



R/C UAV Testing on Government Contract

RE: Form 442 Q4: Government Project Description, Exhibit

File Number:

Confirmation Number:

Date: August 2020

Systems & Technology Research (STR) is leading an effort on the DARPA Mercury program. The program involves a series of technology maturation tests to be performed by the STR team throughout CY2020 at Fort Devens MA culminating in a system test not addressed within this request.

The contract number is FA8650-19-C-7927. The contracting agency is USAF, AFMC, AFRL Wright Research Site, 2130 Eighth Street, Building 45, Wright-Patterson AFB, OH 45433-7541.

This test is being conducted as part of the Mercury Program. Mercury is a classified DoD mission which includes the use of several UAVs carrying classified payloads. The UAVs must autonomously fly to predetermined waypoints, hover at those waypoints, and return to base. The frequency request is specific to the use of the Futaba R6208SB 2.4-2.485 GHz radio controller for safety operators to have joystick control of the UAV. This request applies a series of tests designed to mature the UAV with payload and control technology elements in preparation for a system demonstration at the end of CY2020. The system under test includes up to 5 modified commercial drones with a payload + communications + PNT and a ground system comprised of a ground mission controller (GMC), a ground analysis computer (GAC), and a ground payload computer. Initial tests are designed to demonstrate aircraft flight control. These flights will use surrogate payloads having identical form and mass properties to the actual payload to assess flight characteristics and the ability of the UAVs to perform required maneuvers. Once aircraft flight is confirmed, flight tests will be conducted to demonstrate successful integration and functionality of the ground and airborne elements of the system. The aircraft will be commanded over a COTs communications channel (file number 0130-EX-CM-2020) executing pre-planned flight patterns. The next step will be the demonstration of multi-aircraft operations from the GAC over the COTs equipment communications channel. Upon completion of these incremental flight tests, information learned will inform final system updates.

Tests will be conducted by STR and the Charles Stark Draper Laboratory, Inc. (Draper) at the Devens Reserve Forces Training Area in Devens, MA and Army National Guard Camp Edwards in Mashpee, MA. The Air Force Research Laboratory (AFRL) will serve as the Lead Test Organization (LTO). The test team is comprised of members from AFRL/RYZ, STR, Draper, GeoScout, L3Harris, and Centauri.



Fort Devens: Altitudes will still be constrained to < 3,995 ft., confined to R4102 A & B.

Camp Edwards: Altitudes will still be constrained to < 9,000 ft., confined to R4101.

The request is for Radio Control (R/C) transmitter operations using the Futaba radio controllers (Futaba R6208SB 2.4 – 2.485 GHz). These are standard controllers developed for model aircraft

This effort will be expected to begin 01 September 2020 and extend through 28 February 2021.



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Experiment Overview

Systems & Technology Research (STR) is leading an effort on the DARPA Mercury program. The program involves a series of technology maturation tests to be performed by the STR team throughout CY2020 at Fort Devens MA culminating in a system test not addressed within this request.

Flight Test operations will occur in R-4102 A&B at the Devens Reserve Forces Training Area in Devens, MA and R-4101 at Army National Guard Base Camp Edwards in Mashpee, MA. The test will include up to 5 modified commercial drones with onboard payload/communications/PNT capabilities. The UAVs will be controlled via the Futaba R6208SB 2.4-2.485 GHz radio controller for safety operators via joystick. The UAVs will be restricted to the R-4102 A and B air space with a maximum altitude of 3,995 feet MSL and R-4101 air space with a maximum altitude of 9,000 feet MSL.

The FCC has previously granted a STA under WQ9XRB. The Futaba R6208SB has previously been approved by FCC for ISM band use under FCC ID AZPR6308SBT-24G.

This effort will be expected to begin in September 2020 and extend through February 2021. Four tests are planned, spaced approximately 2 months apart. Each test will last from 2-4 days.

Antenna Parameters:

The antenna is a simple two wire antenna. The antenna pattern is omni-directional. The antenna gain is -1.16 dBi.

EUT External Photos

Figure 1
General Appearance (Front & Side View)



Figure 2
General Appearance (Back & Side View)



APPLICATION FOR CERTIFICATION

On Behalf of
FUTABA Corporation
Radio Control
Model No. : R6308SBT
FCC ID : AZPR6308SBT-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, Dingfu, Linkou Dist.,
New Taipei City 244, Taiwan, R.O.C.

Tel : (02) 2609-9301, 2609-2133
Fax: (02) 2609-9303

File Number : C1M1201245
Report Number : EM-F1010321
Date of Test : Feb. 21 ~ Apr. 27, 2012
Date of Report : May 02, 2012

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TEST REPORT CERTIFICATION

Applicant : FUTABA Corporation
Manufacturer : FUTABA Corporation
EUT Description : Radio Control
FCC ID : AZPR6308SBT-24G
(A) Model No. : R6308SBT
(B) Serial No. : N/A
(C) Brand : Futaba
(D) Power Supply : DC 3.5V ~ 8.4V
(E) Test Voltage : DC 8.4V (Via DC Power Supply)

Measurement Procedure Used:

FCC RULES AND REGULATIONS PART 15 SUBPART C, Oct. 2010
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. 21 ~ Apr. 27, 2012 Date of Report : May 02, 2012

Producer : Tina Huang
(Tina Huang/Administrator)

Signatory : Ben Cheng
(Ben Cheng/Manager)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Radio Control
Model Number	:	R6308SBT
Serial Number	:	N/A
FCC ID	:	AZPR6308SBT-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	:	DSSS
Modulation	:	FSK
Frequency Band	:	2405.376MHz ~ 2472.960MHz
Tested Frequency	:	2405.376MHz (Channel 02) 2439.168MHz (Channel 35) 2472.960MHz (Channel 68)
Frequency Channel	:	23 channels
Antenna Gain	:	-1.16dBi
Date of Receipt of Sample	:	Jan. 30, 2012
Date of Test	:	Feb. 21 ~ Apr. 27, 2012

1.2. Tested Supporting System Details

1.2.1. DC POWER SUPPLY

Model Number	:	3303A
Serial Number	:	721773
Manufacturer	:	TOP WARD
DC Power Cable	:	Non-Shielded, Detachable, 0.8m
AC Power Cord	:	Non-Shielded, Detachable, 1.8m

1.3. Description of Test Facility

Name of Firm	:	AUDIX Technology Corporation EMC Department No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan, R.O.C.
Test Location & Facility (AC)	:	Semi-Anechoic Chamber No. 53-11, Dingfu, Linkou Dist., New Taipei City 244, Taiwan, R.O.C. May 14, 2009 Renewal on Federal Communication Commission Registration Number: 90993
NVLAP Lab. Code	:	200077-0
TAF Accreditation No	:	1724

1.4. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB)
Radiation Test (Distance: 3m)	30MHz~300MHz	± 2.91dB
	300MHz~1000MHz	± 2.74dB
	Above 1GHz	± 5.02dB

Remark: Uncertainty = $ku_c(y)$

Test Item	Uncertainty
6dB Bandwidth	± 0.05kHz
Maximum peak output power	± 0.33dBm
Emission Limitations	± 0.13dB
Band edges	± 0.13dB
Power spectral density	± 0.13dB

2. CONDUCTED EMISSION MEASUREMENT

【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)

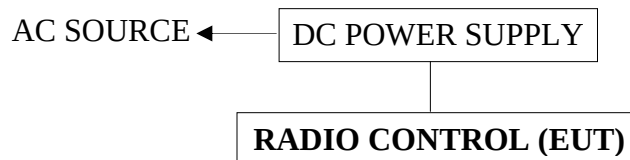
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 04, 11'	Aug. 03, 12'
2.	Test Receiver	R & S	ESCS30	100339	Jun. 23, 11'	Jun. 22, 12'
3.	Amplifier	HP	8447D	2944A06305	Feb. 13, 12'	Feb. 12, 13'
4.	Log Periodic Antenna	Schwarzbeck	UHALP 9108-A	0810	Mar. 03, 12'	Mar. 02, 13'
5.	Biconical Antenna	CHASE	VBA6106A	1264	Mar. 03, 12'	Mar. 02, 13'

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

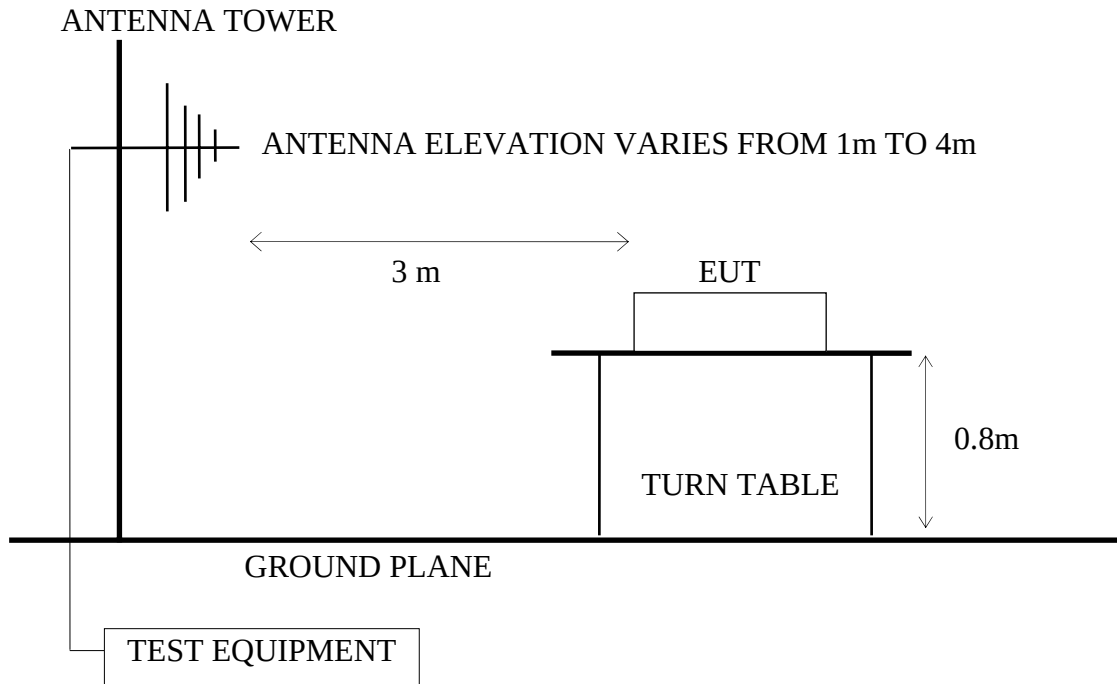
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 04, 11'	Aug. 03, 12'
2.	Test Receiver	R & S	ESCS30	100339	Jun. 23, 11'	Jun. 22, 12'
3.	Amplifier	HP	8449B	3008A00529	Dec. 09, 11'	Dec. 08, 12'
4.	Horn Antenna	EMCO	3115	9112-3775	May 09, 11'	May 08, 12'
5.	Horn Antenna	EMCO	3116	2653	Oct. 07, 11'	Oct. 06, 12'
6.	2.4GHz Notch Filter	EWT	EWT-14-007 0-R1	G2	Dec. 05, 11'	Dec. 04, 12'
7.	3.5GHz High Pass Filter	HP	84300-80038	005	Jan. 04, 12'	Jan. 03, 13'

3.2. Test Setup

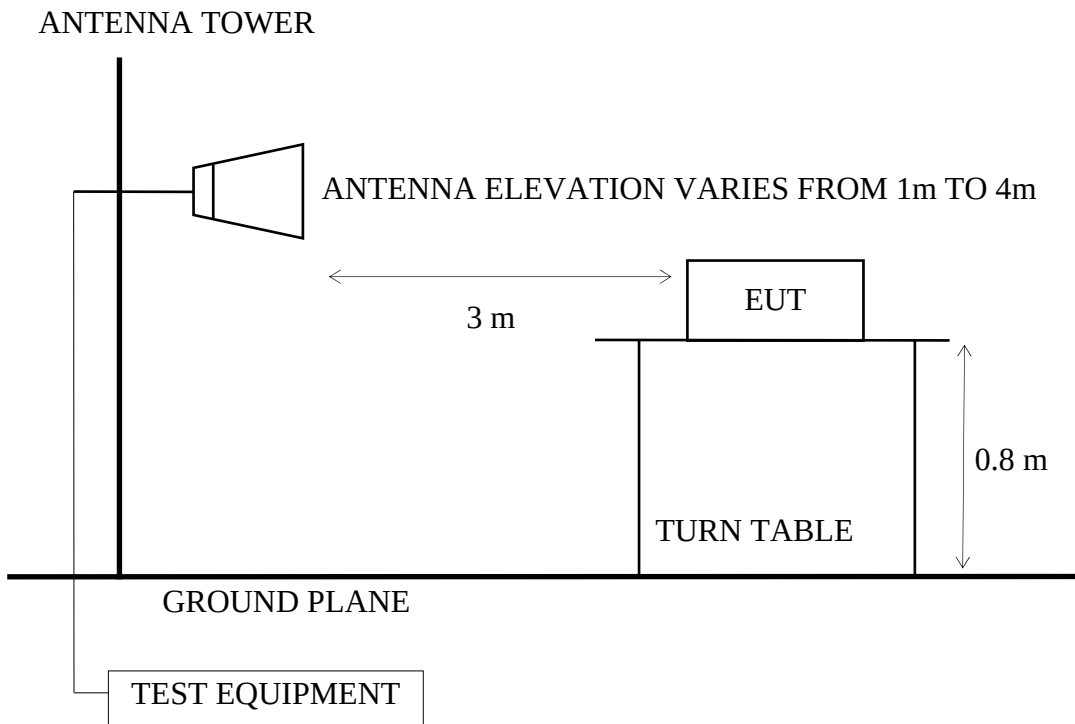
3.2.1. Block Diagram of connection between EUT and simulators



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	
		$\mu\text{V/m}$	$\text{dB}\mu\text{V/m}$
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 $\text{dB}\mu\text{V/m}$ (Peak) 54.0 $\text{dB}\mu\text{V/m}$ (Average)	

- Remark :
- (1) Emission level ($\text{dB}\mu\text{V/m}$) = 20 log Emission level ($\mu\text{V/m}$)
 - (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. The EUT was set to continuously transmit signals at 2405.376MHz 、2439.168MHz and 2472.960MHz 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 to 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 10th harmonics from fundamental frequency) was checked.

Above 1GHz was measured with peak and average detector. For frequency from 18GHz 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 : R6308SBT

Test Date : Apr. 27, 2012 Temperature : 24°C Humidity : 54%

For Frequency Range 30MHz~1000MHz:

R6308SBT has two antennas, but can't transmit simultaneously. We performed all testing at antenna 1 as it has a worst performance.

