APPLICATION FOR CERTIFICATION

On Behalf of

FUTABA Corporation

Radio Control

Model No.：FHSS3-2.4G

FCC ID：AZPFHSS3-24G

Brand: Futaba

Prepared for : FUTABA Corporation
1080 Yabutsuka Chosei-son Chosei-gun
Chiba, 299-4395 Japan.

Prepared by : AUDIX Technology Corporation
EMC Department
No. 53-11, Tin-Fu Tsun, Lin-Kou Hsiang,
Taipei Hsien, Taiwan

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File Number	:	C1M1102110
Report Number	:	EM-F10000214
Date of Test	:	Feb. 17 ~ Mar. 14, 2011
Date of Report	:	Mar. 14, 2011

TABLE OF CONTENTS

TEST REPORT CERTIFICATION

Applicant	:	FUTABA Corporation
Manufacturer	:	FUTABA Corporation
EUT Description	:	Radio Control
FCC ID	:	AZPFHSS3-24G
		(A) Model No. : FHSS3-2.4G
		(B) Serial No. : N/A
		(C) Brand : Futaba
		(D) Power Supply : DC 6V Powered by Radio Control
		(E) Test Voltage : DC 6V (Via Powered by Radio Control)

Measurement Procedure Used:

FCC RULES AND REGULATIONS PART 15 SUBPART C, Oct. 2009
AND ANSI C63.4/2003

(FCC CFR 47 Part 15C, §15.207 and §15.209 and §15.247)

The device described above was tested by AUDIX Technology Corporation to determine the maximum emission levels emanating from the device. The maximum emission levels were compared to the FCC Part 15 subpart B & C limits.

The measurement results are contained in this test report and AUDIX Technology Corporation is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the FCC official limits.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX Technology Corporation.

Date of Test : Feb. 17 ~ Mar. 14, 2011 Date of Report : Mar. 14, 2011

Producer : _____
(Tina Huang/Administrator)

Reviewer : _____
(Henning Chang/Supervisor)

Signatory : _____
(Ben Cheng/Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Radio Control (RF Module)
Model Number	:	FHSS3-2.4G
Serial Number	:	N/A
FCC ID	:	AZPFHSS3-24G
Applicant	:	FUTABA Corporation 1080 Yabutsuka Chosei-son Chosei-gun Chiba, 299-4395 Japan.
Manufacturer	:	FUTABA Corporation 1080 Yabutsuka Chosei-son Chosei-gun Chiba, 299-4395 Japan.
Radio Technology	:	FHSS Modulation
Frequency Band	:	2404.000MHz ~ 2447.500MHz
Tested Frequency	:	2404.000MHz (Channel 01) 2425.00MHz (Channel 15) 2447.500MHz (Channel 30)
Frequency Channel	:	30 channels
Antenna (Pencil Antenna)	:	Antenna Gain: 2.0dBi
Date of Receipt of Sample	:	Feb. 10, 2011
Date of Test	:	Feb. 17 ~ Mar. 14, 2011

Remark: The EUT is tested within T6J-2.4G Radio Control.

1.2. Description of Test Facility

Name of Firm	:	**AUDIX Technology Corporation** **EMC Department** No. 53-11, Tin-Fu Tsun, Lin-Kou Hsiang, Taipei Hsien, Taiwan
Test Location & Facility (AC)	:	**Semi-Anechoic Chamber** No. 53-11, Tin-Fu Tsun, Lin-Kou Hsiang, Taipei Hsien, Taiwan. May 14, 2009 Renewal on Federal Communication Commission Registration Number: 90993
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	:	1724

1.3. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Radiation Test (Distance: 3m)	30MHz~300MHz	±2.91dB
	300MHz~1000MHz	±2.94dB
	Above 1GHz	± 5.02dB

Remark **:** Uncertainty = $ku_c(y)$

Test Item	Uncertainty
20dB Bandwidth	± 0.2kHz
Carrier Frequency Separation	± 0.2kHz
Time Of Occupancy	± 0.03sec
Maximum peak Output power	± 0.52dBm
Emission Limitations	± 0.13dB
Band Edges	± 0.13dB

2. CONDUCTED EMISSION MEASUREMET

【The EUT only employs battery power for operation, no conductive emission limits are required according to FCC Part 15 Section §15.207】

3. RADIATED EMISSION MEASUREMENT

3.1. Test Equipment

The following test equipment was used during the radiated emission measurement:

3.1.1. For Frequency Range 30MHz~1000MHz (at Semi-Anechoic Chamber)

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 04, 10’	Aug. 03, 11’
2.	Test Receiver	R & S	ESCS30	100265	Sep. 01, 10’	Aug. 31, 11’
3.	Pre-Amplifier	HP	8447D	2944A06305	Feb. 10, 11’	Feb. 09, 12’
4.	Biconical Antenna	CHASE	VBA6106A	1264	Mar. 13, 10’	Mar. 12, 11’
5.	Log Periodic Antenna	Schwarzbeck	UHALP9108-A	0810	Mar. 13, 10’	Mar. 12, 11’

3.1.2. For Frequency Above 1GHz (at Semi-Anechoic Chamber)

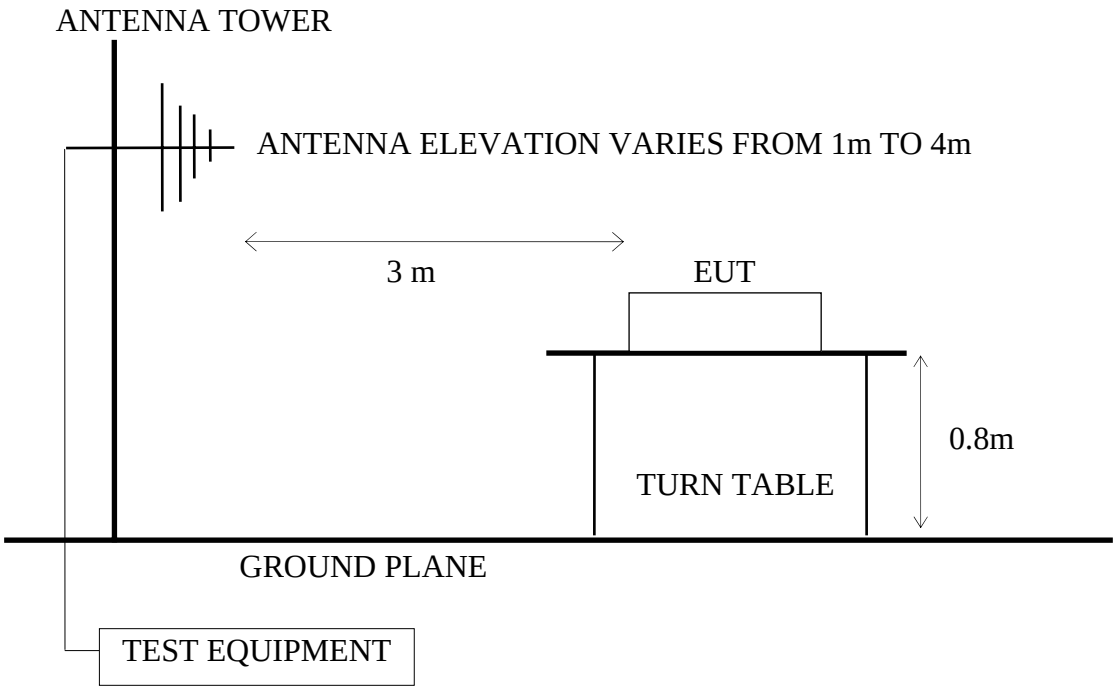
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 04, 10’	Aug. 03, 11’
2.	Pre-Amplifier	HP	8449B	3008A00529	Dec. 10, 10’	Dec. 09, 11’
3.	2.4GHz Notch Filter	EWT	EWT-14-0070-R1	G2	Dec. 04, 10’	Dec. 03, 11’
4.	3.5G High Pass Filter	HP	84300-80038	005	Jan. 05, 11’	Jan. 04, 12’
5.	Horn Antenna	EMCO	3115	9112-3775	May 10, 10’	May 09, 11’
6.	Horn Antenna	EMCO	3116	2653	Oct. 04, 10’	Oct. 03, 11’

3.2. Test Setup

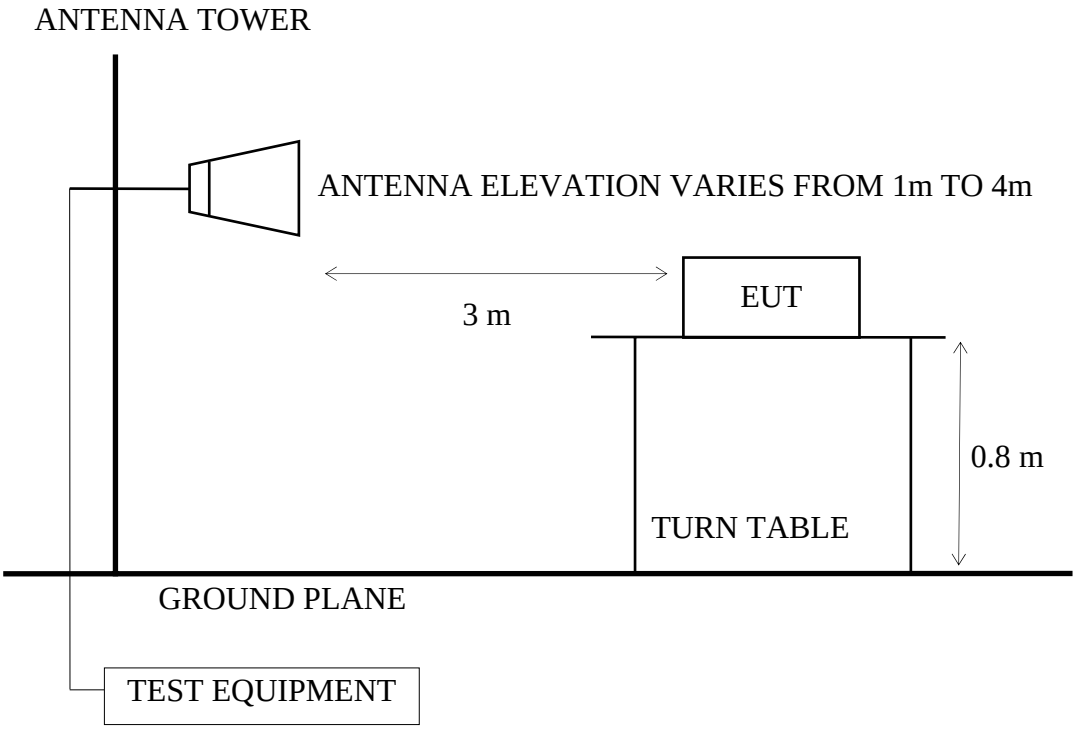
3.2.1. Block Diagram of connection between EUT and simulators

RADIO CONTROL (EUT)

3.2.2. Semi-Anechoic Chamber (3m) Setup Diagram for 30-1000MHz



3.2.3. Semi-Anechoic Chamber (3m) Setup Diagram for above 1GHz



3.3. Radiated Emission Limits (§15.209)

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMITS	
		μV/m	dBμV/m
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
Above 960	3	500	54.0
Above 1000	3	74.0 dBμV/m (Peak) 54.0 dBμV/m (Average)	

Remark：(1) Emission level (dBμV/m) = 20 log Emission level (μV/m)

(2) The tighter limit applies at the edge between two frequency bands.

(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) The limits in this table are based on CFR 47 Part 15.205(a)(b) and Part 15.209 (a).

(5) The over 1GHz limit, FCC limit is used based on CFR 47 Part 15.35 (b) and Part 15.205(b) & Part 15.209(e) and Part 15.207(c).

3.4. Operating Condition of EUT

3.4.1. Set up the EUT (Radio Control) as shown on 3.2.

3.4.2. To turn on the power of all equipment.

3.4.3. The EUT was set the PC system using test program “Futaba Term”.

3.4.4. Transmit Mode: The EUT was set to continuously transmit signals at 2404.000MHz、2425.000MHz and 2447.500MHz during testing.

3.4.5. Receive Mode: The EUT was set to continuously receive signals at 2425.000MHz during testing.

3.5. Test Procedure

The EUT and its simulators were placed on a turn table which was 0.8 meter above the ground. The turn table rotated 360 degrees to determine the position of the maximum emission level. EUT was set 3 meters away from the receiving antenna which was mounted on an antenna tower. The antenna could be moved up and down between 1 to 4 meters to find out the maximum emission level. Broadband antenna such as calibrated biconical and log-periodical antenna or horn antenna were used as a receiving antenna. Both horizontal and vertical polarization of the antenna were set on measurement. In order to find the maximum emission, all of the interface cables were manipulated according to FCC ANSI C63.4-2003 regulation.

The bandwidth of the R&S Test Receiver ESCS30 was set at 120kHz. (For 30MHz to 1000MHz)

The resolution bandwidth and video bandwidth of test spectrum analyzer is 1MHz for peak detection (PK) at frequency above 1GHz.

The resolution bandwidth of test spectrum analyzer is 1MHz and the video bandwidth is 10Hz for average detection (AV) at frequency above 1GHz.

The frequency range from 30MHz to 25GHz (Up to 10^{th} harmonics from fundamental frequency) was checked.

Above 1GHz was measured with peak and average detector. For frequency from 7.5GHz to 25GHz, we checked it in 1 meter distance and with a shorter cable 2 meter instead of original's. There is no signal exist.

3.6. Radiated Emission Measurement Results

PASSED.

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

EUT：Radio Control M/N：FHSS3-2.4G

Test Date：Mar. 08, 2011 Temperature：22℃ Humidity：50%

For Frequency Range 30MHz~1000MHz:

The EUT emitted the fundamental frequency with data code at the stand, side and lying conditions.

The EUT select **worst position "stand"** and with following test modes was performed during this section testing and all the test results are listed in section 3.6.1.

Mode	Channel	Frequency	Test Mode	Position	Reference Test Data	
					Horizontal	Vertical
1.	01	2404.000MHz	Transmit	Stand	# 1	# 2
2.	15	2425.000MHz		Stand	# 2	# 1
3.	30	2447.500MHz		Stand	# 1	# 2
4.	15	2425.000MHz	Receive	Stand	# 2	# 1

* Above all final readings were measured with Quasi-Peak detector.

For Frequency above 1GHz:

The EUT select **worst position "stand"** and with following test modes was performed during this section testing and all the test results are listed in section 3.6.2.

Mode	Chnnel	Frequency	Test Mode	Position	Test Frequency Range
1.	01	2404.000MHz	Transmit	Stand	**1000-2680MHz***
2.					2680-4000MHz
3.					**4000-5500MHz***
4.					**5500-7500MHz***
5.					7500-18000MHz
6.	15	2425.000MHz	Transmit	Stand	**1000-2680MHz***
7.					2680-4000MHz
8.					**4000-5500MHz***
9.					**5500-7500MHz***
10.					7500-18000MHz
11.	30	2447.500MHz	Transmit	Stand	**1000-2680MHz***
12.					2680-4000MHz
13.					**4000-5500MHz***
14.					**5500-7500MHz***
15.					7500-18000MHz
16.	15	2425.000MHz	Receive	Stand	1000-2680MHz
17.					2680-5500MHz
18.					5500-18000MHz

Remark 1：The emissions level were too low against the official limit and not report.

Remark 2："*" means there is spurious emission falling the frequency band and be measures.

For Restricted Bands:

The EUT was tested in restricted bands and all the test results are listed in section 3.6.3. (The restricted bands defined in part 15.205(a))

Mode	Channel	Frequency	Test Mode	Reference Test Data	
				Horizontal	Vertical
1.	01	2404.000MHz	Transmit	# 1, #4	#2, #3
2.	30	2447.500MHz	Transmit	#5, #8	#6, #7

3.6.1. Frequency Range 30-1000MHz

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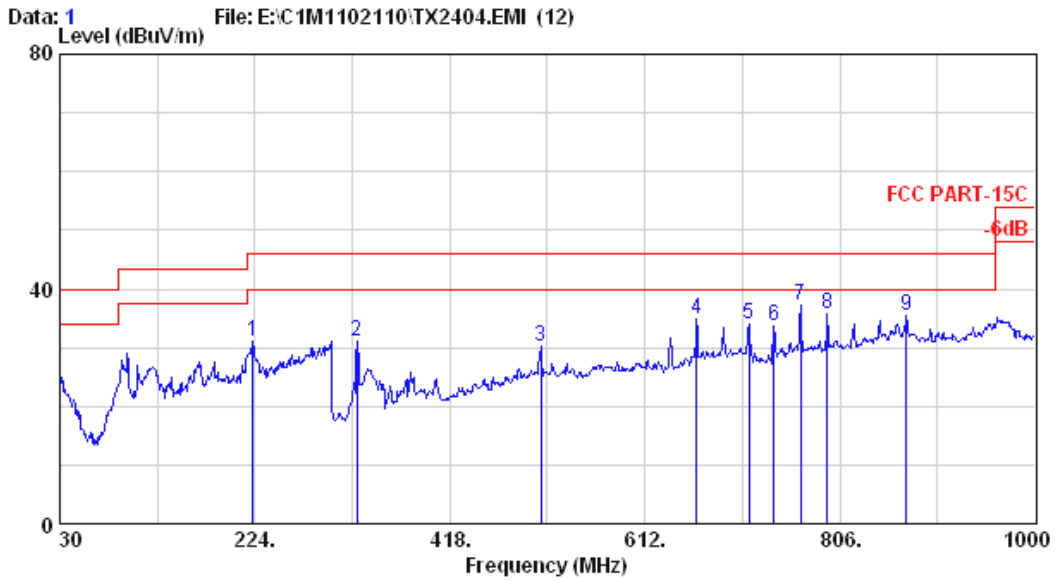

Site no. : A/C Chamber Data no. : 1
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
Limit : FCC PART-15C
Env. / Ins. : E4446A 22*C /50% Engineer : Jarwei Wang
EUT : FHSS3-2.4G
Power Rating : DC 6V
Test Mode : TX2404

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	222.060	21.90	3.30	6.00	31.20	46.00	14.80	
2	325.850	15.15	4.20	11.80	31.15	46.00	14.85	
3	508.210	19.14	6.80	4.19	30.13	46.00	15.87	
4	663.410	22.52	6.32	6.03	34.86	46.00	11.14	
5	715.790	22.74	6.55	4.71	34.01	46.00	11.99	
6	740.040	22.38	6.64	4.68	33.70	46.00	12.30	
7	767.200	23.86	6.80	6.44	37.10	46.00	8.90	
8	793.390	23.98	6.90	4.77	35.65	46.00	10.35	
9	871.960	25.52	7.20	2.83	35.55	46.00	10.45	

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

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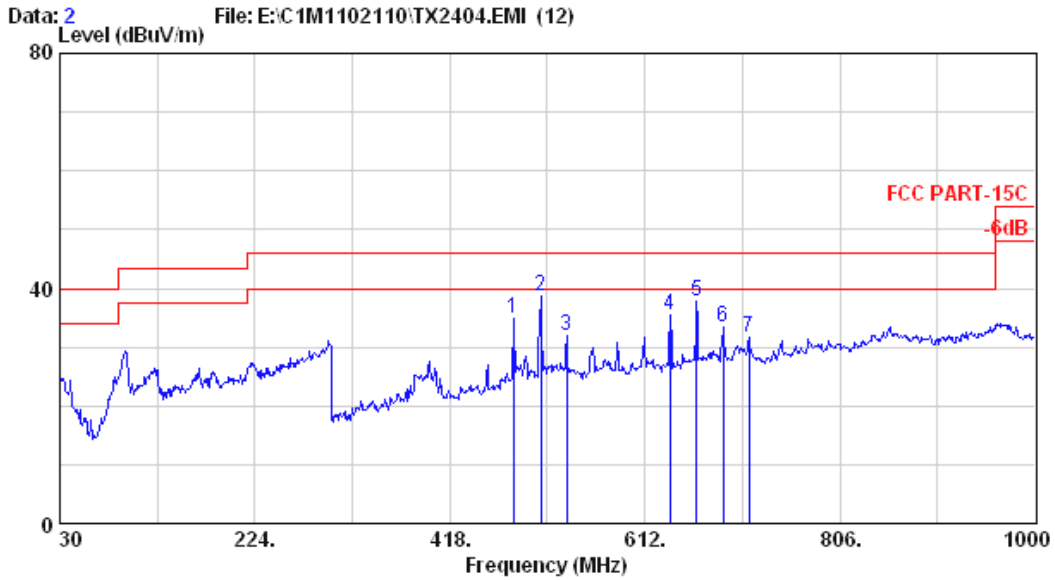

Site no. : A/C Chamber Data no. : 2
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
Limit : FCC PART-15C
Env. / Ins. : E4446A 22*C /50% Engineer : Jarwei Wang
EUT : FHSS3-2.4G
Power Rating : DC 6V
Test Mode : TX2404

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	481.050	18.74	6.10	10.03	34.87	46.00	11.13	
2	508.210	19.14	6.80	12.68	38.62	46.00	7.38	
3	534.400	19.57	7.00	5.22	31.79	46.00	14.21	
4	637.220	20.92	6.20	8.46	35.57	46.00	10.43	
5	663.410	22.52	6.32	9.09	37.92	46.00	8.08	
6	689.600	23.25	6.50	3.51	33.26	46.00	12.74	
7	715.790	22.74	6.55	2.33	31.63	46.00	14.37	

