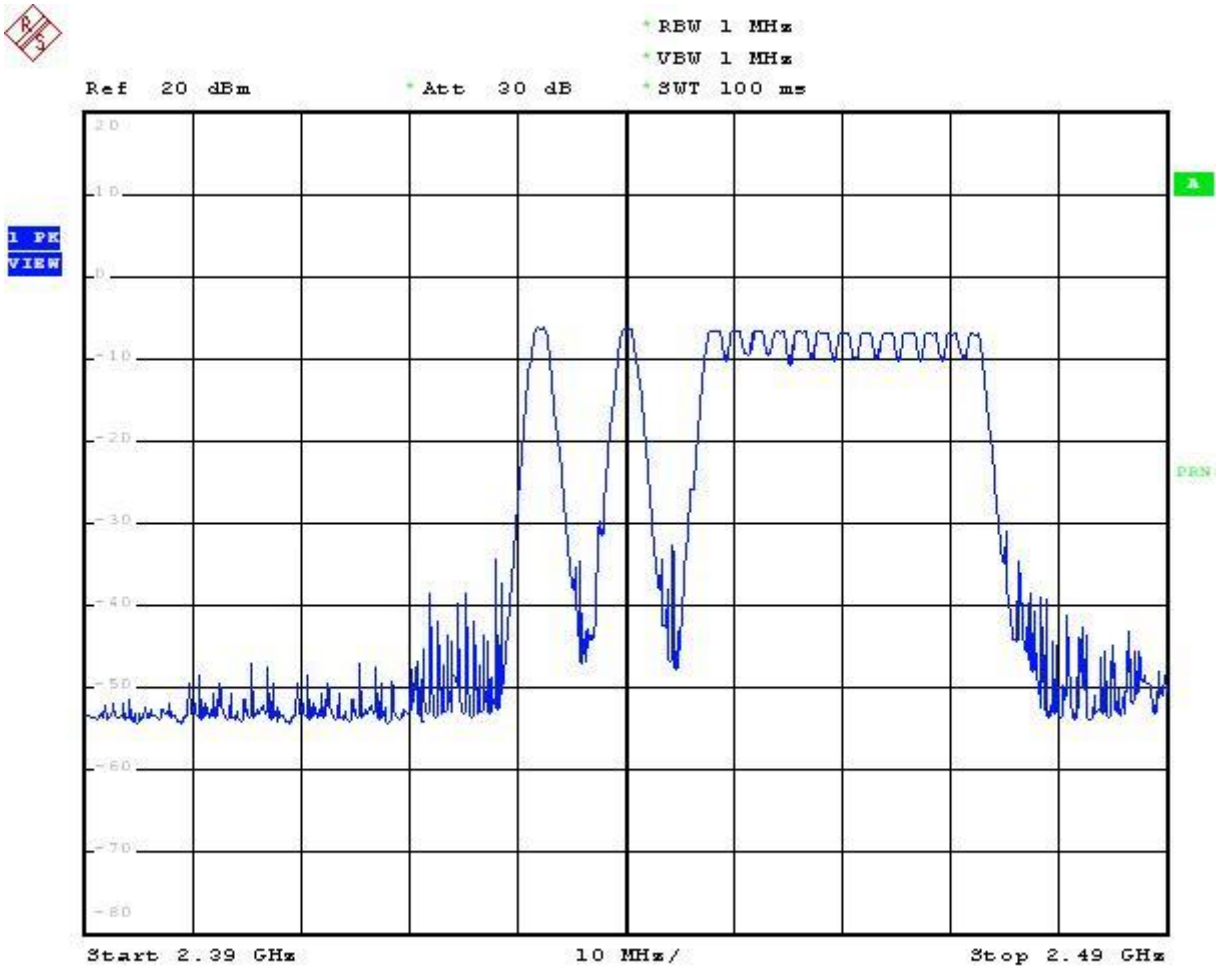


Hopping Group 2

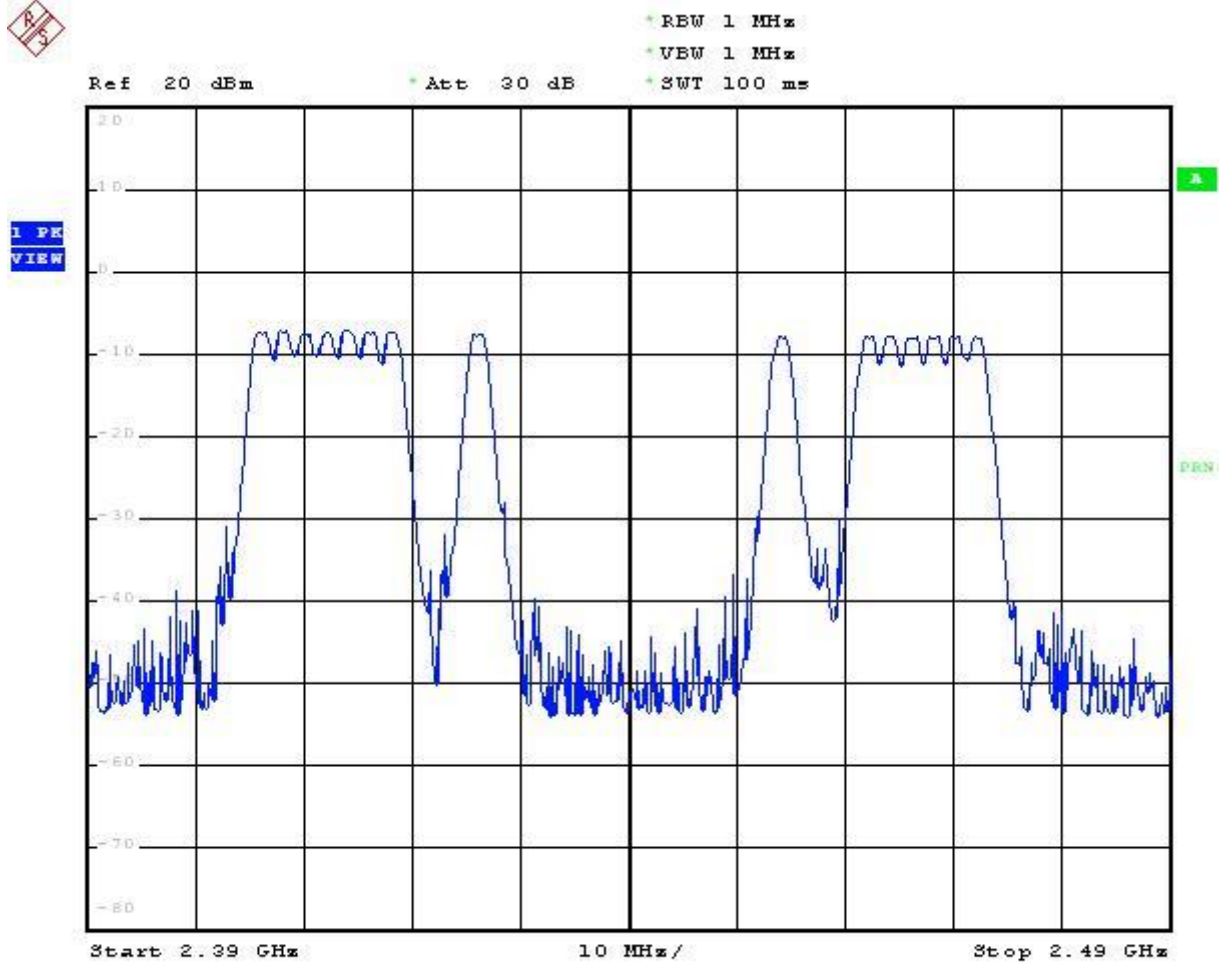


Date: 12.JAN.2012 08:37:55

Hopping Group 3



Hopping Group 4



Date: 12.JAN.2012 08:33:35

8. Channel Separation

8.1. Test Equipment

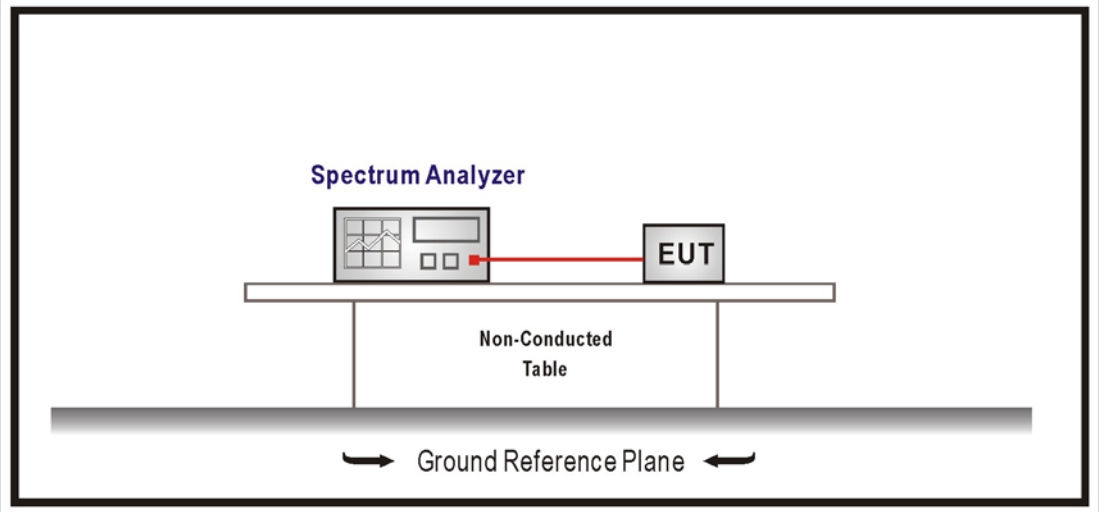
The following test equipment is used during the test:

Channel Separation / No.7 Shielding Room

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2013/01/16

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

8.2. Test Setup



8.3. Limits

For frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.

8.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements

Span = wide enough to capture the peaks of two adjacent channels

Resolution Bandwidth (RBW) ≥ 1% of the span, VBW ≥ RBW

Sweep = auto, Detector function = peak, Trace = max hold

8.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2010

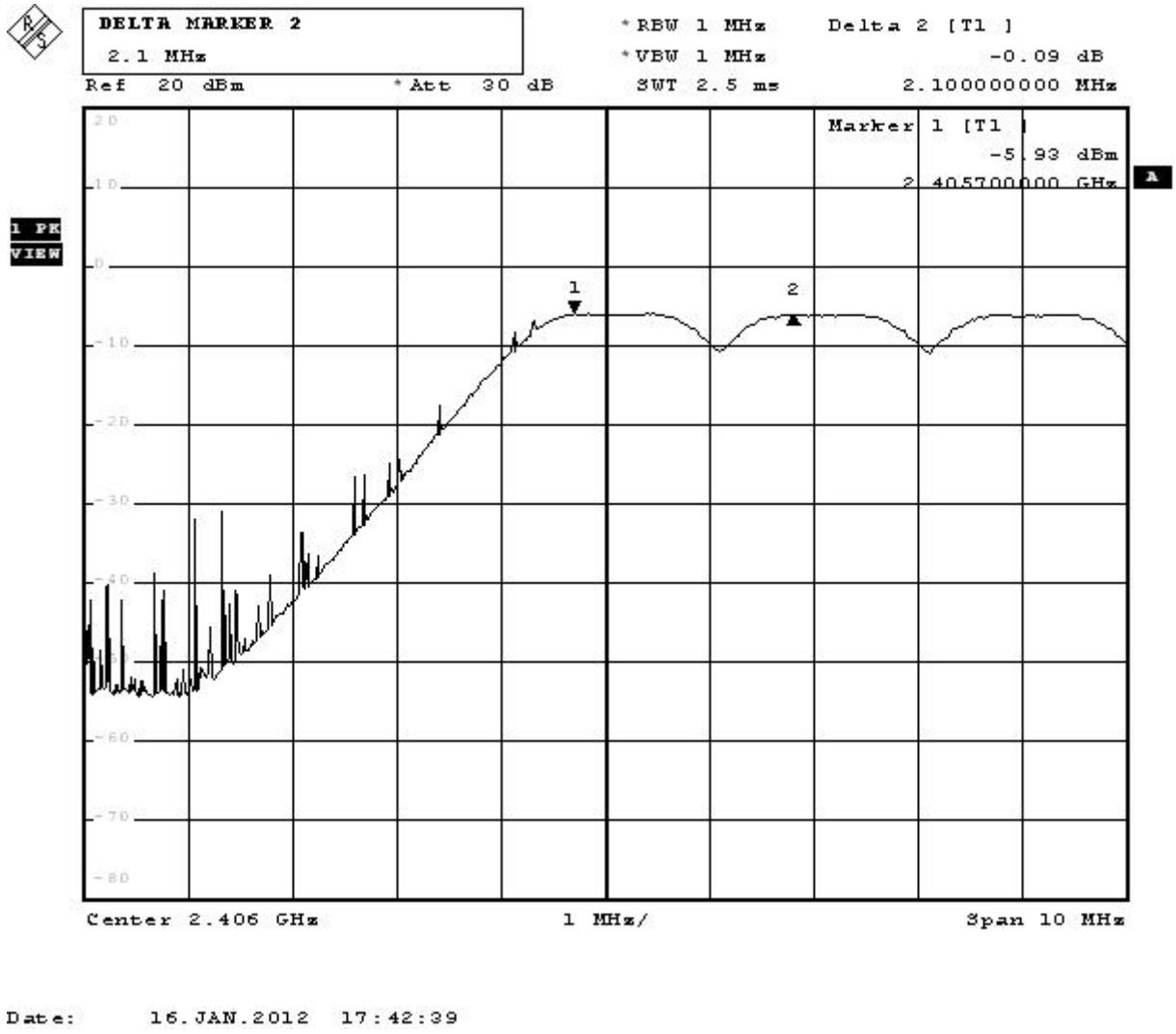
8.6. Test Result

Product	Wire-to-Air		
Test Item	Channel Separation		
Test Mode	Mode 1: Transmit		
Date of Test	2012/01/16	Test Site	No.7 Shielding Room