The EUT 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	Reference Test Data	
				Horizontal	Vertical
1.	02	2405.376MHz	Transmit	# 2	# 1
2.	35	2439.168MHz		# 1	# 2
3.	68	2472.960MHz		# 2	# 1

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

For Frequency above 1GHz:

The EUT 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	Test Frequency Range
1.	02	2405.376MHz	Transmit	1000-2680MHz
2.				2680-4000MHz
3.				4000-5500MHz
4.				5500-11000MHz
5.				11000-18000MHz
6.				18000-25000MHz
7.	35	2439.168MHz	Transmit	1000-2680MHz
8.				2680-4000MHz
9.				4000-5500MHz
10.				5500-11000MHz
11.				11000-18000MHz
12.				18000-25000MHz
13.	68	2472.960MHz	Transmit	1000-2680MHz
14.				2680-4000MHz
15.				4000-5500MHz
16.				5500-11000MHz
17.				11000-18000MHz
18.				18000-25000MHz

Note: 1. Above all final readings were measured with Peak and Average detector.
 2. The emissions (up to 25GHz) not reported are too low to be measured.

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.	02	2405.376MHz	Transmit	# 3	# 1
2.	68	2472.960MHz	Transmit	# 7	# 5

3.6.1. Frequency Range 30-1000MHz

Frequency: 2405.376MHz

Site no. : A/C Chamber Data no. : 2
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 24°C/54% □Jarwei Wang
 EUT : R6308SBT
 Power Rating : DC8.4V
 Test Mode : TX2405.376

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
48.090	17.32	1.40	5.97	24.68	40.00	15.32	QP
57.540	13.77	1.60	6.63	22.00	40.00	18.00	QP
105.330	17.65	2.15	6.28	26.08	43.50	17.42	QP
166.890	20.96	2.70	1.87	25.53	43.50	17.97	QP
803.300	24.20	6.90	8.69	39.79	46.00	6.21	QP

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

Site no. : A/C Chamber Data no. : 1
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 24°C/54% □Jarwei Wang
 EUT : R6308SBT
 Power Rating : DC8.4V
 Test Mode : TX2405.376

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
58.890	13.16	1.60	14.70	29.46	40.00	10.54	QP
93.990	16.37	2.00	5.03	23.39	43.50	20.11	QP
130.440	19.79	2.40	2.29	24.49	43.50	19.01	QP
166.890	20.96	2.70	1.81	25.47	43.50	18.03	QP
803.300	24.20	6.90	3.01	34.11	46.00	11.89	QP

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

Frequency: 2439.168MHz

Site no. : A/C Chamber Data no. : 1
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 24°C/54% □Jarwei Wang
 EUT : R6308SBT
 Power Rating : DC8.4V
 Test Mode : TX2439.168

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
56.730	13.77	1.60	8.29	23.66	40.00	16.34	QP
93.990	16.37	2.00	5.87	24.23	43.50	19.27	QP
166.890	20.96	2.70	1.37	25.03	43.50	18.47	QP
813.800	23.98	7.00	6.89	37.87	46.00	8.13	QP

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

Site no. : A/C Chamber Data no. : 2
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 24°C/54% □Jarwei Wang
 EUT : R6308SBT
 Power Rating : DC8.4V
 Test Mode : TX2439.168

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
48.090	17.32	1.40	4.50	23.21	40.00	16.79	QP
93.990	16.37	2.00	4.29	22.65	43.50	20.85	QP
254.640	24.19	3.56	10.24	37.99	46.00	8.01	QP
325.900	15.15	4.20	2.83	22.19	46.00	23.81	QP
813.800	23.98	7.00	1.11	32.09	46.00	13.91	QP

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

Frequency: 2472.960MHz

Site no. : A/C Chamber Data no. : 2
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 24°C/54% □Jarwei Wang
 EUT : R6308SBT
 Power Rating : DC8.4V
 Test Mode : TX2472.960

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
48.090	17.32	1.40	5.00	23.71	40.00	16.29	QP
58.080	13.43	1.60	6.43	21.47	40.00	18.53	QP
93.990	16.37	2.00	6.24	24.60	43.50	18.90	QP
166.890	20.96	2.70	1.21	24.87	43.50	18.63	QP

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

Site no. : A/C Chamber Data no. : 1
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL
 Limit : FCC PART-15C
 Env. / Ins. : E4446A 24°C/54% □Jarwei Wang
 EUT : R6308SBT
 Power Rating : DC8.4V
 Test Mode : TX2472.960

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
51.330	15.96	1.50	16.20	33.66	40.00	6.34	QP
56.190	14.11	1.60	15.44	31.16	40.00	8.84	QP
102.090	17.29	2.10	4.17	23.56	43.50	19.94	QP
166.890	20.96	2.70	2.88	26.54	43.50	16.96	QP

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 : May 17, 2012 Temperature : 24°C

EUT : Radio Control Humidity : 54%

Test Mode : Transmitting Mode, Frequency: 2405.376MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)	Limits (dBμV/m)	Margin (dB)
1818.160	26.90	6.80	17.58	51.29	74.00	22.71
3210.640	30.77	7.36	17.61	55.74	74.00	18.26
4813.000	33.06	9.14	12.34	54.54	74.00	19.46
7227.000	35.88	11.25	8.22	55.36	74.00	18.64

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)	Duty Cycle Correction Factor (dB)	Average Value Horizontal (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1818.160	51.29	-25.34	25.95	54.00	28.05
3210.640	55.74	-25.34	30.40	54.00	23.60
4813.000	54.54	-25.34	29.20	54.00	24.80
7227.000	55.36	-25.34	30.02	54.00	23.98

Remarks: 1. Duty Cycle Correction Factor = $20\log(\text{cumulative on}/T) = 20\log(1.52\text{ms}/28.12\text{ms}) = -25.34$
 "T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
 2. Average value=Peak value+ Duty Cycle Correction Factor
 3. All final readings of measurement were with Average values.

Date of Test : May 17, 2012 Temperature : 24°C

EUT : Radio Control Humidity : 54%

Test Mode : Transmitting Mode, Frequency: 2405.376MHz

Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Vertical	Emission Level Vertical	Limits	Margin
(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)
1821.520	26.90	6.80	17.42	51.12	74.00	22.88
3210.640	30.77	7.36	16.39	54.52	74.00	19.48
4813.000	33.06	9.14	16.59	58.79	74.00	15.21
7227.000	35.88	11.25	15.56	62.70	74.00	11.30
12029.000	39.35	14.96	9.56	63.88	74.00	10.12

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	Peak Value	Duty Cycle Correction Factor	Average Value Vertical	Limit	Margin
(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
1821.520	51.12	-25.34	25.78	54.00	28.22
3210.640	54.25	-25.34	29.18	54.00	24.82
4813.000	58.79	-25.34	33.45	54.00	20.55
7227.000	62.70	-25.34	37.36	54.00	16.64
12029.00	63.88	-25.34	38.54	54.00	15.46

Remarks: 1. Duty Cycle Correction Factor = $20\log(\text{cumulative on}/T) = 20\log(1.52\text{ms}/28.12\text{ms}) = -25.34$
 "T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
 2. Average value=Peak value+ Duty Cycle Correction Factor
 3. All final readings of measurement were with Average values.

Date of Test : May 17, 2012 Temperature : 24°C

EUT : Radio Control Humidity : 54%

Test Mode : Transmitting Mode, Frequency: 2439.168MHz

Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Horizontal	Emission Level Horizontal	Limits	Margin
(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)
1821.520	26.90	6.80	16.40	50.10	74.00	23.90
3252.880	30.87	7.40	16.34	54.60	74.00	19.40
4880.500	33.18	9.15	12.70	55.02	74.00	18.98
7326.000	36.15	11.44	11.30	58.89	74.00	15.11

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	Peak Value	Duty Cycle Correction Factor	Average Value Horizontal	Limit	Margin
(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
181.520	50.10	-25.34	24.74	54.00	29.24
3252.880	54.60	-25.34	29.26	54.00	24.74
4880.500	55.02	-25.34	29.68	54.00	24.32
7326.000	58.89	-25.34	33.55	54.00	20.45

Remarks: 1. Duty Cycle Correction Factor = $20\log(\text{cumulative on}/T) = 20\log(1.52\text{ms}/28.12\text{ms}) = -25.34$
 "T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
 2. Average value=Peak value+ Duty Cycle Correction Factor
 3. All final readings of measurement were with Average values.

Date of Test : May 17, 2012 Temperature : 24°C

EUT : Radio Control Humidity : 54%

Test Mode : Transmitting Mode, Frequency: 2439.168MHz

Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Vertical	Emission Level Vertical	Limits	Margin
(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)
1818.160	26.90	6.80	16.67	50.38	74.00	23.62
3252.880	30.87	7.40	15.71	53.97	74.00	20.03
4880.500	33.18	9.15	15.12	57.44	74.00	16.56
7326.000	36.15	11.44	16.19	63.78	74.00	10.22
9757.000	38.31	12.94	7.26	58.52	74.00	15.48
12183.000	39.13	15.01	7.77	61.91	74.00	12.09

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	Peak Value	Duty Cycle Correction Factor	Average Value Vertical	Limit	Margin
(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
1818.160	50.38	-25.34	25.04	54.00	28.96
3252.880	53.97	-25.34	28.63	54.00	25.37
4880.500	57.44	-25.34	32.10	54.00	21.90
7326.000	63.78	-25.34	38.44	54.00	15.56
9757.000	58.52	-25.34	33.18	54.00	20.82
12183.000	61.91	-25.34	36.57	54.00	17.43

Remarks: 1. Duty Cycle Correction Factor = $20\log(\text{cumulative on}/T) = 20\log(1.52\text{ms}/28.12\text{ms}) = -25.34$
 "T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
 2. Average value=Peak value+ Duty Cycle Correction Factor
 3. All final readings of measurement were with Average values.

Date of Test : May 17, 2012 Temperature : 24°C

EUT : Radio Control Humidity : 54%

Test Mode : Transmitting Mode, Frequency: 2472.960MHz

Emission Frequency	Antenna Factor	Cable Loss	Meter Reading Horizontal	Emission Level Horizontal	Limits	Margin
(MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)
1821.520	26.90	6.80	12.86	46.56	74.00	27.44
3299.080	30.93	7.45	13.84	52.22	74.00	21.78
4948.000	33.31	9.10	14.71	57.12	74.00	16.88
7436.000	36.47	11.61	10.89	58.97	74.00	15.03
14143.000	42.27	16.37	8.80	67.43	74.00	6.57

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	Peak Value	Duty Cycle Correction Factor	Average Value Horizontal	Limit	Margin
(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
1821.520	46.56	-25.34	21.22	54.00	32.78
3299.080	52.22	-25.34	26.88	54.00	27.12
4948.000	57.12	-25.34	31.78	54.00	22.22
7436.000	58.97	-25.34	33.63	54.00	20.37
14143.000	67.43	-25.34	42.09	54.00	11.91

Remarks: 1. Duty Cycle Correction Factor = $20\log(\text{cumulative on}/T) = 20\log(1.52\text{ms}/28.12\text{ms}) = -25.34$
 "T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
 2. Average value=Peak value+ Duty Cycle Correction Factor
 3. All final readings of measurement were with Average values.

Date of Test : May 17, 2012 Temperature : 24°C

EUT : Radio Control Humidity : 54%

Test Mode : Transmitting Mode, Frequency: 2472.960MHz

Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Vertical (dBμV)	Emission Level Vertical (dBμV/m)	Limits (dBμV/m)	Margin (dB)
1821.520	26.90	6.80	13.50	47.20	74.00	26.80
3299.080	30.93	7.45	15.98	54.36	74.00	19.64
4948.000	33.31	9.10	16.18	58.59	74.00	15.41
7419.500	36.42	11.58	15.64	63.64	74.00	10.36

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.
 4. *: Measured at 1m and limit is transformed to 83.5dBμV/m by adding a factor 9.5 which is calculated from $20\log(3/1)$.

Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Vertical (dBμV/m)	Limit (dBμV/m)	Margin (dB)
1821.520	47.20	-25.34	21.86	54.00	32.14
3299.080	54.36	-25.34	29.02	54.00	24.98
4948.000	58.59	-25.34	33.25	54.00	20.75
7419.500	63.34	-25.34	38.30	54.00	15.70

Remarks: 1. Duty Cycle Correction Factor = $20\log(\text{cumulative on}/T) = 20\log(1.52\text{ms}/28.12\text{ms}) = -25.34$
 "T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
 2. Average value=Peak value+ Duty Cycle Correction Factor
 3. All final readings of measurement were with Average values.

3.6.3. Restricted Bands Measurement Results

Date of Test : May 17, 2012 Temperature : 24°C

EUT : Radio Control Humidity : 54%

Test Mode : Transmit, Channel: 02, Frequency: 2405.376MHz

	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*	2388.480	28.47	6.34	12.67	47.48	74.00	26.52

Remark: 1.Emission Level = Antenna Factor + Cable Loss + Meter Reading.