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

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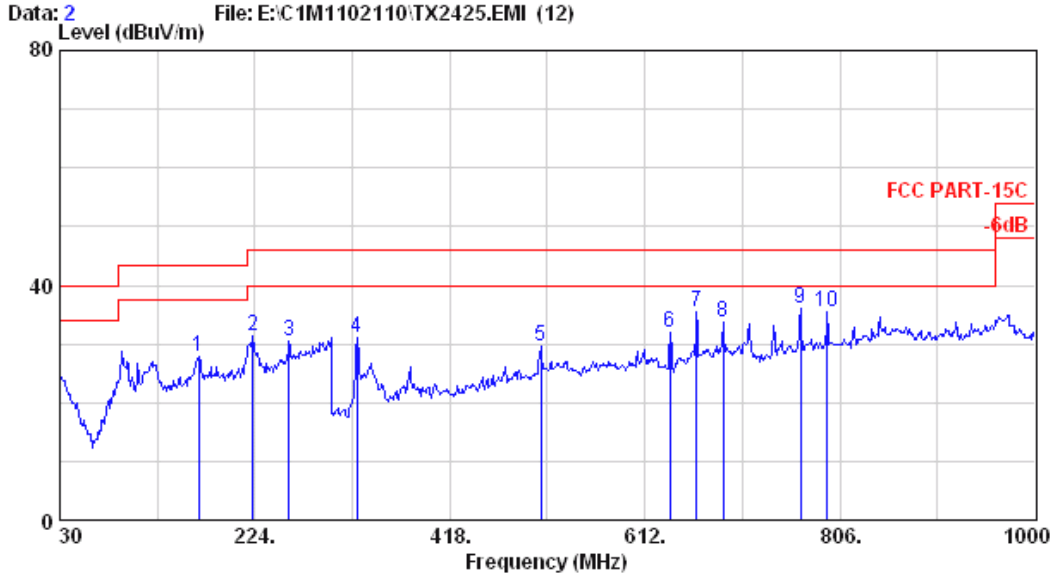

Site no. : A/C Chamber Data no. : 2
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
Limit : FCC PART-15C
Env. / Ins. : E4446A 22*C /50% Engineer : Jarwei Wang
EUT : FHSS3-2.4G
Power Rating : DC 6V
Test Mode : TX2425

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	167.740	20.97	2.70	4.16	27.84	43.50	15.66	
2	222.060	21.90	3.30	6.17	31.37	46.00	14.63	
3	257.950	24.44	3.50	2.66	30.59	46.00	15.41	
4	325.850	15.15	4.20	11.77	31.12	46.00	14.88	
5	508.210	19.14	6.80	3.55	29.49	46.00	16.51	
6	637.220	20.92	6.20	4.96	32.07	46.00	13.93	
7	663.410	22.52	6.32	6.56	35.39	46.00	10.61	
8	689.600	23.25	6.50	4.05	33.80	46.00	12.20	
9	767.200	23.86	6.80	5.51	36.17	46.00	9.83	
10	793.390	23.98	6.90	4.61	35.49	46.00	10.51	

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

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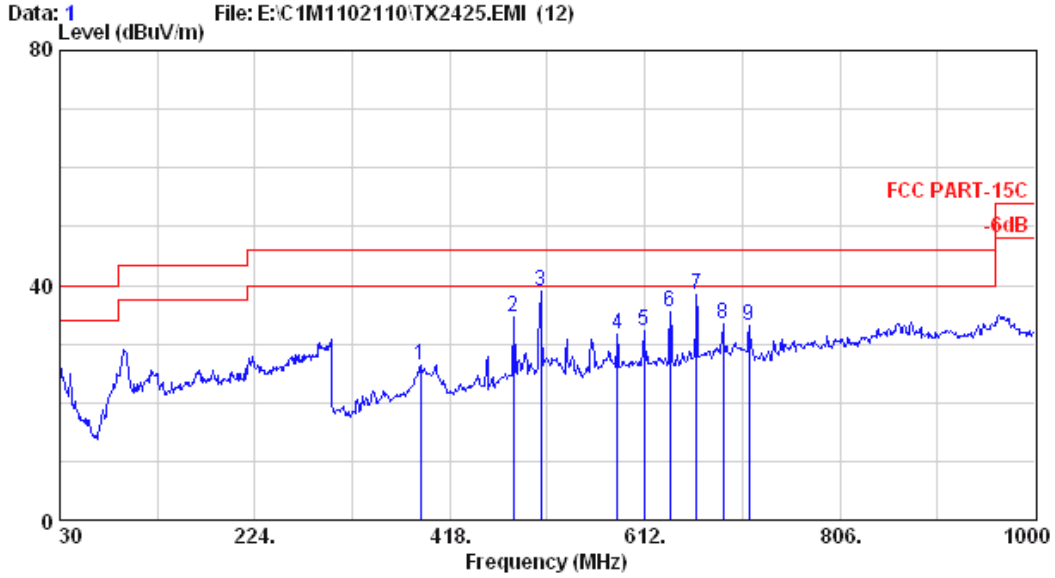

Site no. : A/C Chamber Data no. : 1
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
Limit : FCC PART-15C
Env. / Ins. : E4446A 22*C /50% Engineer : Jarwei Wang
EUT : FHSS3-2.4G
Power Rating : DC 6V
Test Mode : TX2425

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	388.900	17.47	4.80	4.18	26.45	46.00	19.55	
2	481.050	18.74	6.10	9.73	34.57	46.00	11.43	
3	508.210	19.14	6.80	13.13	39.07	46.00	6.93	
4	584.840	20.97	6.40	4.42	31.79	46.00	14.21	
5	611.030	21.41	6.30	4.42	32.13	46.00	13.87	
6	637.220	20.92	6.20	8.48	35.59	46.00	10.41	
7	663.410	22.52	6.32	9.46	38.29	46.00	7.71	
8	689.600	23.25	6.50	3.77	33.52	46.00	12.48	
9	715.790	22.74	6.55	3.95	33.25	46.00	12.75	

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

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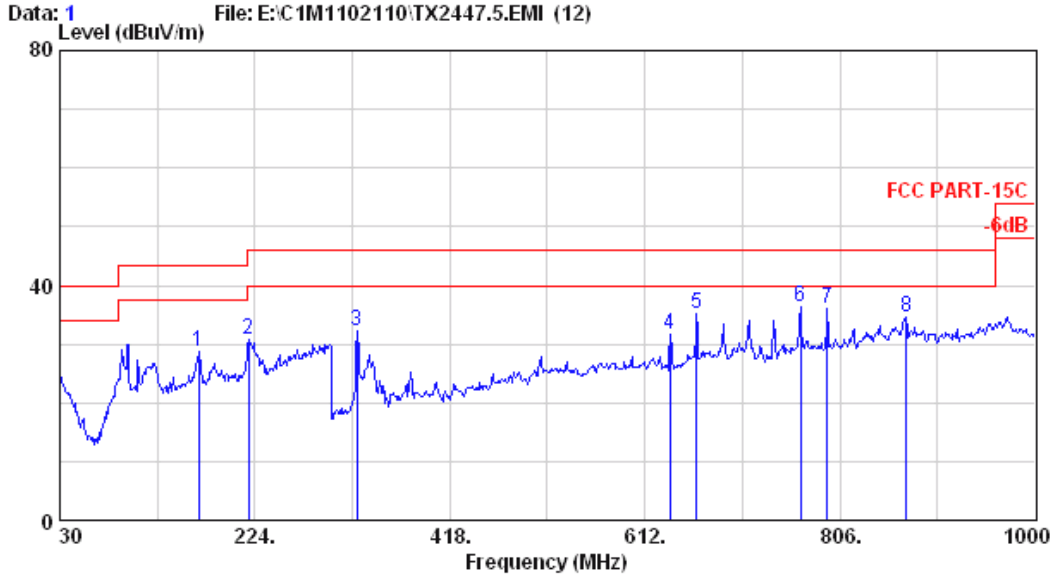

Site no. : A/C Chamber Data no. : 1
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
Limit : FCC PART-15C
Env. / Ins. : E4446A 22*C /50% Engineer : Jarwei Wang
EUT : FHSS3-2.4G
Power Rating : DC 6V
Test Mode : TX2447.5

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	167.740	20.97	2.70	5.05	28.73	43.50	14.77	
2	218.180	21.91	3.20	5.58	30.70	46.00	15.30	
3	325.850	15.15	4.20	12.81	32.16	46.00	13.84	
4	637.220	20.92	6.20	4.42	31.53	46.00	14.47	
5	663.410	22.52	6.32	6.26	35.09	46.00	10.91	
6	767.200	23.86	6.80	5.64	36.30	46.00	9.70	
7	793.390	23.98	6.90	5.02	35.90	46.00	10.10	
8	871.960	25.52	7.20	1.92	34.64	46.00	11.36	

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

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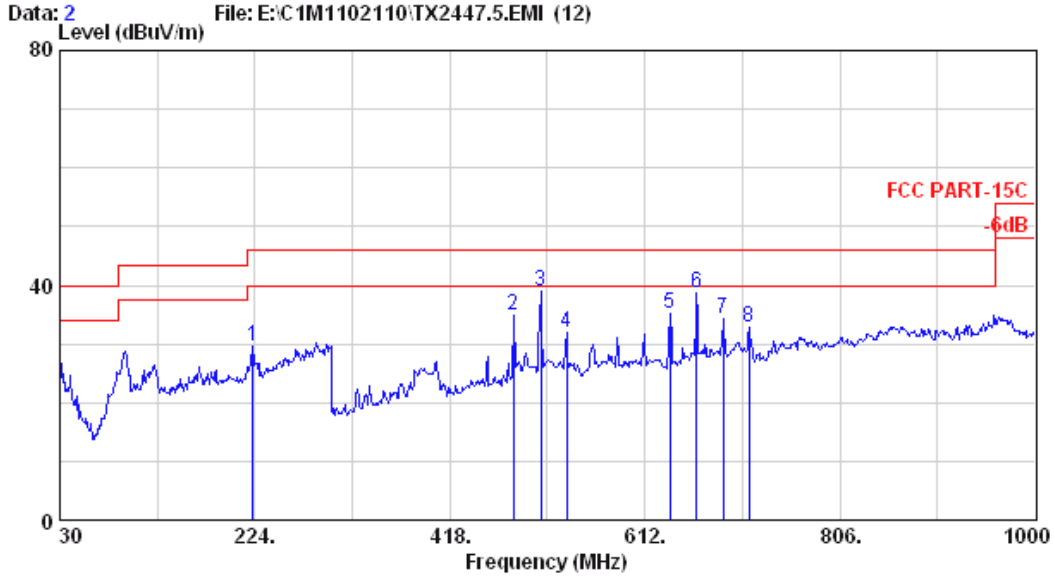

Site no. : A/C Chamber Data no. : 2
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
Limit : FCC PART-15C
Env. / Ins. : E4446A 22*C /50% Engineer : Jarwei Wang
EUT : FHSS3-2.4G
Power Rating : DC 6V
Test Mode : TX2447.5

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	222.060	21.90	3.30	4.47	29.67	46.00	16.33	
2	481.050	18.74	6.10	9.97	34.81	46.00	11.19	
3	508.210	19.14	6.80	12.94	38.88	46.00	7.12	
4	534.400	19.57	7.00	5.51	32.08	46.00	13.92	
5	637.220	20.92	6.20	8.16	35.27	46.00	10.73	
6	663.410	22.52	6.32	9.71	38.54	46.00	7.46	
7	689.600	23.25	6.50	4.67	34.42	46.00	11.58	
8	715.790	22.74	6.55	3.52	32.82	46.00	13.18	

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

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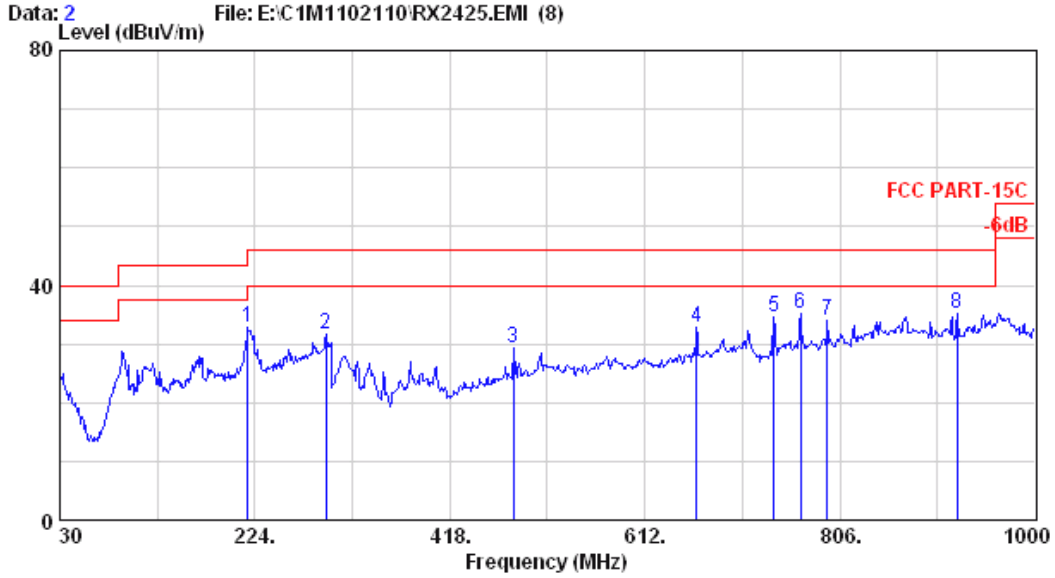

Site no. : A/C Chamber Data no. : 2
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
Limit : FCC PART-15C
Env. / Ins. : E4446A 22*C /50% Engineer : Jarwei Wang
EUT : FHSS3-2.4G
Power Rating : DC 6V
Test Mode : RX2425

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	217.210	21.90	3.20	7.79	32.89	46.00	13.11	
2	294.810	26.43	3.99	1.11	31.53	46.00	14.47	
3	481.050	18.74	6.10	4.34	29.18	46.00	16.82	
4	663.410	22.52	6.32	3.91	32.74	46.00	13.26	
5	740.040	22.38	6.64	5.64	34.66	46.00	11.34	
6	767.200	23.86	6.80	4.62	35.28	46.00	10.72	
7	793.390	23.98	6.90	3.17	34.05	46.00	11.95	
8	922.400	24.52	7.40	3.17	35.09	46.00	10.91	

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

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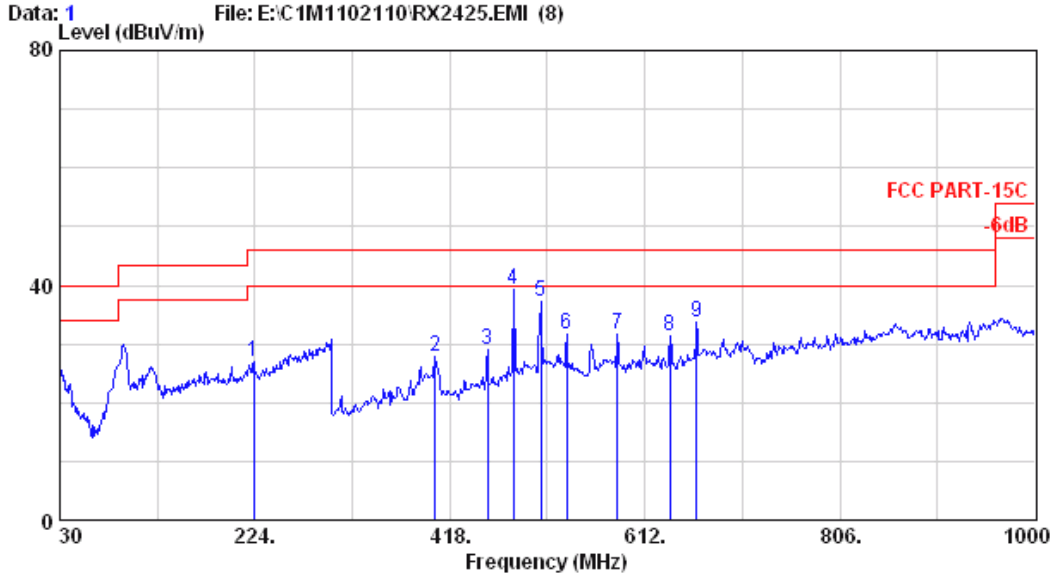

Site no. : A/C Chamber Data no. : 1
Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
Limit : FCC PART-15C
Env. / Ins. : E4446A 22*C /50% Engineer : Jarwei Wang
EUT : FHSS3-2.4G
Power Rating : DC 6V
Test Mode : RX2425

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	223.030	21.94	3.30	1.61	26.85	46.00	19.15	
2	403.450	17.54	4.90	5.52	27.96	46.00	18.04	
3	455.830	17.75	5.50	5.83	29.08	46.00	16.92	
4	481.050	18.74	6.10	14.43	39.27	46.00	6.73	
5	508.210	19.14	6.80	11.31	37.25	46.00	8.75	
6	534.400	19.57	7.00	5.13	31.70	46.00	14.30	
7	584.840	20.97	6.40	4.31	31.68	46.00	14.32	
8	637.220	20.92	6.20	4.10	31.21	46.00	14.79	
9	663.410	22.52	6.32	4.88	33.71	46.00	12.29	

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

3.6.2. Above 1GHz Frequency Range Measurement Results

Date of Test： Mar. 08, 2011 Temperature： 22℃

EUT： Radio Control Humidity： 50%

Test Mode： Transmitting Mode, Frequency: 2404MHz, Position: Stand

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)	Limits (dBμV/m)	Margin (dB)
2249.920	27.96	6.17	18.81	52.94	74.00	21.06
2330.560	28.03	6.26	20.94	55.23	74.00	18.77
2565.760	28.45	6.58	13.40	48.43	74.00	25.57
4805.500	32.92	9.14	10.78	52.84	74.00	21.16
7208.000	35.80	11.22	13.13	60.15	74.00	13.85

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. All final readings of measurement were with Peak values.

Emission Frequency (MHz)	Peak Value (dB/m)	PDCF (dB)	Average Value Horizontal (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2249.920	52.94	-30.35	22.59	54.00	31.41
2330.560	55.23	-30.35	24.88	54.00	29.12
2565.760	48.43	-30.35	18.08	54.00	35.92
4805.500	52.84	-30.35	22.49	54.00	31.51
7208.000	60.15	-30.35	29.80	54.00	24.20

Remarks: 1. PDCF=20log(dwell time/100ms)=20log(3.038ms/100ms)=-30.35
2. Average value=Peak value+PDCF
3. All final readings of measurement were with Average values.

Date of Test： Mar. 08, 2011 Temperature： 22℃

EUT： Radio Control Humidity： 50%

Test Mode： Transmitting Mode, Frequency: 2404MHz, Position: Stand

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Vertical (dBμV/m)	Limits (dBμV/m)	Margin (dB)
2330.560	28.03	6.26	16.52	50.81	74.00	23.19
4805.500	32.92	9.14	13.80	55.86	74.00	18.14
7208.000	35.80	11.22	16.19	63.21	74.00	10.79

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. All final readings of measurement were with Peak values.

Emission Frequency (MHz)	Peak Value (dB/m)	PDCF (dB)	Average Value Vertical (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2330.560	50.81	-30.35	20.46	54.00	33.54
4805.500	55.86	-30.35	25.51	54.00	28.49
7208.000	63.21	-30.35	32.86	54.00	21.14

Remarks: 1. PDCF=20log(dwell time/100ms)=20log(3.038ms/100ms)=-30.35
2. Average value=Peak value+PDCF
3. All final readings of measurement were with Average values.

Date of Test： Mar. 08, 2011 Temperature： 22℃

EUT： Radio Control Humidity： 50%

Test Mode： Transmitting Mode, Frequency: 2425MHz, Position: Stand

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)	Limits (dBμV/m)	Margin (dB)
2308.720	28.01	6.23	16.93	51.18	74.00	22.82
2355.760	28.06	6.29	20.06	54.41	74.00	19.59
2372.560	28.08	6.31	17.40	51.79	74.00	22.21
2532.160	28.33	6.52	19.59	54.43	74.00	19.57
2543.920	28.39	6.54	18.98	53.91	74.00	20.09
4846.000	32.99	9.15	10.59	52.74	74.00	21.26
7274.000	35.96	11.32	13.59	60.87	74.00	13.13

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. All final readings of measurement were with Peak values.

Emission Frequency (MHz)	Peak Value (dB/m)	PDCF (dB)	Average Value Horizontal (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2308.720	51.18	-30.35	20.83	54.00	33.17
2355.760	54.41	-30.35	24.06	54.00	29.94
2372.560	51.79	-30.35	21.44	54.00	32.56
2532.160	54.43	-30.35	24.08	54.00	29.92
2543.920	53.91	-30.35	23.56	54.00	30.44
4846.000	52.74	-30.35	22.39	54.00	31.61
7274.000	60.87	-30.35	30.52	54.00	23.48

Remarks: 1. PDCF=20log(dwell time/100ms)=20log(3.038ms/100ms)=-30.35
2. Average value=Peak value+PDCF
3. All final readings of measurement were with Average values.

Date of Test： Mar. 08, 2011 Temperature： 22℃

EUT： Radio Control Humidity： 50%

Test Mode： Transmitting Mode, Frequency: 2425MHz, Position: Stand

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Vertical (dBμV/m)	Limits (dBμV/m)	Margin (dB)
2350.720	28.04	6.29	16.34	50.67	74.00	23.33
2359.120	28.06	6.30	16.46	50.83	74.00	23.17
2540.560	28.39	6.53	11.62	46.54	74.00	27.46
4846.000	32.99	9.15	12.92	55.07	74.00	18.93
7274.000	35.96	11.32	15.33	62.61	74.00	11.39

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. All final readings of measurement were with Peak values.