GFSK

Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
01	2406	2.10	>1.38	Pass

Channel 01

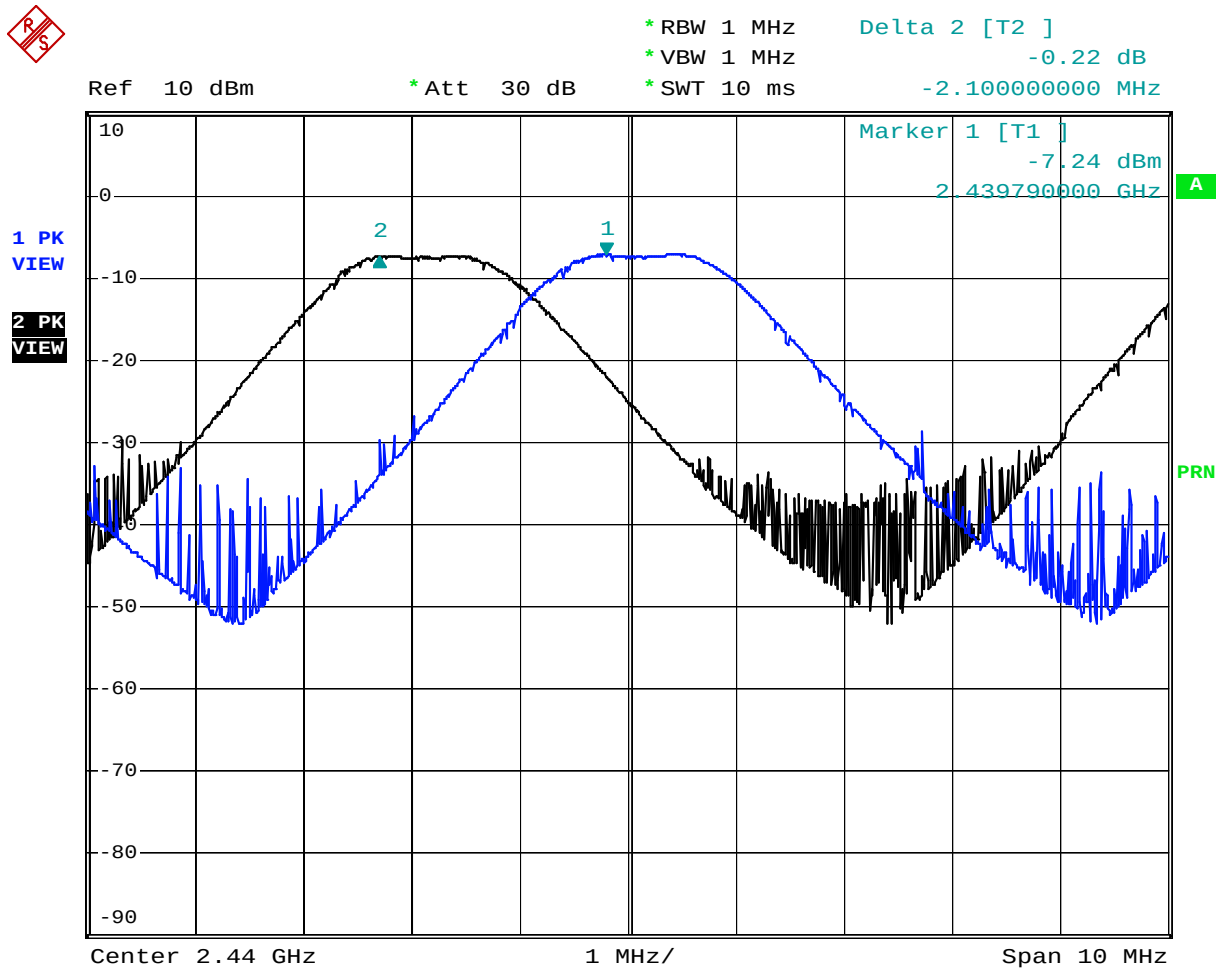


Product	Wire-to-Air		
Test Item	Channel Separation		
Test Mode	Mode 1: Transmit		
Date of Test	2012/01/16	Test Site	No.7 Shielding Room