2. Low frequency section (spurious in the restricted band 2310-2430MHz).

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	Duty Cycle Correction Factor	Average Value Horizontal	Limit	Margin
	(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
Average*	2388.480	47.48	-25.34	22.14	54.00	31.86

Remarks: 1. Duty Cycle Correction Factor = $20\log(\text{cumulative on}/100\text{ms}) = 20\log(1.52\text{ms}/28.12\text{ms}) = -25.34$

“T” means the period of the pulse train or 100ms if the pulse train length is greater than 100ms

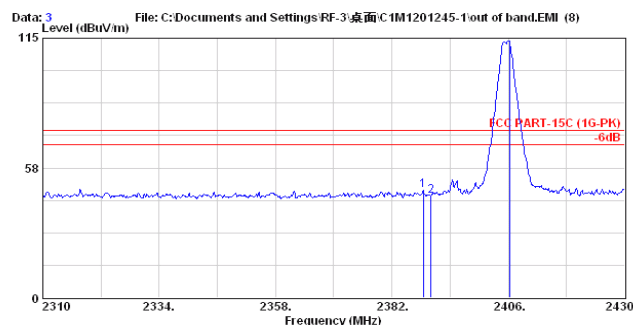
2. Average value=Peak value+ Duty Cycle Correction Factor

3. Low frequency section (spurious in the restricted band 2310-2430MHz).

4. ‘*’ The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code:24443
Tel:+886-2-26092133 Fax:+886-2-26099303
Email:temco@itemc.com.tw



Site no. : A/C Chamber Data no. : 3
Dis. / Ant. : 3m 3115 (4927) Ant. pol. : HORIZONTAL
Limit : FCC PART-15C (1G-PK)
Env. / Ins. : E4446A 24°C/54% □Jarwei Wang
EUT : R6308SBT
Power Rating : DC8.4V
Test Mode : TX2405.376

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2388.480	28.47	6.34	12.67	47.48	74.00	26.52	Peak
2	2390.040	28.47	6.34	10.22	45.04	74.00	28.96	Peak
3	2406.240	28.51	6.36	78.70	113.57	74.00	-39.57	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 : May 17, 2012 Temperature : 24°C

EUT : Radio Control Humidity : 54%

Test Mode : Transmit, Channel: 02, Frequency: 2405.376MHz

	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*	2386.680	28.47	6.33	11.24	46.04	74.00	27.96

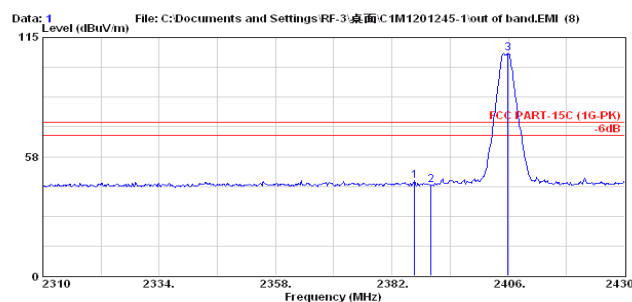
Remark: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Low frequency section (spurious in the restricted band 2310-2430MHz).
 3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

	Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value Vertical	Limit	Margin
	(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
Average*	2386.68	46.04	-25.34	20.70	54.00	33.30

Remarks: 1. Duty Cycle Correction Factor = $20\log(\text{cumulative on}/100\text{ms}) = 20\log(1.52\text{ms}/28.12\text{ms}) = -25.34$
 "T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
 2. Average value = Peak value + Duty Cycle Correction Factor
 3. Low frequency section (spurious in the restricted band 2310-2430MHz).
 4. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



AUDIX TECHNOLOGY Corp. EMC Laboratory
 No. 53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
 County, Taiwan R.O.C. Post Code 24443
 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(4927) Ant. pol. : VERTICAL
 Limit : FCC PART-15C (1G-PK)
 Env. / Ins. : E4446A 24°C/54% □Jarwei Wang
 EUT : R6308SBT
 Power Rating : DC8.4V
 Test Mode : TX2405.376

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2386.680	28.47	6.33	11.24	46.05	74.00	27.95	Peak
2	2390.040	28.47	6.34	8.89	43.71	74.00	30.29	Peak
3	2405.800	28.51	6.36	72.48	107.35	74.00	-33.35	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 : May 17, 2012 Temperature : 24°C

EUT : Radio Control Humidity : 54%

Test Mode : Transmit, Channel: 68, Frequency: 2472.960MHz

	Emission Frequency (MHz)	Antenna Factor (dB/m)	Cable Loss (dB)	Meter Reading Horizontal (dBμV)	Emission Level Horizontal (dBμV/m)	Limits (dBμV/m)	Margin (dB)
Peak*	2484.960	28.66	6.45	11.95	47.06	74.00	26.94

Remark: 1.Emission Level = Antenna Factor + Cable Loss + Meter Reading.

2. Low frequency section (spurious in the restricted band 2310-2430MHz).

3. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

	Emission Frequency (MHz)	Peak Value (dB/m)	Duty Cycle Correction Factor (dB)	Average Value Horizontal (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Average*	2484.960	47.06	-25.34	21.72	54.00	32.28

Remarks: 1. Duty Cycle Correction Factor = $20\log$ (cumulative on/100ms) = $20\log$ (1.52ms/28.12ms)=-25.34

"T" means the period of the pulse train or 100ms if the pulse train length is greater than 100ms

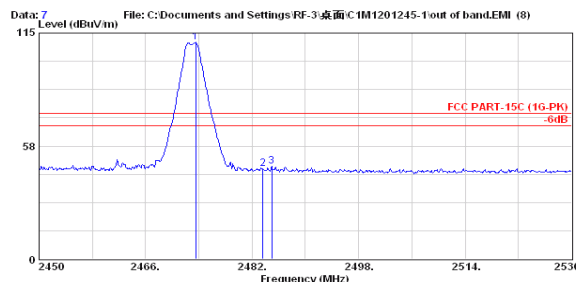
2. Average value=Peak value+ Duty Cycle Correction Factor

3. Low frequency section (spurious in the restricted band 2310-2430MHz).

4. '*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



AUDIX TECHNOLOGY Corp. EMC Laboratory
No.53-11, Tin-Au Tsun, Lin-kou Hsiang, Taipei
County, Taiwan R.O.C. Post Code:24443
Tel:+886-2-26092133 Fax:+886-2-26099303
Email:ttmc@ttmc.com.tw



Site no. : A/C Chamber Data no. : 7
Dis. / Ant. : 3m 3115(4927) Ant. pol. : HORIZONTAL
Limit : FCC PART-15C (1G-PK)
Env. / Ins. : E4446A 24°C/54% □Jarwei Wang
EUT : R63088BT
Power Rating : DC8.4V
Test Mode : TX2472.960

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2473.520	28.66	6.43	75.08	110.17	74.00	-36.17	Peak
2	2483.600	28.66	6.45	10.71	45.83	74.00	28.17	Peak
3	2484.960	28.66	6.45	11.95	47.06	74.00	26.94	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 : May 17, 2012 Temperature : 24°C

EUT : Radio Control Humidity : 54%

Test Mode : Transmit, Channel: 68, Frequency: 2472.960MHz

	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*	2485.200	28.66	6.45	10.46	45.57	74.00	28.43

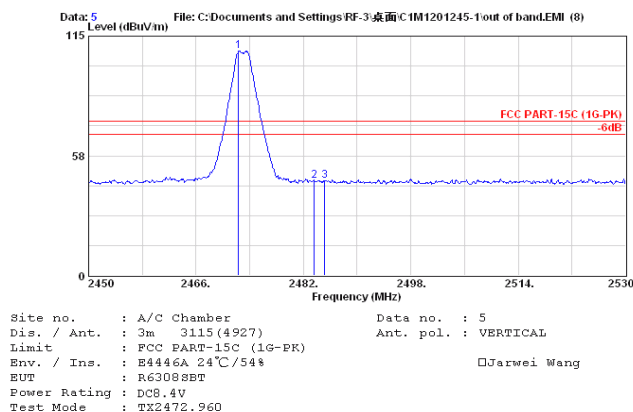
Remark: 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.
 2. Low frequency section (spurious in the restricted band 2310-2430MHz).
 3. ‘*’ The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.

	Emission Frequency	Peak Value	Duty Cycle Correction Factor	Average Value Vertical	Limit	Margin
	(MHz)	(dB/m)	(dB)	(dBμV/m)	(dBμV/m)	(dB)
Average*	2485.20	45.57	-25.34	20.23	54.00	33.77

Remarks: 1. Duty Cycle Correction Factor = $20\log(\text{cumulative on}/100\text{ms}) = 20\log(1.52\text{ms}/28.12\text{ms}) = -25.34$
 “T” means the period of the pulse train or 100ms if the pulse train length is greater than 100ms
 2. Average value = Peak value + Duty Cycle Correction Factor
 3. Low frequency section (spurious in the restricted band 2310-2430MHz).
 4. ‘*’ The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



AUDIX TECHNOLOGY Corp. EMC Laboratory
 No.53-11, Tin-fu Tsun, Lin-kou Hsiang, Taipei
 County, Taiwan R.O.C. Post Code 24443
 Tel:+886-2-26092133 Fax:+886-2-26099303
 Email:temc@temc.com.tw



	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2472.320	28.66	6.43	72.76	107.85	74.00	-33.85	Peak
2	2483.600	28.66	6.45	10.40	45.51	74.00	28.49	Peak
3	2485.200	28.66	6.45	10.46	45.57	74.00	28.43	Peak

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

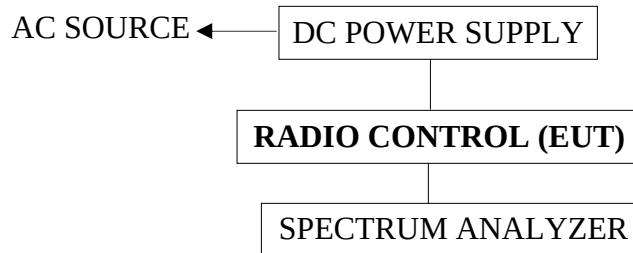
4. DUTY CYCLE CORRECTION FACTOR

4.1. Test Equipment

The following test equipment was used during the duty cycle factor measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 14, 11'	Oct. 13, 12'

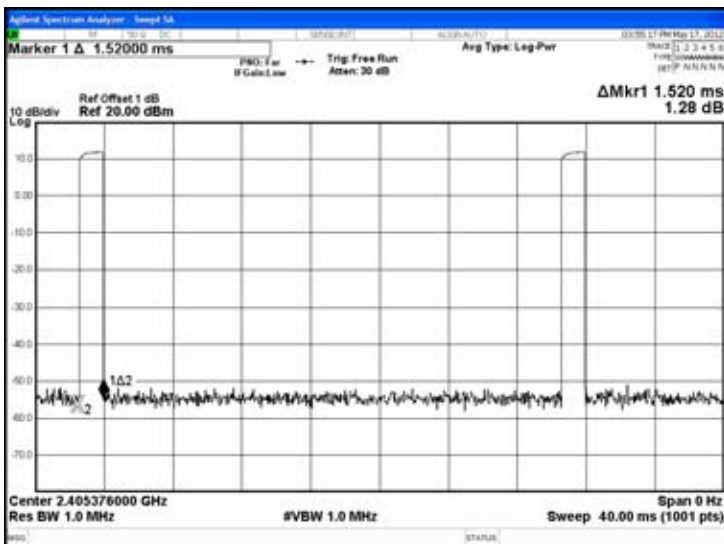
4.2. Block Diagram of Test Setup



4.3. Test Results

PASSED.

(Test Date: May 17, 2012 Temperature : 22°C Humidity : 51%)



$$\text{Duty Cycle Factor} = 20\log(\text{cumulative on}/T) = 20\log(1.52/28.12) = -25.34$$

T: The period of the pulse train or 100ms if the pulse train length is greater than 100ms

5. 6dB BANDWIDTH MEASUREMENT

5.1. 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	N9030A-544	US51350140	Oct. 14, 11'	Oct. 13, 12'

5.2. Block Diagram of Test Setup

The same as section.4.2.

5.3. Specification Limits (§15.247(a)(2))

The minimum 6dB bandwidth shall be at least 500kHz.

5.4. Operating Condition of EUT

5.4.1. Set up the EUT and simulator as shown on 5.2.

5.4.2. To turn on the power of all equipment.

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

5.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer and RBW=1-5% of OBW and VBW > 3*RBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

The measurement guideline was according to 558074 D01.

5.6. Test Results

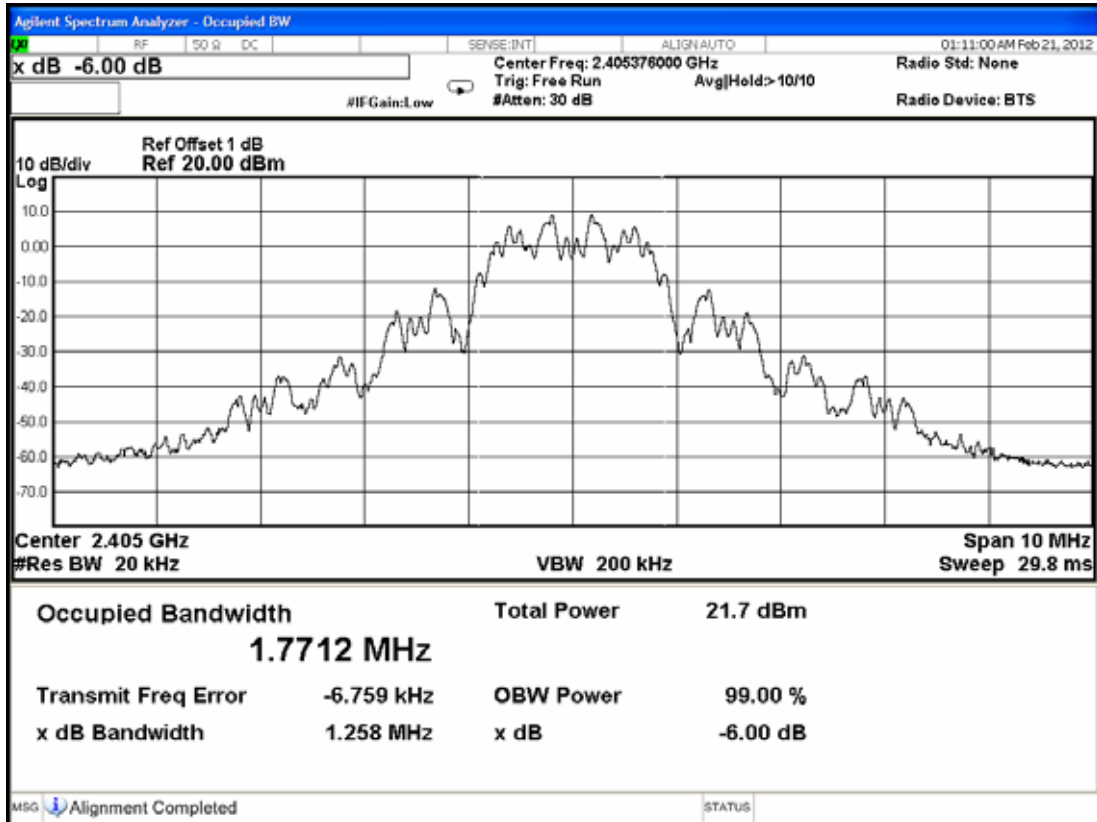
PASSED. All the test results are attached in next pages.