Emission Frequency (MHz)	Peak Value (dB/m)	PDCF (dB)	Average Value Vertical (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2350.720	50.67	-30.35	20.32	54.00	33.68
2359.120	50.83	-30.35	20.48	54.00	33.52
2540.560	46.54	-30.35	16.19	54.00	37.81
4846.000	55.07	-30.35	24.72	54.00	29.28
7274.000	62.61	-30.35	32.26	54.00	21.74

Remarks: 1. PDCF=20log(dwell time/100ms)=20log(3.038ms/100ms)=-30.35
2. Average value=Peak value+PDCF
3. All final readings of measurement were with Average values.

Date of Test： Mar. 08, 2011 Temperature： 22℃

EUT： Radio Control Humidity： 50%

Test Mode： Transmitting Mode, Frequency: 2447.5MHz, Position: Stand

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)	Limits (dBμV/m)	Margin (dB)
2291.920	27.99	6.22	16.78	51.00	74.00	23.00
2338.960	28.04	6.28	15.67	49.99	74.00	24.01
2527.120	28.33	6.50	22.24	57.06	74.00	16.94
2552.320	28.39	6.56	19.32	54.27	74.00	19.73
4891.000	33.09	9.16	11.38	53.64	74.00	20.36
7338.000	36.13	11.44	14.29	61.86	74.00	12.14

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. All final readings of measurement were with Peak values.

Emission Frequency (MHz)	Peak Value (dB/m)	PDCF (dB)	Average Value Horizontal (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2291.920	51.00	-30.35	20.65	54.00	33.35
2338.960	49.99	-30.35	19.64	54.00	34.36
2527.120	57.06	-30.35	26.71	54.00	27.29
2552.320	54.27	-30.35	23.92	54.00	30.08
4891.000	53.61	-30.35	23.29	54.00	30.71
7338.000	61.86	-30.35	31.51	54.00	22.49

Remarks: 1. PDCF=20log(dwell time/100ms)=20log(3.038ms/100ms)=-30.35
2. Average value=Peak value+PDCF
3. All final readings of measurement were with Average values.

Date of Test： Mar. 08, 2011 Temperature： 22℃

EUT： Radio Control Humidity： 50%

Test Mode： Transmitting Mode, Frequency: 2447.5MHz, Position: Stand

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Vertical (dBμV/m)	Limits (dBμV/m)	Margin (dB)
2350.720	28.04	6.29	12.85	47.18	74.00	26.82
2367.520	28.06	6.31	13.12	47.50	74.00	26.50
2535.520	28.33	6.53	14.30	49.16	74.00	24.84
2548.960	28.39	6.54	11.77	46.71	74.00	27.29
4891.000	33.09	9.16	11.03	53.29	74.00	20.71
7338.000	36.13	11.44	11.96	59.53	74.00	14.47

Remarks: 1. Emission level=Antenna Factor + Cable Loss + Reading.
2. The emission levels that are 20dB below the official limit are not reported.
3. All final readings of measurement were with Peak values.

Emission Frequency (MHz)	Peak Value (dB/m)	PDCF (dB)	Average Value Vertical (dBμV/m)	Limit (dBμV/m)	Margin (dB)
2350.720	47.18	-30.35	16.83	54.00	37.17
2367.520	47.50	-30.35	17.15	54.00	36.85
2535.520	49.16	-30.35	18.81	54.00	35.19
2548.960	46.71	-30.35	16.36	54.00	37.64
4891.000	53.29	-30.35	22.94	54.00	31.06
7338.000	59.53	-30.35	29.18	54.00	24.82

Remarks: 1. PDCF=20log(dwell time/100ms)=20log(3.038ms/100ms)=-30.35
2. Average value=Peak value+PDCF
3. All final readings of measurement were with Average values.

3.6.3. Restricted Bands Measurement Results

Date of Test： Mar. 08, 2011 Temperature： 22℃

EUT： Radio Control Humidity： 50%

Test Mode： Transmit, Channel: 01, Frequency: 2404.000MHz

	Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Horizontal	Emission Level Horizontal	Limits	Margin
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)
Peak*	2389.640	28.10	6.37	37.70	72.17	74.00	1.83

Remark ： 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Low frequency section (spurious in the restricted band 2310-2390MHz).
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

	Emission Frequency	Peak Value	PDCF	Average Value Horizontal	Limit	Margin
	(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
Average*	2389.640	72.14	-30.35	41.79	54.00	12.21

Remarks: 1. PDCF=20log(dwell time/100ms)=20log(3.038ms/100ms)=-30.35
2. Average value=Peak value+PDCF
3. Low frequency section (spurious in the restricted band 2310-2390MHz).
4. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

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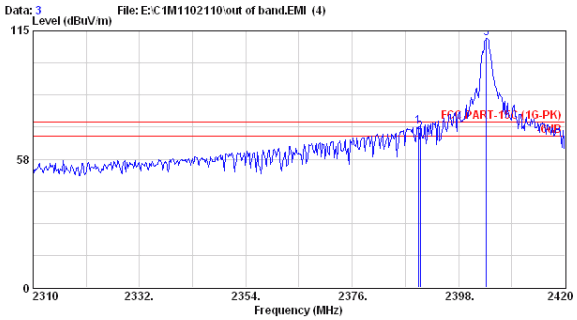


Site no. : A/C Chamber
Dis. / Ant. : 3m 3115(3775)
Limit : FCC PART-15C (1G-PK)
Env. / Ins. : E4446A 22°C /50%
EUT : FHSS3-2.4G
Power Rating : DC 6V
Test Mode : TX2404

Data no. : 3
Ant. pol. : HORIZONTAL
Engineer : Jarwei Wang

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2389.640	28.10	6.34	37.70	72.14	74.00	1.86	Peak
2	2390.080	28.10	6.34	35.14	69.58	74.00	4.42	Peak
3	2403.720	28.11	6.36	77.29	111.76	74.00	-37.76	Peak

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

Date of Test： Mar. 08, 2011 Temperature： 22℃

EUT： Radio Control Humidity： 50%

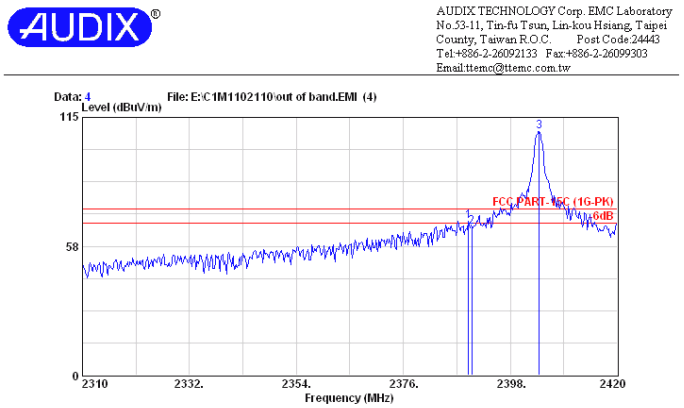
Test Mode： Transmit, Channel: 01, Frequency: 2404.000MHz

	Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Vertical	Emission Level Vertical	Limits	Margin
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)
Peak*	2389.420	28.10	6.34	34.27	68.71	74.00	5.29

Remark ： 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Low frequency section (spurious in the restricted band 2310-2390MHz).
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

	Emission Frequency	Peak Value	PDCF	Average Value Vertical	Limit	Margin
	(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
Average*	2389.420	68.71	-30.35	38.36	54.00	15.64

Remarks: 1. PDCF=20log(dwell time/100ms)=20log(3.038ms/100ms)=-30.35
2. Average value=Peak value+PDCF
3. Low frequency section (spurious in the restricted band 2310-2390MHz).
4. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



Site no. : A/C Chamber
Dis. / Ant. : 3m 3115(3775)
Limit : FCC PART-15C (1G-PK)
Env. / Ins. : E4446A 22*C /50%
EUT : FHSS3-2.4G
Power Rating : DC 6V
Test Mode : TX2404

Data no. : 4
Ant. pol. : VERTICAL
Engineer : Jarwei Wang

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2389.420	28.10	6.34	34.27	68.71	74.00	5.29	Peak
2	2390.080	28.10	6.34	31.81	66.25	74.00	7.75	Peak
3	2403.940	28.11	6.36	74.18	108.65	74.00	-34.65	Peak

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

Date of Test： Mar. 08, 2011 Temperature： 22℃

EUT： Radio Control Humidity： 50%

Test Mode： Transmit, Channel: 30, Frequency: 2447.500MHz

	Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Horizontal	Emission Level Horizontal	Limits	Margin
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)
Peak*	2483.560	28.18	6.45	29.64	64.27	74.00	9.73

Remark ： 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Low frequency section (spurious in the restricted band 2483.5-2500MHz).
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

	Emission Frequency	Peak Value	PDCF	Average Value Horizontal	Limit	Margin
	(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
Average*	2483.560	64.27	-30.35	33.92	54.00	20.08

Remarks: 1. PDCF=20log(dwell time/100ms)=20log(3.038ms/100ms)=-30.35
2. Average value=Peak value+PDCF
3. Low frequency section (spurious in the restricted band 2483.5-2500MHz).
4. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

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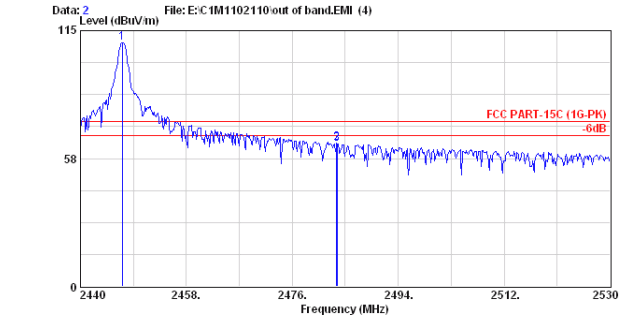
Email:ttemc@ttemc.com.tw



Site no. : A/C Chamber Data no. : 2
Dis. / Ant. : 3m 3115(3775) Ant. pol. : HORIZONTAL
Limit : FCC PART-15C (1G-PK)
Env. / Ins. : E4446A 22*C /50% Engineer : Jarwei Wang
EUT : FHS83-2.4G
Power Rating : DC 6V
Test Mode : TX2447.5

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2447.110	28.15	6.41	75.06	109.62	74.00	-35.62	Peak
2	2483.560	28.18	6.45	29.64	64.27	74.00	9.73	Peak
3	2483.650	28.18	6.45	29.42	64.05	74.00	9.95	Peak

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

Date of Test： Mar. 08, 2011 Temperature： 22℃

EUT： Radio Control Humidity： 50%

Test Mode： Transmit, Channel: 30, Frequency: 2447.500MHz

	Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Vertical	Emission Level Vertical	Limits	Margin
	(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)
Peak*	2486.710	28.18	6.45	22.41	57.04	74.00	16.96

Remark ： 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
2. Low frequency section (spurious in the restricted band 2483.5-2500MHz).
3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

	Emission Frequency	Peak Value	PDCF	Average Value Vertical	Limit	Margin
	(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
Average*	2486.710	57.05	-30.35	26.70	54.00	27.30

Remarks: 1. PDCF=20log(dwell time/100ms)=20log(3.038ms/100ms)=-30.35
2. Average value=Peak value-PDCF
3. Low frequency section (spurious in the restricted band 2483.5-2500MHz).
4. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

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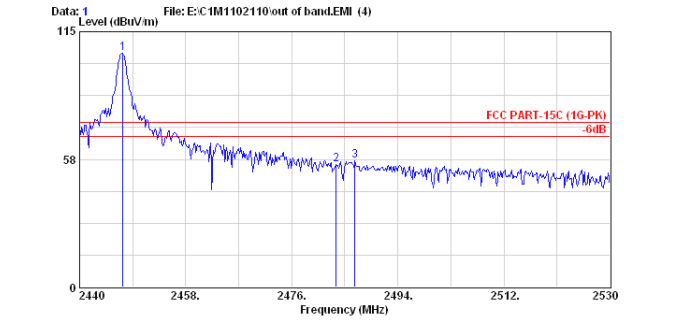
Tel:+886-2-26092133 Fax:+886-2-26099303
Email:ttemc@ttemc.com.tw



Site no. : A/C Chamber Data no. : 1
Dis. / Ant. : 3m 3115(3775) Ant. pol. : VERTICAL
Limit : FCC PART-15C (1G-PK)
Env. / Ins. : E4446A 20°C/40% Engineer : Jarwei
EUT : Parani-ESD1000
Power Rating : DC 5V
Test Mode : TX2402(GFSK)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2447.380	28.15	6.41	70.74	105.30	74.00	-31.30	Peak
2	2483.560	28.18	6.45	20.42	55.05	74.00	18.95	Peak
3	2486.710	28.18	6.45	22.41	57.05	74.00	16.95	Peak

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

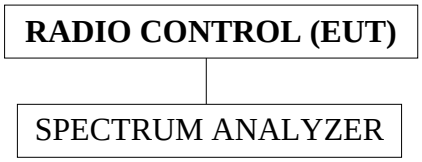
4. 20dB BANDWIDTH MEASUREMENT

4.1. Test Equipment

The following test equipment was used during the 20dB bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 04, 10'	Aug. 03, 11'

4.2. Block Diagram of Test Setup



4.3. Specification Limits (§15.247(a)(1))

Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

4.4. Operating Condition of EUT

4.4.1. Set up the EUT and simulator as shown on 4.2.

4.4.2. To turn on the power of all equipment.

4.4.3. EUT (Radio Control) was on transmitting frequency function during the testing.

4.5. Test Procedure (DA 00-705)

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 3kHz RBW and 3kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.
RBW=1% of the 20dB bandwidth
VBW=RBW

4.6. Test Results

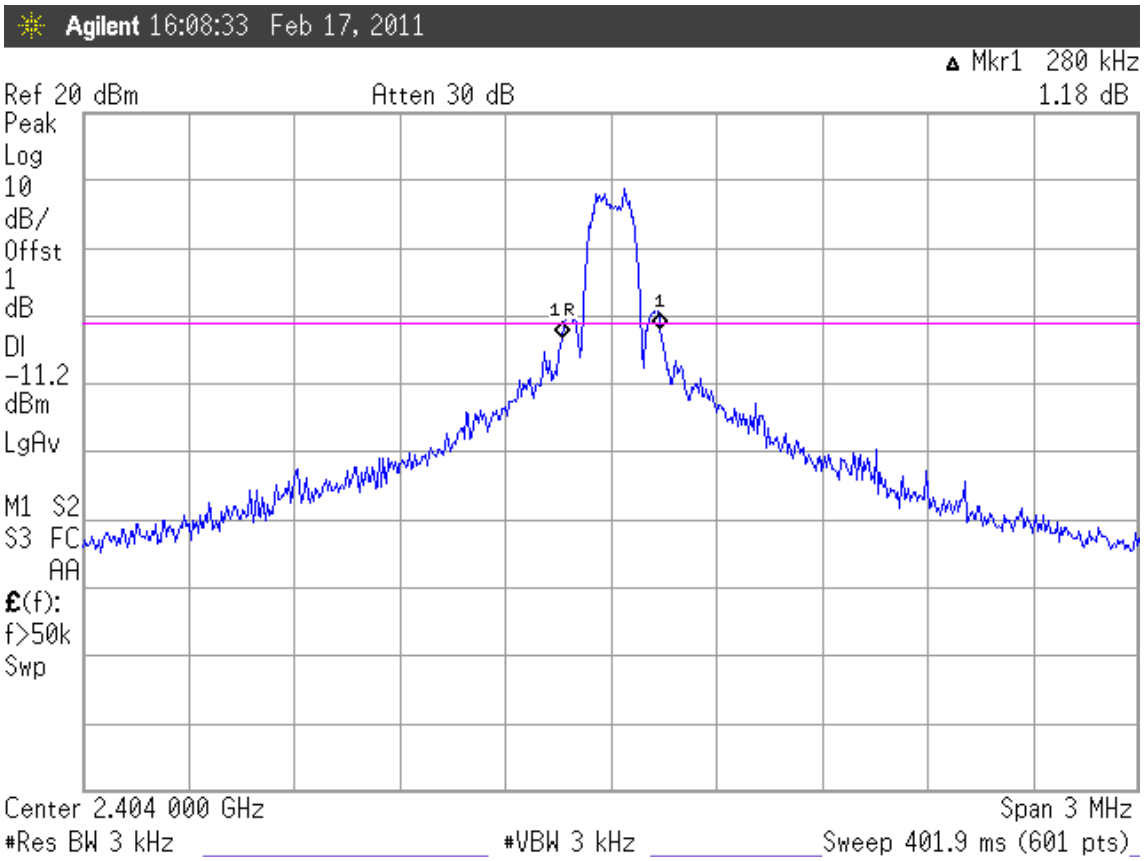
PASSED. All the test results are attached in next pages.

Test Date : Feb. 17, 2011 Temperature :24℃ Humidity : 54%

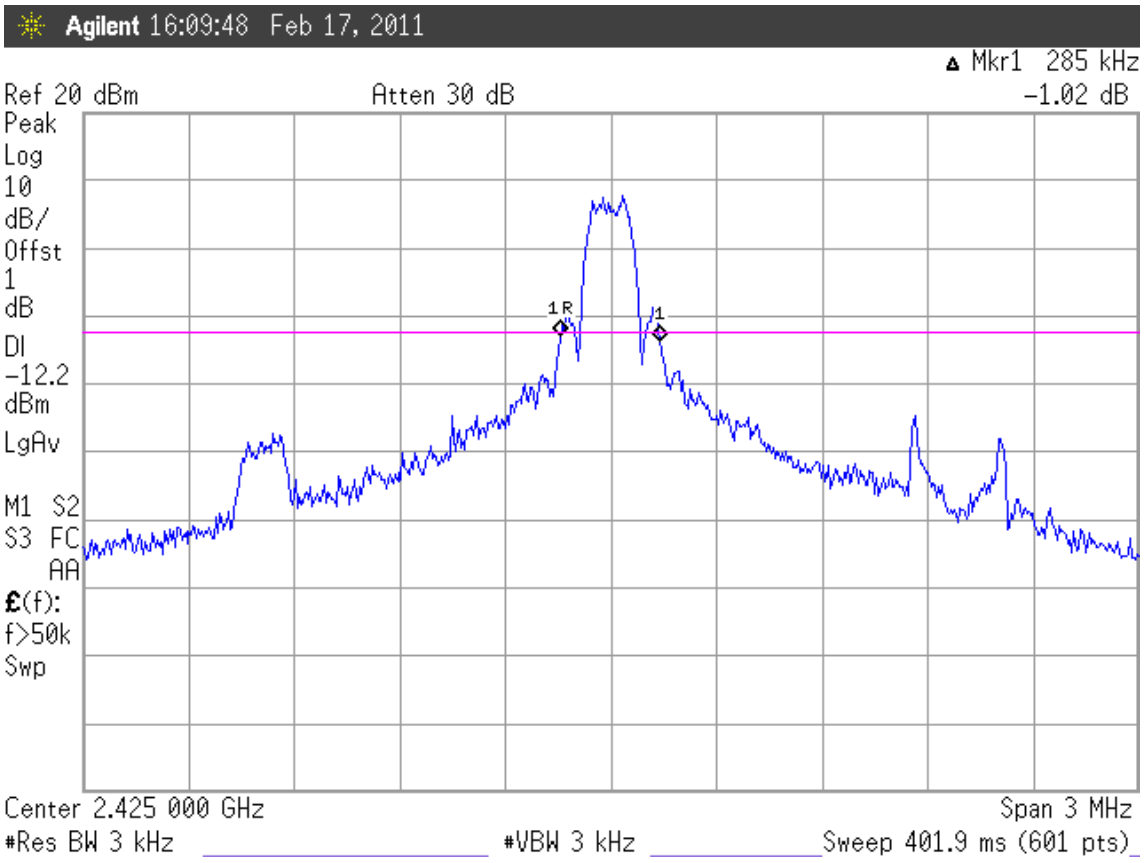
No.	Channel	Test Frequency	**20dB Bandwidth**	**2/3 (20dB Bandwidth)**
1.	01	2404.000MHz	**280kHz**	**186.67kHz**
2.	15	2425.000MHz	**285kHz**	**190.00kHz**
3.	30	2447.500MHz	**285kHz**	**190.00kHz**

The maximum two-thirds of the 20dB bandwidth shall be at maximum 190.00kHz.