GFSK

Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
16	2440	2.10	>1.39	Pass

Channel 16

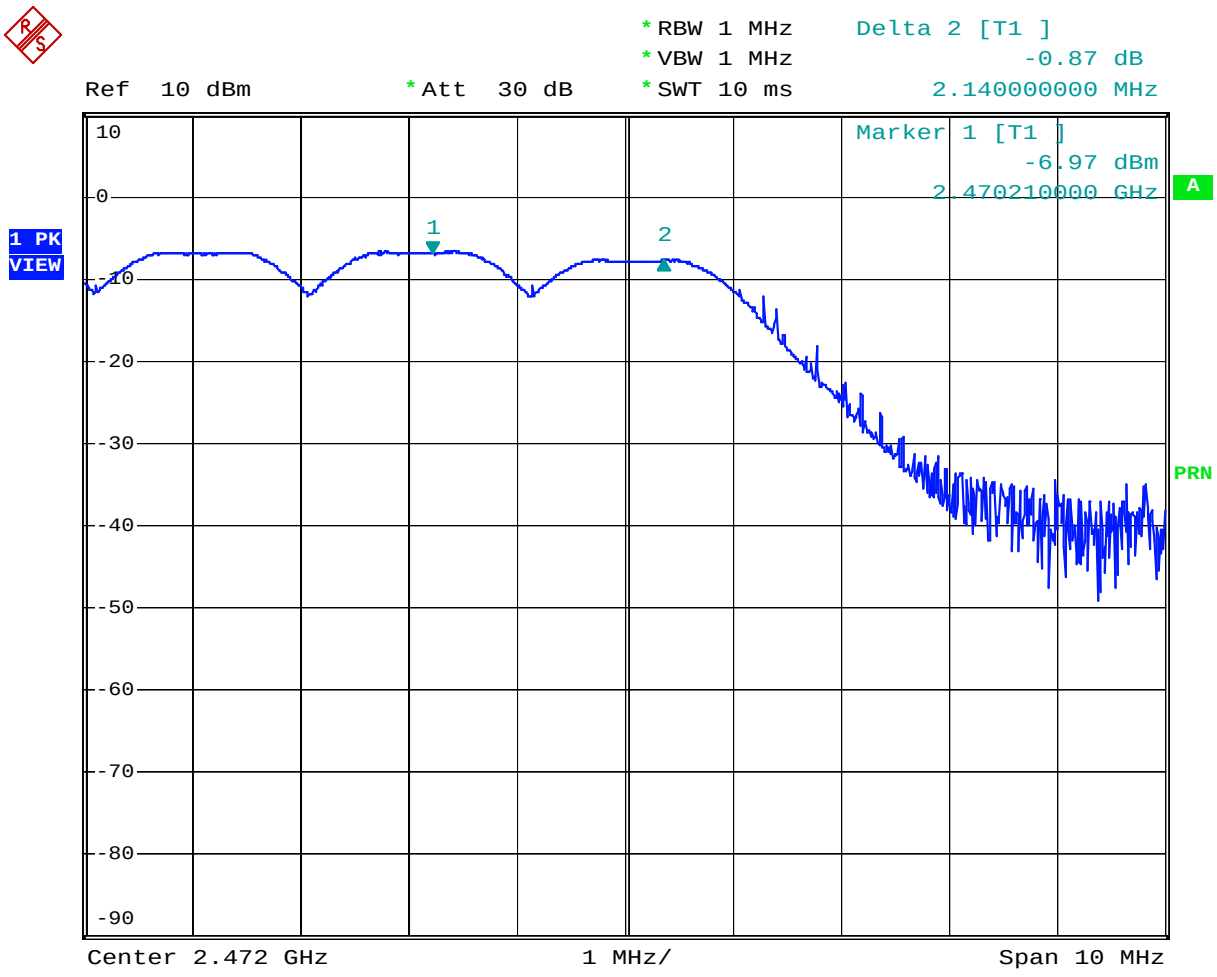


Product	Wire-to-Air		
Test Item	Channel Separation		
Test Mode	Mode 1: Transmit		
Date of Test	2012/01/16	Test Site	No.7 Shielding Room

GFSK

Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
31	2472	2.14	>1.42	Pass

Channel 31



Comment: A:\2
Date: 16.JAN.2012 17:50:04

9. Occupied Bandwidth

9.1. Test Equipment

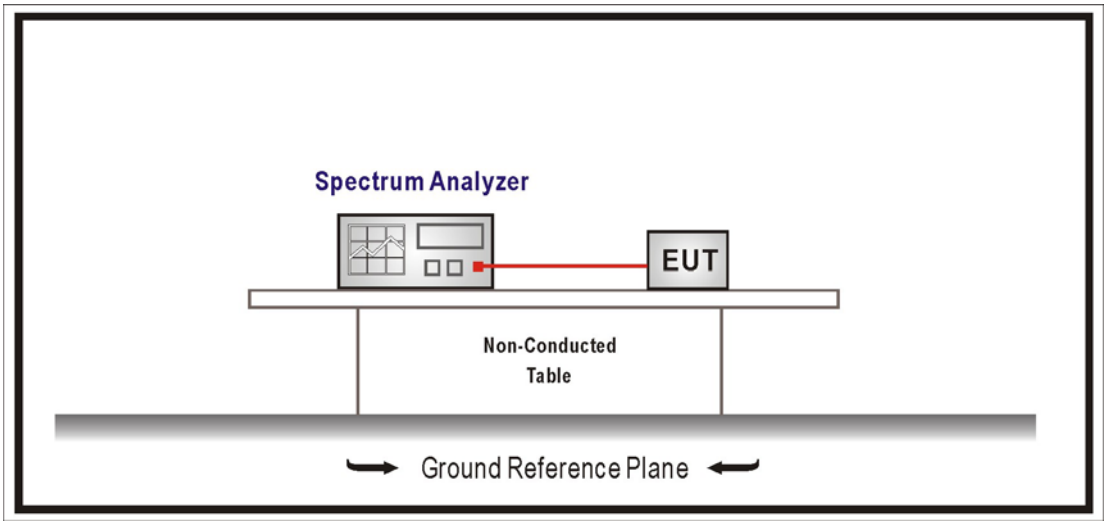
The following test equipment is used during the test:

Occupied Bandwidth / No.7 Shielding Room

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2013/01/16

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

9.2. Test Setup



9.3. Limits

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period. The maximum allowed 20 dB bandwidth of the hopping channel is 500 kHz.
For frequency hopping systems operating in the 5725-5850 MHz bands. The maximum 20 dB bandwidth of the hopping channel is 1 MHz.
For frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater.

9.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements
Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 20 dB bandwidth, centered on a hopping channel
RBW ≥ 1% of the 20 dB bandwidth, VBW ≥ RBW
Sweep = auto, Detector function = peak, Trace = max hold
The EUT should be transmitting at its maximum data rate.