(Test Date: Feb. 21, 2012 Temperature : 23°C Humidity : 55%)

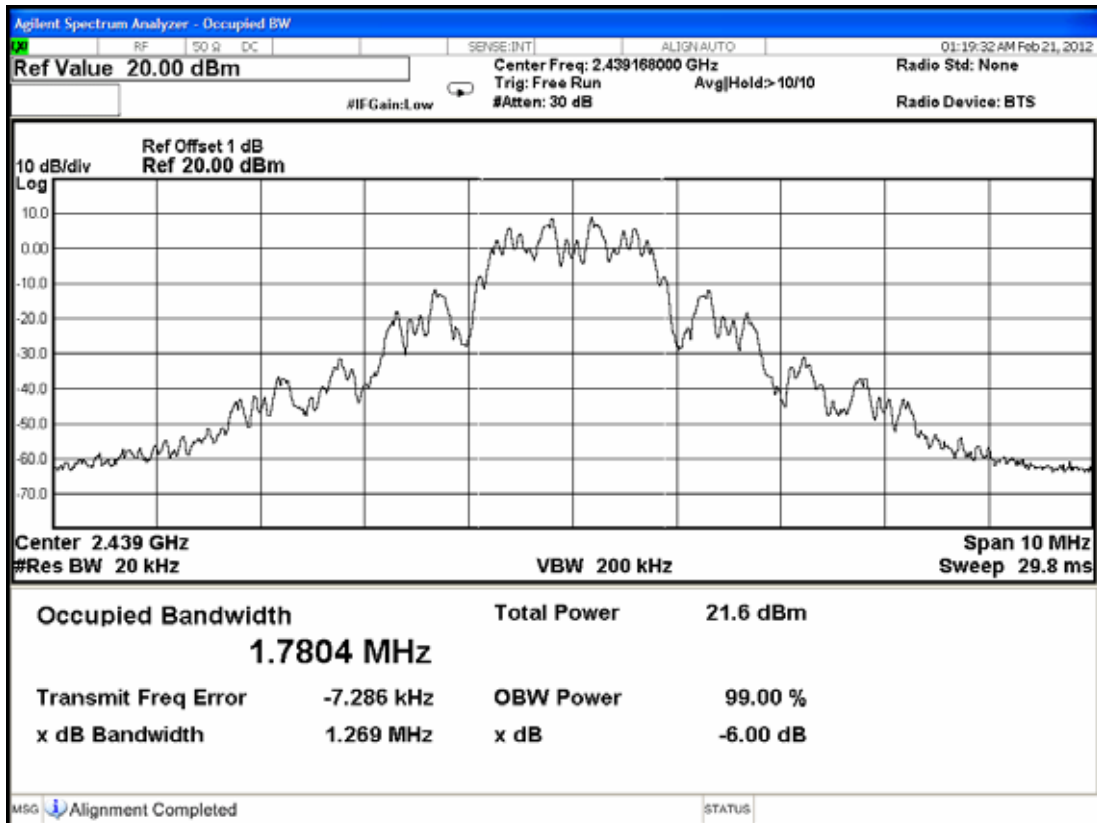
Mode	Channel	Frequency	6dB Bandwidth
1.	CH 02	2405.376MHz	1.258MHz
2.	CH 35	2439.168MHz	1.269MHz
3.	CH 68	2472.960MHz	1.482MHz

[Limit: least 500kHz]

5.6.1. Channel 02, Frequency: 2405.376MHz



5.6.2. Channel 35, Frequency: 2439.168MHz



5.6.3. Channel 68, Frequency: 2472.960MHz



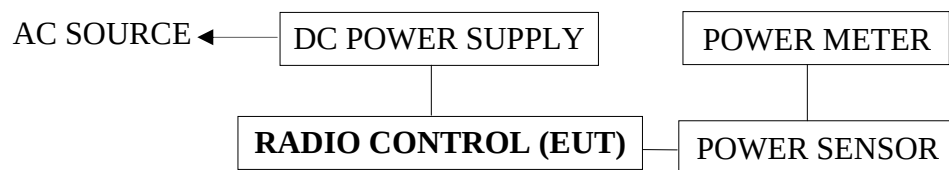
6. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

6.1. 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.	Power Meter	Anritsu	ML2495A	1145008	Nov. 11, 11'	Nov. 10, 12'
2.	Power Sensor	Anritsu	MA2411B	1126096	Oct. 24, 11'	Oct. 23, 12'

6.2. Block Diagram of Test Setup



6.3. Specification Limits (§15.247(b)-(3))

The Limits of maximum Peak Output Power for digital modulation in 2400-2483.5MHz is : 1Watt. (30dBm)

6.4. Operating Condition of EUT

Same as 6dB bandwidth measurement which was listed in 5.4 except the test set up replaced by section 6.2.

6.5. Test Procedure

The transmitter output was connected to the power sensor and record the reading of power meter.

The measurement guideline was according to 558074 D01.

6.6. Test Results

PASSED. All the test results are listed below.

(Test Date: Feb. 21, 2012 Temperature : 23°C Humidity : 55%)

Antenna 1:

No.	Channel	Test Frequency	Peak Output Power	Limit
1.	CH 02	2405.376MHz	13.46dBm	30dBm
2.	CH 35	2439.168MHz	13.18dBm	30dBm
3.	CH 68	2472.960MHz	13.00dBm	30dBm

Antenna 2:

No.	Channel	Test Frequency	Peak Output Power	Limit
1.	CH 02	2405.376MHz	13.34dBm	30dBm
2.	CH 35	2439.168MHz	13.07dBm	30dBm
3.	CH 68	2472.960MHz	12.98dBm	30dBm

7. EMISSION LIMITATIONS MEASUREMENT

7.1. Test Equipment

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

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 14, 11'	Oct. 13, 12'

7.2. Block Diagram of Test Setup

The same as section.4.2.

7.3. Specification Limits (§15.247(c))

7.3.1. 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)

7.3.2. The reference level for determining limit of emission limitations is according to the value measured indicated in plots at section 9.6.

7.4. Operating Condition of EUT

Same as 6dB bandwidth measurement which was listed in 5.4 except the test set up replaced by section 7.2.

7.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measure by spectrum analyzer with 100kHz RBW and 1MHz VBW.

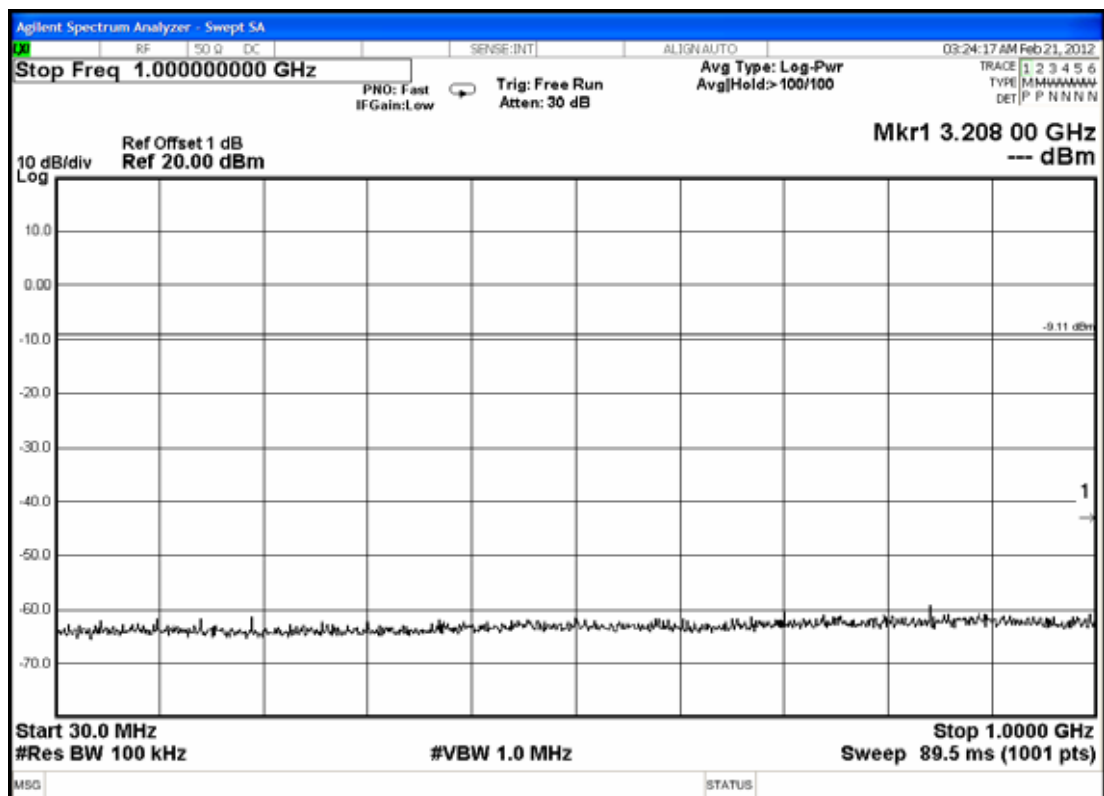
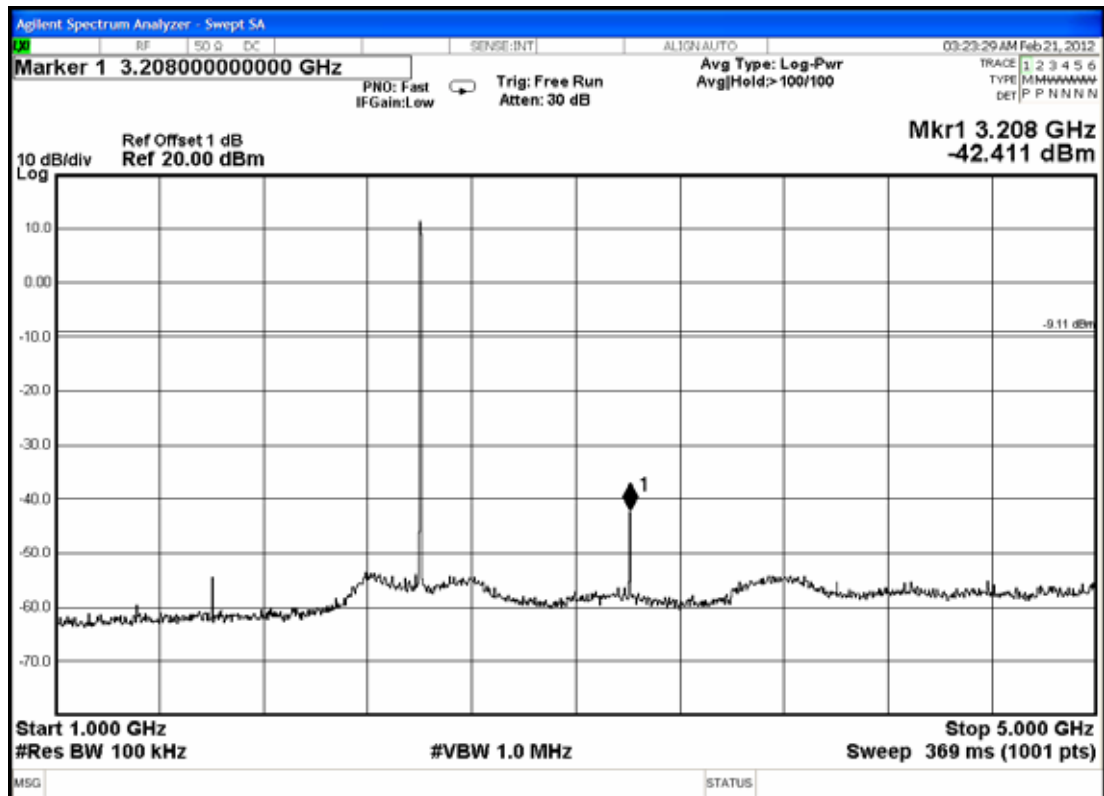
The measurement guideline was according to 558074 D01.

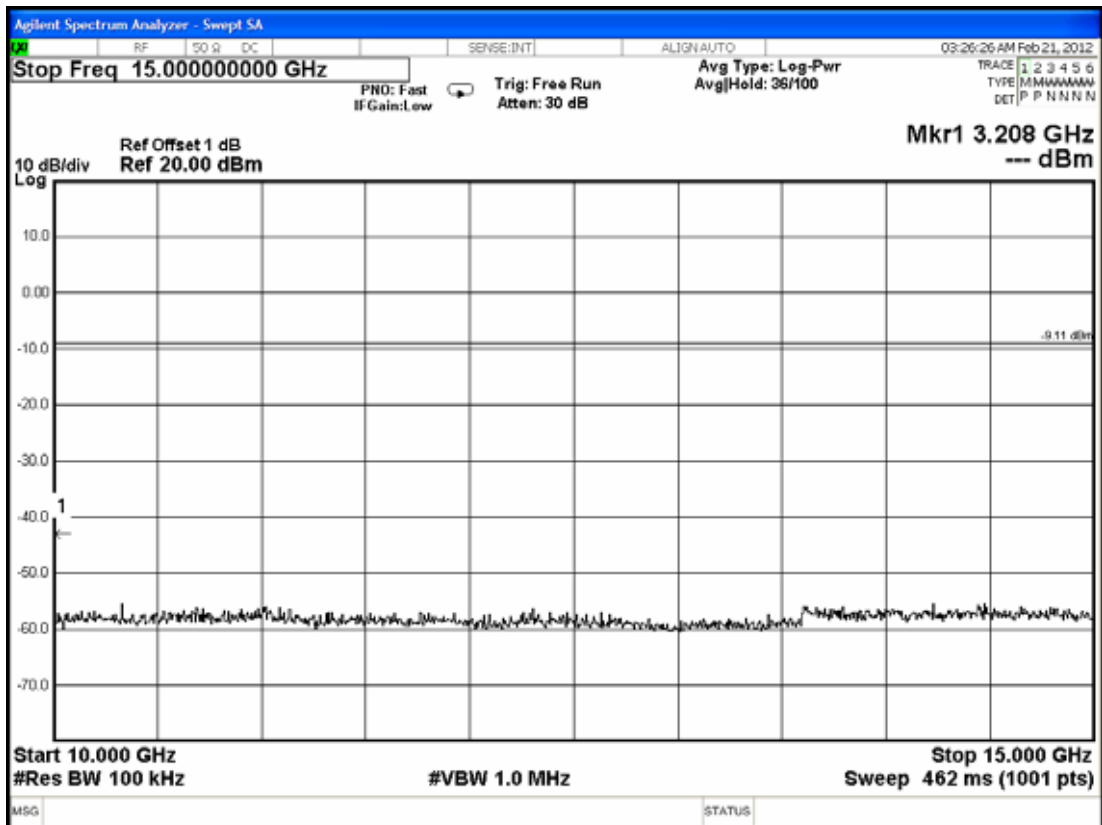
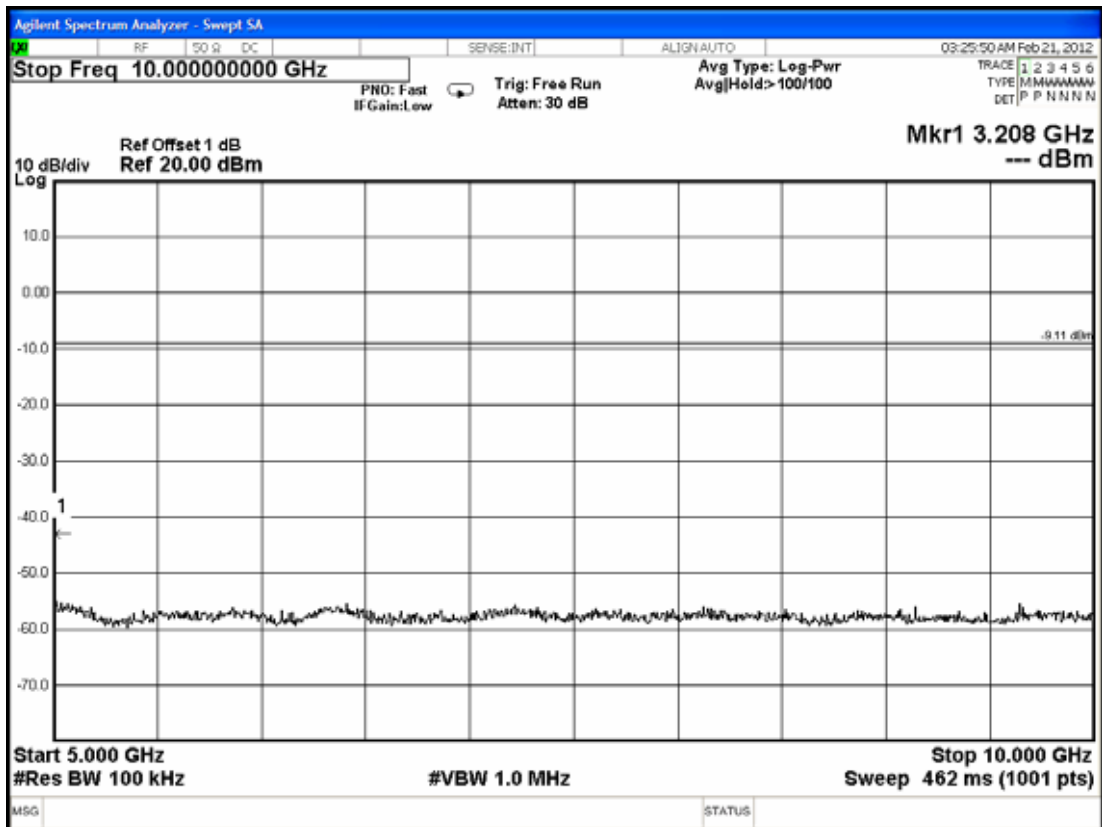
7.6. Test Results