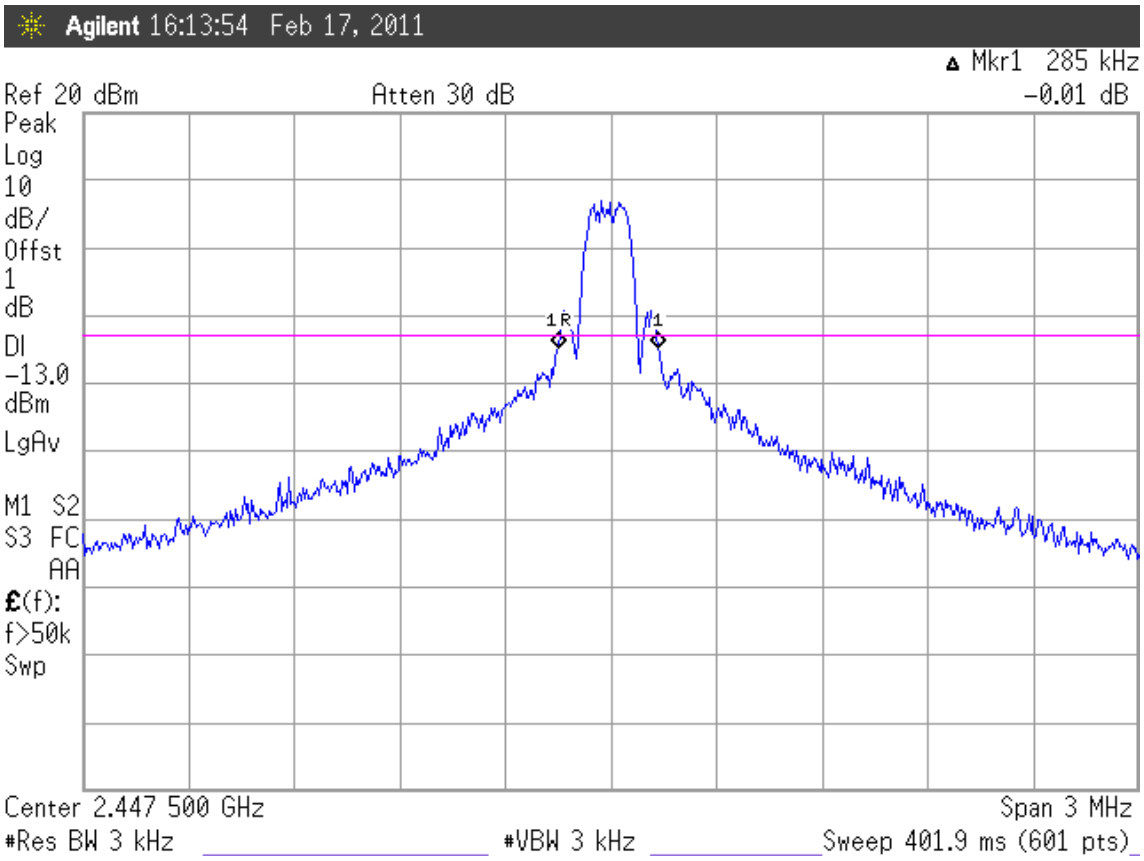
4.6.1. Channel 01, Frequency: 2404.000MHz



4.6.2. Channel 15, Frequency: 2425.000MHz



4.6.3. Channel 30, Frequency: 2447.500MHz



5. CARRIER FREQUENCY SEPARATION MEASUREMENT

5.1. Test Equipment

The following test equipment was used during the carrier frequency separation measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 04, 10’	Aug. 03, 11’

5.2. Block Diagram of Test Setup

The same as section.4.2.

5.3. Specification Limits (§15.247(a)(1))

Alternatively, frequency hopping systems operating in the 2400-2483.5MHz band may have hopping channel carrier frequencies that are separated by 25kHz or two-thirds of the 20dB bandwidth of the hopping channel, whichever is greater.

5.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

5.5. Test Procedure (DA 00-705)

The transmitter output was connected to the spectrum analyzer. The channel separation was measure by spectrum analyzer with 39kHz RBW and 39kHz VBW. The video bandwidth not to be smaller than resolution bandwidth, the peak was mark on adjacent bandwidth, the between of peak is carrier frequency separation.
RBW=1% Span
VBW=RBW

5.6. Test Results

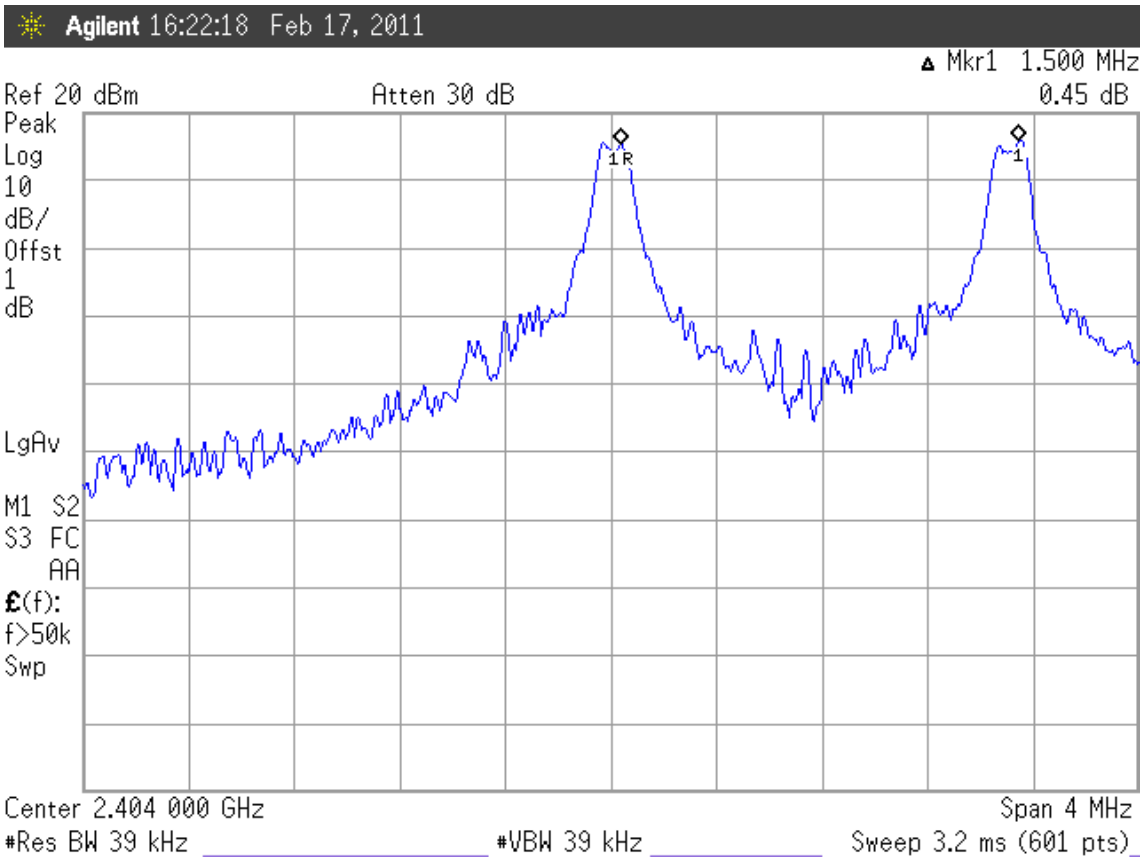
PASSED. All the test results are attached in next pages.

Test Date : Feb. 17, 2011 Temperature :24℃ Humidity : 54%

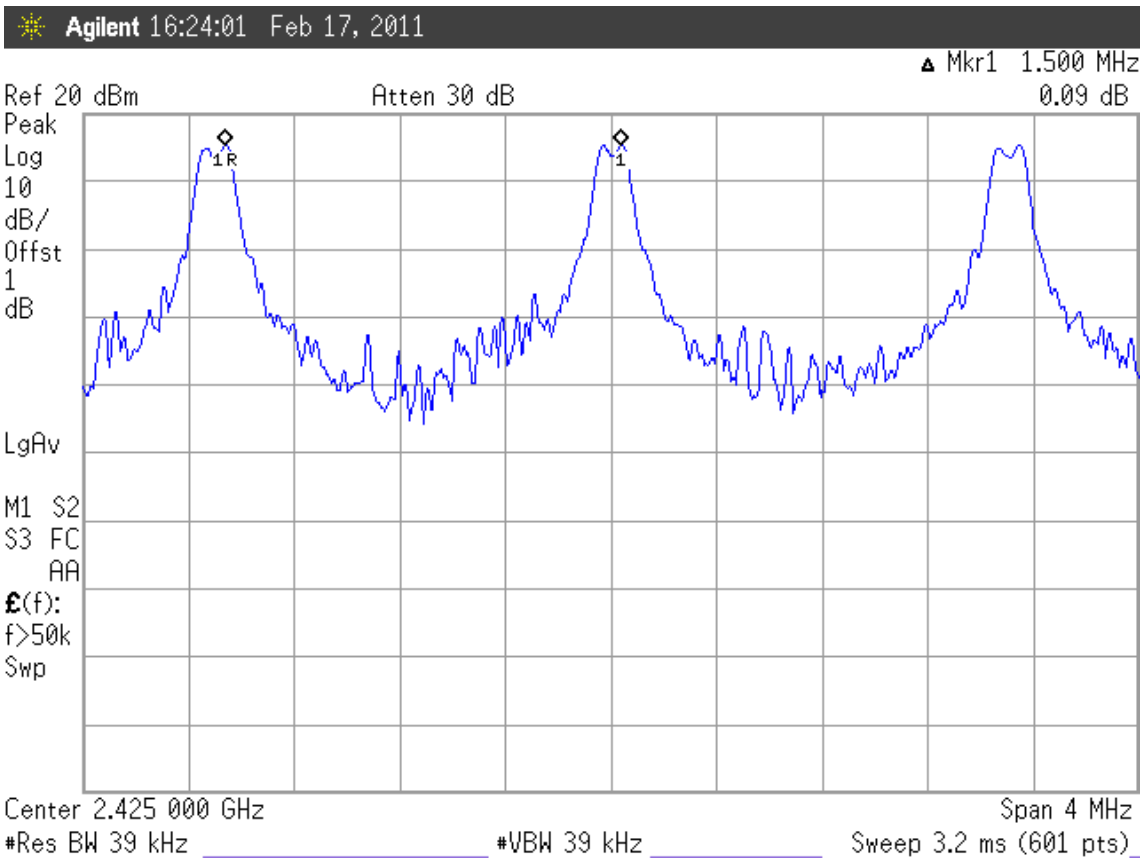
The minimum adjacent channel carrier frequency separation: 1.500MHz。

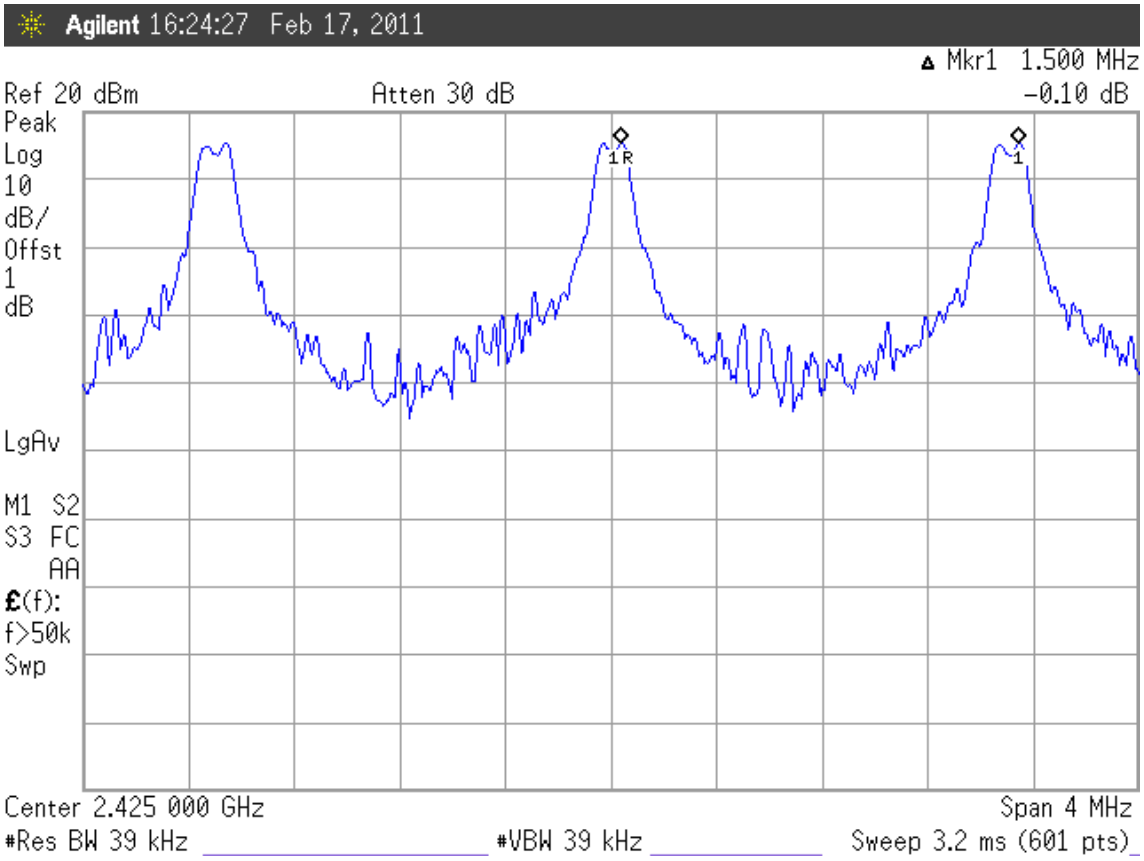
[Above values have met the requirement as specified in section 4.3: frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater.]

5.6.1. Channel 01, Test Frequency: 2404.000MHz

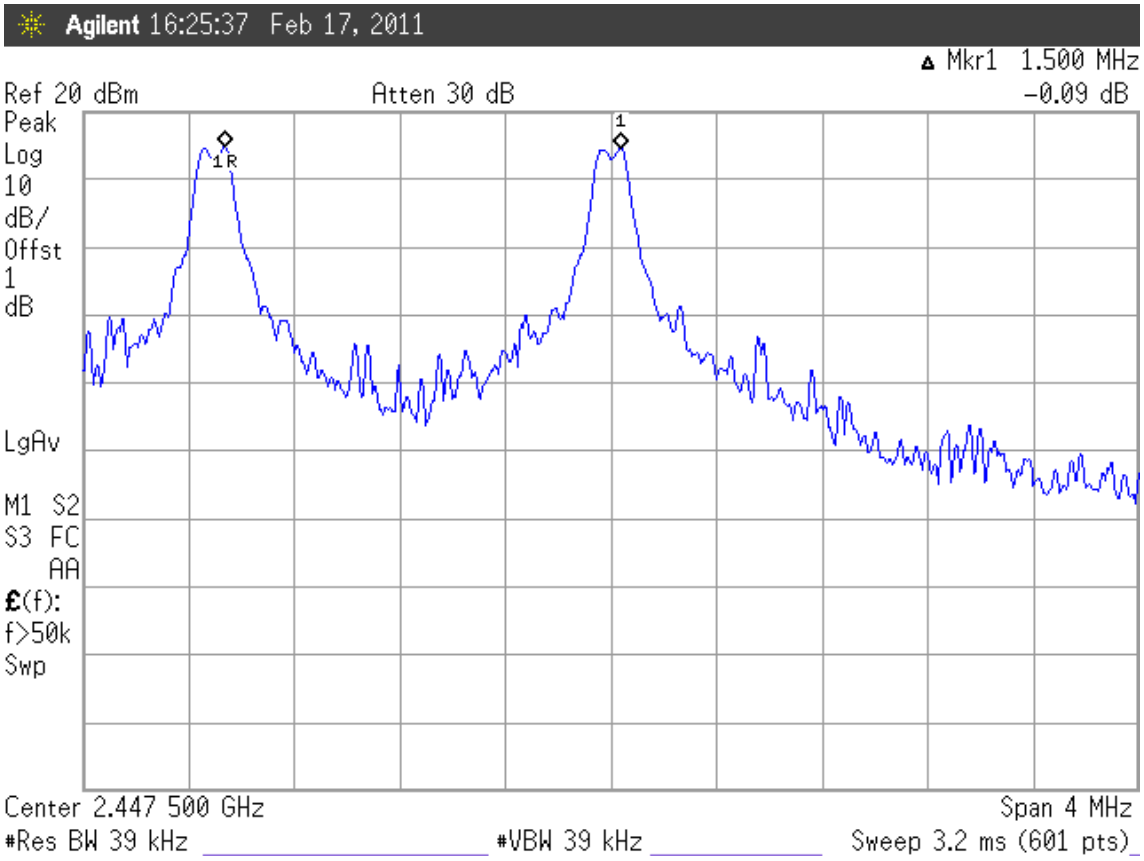


5.6.2. Channel 15, Test Frequency: 2425.000MHz





5.6.3. Channel 30, Test Frequency: 2447.500MHz



6. TIME OF OCCUPANCY MEASUREMENT

6.1. Test Equipment

The following test equipment was used during the time of occupancy measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 04, 10'	Aug. 03, 11'

6.2. Block Diagram of Test Setup

The same as section.4.2.

6.3. Specification Limits (§15.247(a)(1)(iii))

Frequency hopping systems in the 2400-2483.5MHz shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by number of hopping channels employed.

6.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

6.5. Test Procedure (DA 00-705)

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 1MHz RBW and 1MHz VBW. VBW≥RBW ; Span=zero span.
Centered on a hopping channel sweep=as necessary to capture the entire dwell time per hopping channel ; Detector function=peak ; Trace=Max hold

6.6. Test Results

PASSED. All the test results are attached in next pages.

Test Date : Feb. 17, 2011 Temperature :24℃ Humidity : 54%

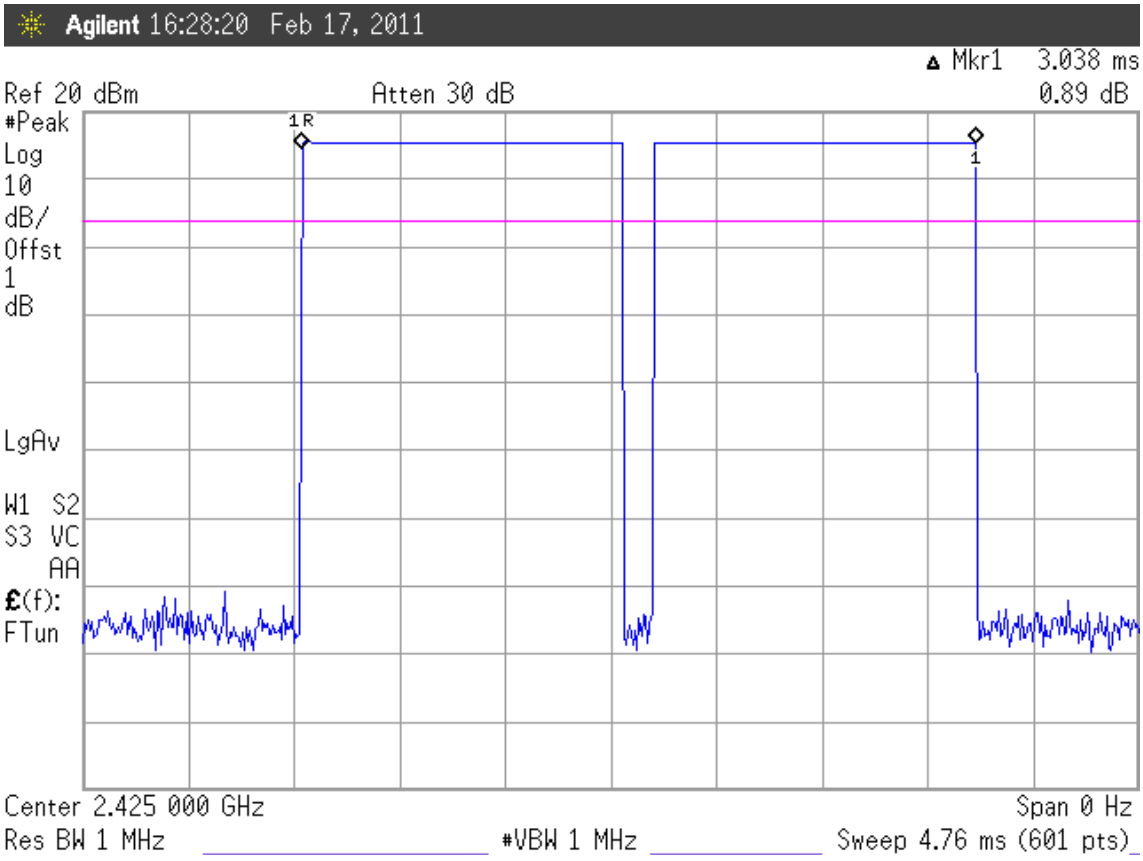
Duty cycle: 30 channels*0.4 seconds = 12 seconds

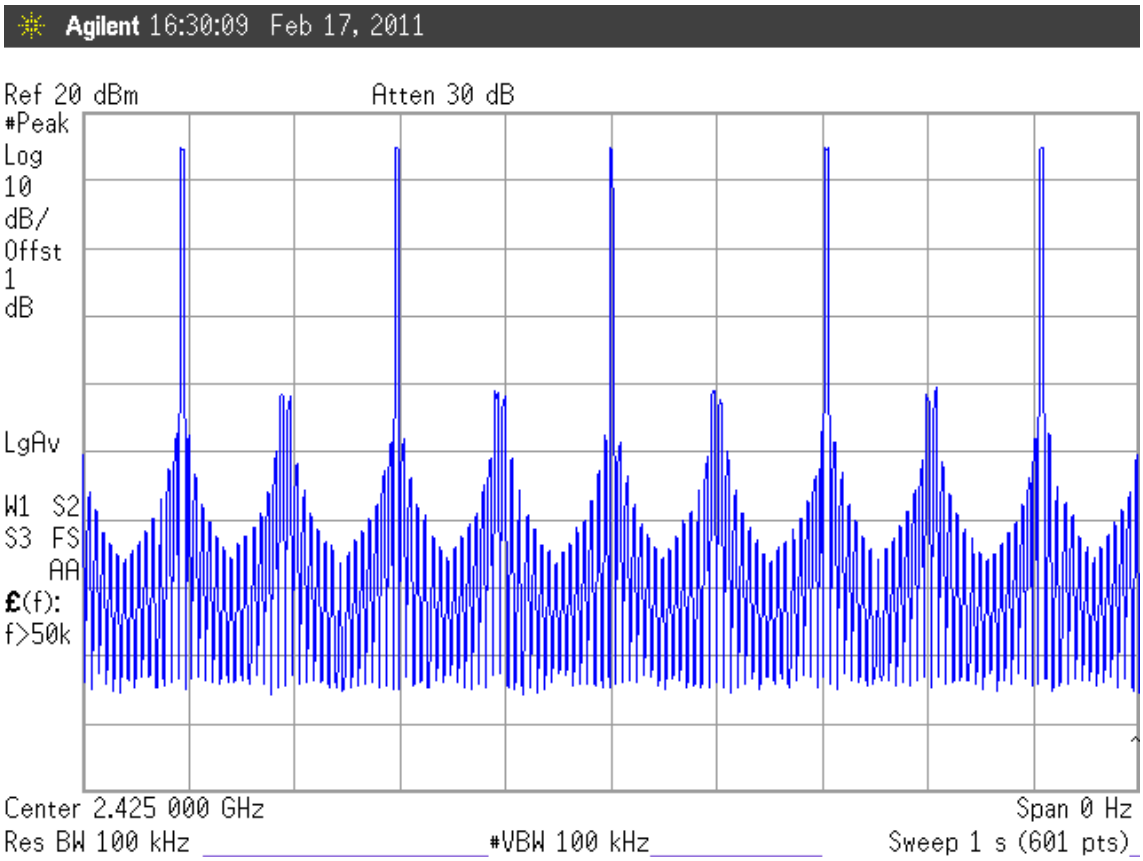
Test Frequency: 2404.000MHz

For per second of 5 channels appearance, the longest time of occupancy for each of 12 seconds is:

5 channels*12 seconds* 3.038ms = 182.28ms (<400ms)

6.6.1. Channel 01, Test Frequency: 2404.000MHz





7. NUMBER OF HOPPING CHANNELS MEASUREMENT

7.1. Test Equipment

The following test equipment was used during the number of hopping channels measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 04, 10'	Aug. 03, 11'

7.2. Block Diagram of Test Setup

The same as section.4.2.