9.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2010

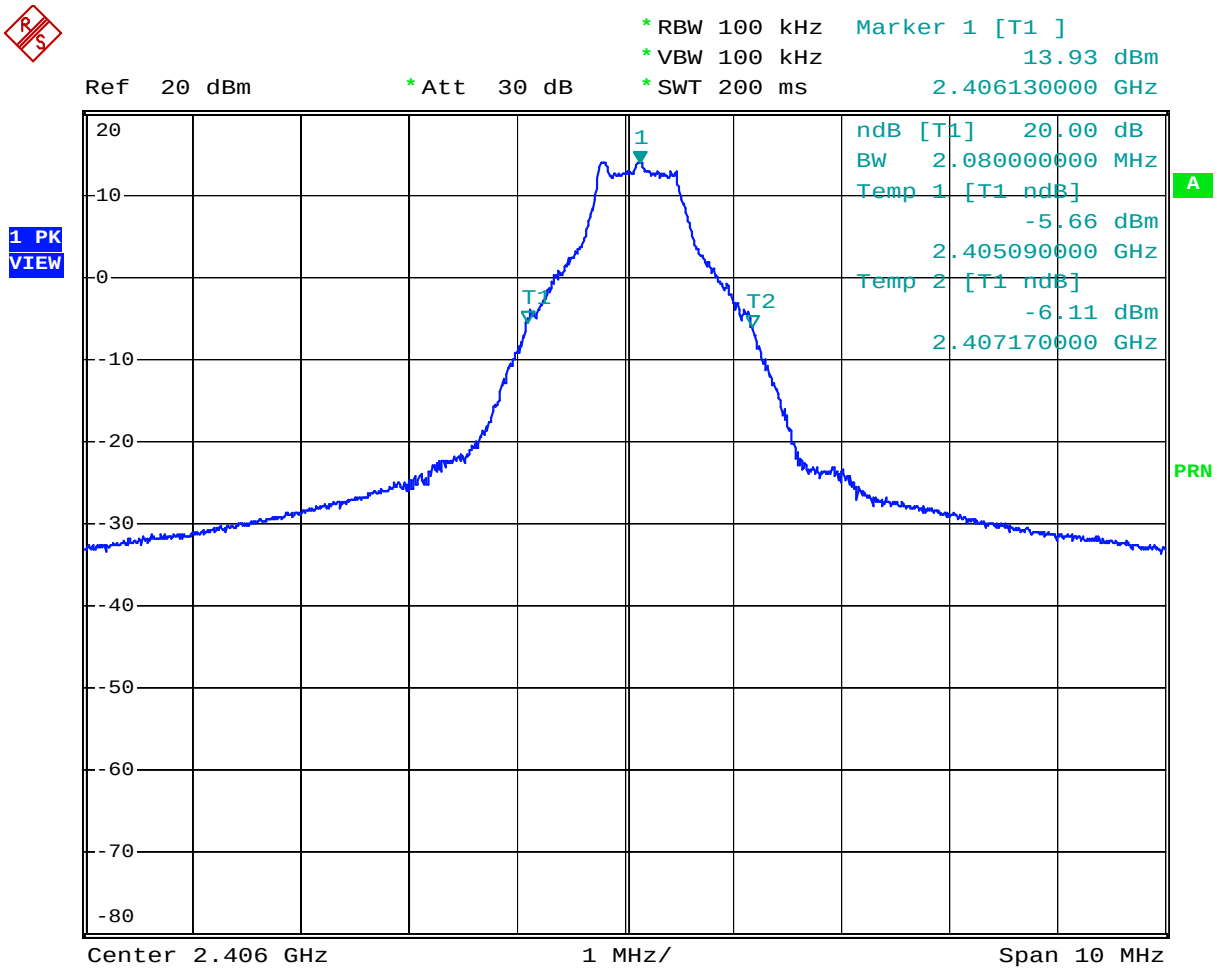
9.6. Test Result

Product	Wire-to-Air		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2012/01/16	Test Site	No.7 Shielding Room

GFSK

Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
01	2406	2.08	--	Pass

Channel 01



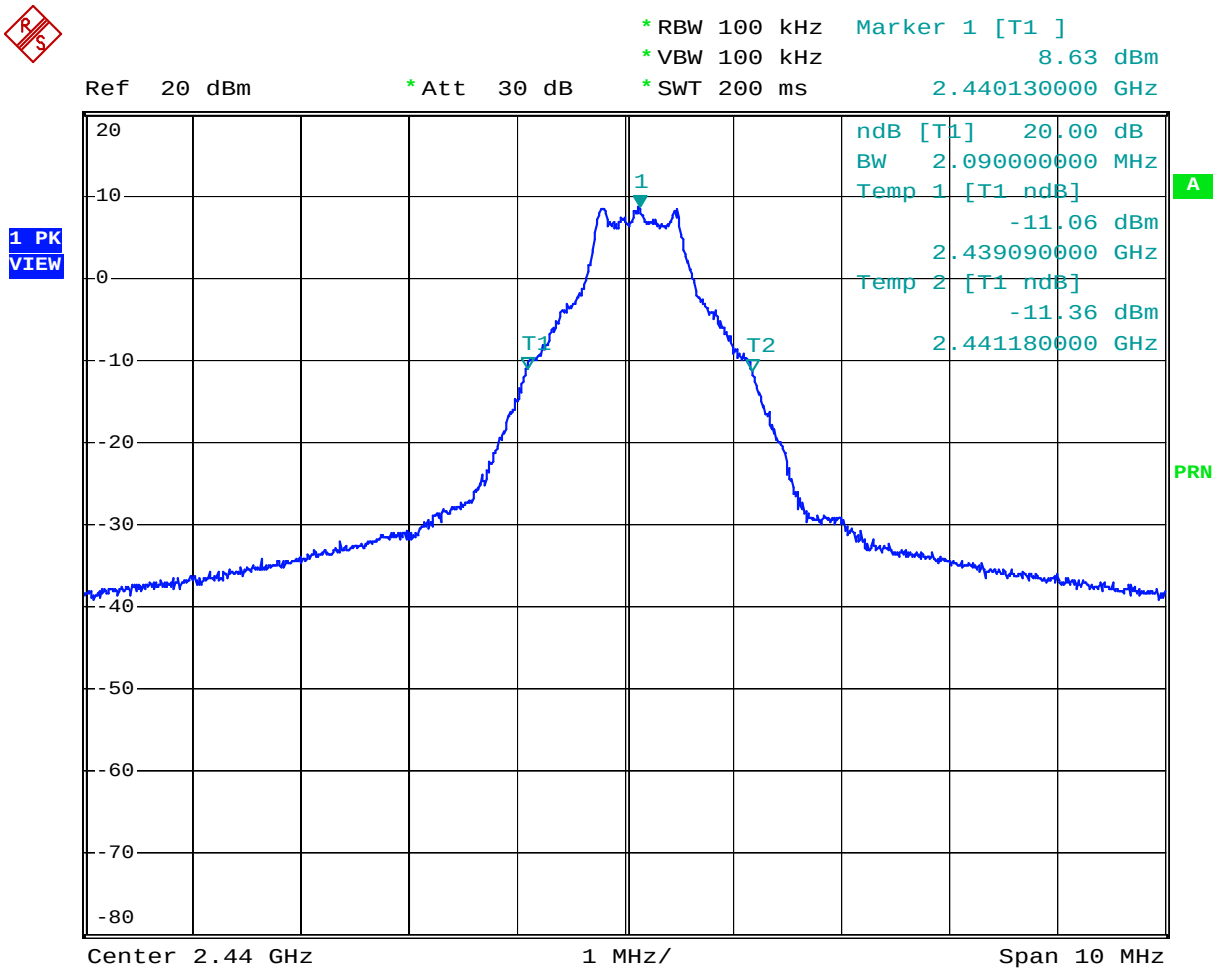
Comment: A:\2
Date: 16.JAN.2012 16:44:13

Product	Wire-to-Air		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2012/01/16	Test Site	No.7 Shielding Room