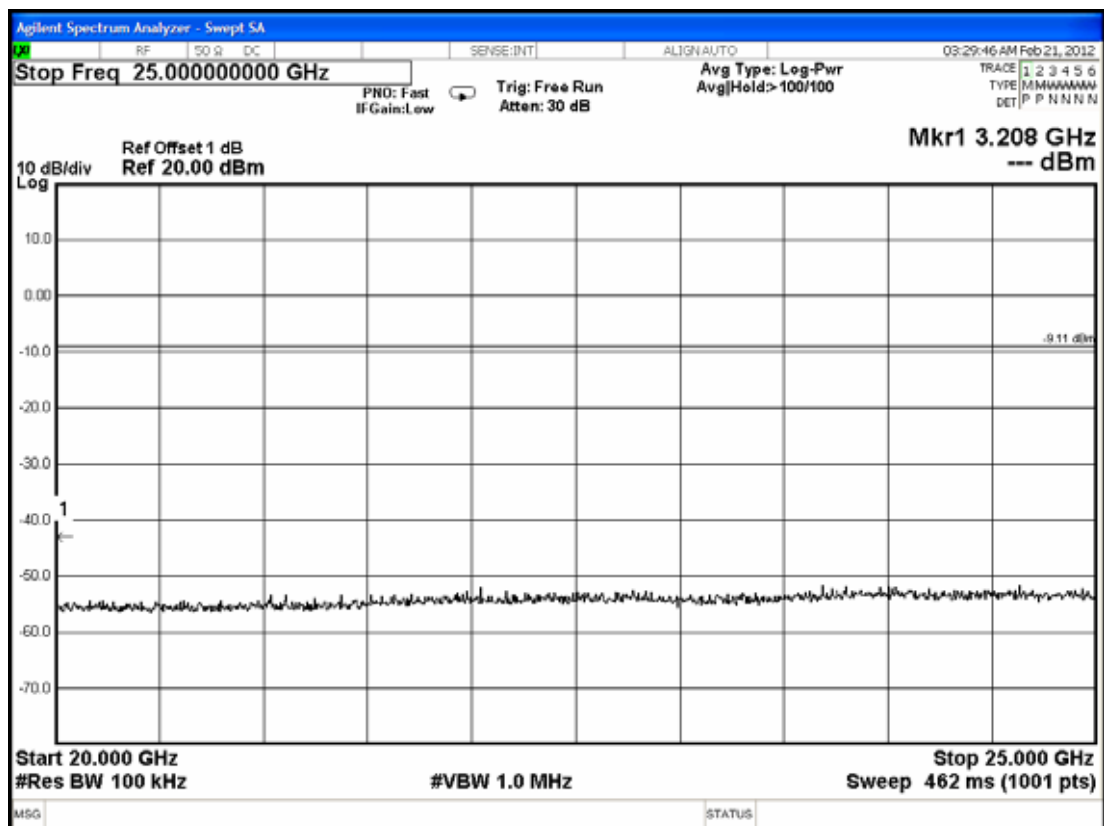
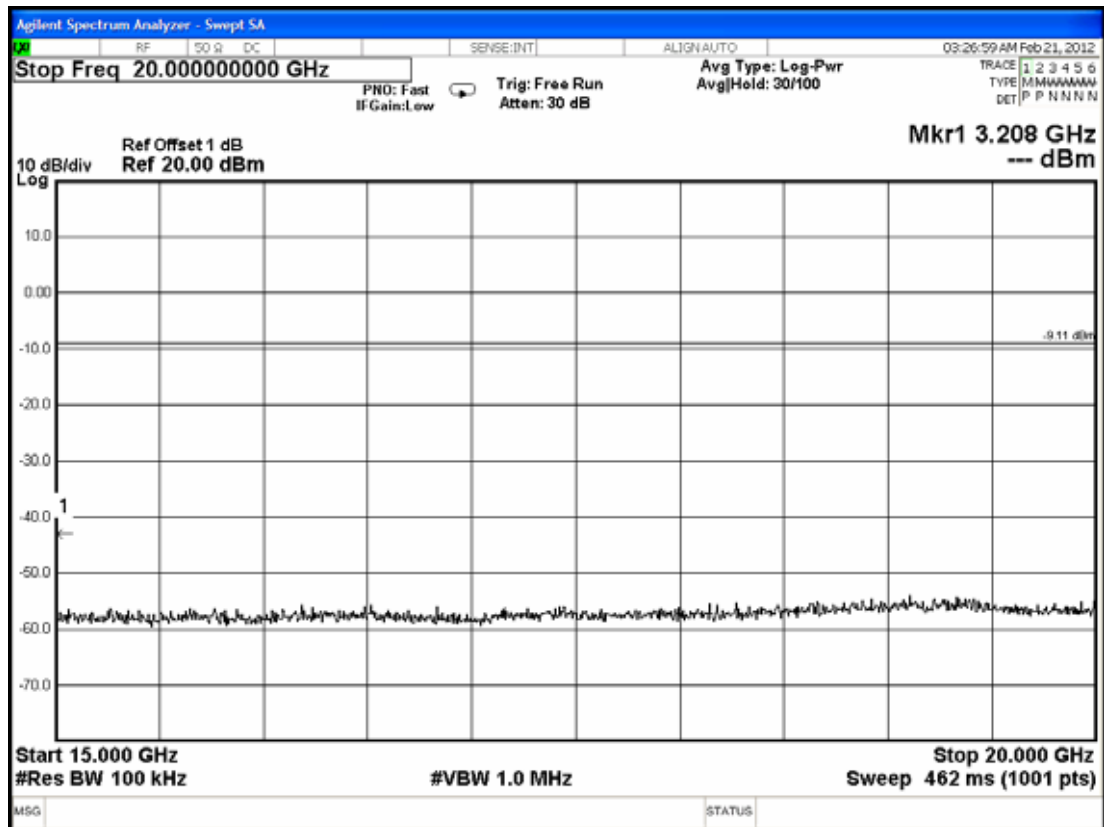
PASSED. The testing data was attached in the next pages.

(Test Date: Feb. 21, 2012 Temperature : 23°C Humidity : 55%)

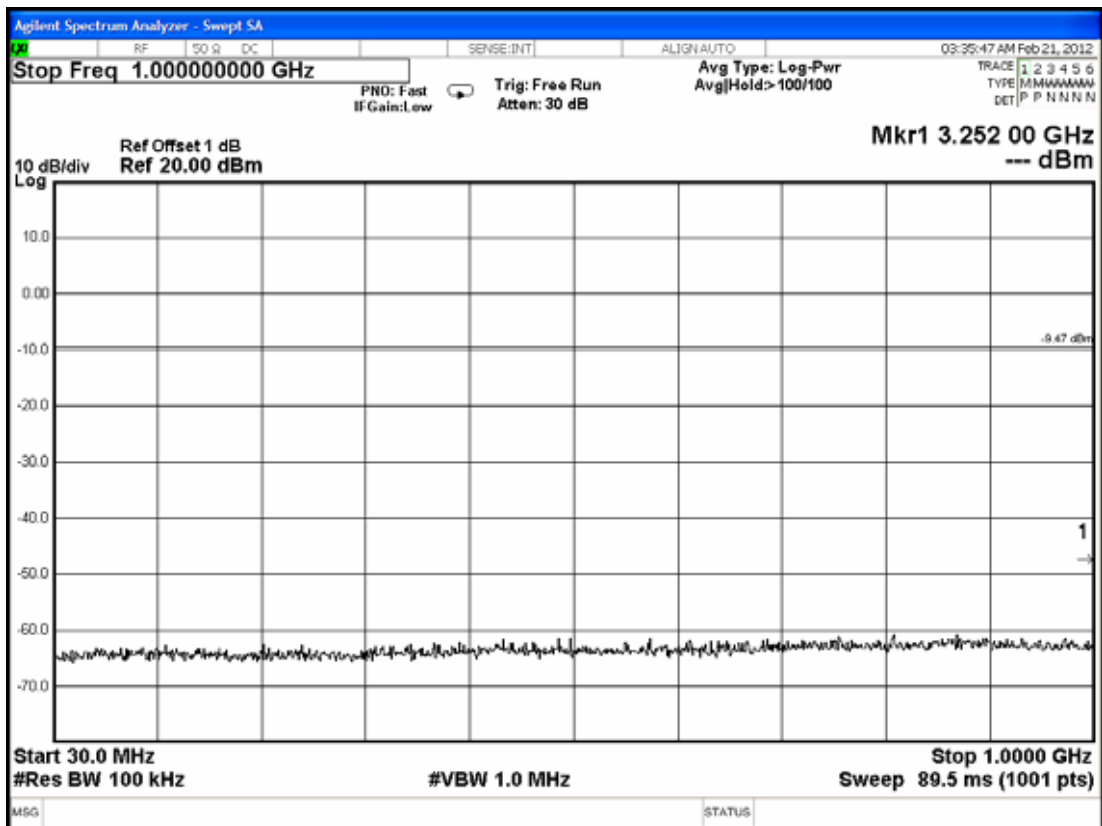
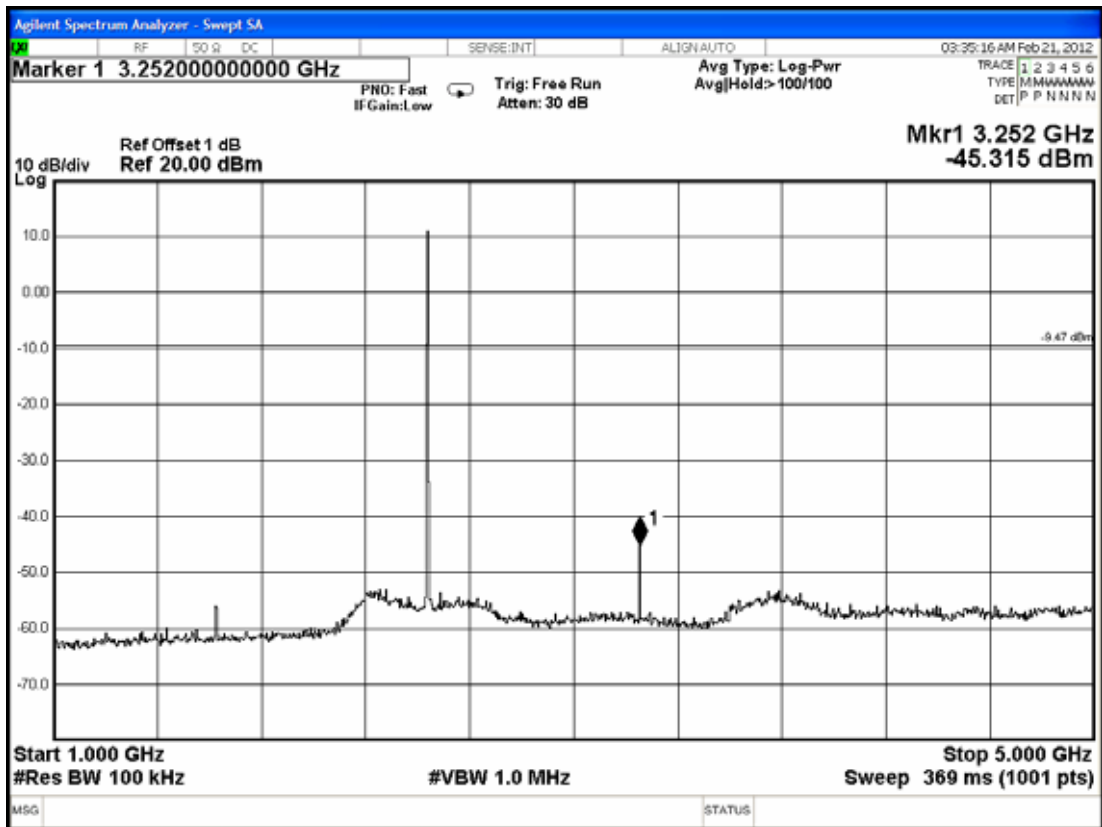
7.6.1. Channel 02, Frequency: 2405.376MHz