7.3. Specification Limits (§15.247(a)(1)(iii))

Frequency hopping systems which use fewer than 20 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.

7.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

7.5. Test Procedure (DA 00-705)

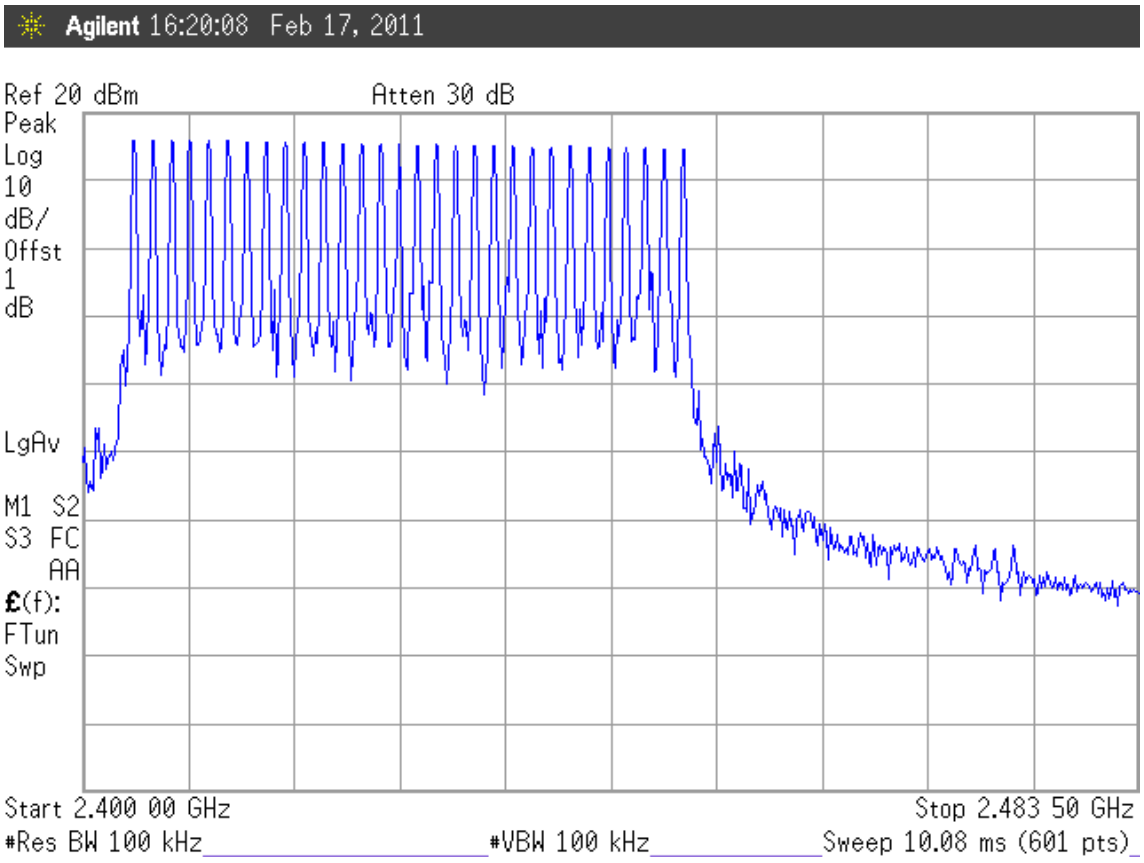
The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 100kHz RBW and 100kHz VBW. Sweep=Auto ; Detector function=peak ; Trace=Max hold

7.6. Test Results

PASSED. All the test results are attached in next page.

Test Date : Feb. 17, 2011 Temperature :24℃ Humidity : 54%

The number hopping channel is 30.


Agilent 16:20:08 Feb 17, 2011
Ref 20 dBm
Atten 30 dB
Peak
Log
10
dB/
Offst
1
dB
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Start 2.400 00 GHz
Stop 2.483 50 GHz
#Res BW 100 kHz
#VBW 100 kHz
Sweep 10.08 ms (601 pts)

8. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

8.1. Test Equipment

The following test equipment was used during the maximum peak output power measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 04, 10'	Aug. 03, 11'

8.2. Block Diagram of Test Setup

The same as section.4.2.

8.3. Specification Limits (§15.247(b)-(1))

The Limits of maximum Peak Output Power for frequency hopping systems in 2400-2483.5MHz is: 0.125Watt. (21dBm)

8.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in 4.4 except the test set up replaced by section 8.2.

8.5. Test Procedure (DA 00-705)

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 1MHz RBW and 13MHz VBW. Sweep=Auto ; Detector function=peak ; Trace=Max hold

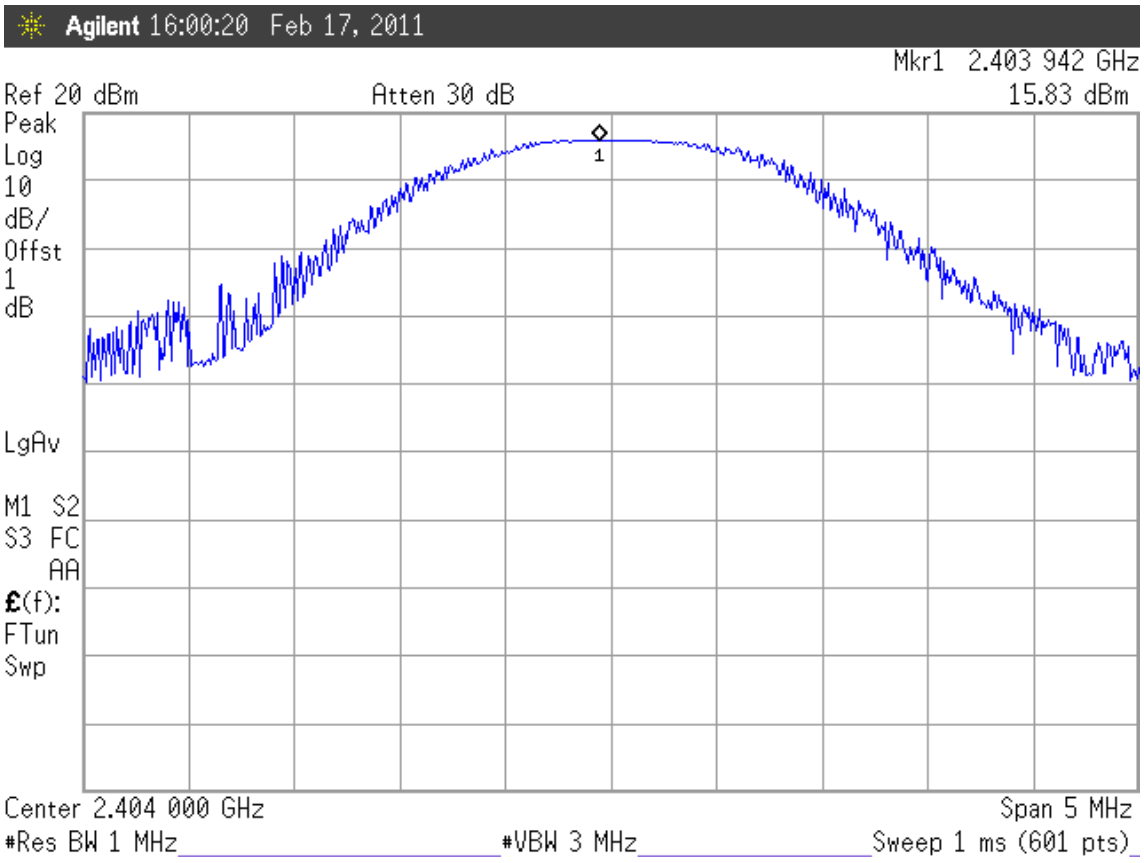
8.6. Test Results

PASSED. All the test results are listed below.

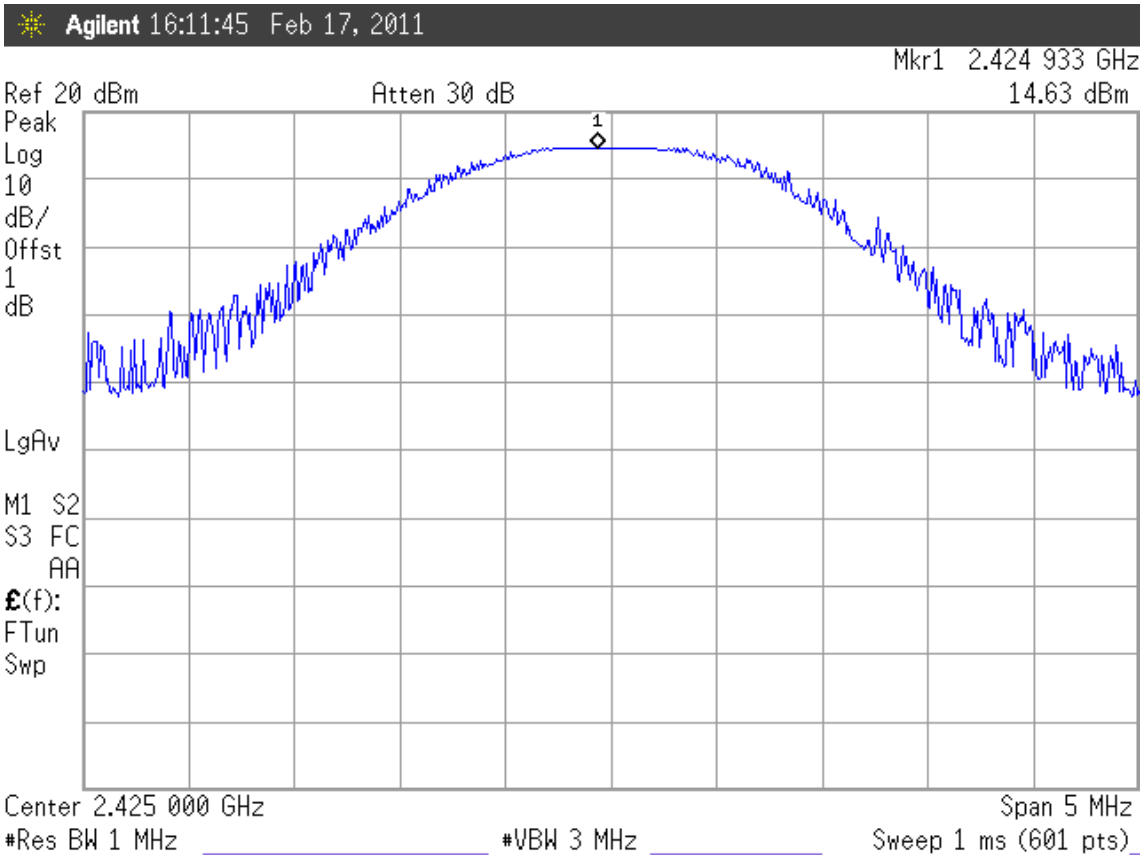
Test Date : Feb. 17, 2011 Temperature :24℃ Humidity : 54%

No.	Channel	Test Frequency	**Peak Output Power**	Limit
1.	01	2404.000MHz	**15.83dBm**	21dBm
2.	15	2425.000MHz	**14.63dBm**	21dBm
3.	30	2447.500MHz	**13.88dBm**	21dBm

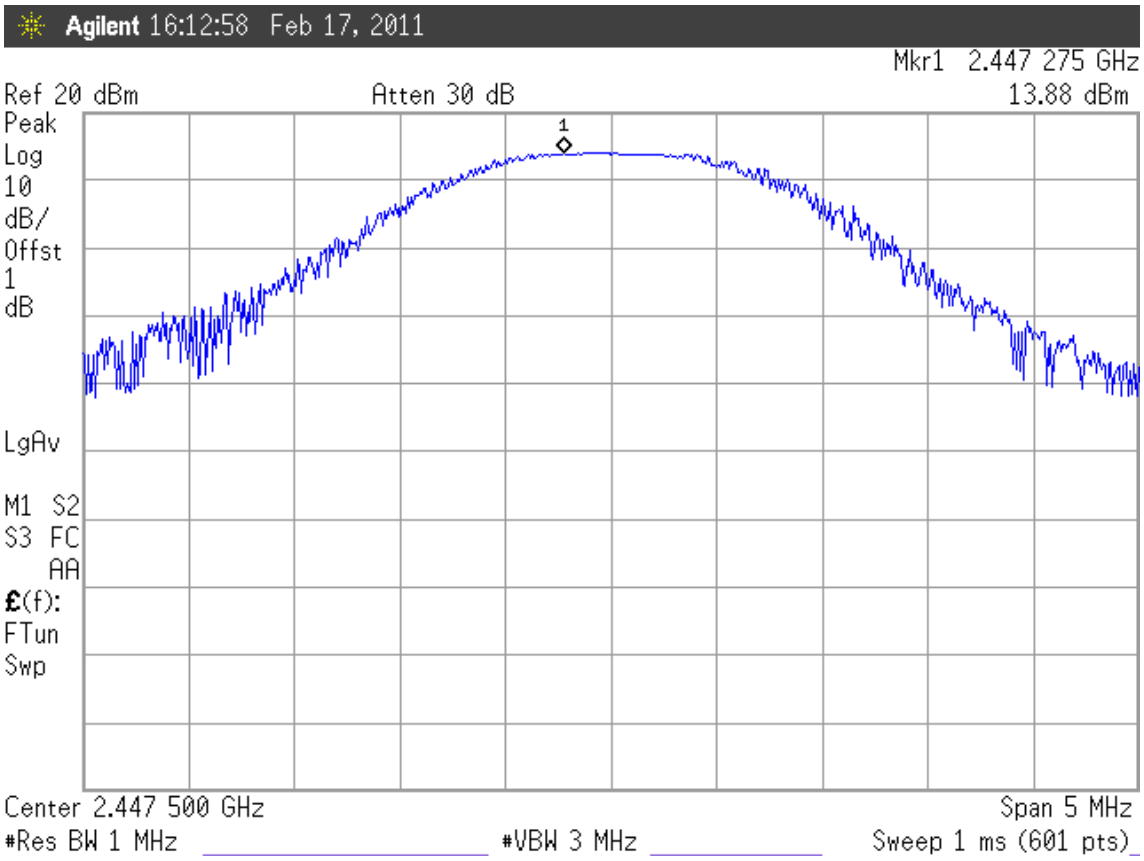
8.6.1. Channel 01, Frequency: 2404.000MHz



8.6.2. Channel 15, Frequency: 2425.000MHz



8.6.3. Channel 30, Frequency: 2447.500MHz



9. EMISSION LIMITATIONS MEASUREMENT

9.1. Test Equipment

The following test equipment was used during the emission limitations measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9010A-526	MY48031076	Oct. 05, 10’	Oct. 04, 11’

9.2. Block Diagram of Test Setup

The same as section.4.2.

9.3. Specification Limits (§15.247(c))

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in 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)).(※ This test result attaching to §3.6.3)

9.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

9.5. Test Procedure (DA 00-705)

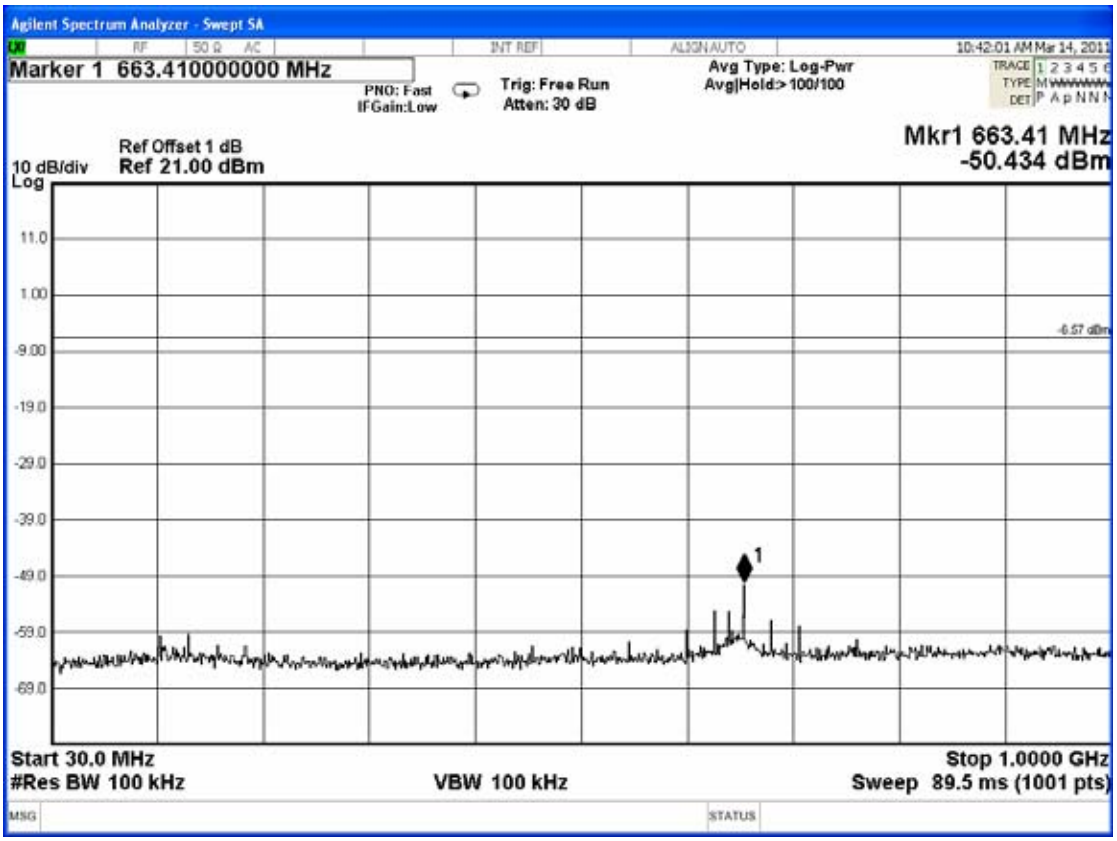
The transmitter output was connected to the spectrum analyzer. Set both RBW and VBW of spectrum analyzer to 100kHz with frequency range from 30MHz to 25GHz.