GFSK

Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
16	2440	2.09	--	Pass

Channel 16



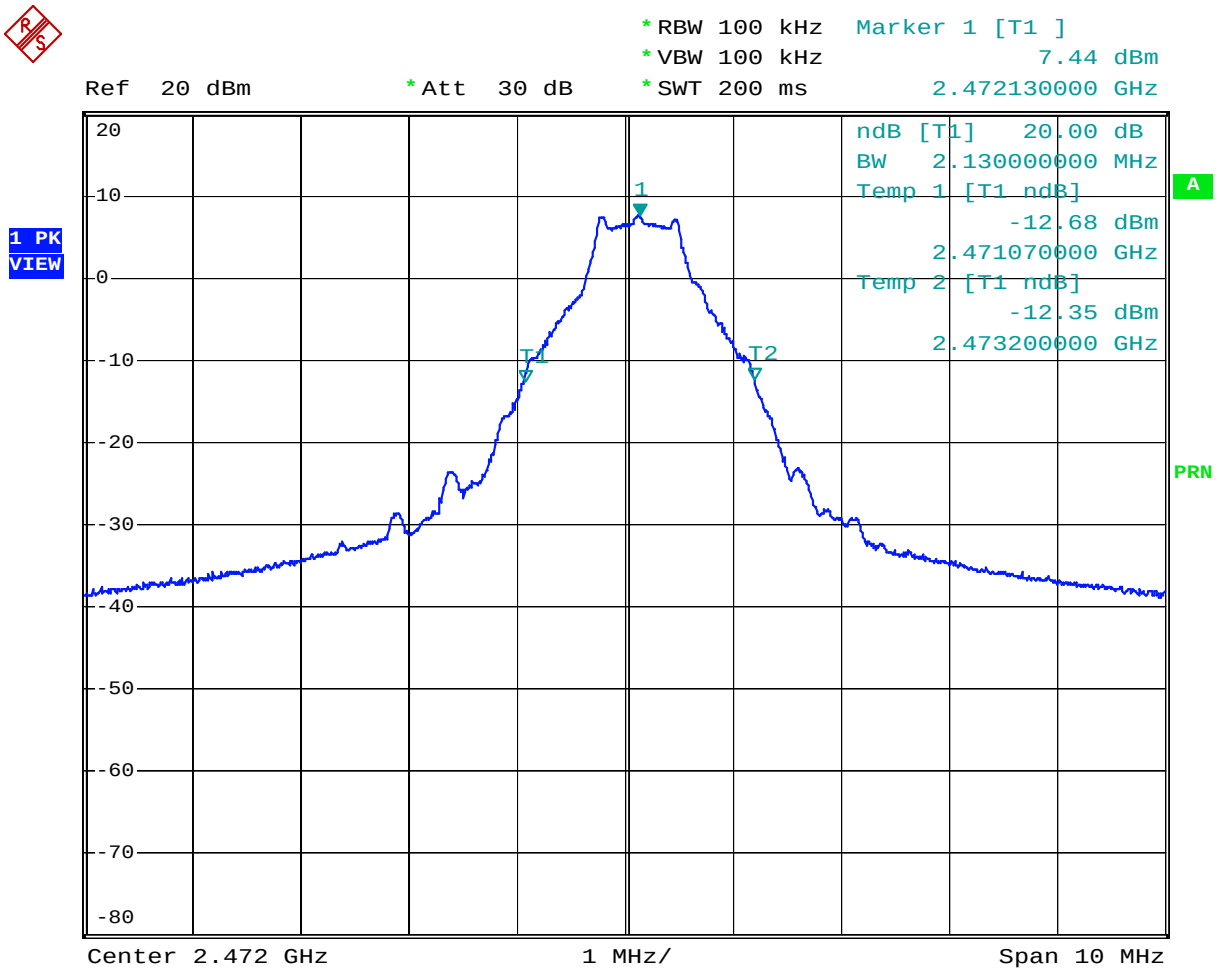
Comment: A:\2
Date: 16.JAN.2012 16:54:14

Product	Wire-to-Air		
Test Item	Occupied Bandwidth		
Test Mode	Mode 1: Transmit		
Date of Test	2012/01/16	Test Site	No.7 Shielding Room

GFSK

Channel No.	Frequency (MHz)	Measure Level (MHz)	Limit (MHz)	Result
31	2472	2.13	--	Pass

Channel 31



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Date: 16.JAN.2012 17:03:12

10. Dwell Time

10.1. Test Equipment

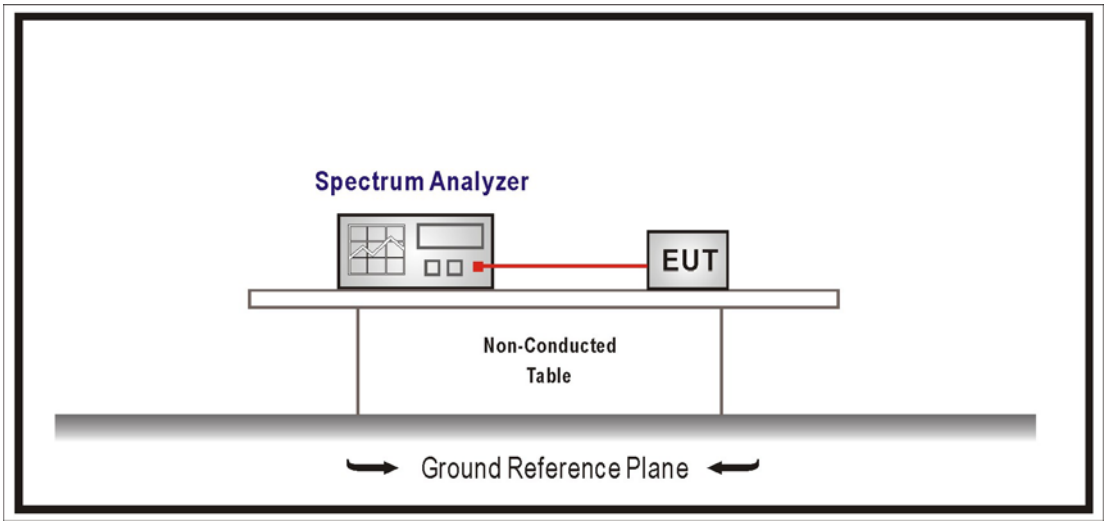
The following test equipment is used during the test:

Dwell Time / SR7

Instrument	Manufacturer	Model No.	Serial No	Next Cal. Date
Spectrum Analyzer	R&S	FSP	100561	2012/01/16

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

10.2. Test Setup



10.3. Limits

For frequency hopping systems operating in the 902-928 MHz band: if the 20 dB bandwidth of the hopping channel is less than 250 kHz, the system shall use at least 50 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 20 second period; if the 20 dB bandwidth of the hopping channel is 250 kHz or greater, the system shall use at least 25 hopping frequencies and the average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 10 second period.
For frequency hopping systems operating in the 2400-2483.5 MHz bands. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.
For frequency hopping systems operating in the 5725-5850 MHz bands. The average time of occupancy on any frequency shall not be greater than 0.4 seconds within a 30 second period.