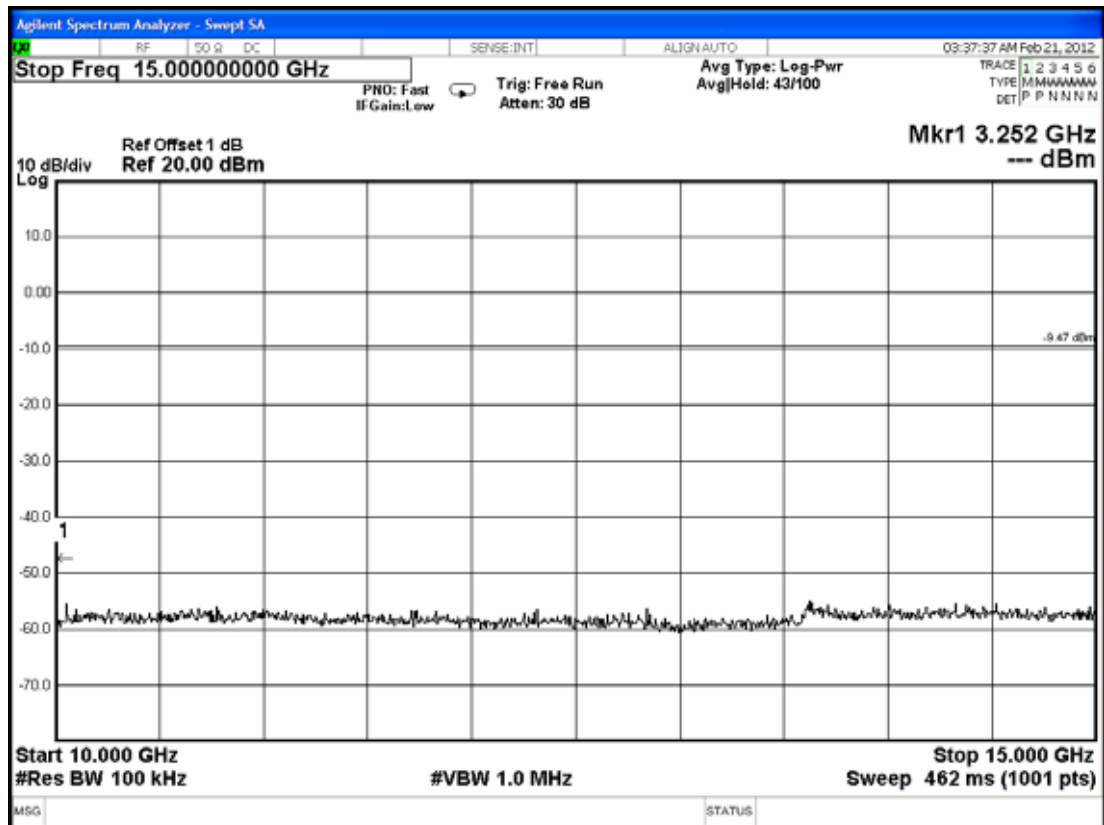
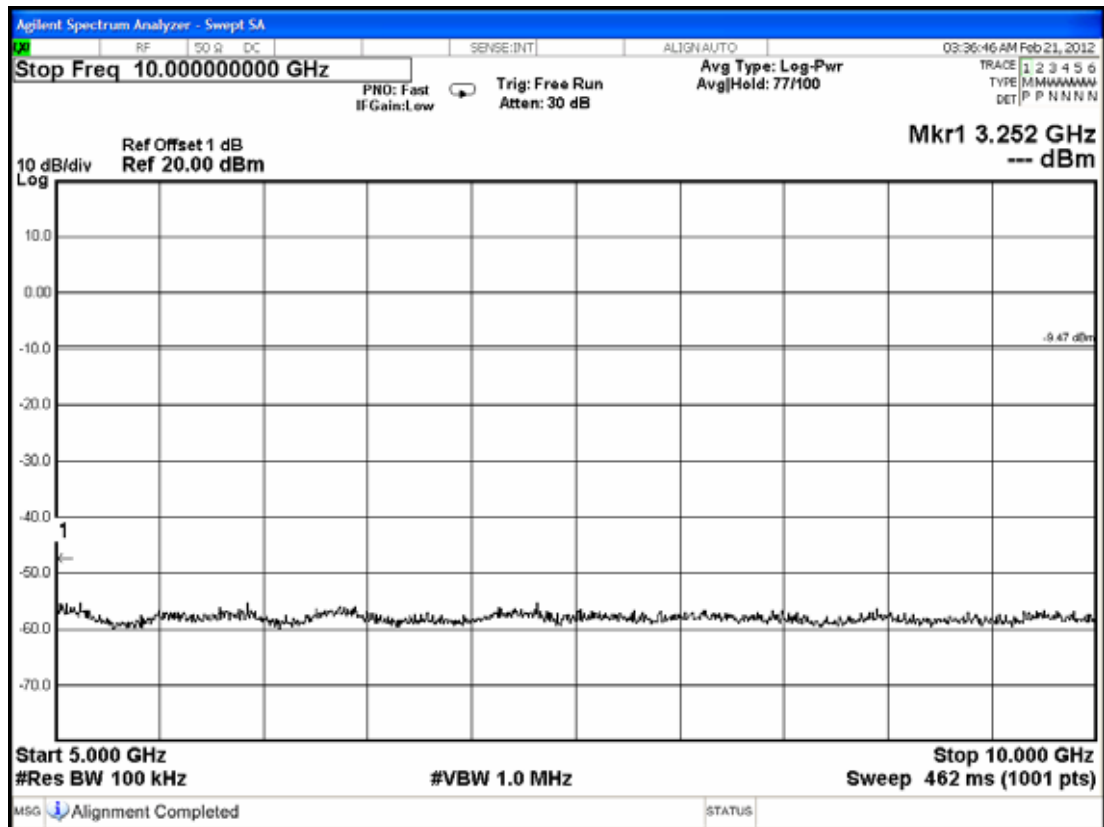


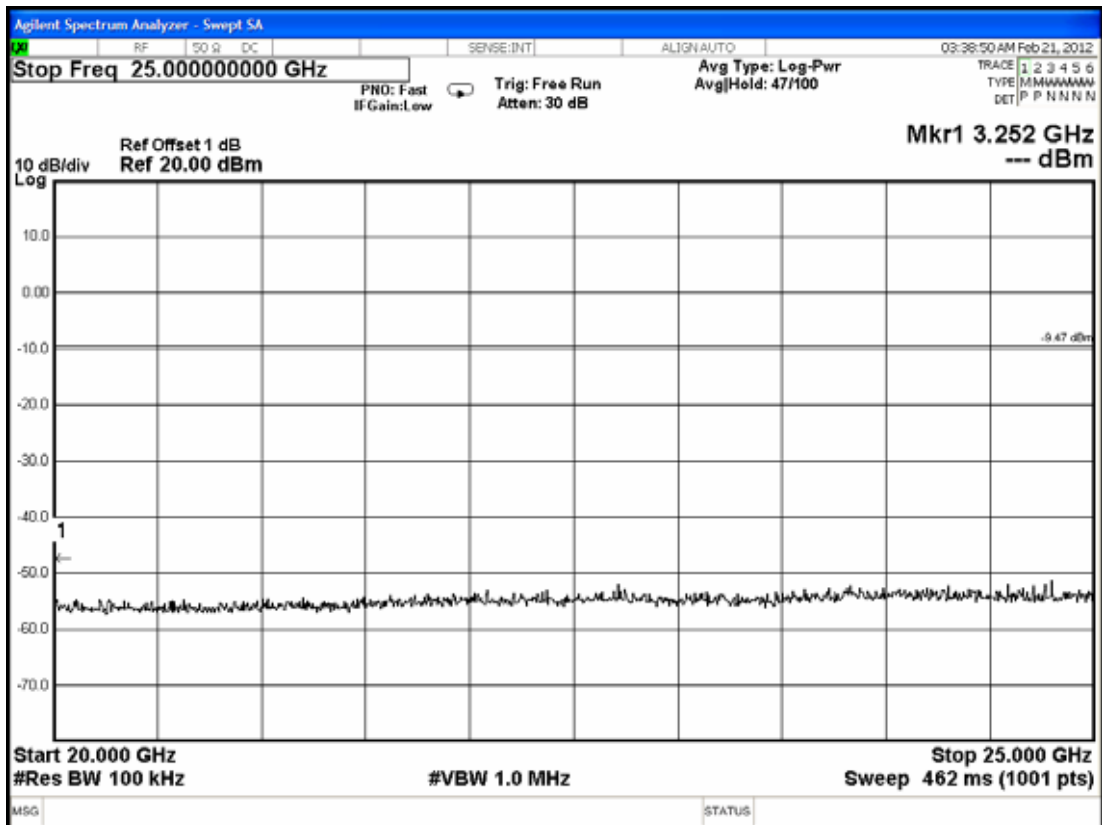
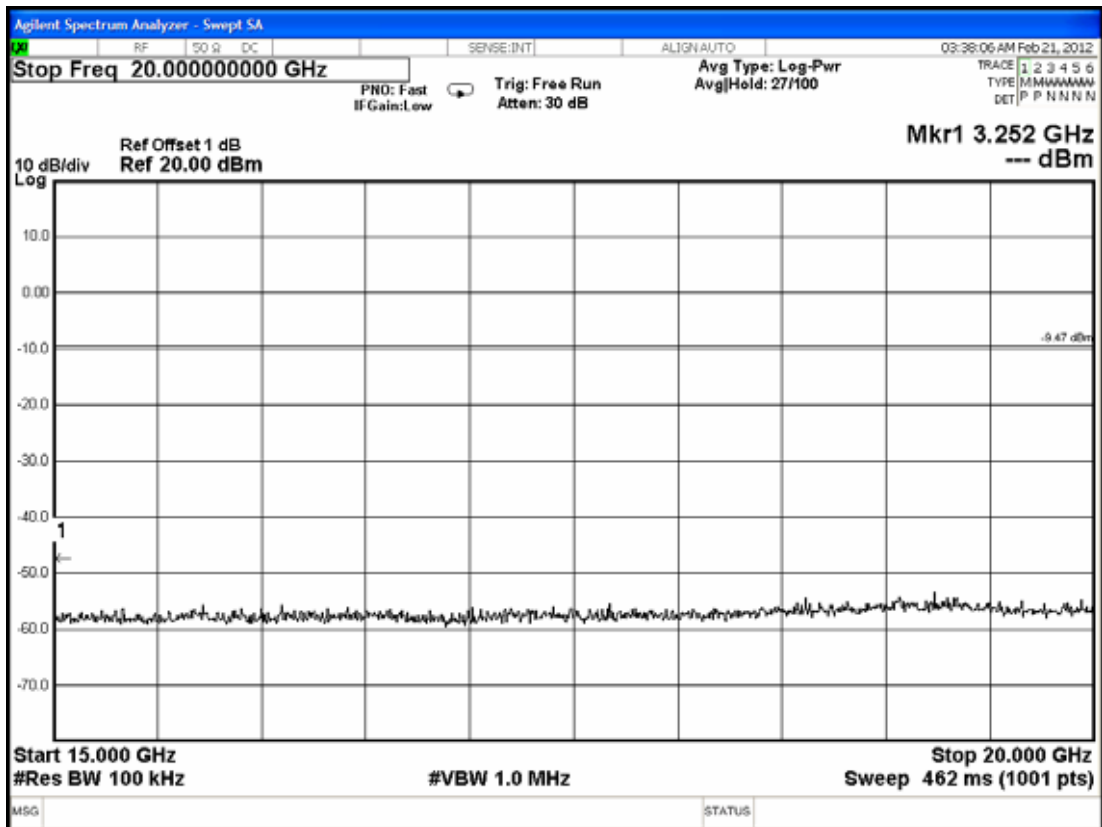