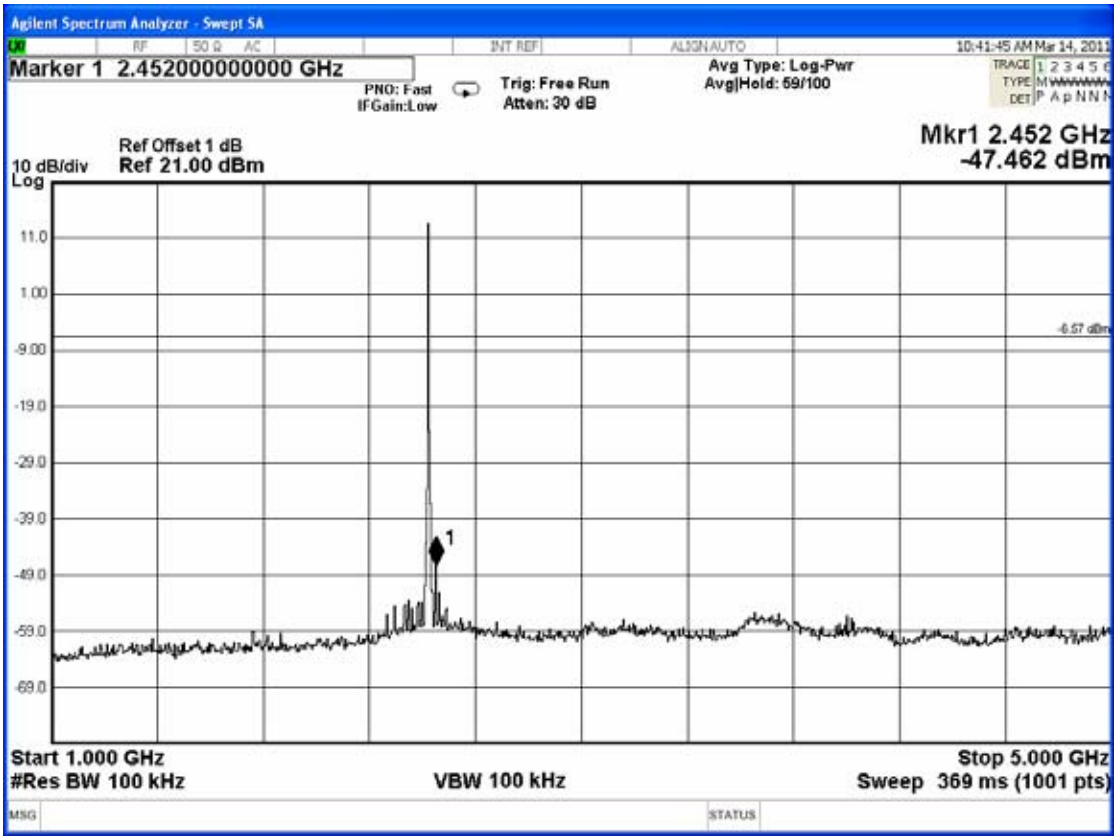
9.6. Test Results

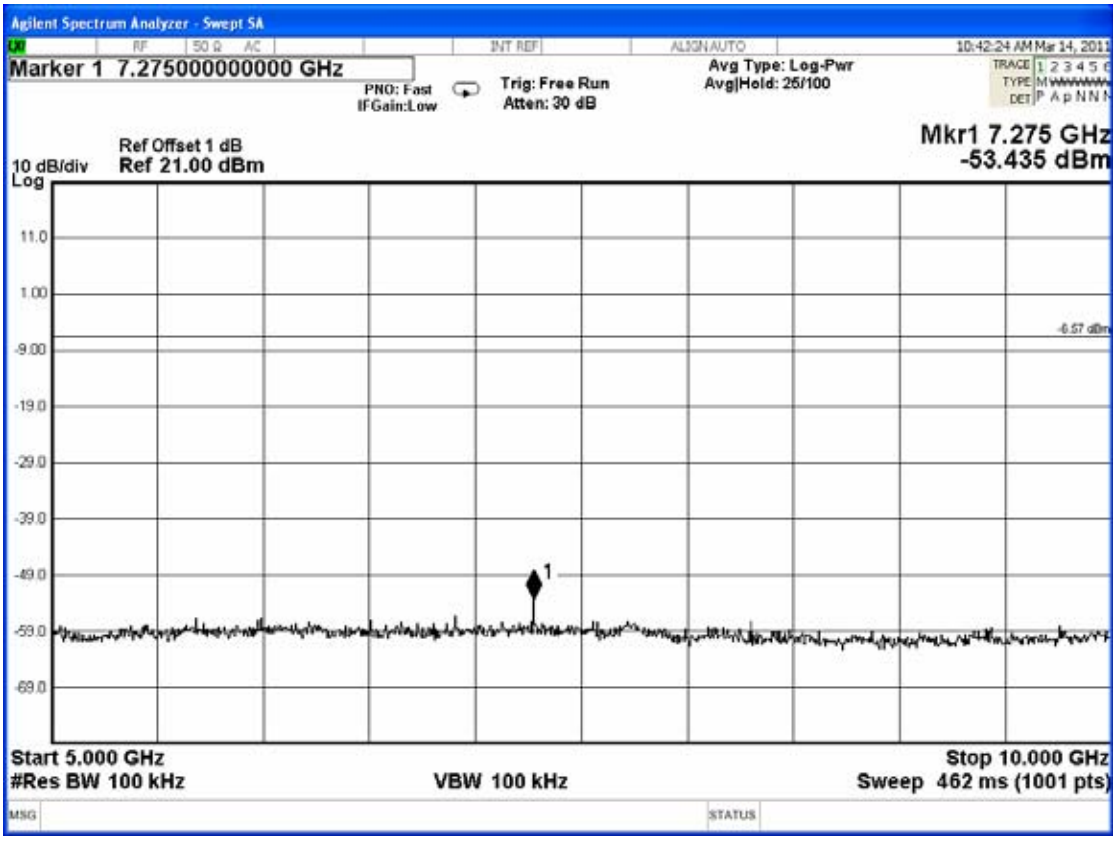
PASSED. All the test results are attached in next pages.

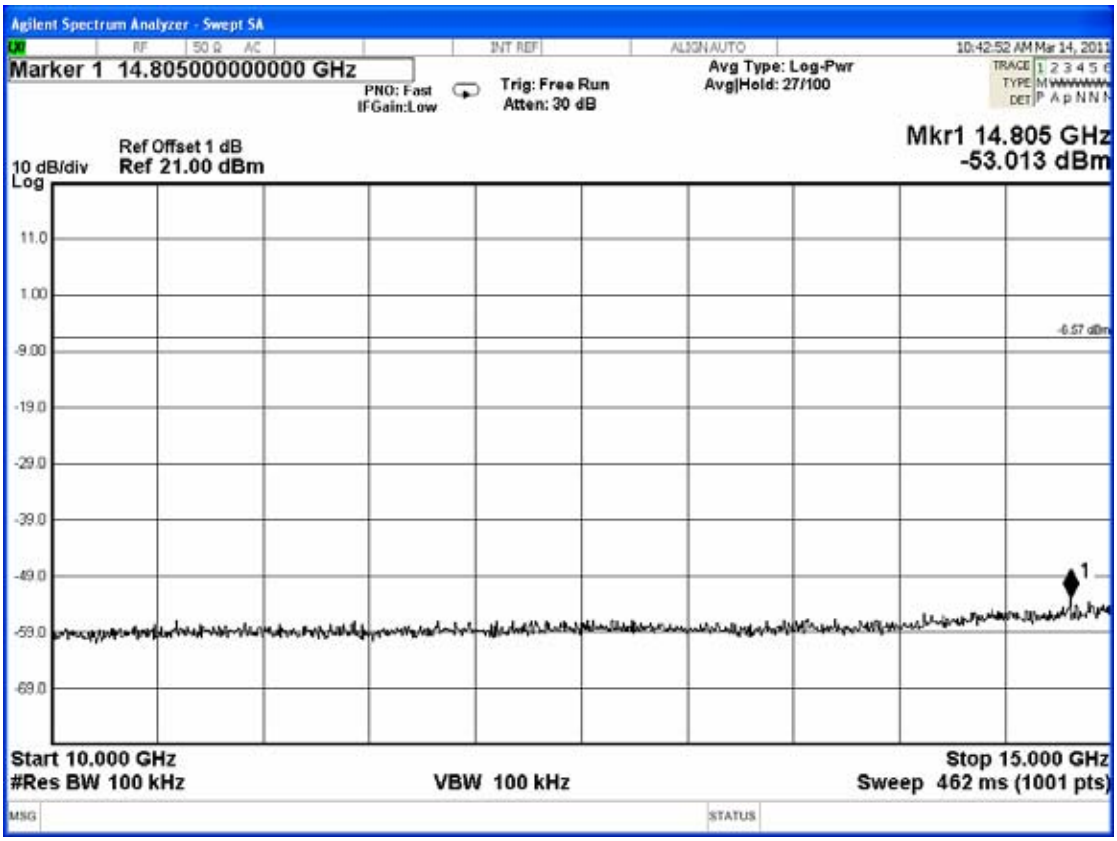
Test Date : Mar. 14, 2011 Temperature :24℃ Humidity : 49%

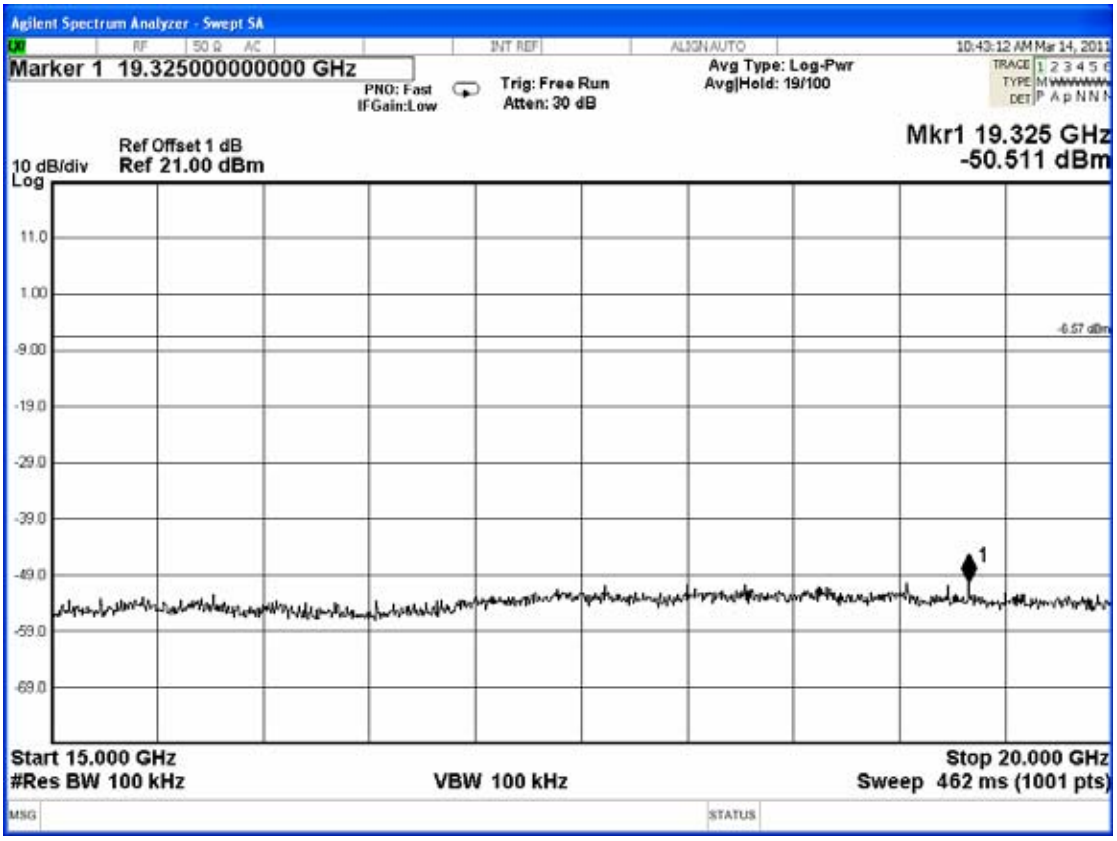
9.6.1. Channel 01, Frequency: 2404.000MHz

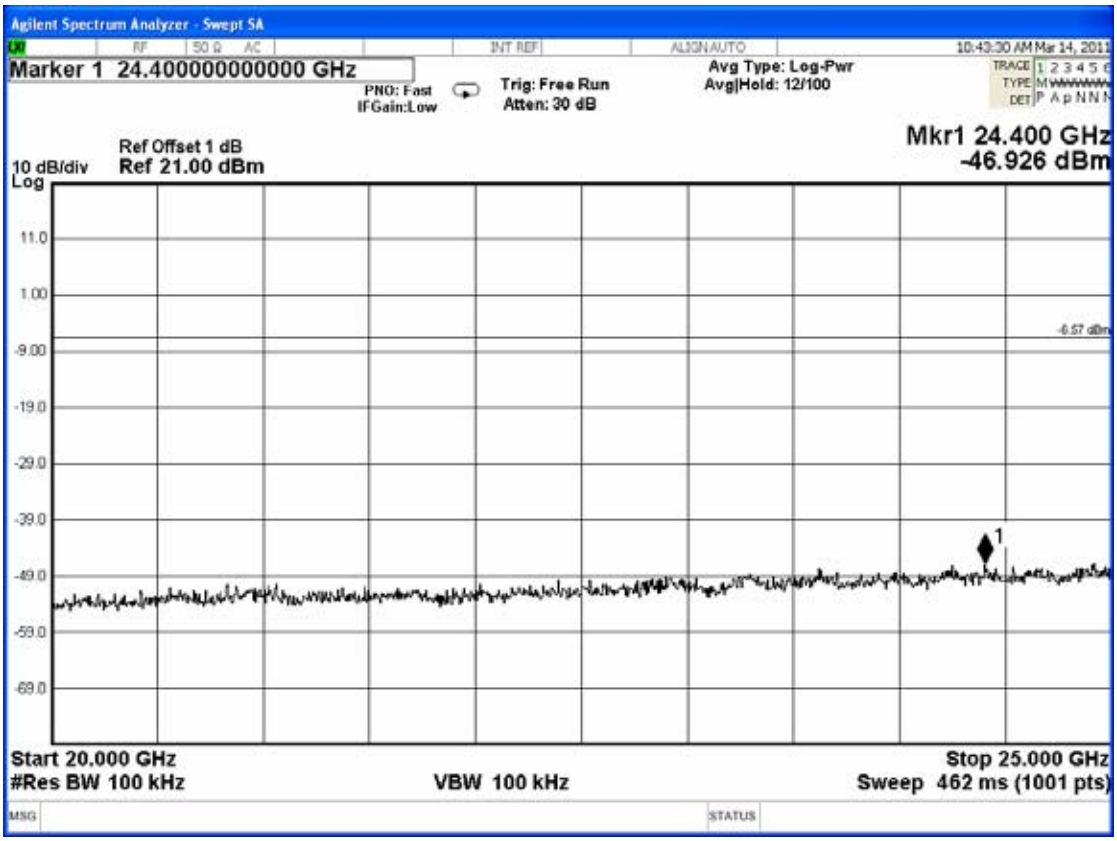




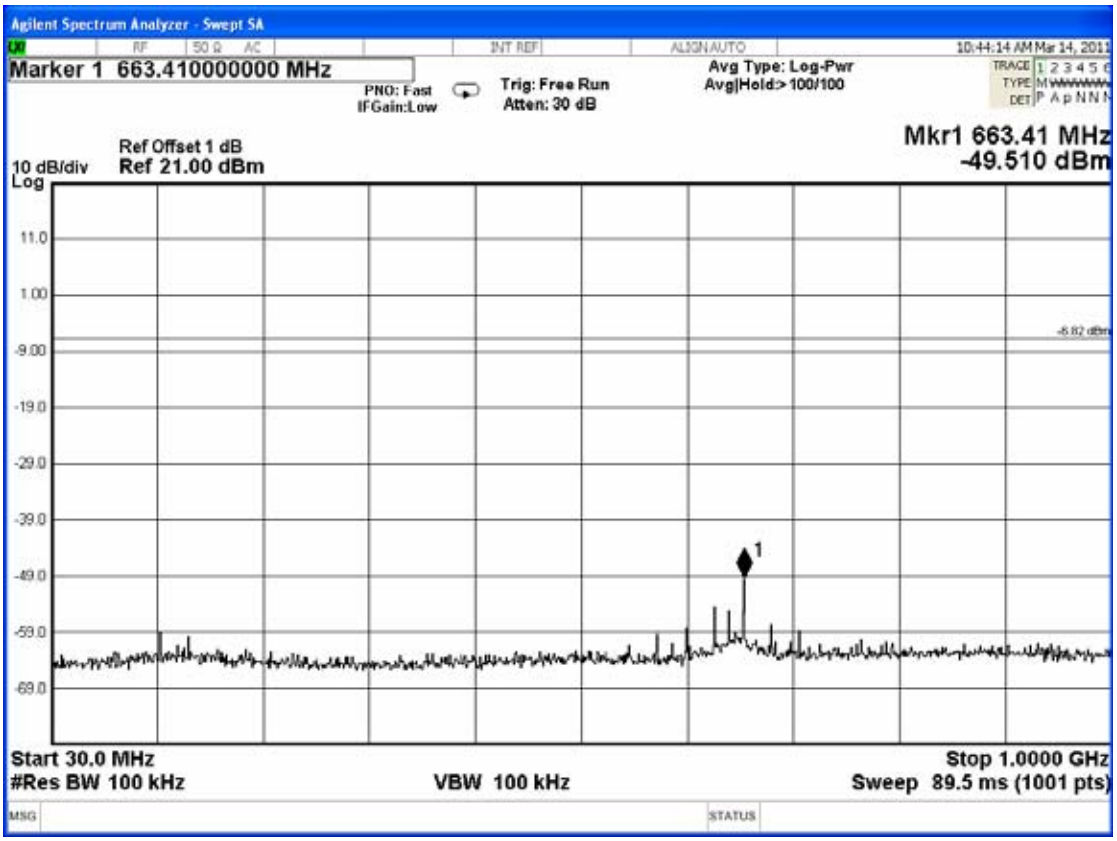

Agilent Spectrum Analyzer - Swept SA
Marker 1 7.275000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 25/100
10:42:24 AM Mar 14, 2011
Mkr1 7.275 GHz
-53.435 dBm
Ref Offset 1 dB
10 dB/div
Log
Ref 21.00 dBm
11.0
1.00
-9.00
-19.0
-29.0
-39.0
-49.0
-59.0
-69.0
-6.57 dBm
Start 5.000 GHz
#Res BW 100 kHz
VBW 100 kHz
Stop 10.000 GHz
Sweep 462 ms (1001 pts)

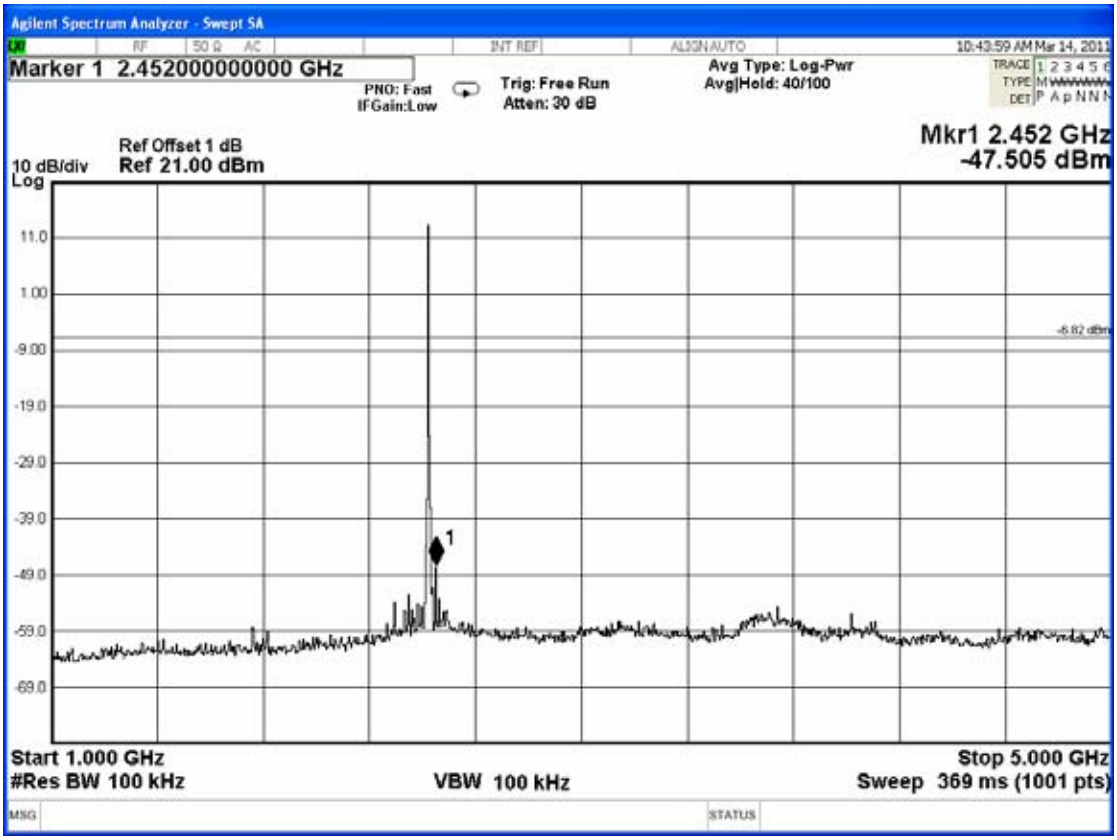

Agilent Spectrum Analyzer - Swept SA
Marker 1 14.805000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 27/100
10:42:52 AM Mar 14, 2011
Mkr1 14.805 GHz
-53.013 dBm
Ref Offset 1 dB
10 dB/div
Log
Ref 21.00 dBm
11.0
1.00
-9.00
-19.0
-29.0
-39.0
-49.0
-59.0
-69.0
-6.57 dBm
Start 10.000 GHz
#Res BW 100 kHz
VBW 100 kHz
Stop 15.000 GHz
Sweep 462 ms (1001 pts)