10.4. Test Procedures

The EUT was setup according to ANSI C63.4, 2009 and tested according to FHSS test procedure of FCC Public Notice DA 00-705 for compliance to FCC 47CFR 15.247 requirements
Span = zero span, centered on a hopping channel
RBW = 1 MHz, VBW ≥ RBW
Sweep = as necessary to capture the entire dwell time per hopping channel
Detector function = peak, Trace = max hold

10.5. Test Specification

According to FCC Part 15 Subpart C Paragraph 15.247: 2010

10.6. Test Result

Product	Wire-to-Air		
Test Item	Dwell Time		
Test Mode	Mode 1: Transmit		
Date of Test	2012/01/12	Test Site	No.7 Shielding Room

Occupancy Time of Frequency Hopping System

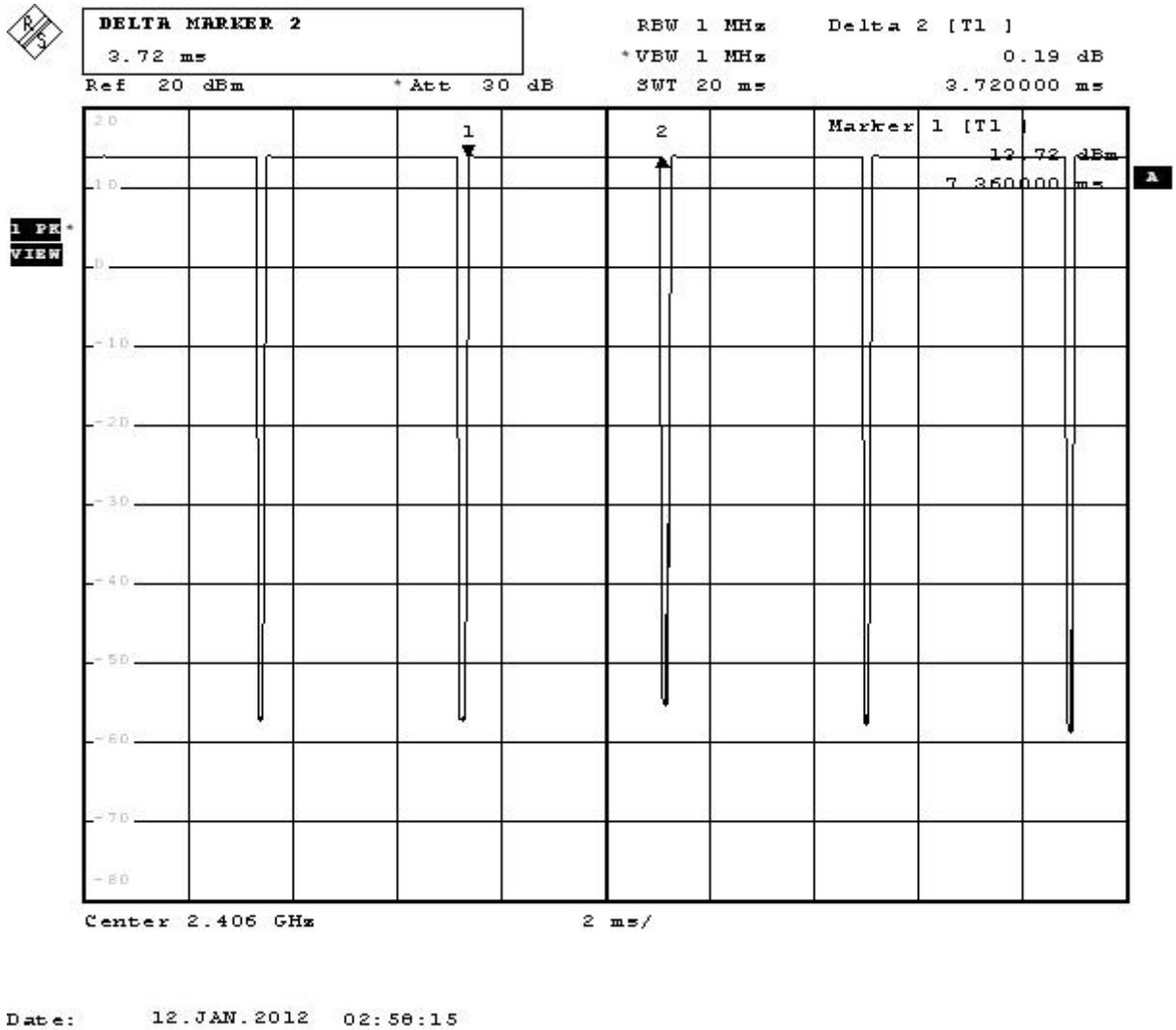
A) 2406MHz Test Time Period: 0.4*15=6sec，Hopping Times Within 1sec: 5/20msec=250 /sec
The Maximum Occupancy Time Within 10sec: 0.00372*(250/15)*6=0.372 sec。

B) 2440MHz Test Time Period: 0.4*15=6sec，Hopping Times Within 1sec: 5/20msec=250 /sec
The Maximum Occupancy Time Within 10sec: 0.00372*(250/15)*6=0.372 sec。