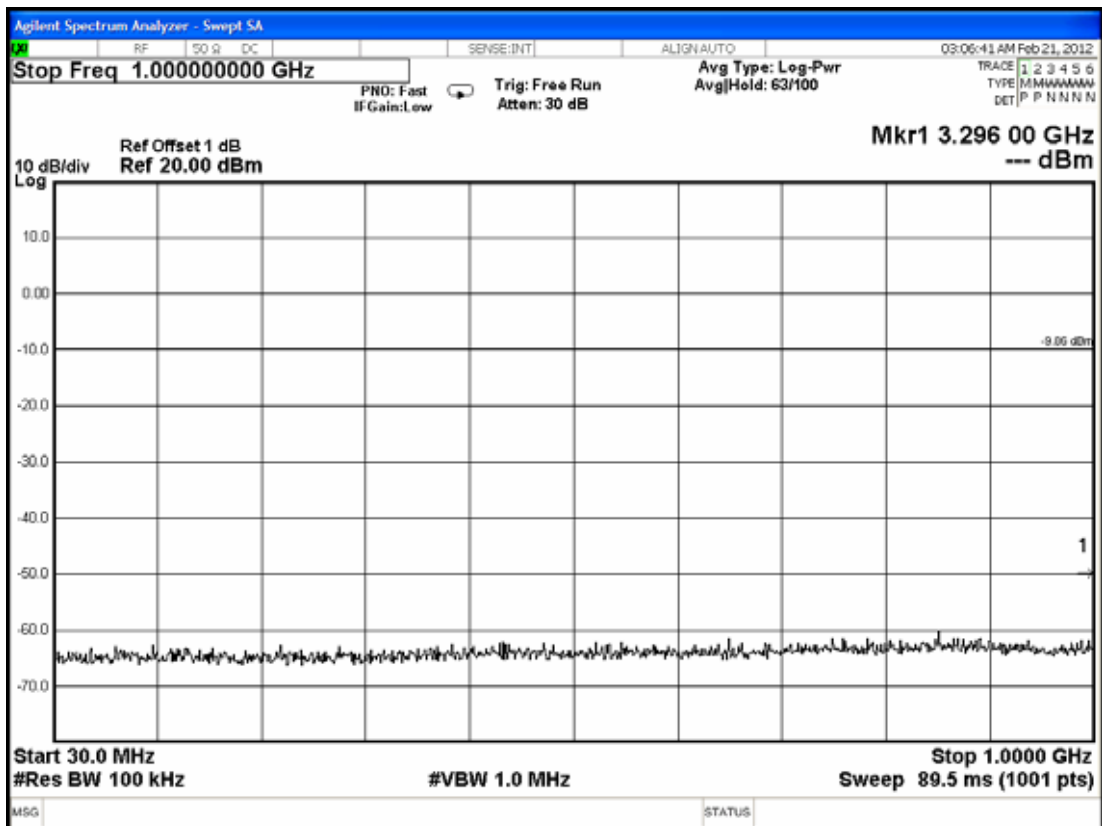
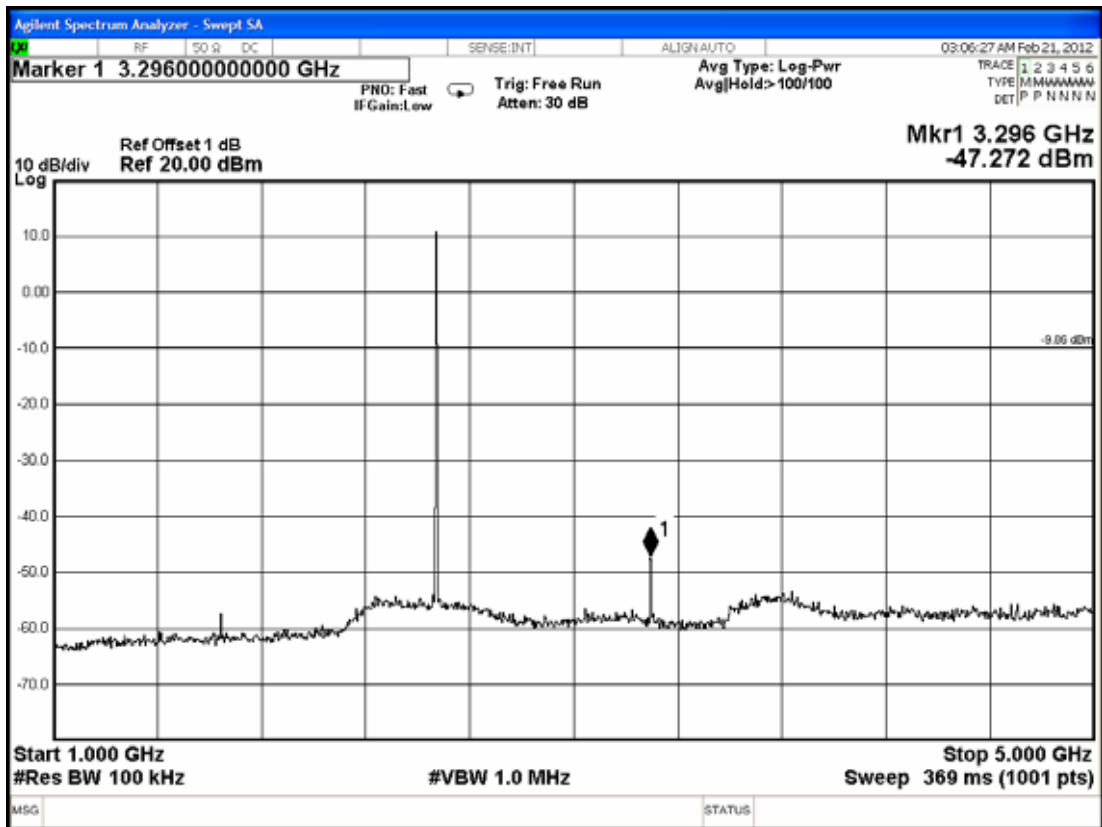
7.6.2. Channel 35, Frequency: 2439.168MHz

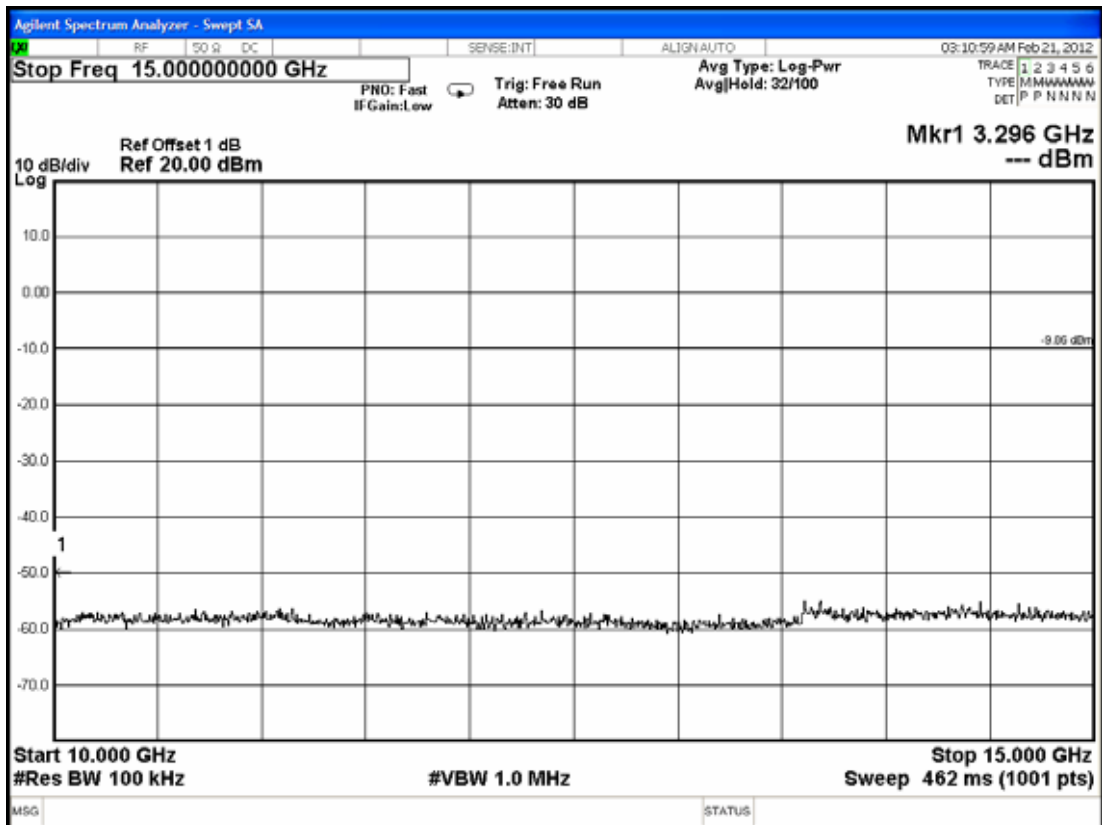
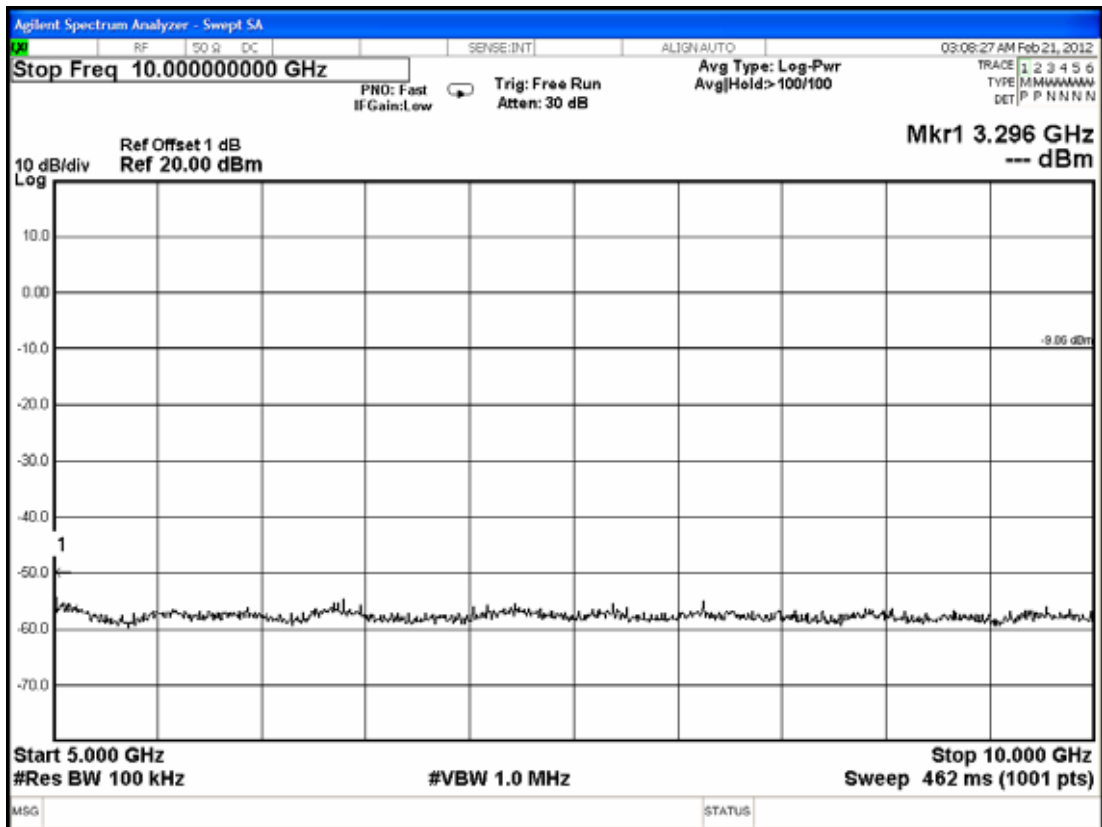


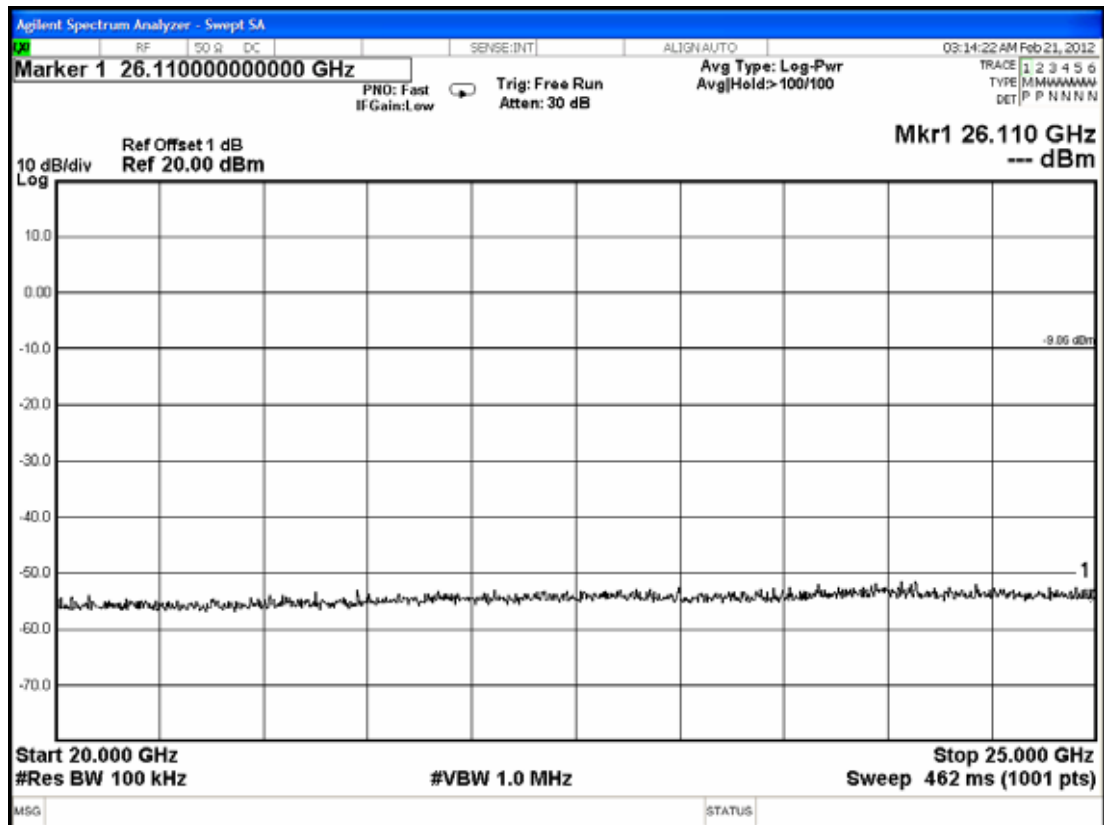
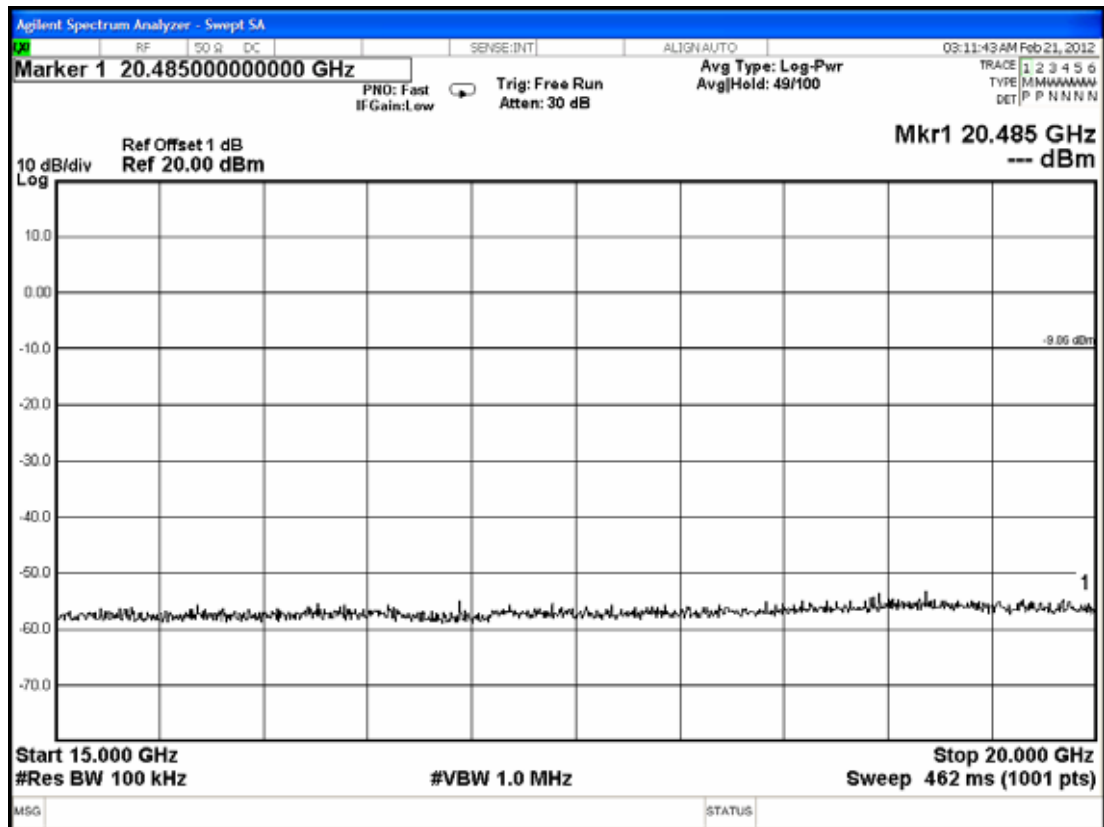




7.6.3. Channel 68, Frequency: 2472.960MHz







8. BAND EDGES MEASUREMENT

8.1. 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	N9030A-544	US51350140	Oct. 14, 11'	Oct. 13, 12'

8.2. Block Diagram of Test Setup

The same as section.4.2.