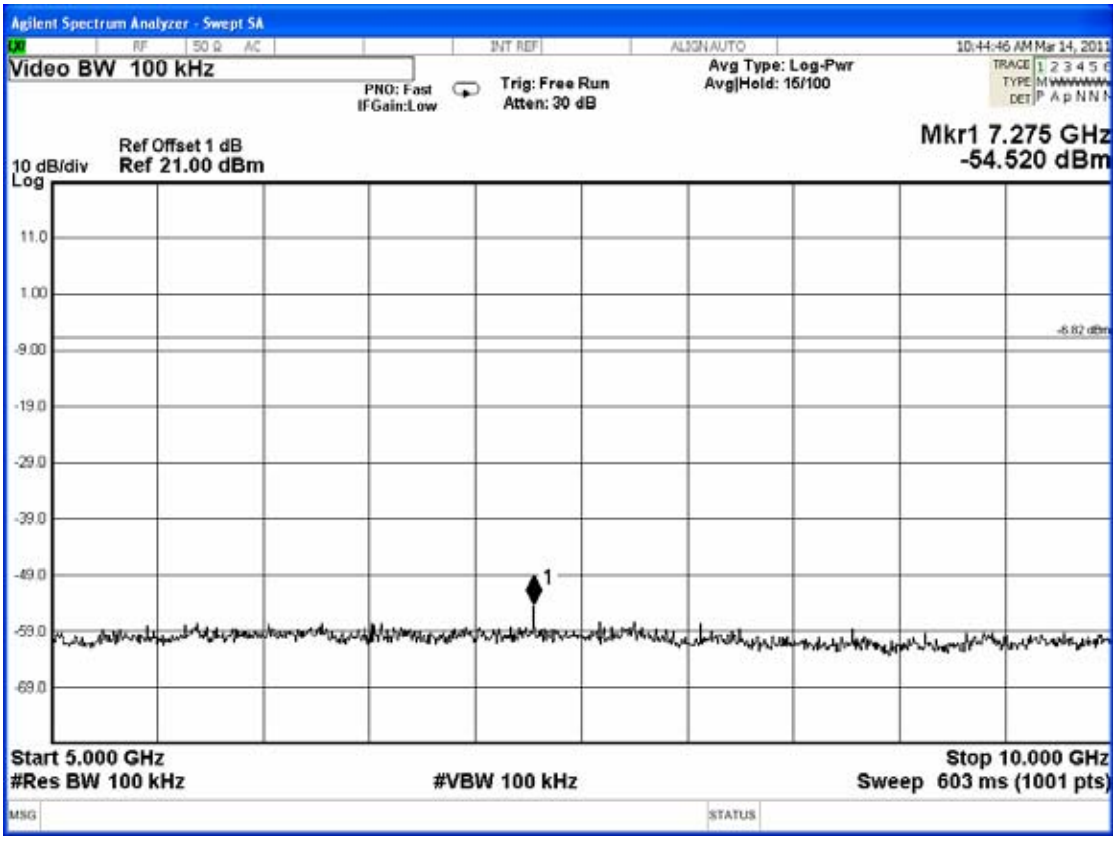

Agilent Spectrum Analyzer - Swept SA
Marker 1 19.325000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 19/100
10:43:12 AM Mar 14, 2011
Ref Offset 1 dB
10 dB/div
Ref 21.00 dBm
Log
Mkr1 19.325 GHz
-50.511 dBm
11.0
1.00
-9.00
-19.0
-29.0
-39.0
-49.0
-59.0
-69.0
Start 15.000 GHz
#Res BW 100 kHz
VBW 100 kHz
Stop 20.000 GHz
Sweep 462 ms (1001 pts)

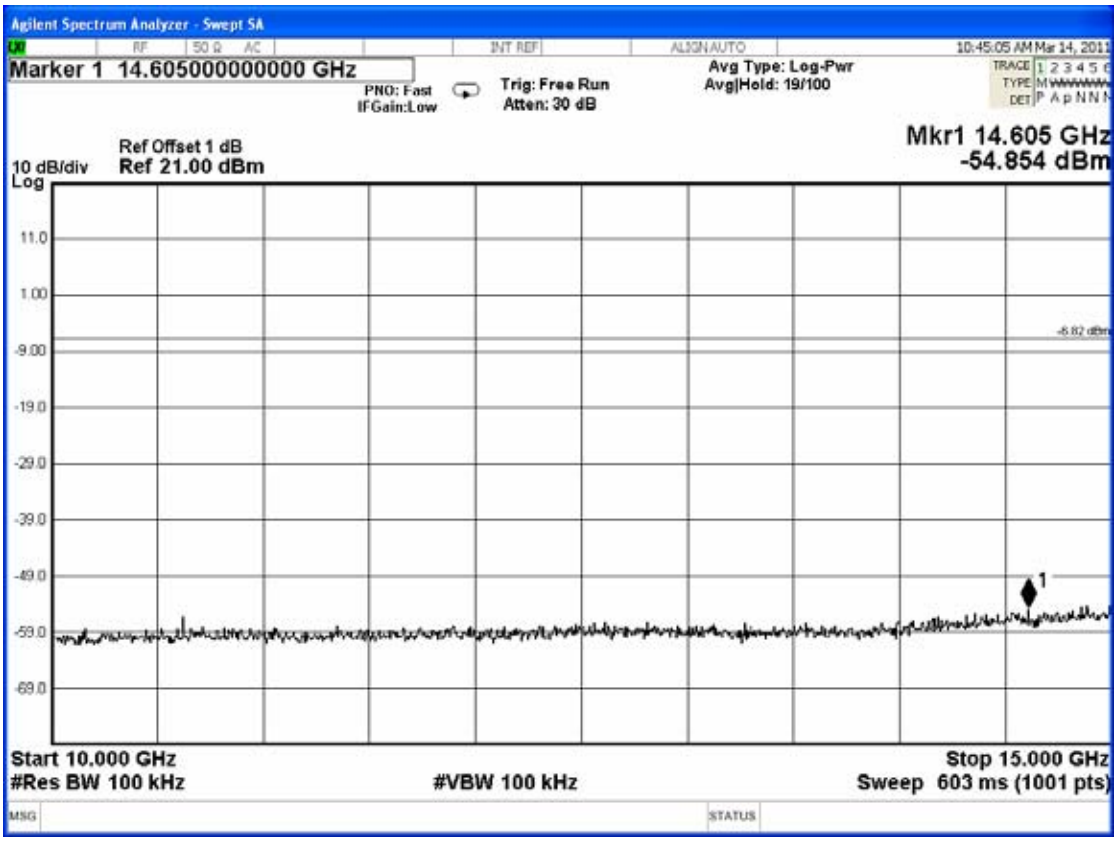

Agilent Spectrum Analyzer - Swept SA
Marker 1 24.400000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 12/100
10:43:30 AM Mar 14, 2011
Ref Offset 1 dB
10 dB/div
Ref 21.00 dBm
Log
Mkr1 24.400 GHz
-46.926 dBm
11.0
1.00
-9.00
-19.0
-29.0
-39.0
-49.0
-59.0
-69.0
Start 20.000 GHz
#Res BW 100 kHz
VBW 100 kHz
Stop 25.000 GHz
Sweep 462 ms (1001 pts)

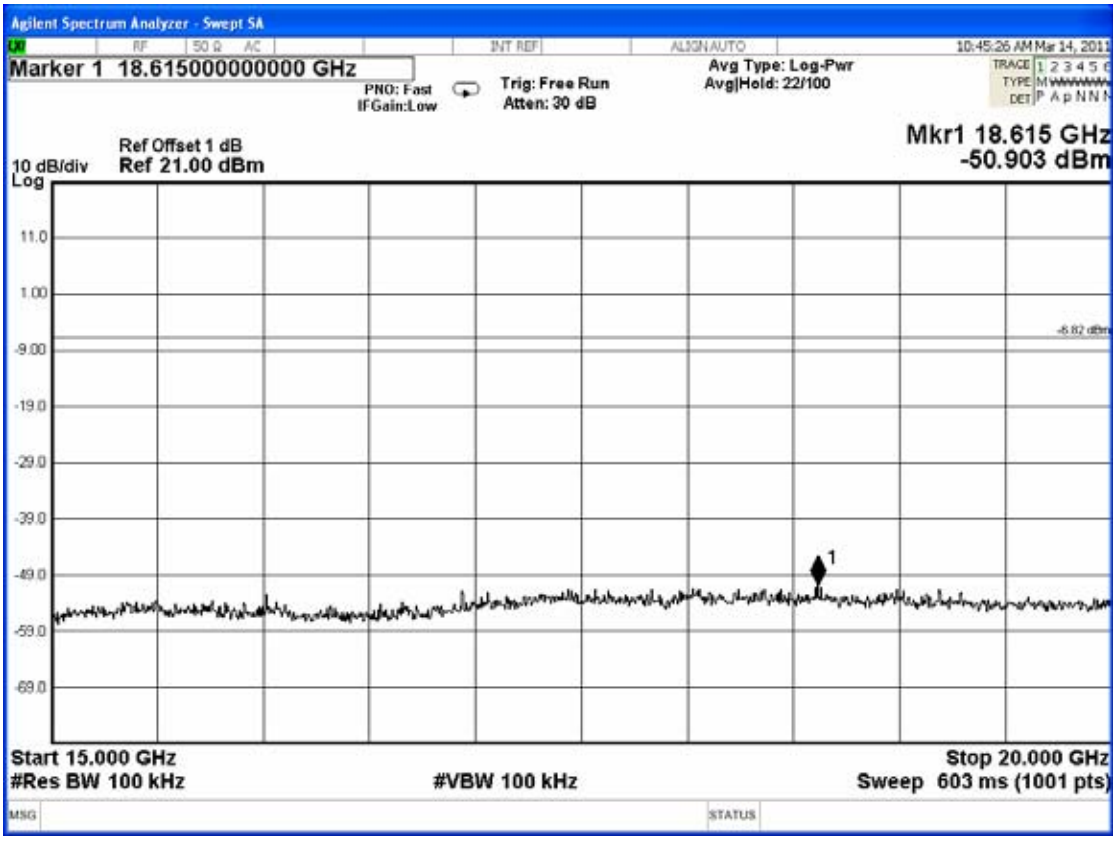
9.6.2. Channel 15, Frequency: 2425.000MHz

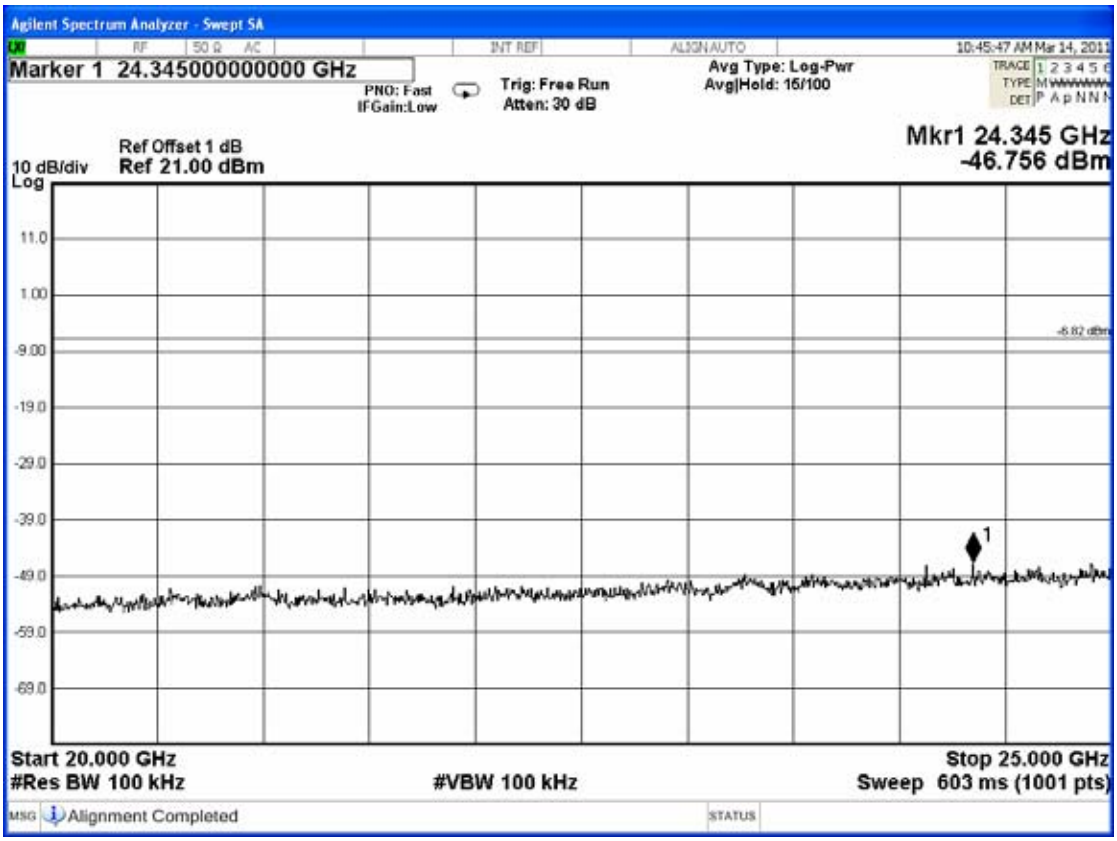




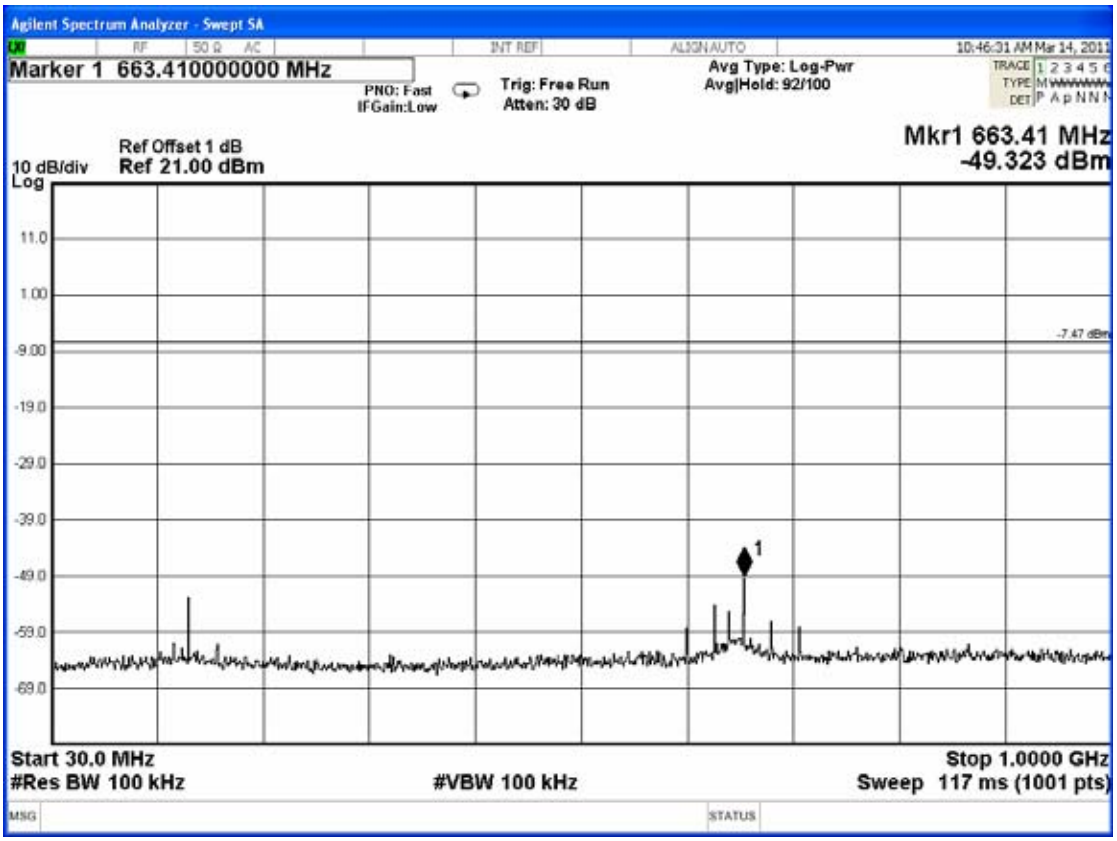

Agilent Spectrum Analyzer - Swept SA
Video BW 100 kHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 16/100
10:44:46 AM Mar 14, 2011
Mkr1 7.275 GHz
-54.520 dBm
Ref Offset 1 dB
10 dB/div
Log
Ref 21.00 dBm
11.0
1.00
-9.00
-19.0
-29.0
-39.0
-49.0
-59.0
-69.0
Start 5.000 GHz
#Res BW 100 kHz
#VBW 100 kHz
Stop 10.000 GHz
Sweep 603 ms (1001 pts)

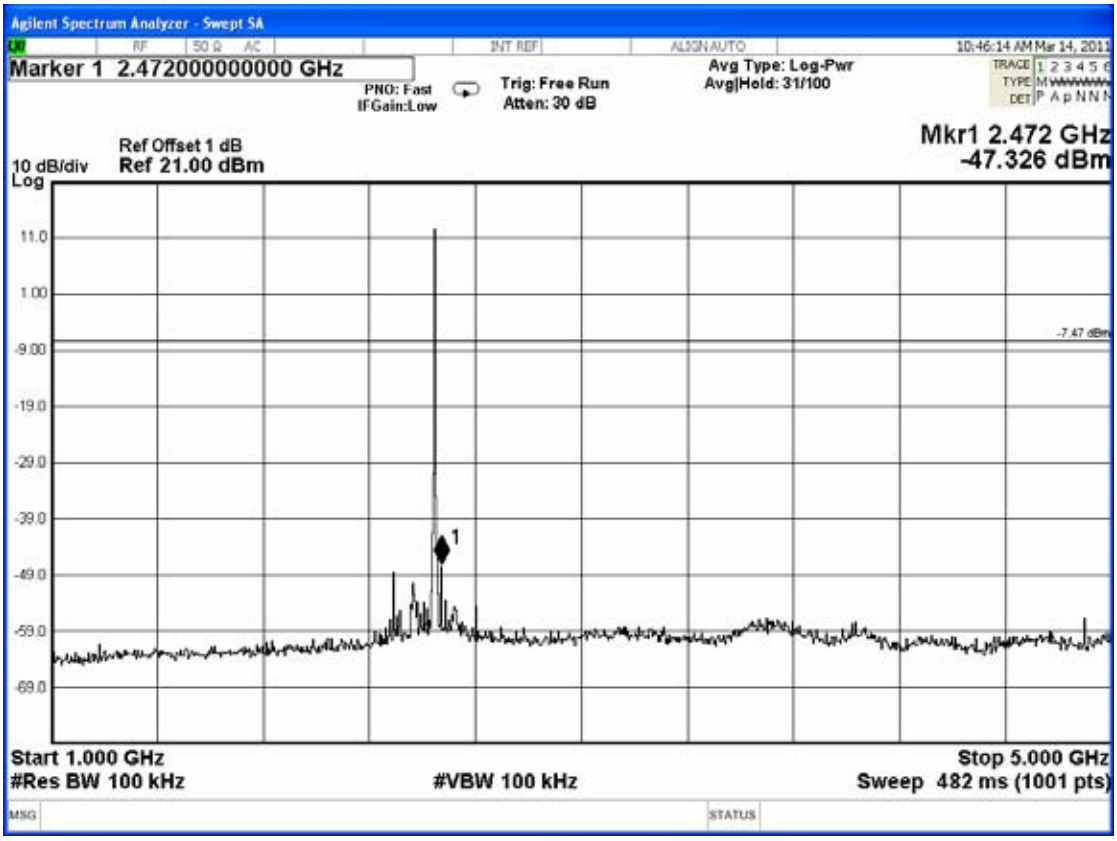

Agilent Spectrum Analyzer - Swept SA
Marker 1 14.605000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 19/100
10:45:05 AM Mar 14, 2011
Mkr1 14.605 GHz
-54.854 dBm
Ref Offset 1 dB
10 dB/div
Log
Ref 21.00 dBm
11.0
1.00
-9.00
-19.0
-29.0
-39.0
-49.0
-59.0
-69.0
Start 10.000 GHz
#Res BW 100 kHz
#VBW 100 kHz
Stop 15.000 GHz
Sweep 603 ms (1001 pts)