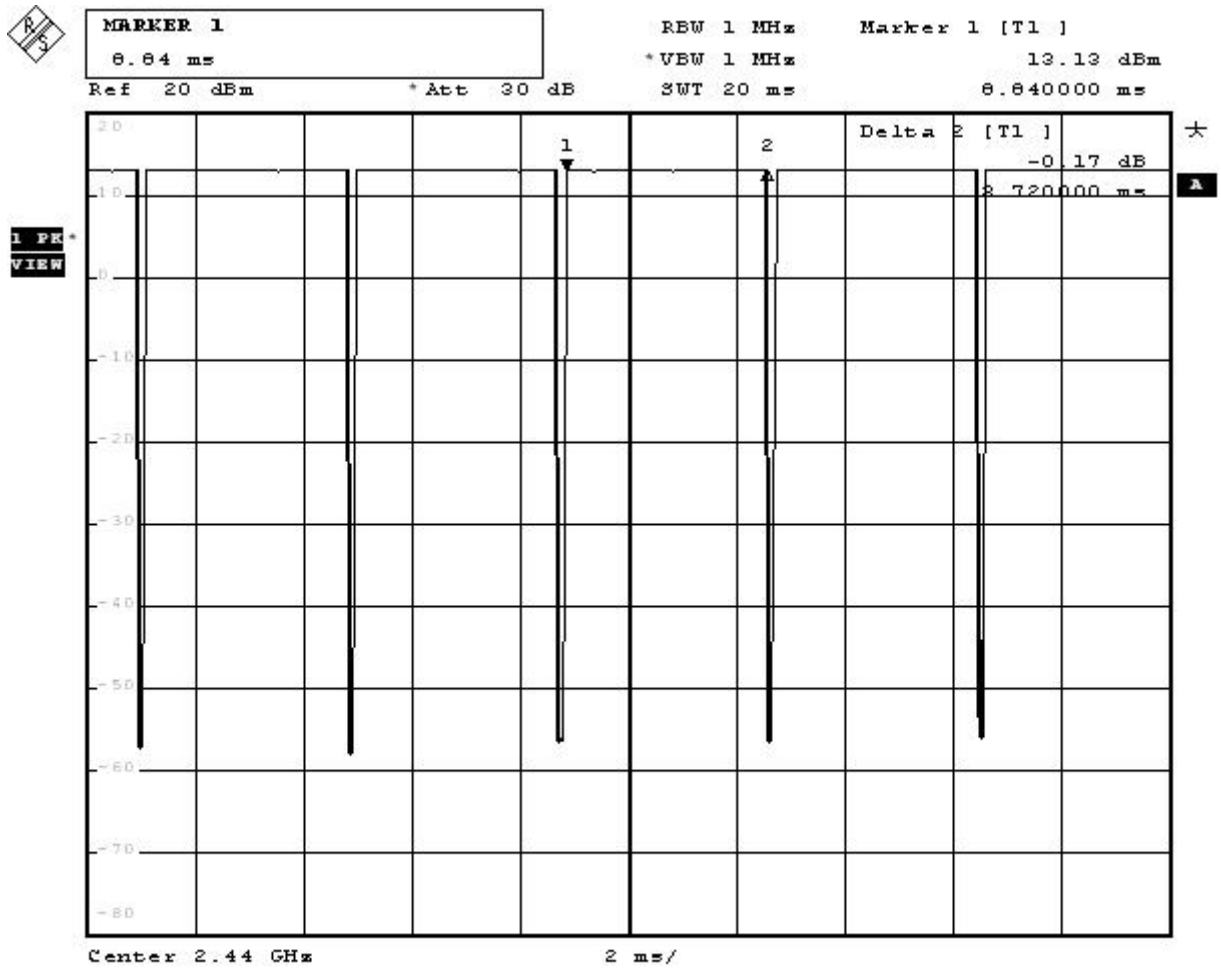
C) 2472MHz Test Time Period: 0.4*15=6sec，Hopping Times Within 1sec: 5/20msec=250 /sec
The Maximum Occupancy Time Within 10sec: 0.00372*(250/15)*6=0.372 sec。

Test Result: The Average Occupancy Time of Each Highest，Middle and Lowest Channel Is Less Than 0.4sec，And Corresponds to The Standard。

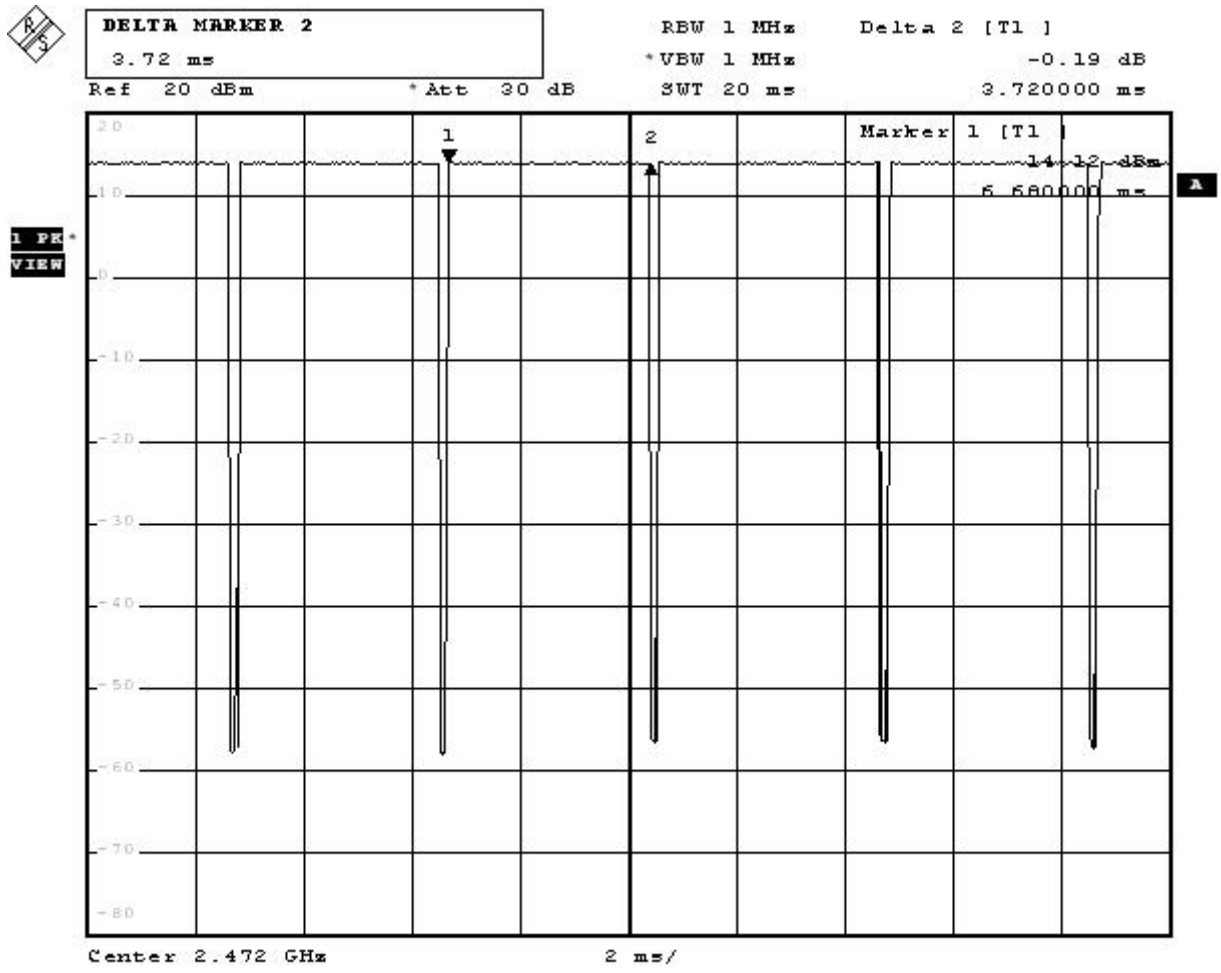
Hop rate-2406MHz



Hop rate-2440MHz



Hop rate-2472MHz



Date: 12.JAN.2012 02:57:09

Note: Dwell time＝time slot length * hop rate / number of hopping channels * period