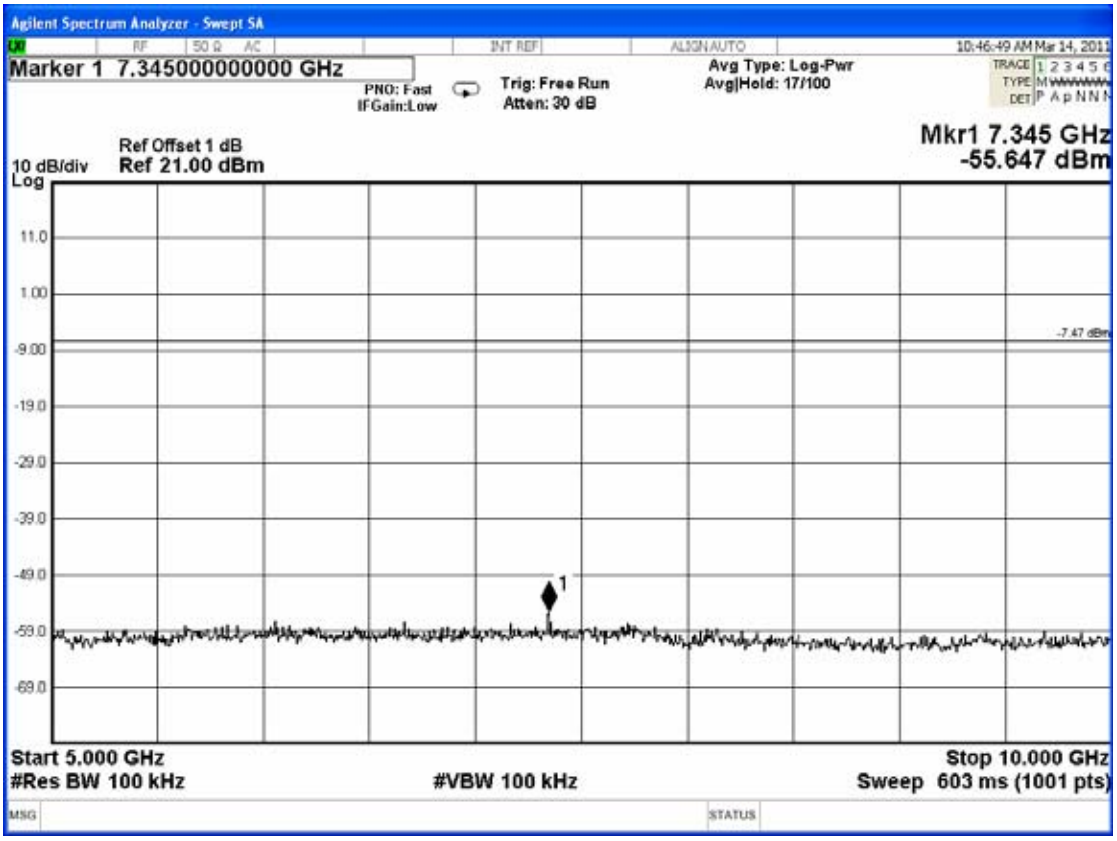

Agilent Spectrum Analyzer - Swept SA
Marker 1 18.615000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 22/100
10:45:26 AM Mar 14, 2011
Ref Offset 1 dB
10 dB/div
Ref 21.00 dBm
Log
Mkr1 18.615 GHz
-50.903 dBm
11.0
1.00
-9.00
-19.0
-29.0
-39.0
-49.0
-59.0
-69.0
Start 15.000 GHz
#Res BW 100 kHz
#VBW 100 kHz
Stop 20.000 GHz
Sweep 603 ms (1001 pts)

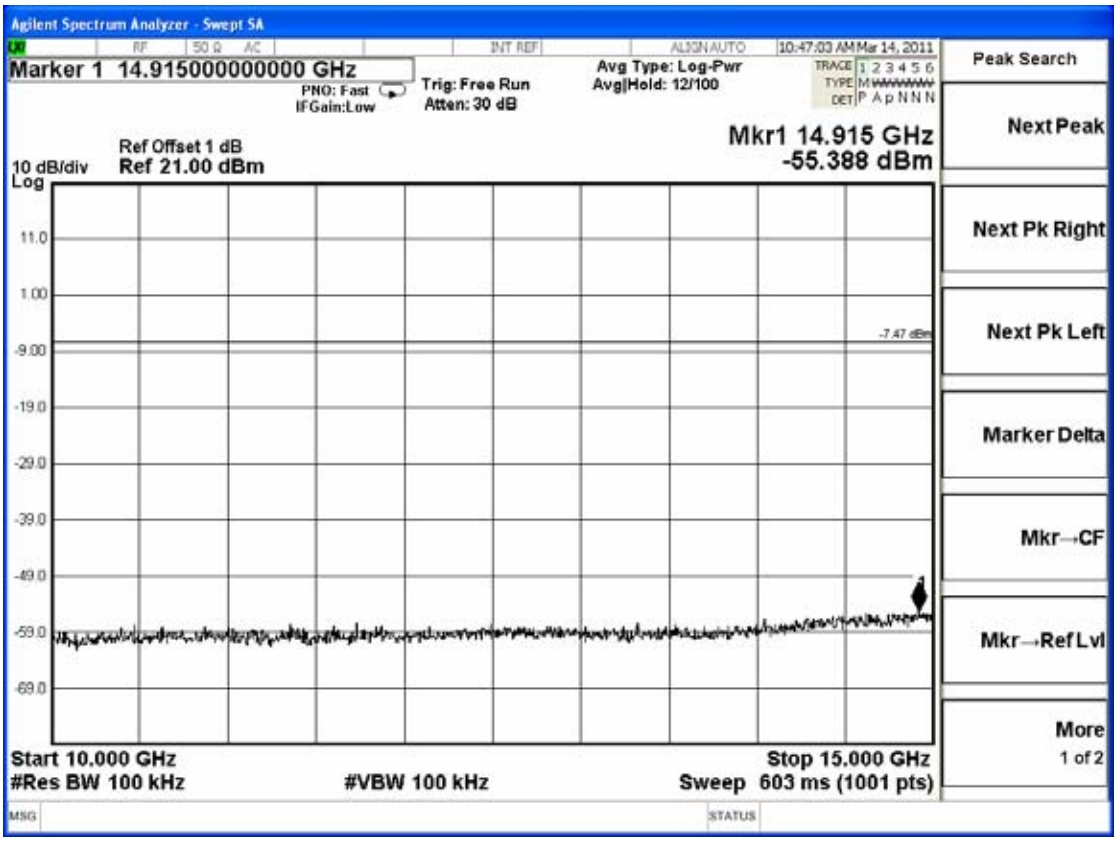

Agilent Spectrum Analyzer - Swept SA
Marker 1 24.345000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 16/100
10:45:47 AM Mar 14, 2011
Ref Offset 1 dB
10 dB/div
Ref 21.00 dBm
Log
Mkr1 24.345 GHz
-46.756 dBm
11.0
1.00
-9.00
-19.0
-29.0
-39.0
-49.0
-59.0
-69.0
Start 20.000 GHz
#Res BW 100 kHz
#VBW 100 kHz
Stop 25.000 GHz
Sweep 603 ms (1001 pts)
Alignment Completed

9.6.3. Channel 30, Frequency: 2447.500MHz

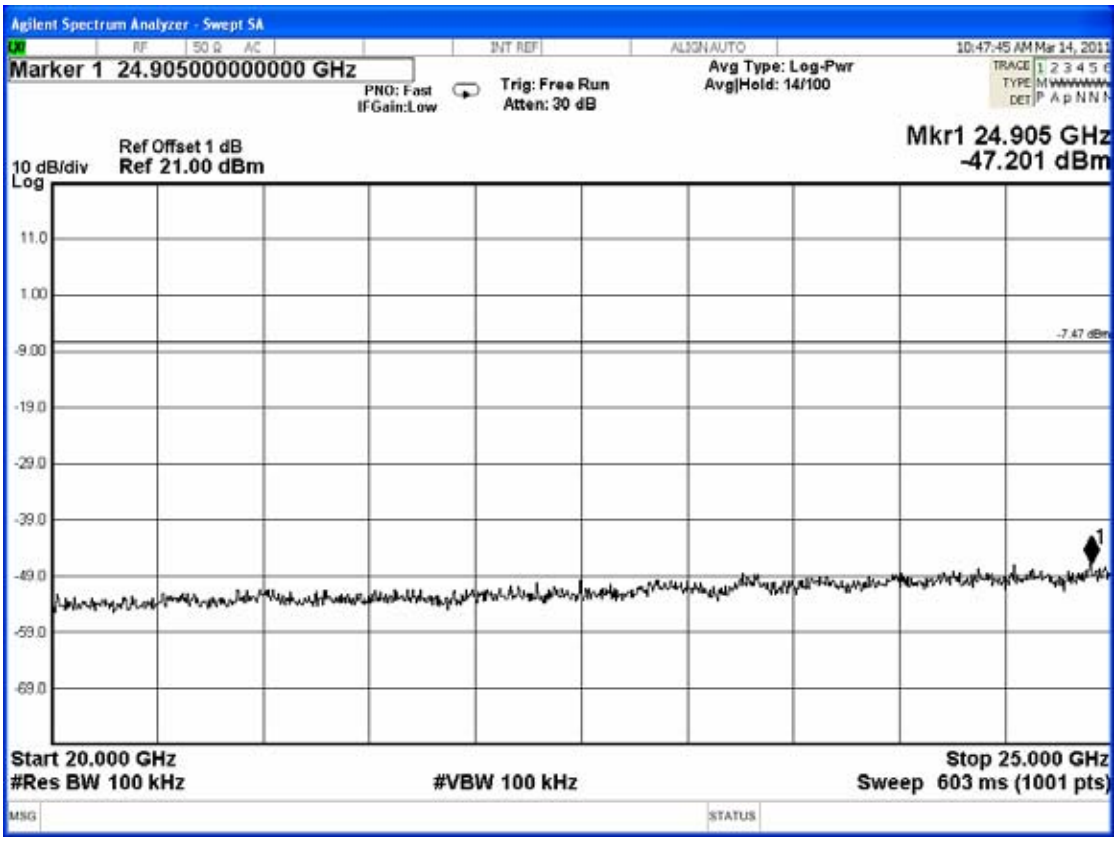





Agilent Spectrum Analyzer - Swept SA
Marker 1 7.345000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 17/100
Mkr1 7.345 GHz
-55.647 dBm
Ref Offset 1 dB
10 dB/div
Log
Ref 21.00 dBm
Start 5.000 GHz
#Res BW 100 kHz
#VBW 100 kHz
Stop 10.000 GHz
Sweep 603 ms (1001 pts)


Agilent Spectrum Analyzer - Swept SA
Marker 1 14.915000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 12/100
Mkr1 14.915 GHz
-55.388 dBm
Ref Offset 1 dB
10 dB/div
Log
Ref 21.00 dBm
Start 10.000 GHz
#Res BW 100 kHz
#VBW 100 kHz
Stop 15.000 GHz
Sweep 603 ms (1001 pts)
Peak Search
Next Peak
Next Pk Right
Next Pk Left
Marker Delta
Mkr→CF
Mkr→Ref Lvl
More
1 of 2


Agilent Spectrum Analyzer - Swept SA
Marker 1 17.415000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 16/100
10:47:29 AM Mar 14, 2011
Ref Offset 1 dB
10 dB/div
Ref 21.00 dBm
Log
Mkr1 17.415 GHz
-51.566 dBm
11.0
1.00
-9.00
-19.0
-29.0
-39.0
-49.0
-59.0
-69.0
-7.47 dBm
Start 15.000 GHz
#Res BW 100 kHz
#VBW 100 kHz
Stop 20.000 GHz
Sweep 603 ms (1001 pts)
MSG
STATUS


Agilent Spectrum Analyzer - Swept SA
Marker 1 24.905000000000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 30 dB
Avg Type: Log-Pwr
Avg|Hold: 14/100
10:47:45 AM Mar 14, 2011
Ref Offset 1 dB
10 dB/div
Ref 21.00 dBm
Log
Mkr1 24.905 GHz
-47.201 dBm
11.0
1.00
-9.00
-19.0
-29.0
-39.0
-49.0
-59.0
-69.0
-7.47 dBm
Start 20.000 GHz
#Res BW 100 kHz
#VBW 100 kHz
Stop 25.000 GHz
Sweep 603 ms (1001 pts)
MSG
STATUS

10. BAND EDGES MEASUREMENT

10.1. Test Equipment

The following test equipment was used during the band edges measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 04, 10'	Aug. 03, 11'

10.2. Block Diagram of Test Setup

The same as section.4.2.

10.3. Specification Limits (§15.247(c))

In any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in 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)). (※ This test result attaching to §3.6.3)

10.4. Operating Condition of EUT

Same as carrier frequency separation measurement which was listed in section 4.4.

10.5. Test Procedure (DA 00-705)

The transmitter output was connected to the spectrum analyzer. Set both RBW and VBW of spectrum analyzer to 100kHz with suitable frequency span including 100kHz bandwidth from band edge.

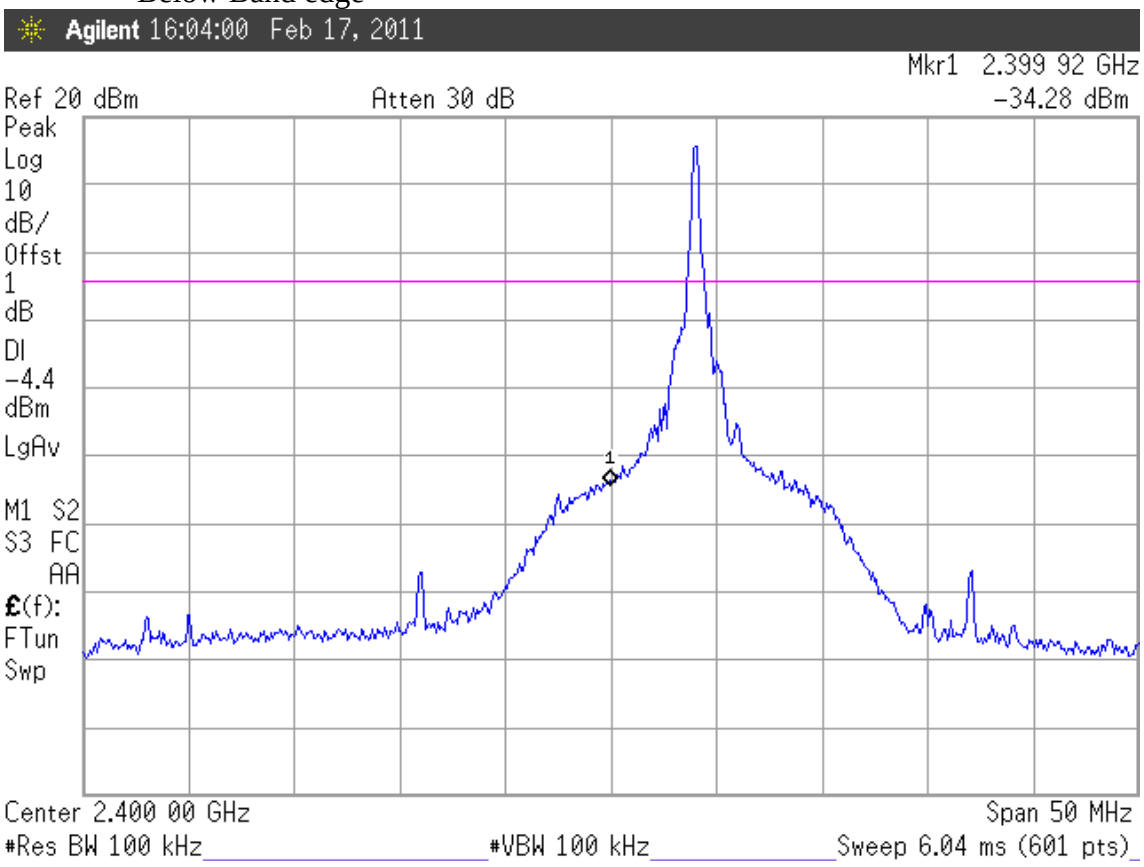
10.6. Test Results

PASSED. The testing data was attached in the next pages.

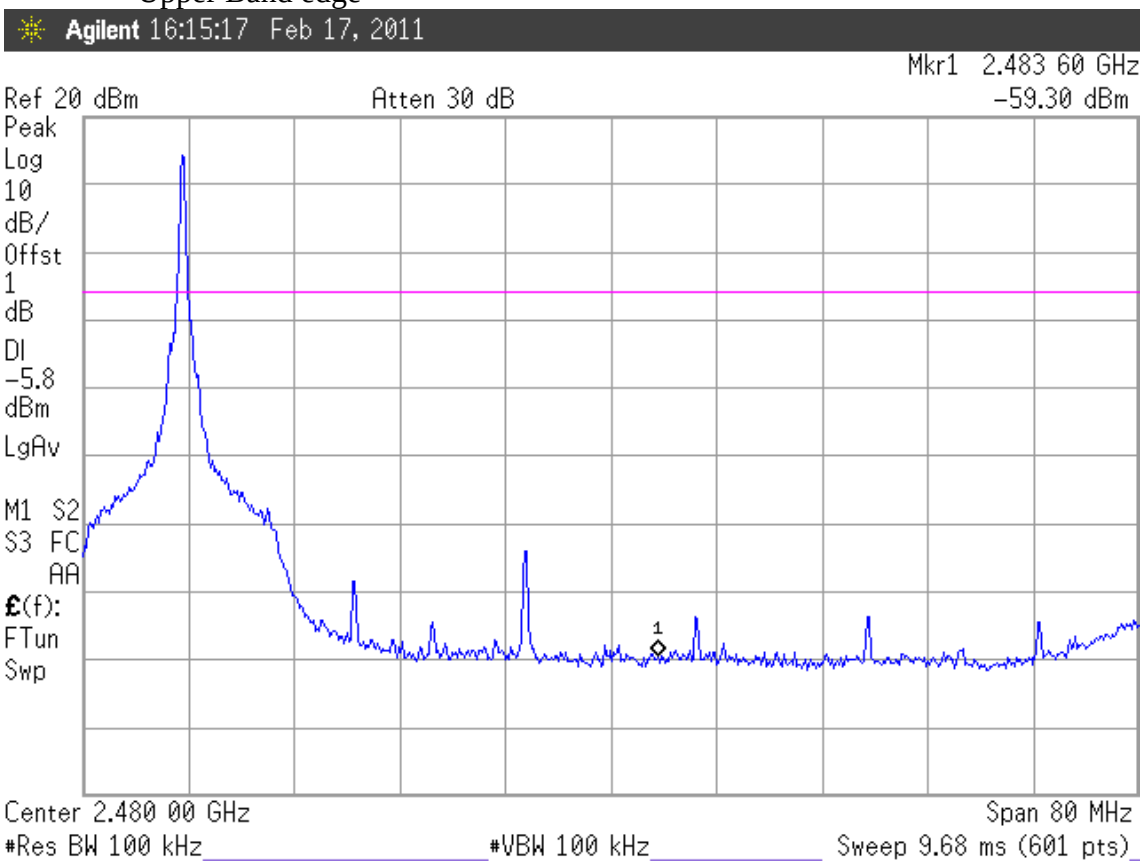
Test Date : Feb. 17, 2011 Temperature :24℃ Humidity : 54%

1. Below Band edge : The highest emission level is -34.28dBm on 2.39992GHz。
2. Upper Band edge: The highest emission level is -59.30dBm on 2.48360GHz。

Below Band edge



Upper Band edge



11. DEVIATION TO TEST SPECIFICATIONS

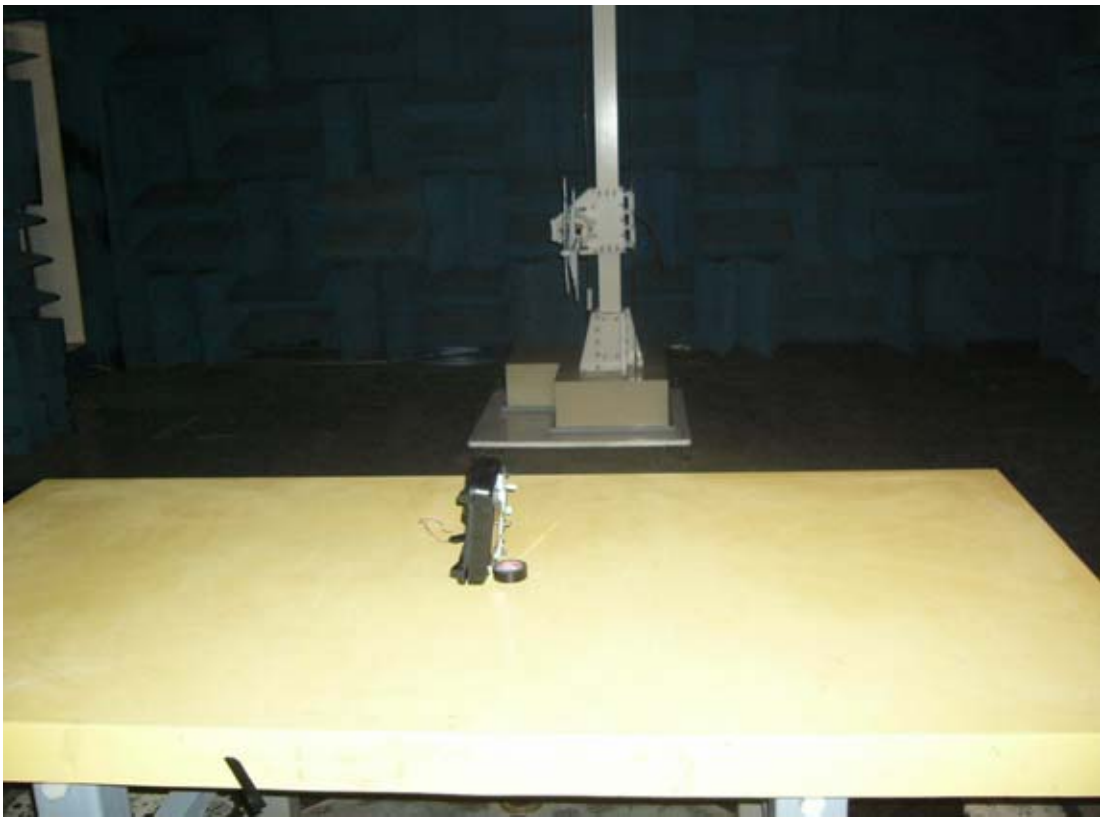
【NONE】

12. PHOTOGRAPHS

12.1. Photos of Radiated Measurement at Semi-Anechoic Chamber

12.1.1. Frequency Range 30MHz~1GHz, Stand

12.1.2. Frequency Range 30MHz~1GHz, Side



12.1.3.Frequency Range 30MHz~1GHz, Lie

12.1.4.Frequency Range Above 1GHz, Stand

12.1.5.Frequency Range Above 1GHz, Side

12.1.6.Frequency Range Above 1GHz, Lie

12.2.Photo of RF Conducted Measurement