8.3. Specification Limits (§15.247(c))

8.3.1. The highest level should be at least 20 dB below that in the 100kHz bandwidth.

8.3.2. The reference level for determining limit of emission limitations is according to the value measured indicated in plots at section 9.6.

8.4. Operating Condition of EUT

Same as 6dB bandwidth measurement which was listed in 5.4 except the test set up replaced by section 8.2.

8.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. Set both RBW and VBW of spectrum analyzer to 1MHz with suitable frequency span including 100kHz bandwidth from band edge.

The measurement guideline was according to 558074 D01.

8.6. Test Results

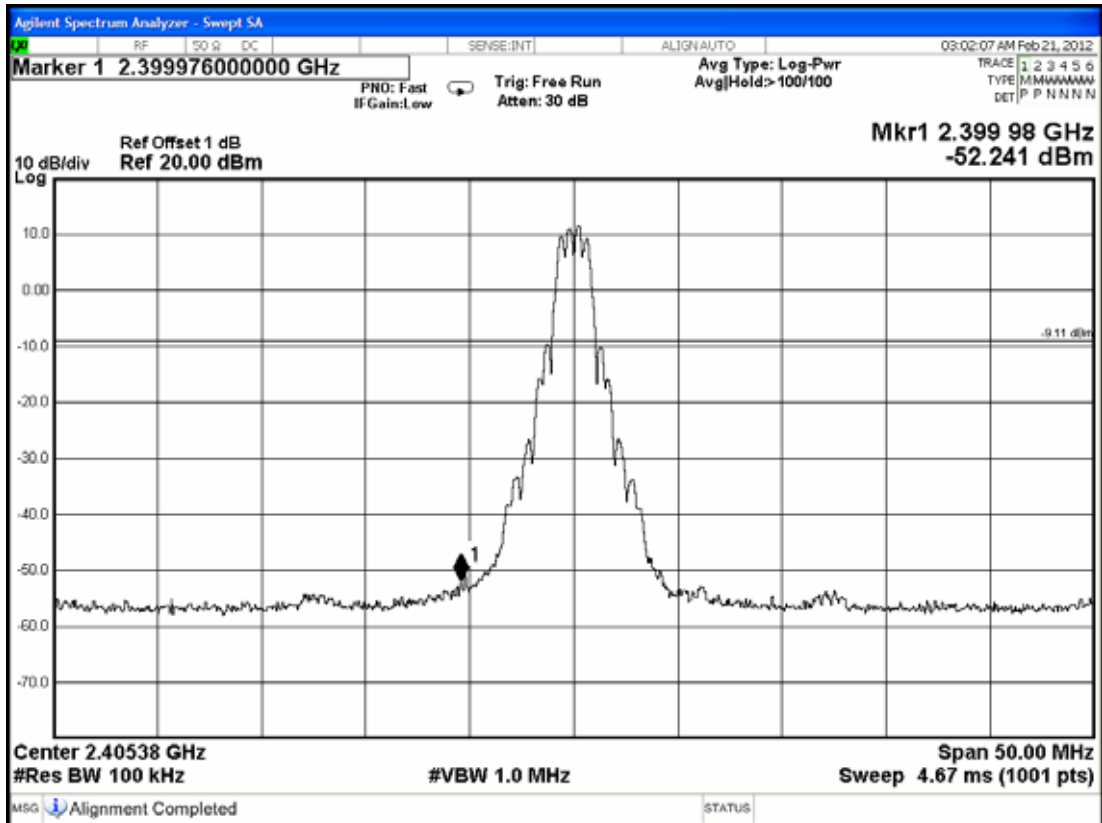
PASSED. All the test results are attached in next pages.

(Test Date: Feb. 21, 2012 Temperature : 23°C Humidity : 55%)

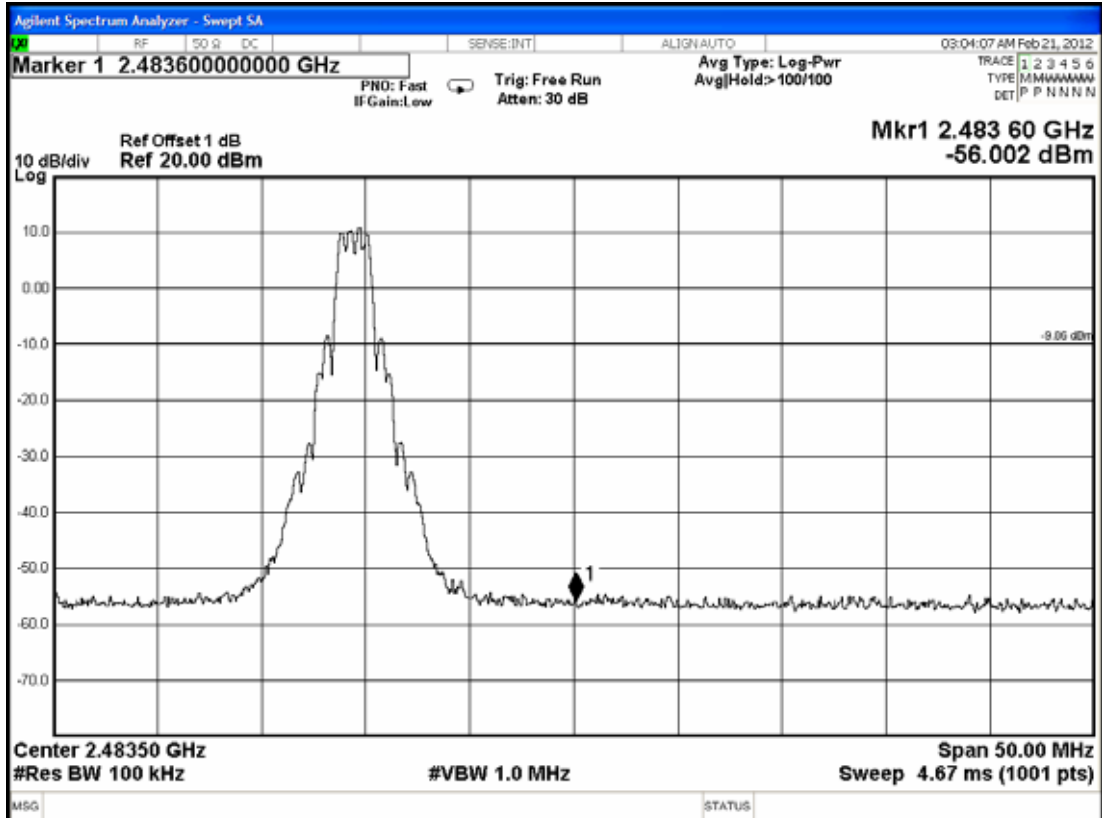
Below Band edge: The highest emission level is -52.241dBm on 2.39998GHz.

Upper Band edge : The highest emission level is -56.002dBm on 2.48360GHz.

Below Band edge



Upper Band edge



9. POWER SPECTRAL DENSITY MEASUREMENT

9.1. Test Equipment

The following test equipment was used during the power spectral density measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	N9030A-544	US51350140	Oct. 14, 11'	Oct. 13, 12'

9.2. Block Diagram of Test Setup

The same as section.4.2.

9.3. Specification Limits (§15.247(d))

The peak power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8dBm in any 3kHz band.

9.4. Operating Condition of EUT

Same as 6dB bandwidth measurement which was listed in 5.4 except the test set up replaced by section 9.2.

9.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 100kHz RBW and 1MHz VBW, set sweep time = Auto.

The measurement guideline was according to KDB 558074.

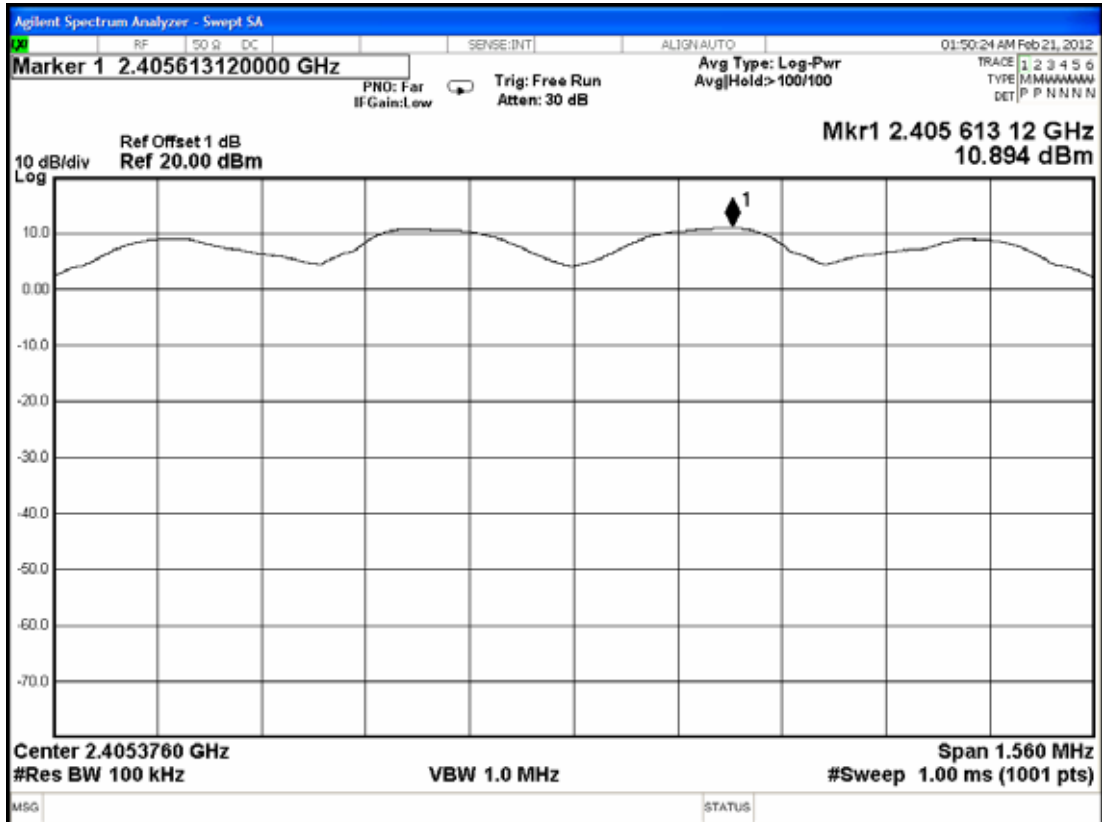
9.6. Test Results

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

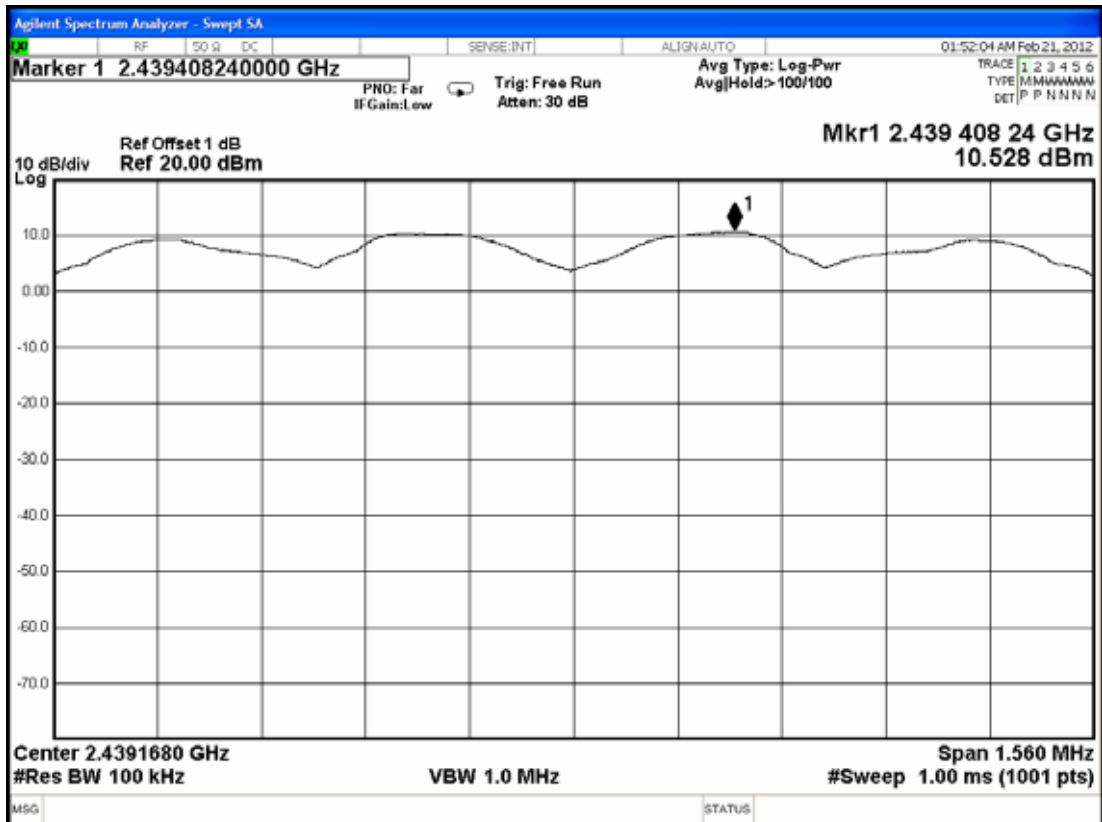
(Test Date: Feb. 21, 2012 Temperature : 23°C Humidity : 55%)

No.	Channel	Test Frequency	Power Spectral Density	BWCF	Final Power Spectral Density	Limit
1.	CH 02	2405.376MHz	10.894dBm	-15.2dB	-4.672dBm	8dBm
2.	CH 35	2439.168MHz	10.528dBm	-15.2dB	-4.306dBm	8dBm
3.	CH 68	2472.960MHz	10.141dBm	-15.2dB	-5.059dBm	8dBm

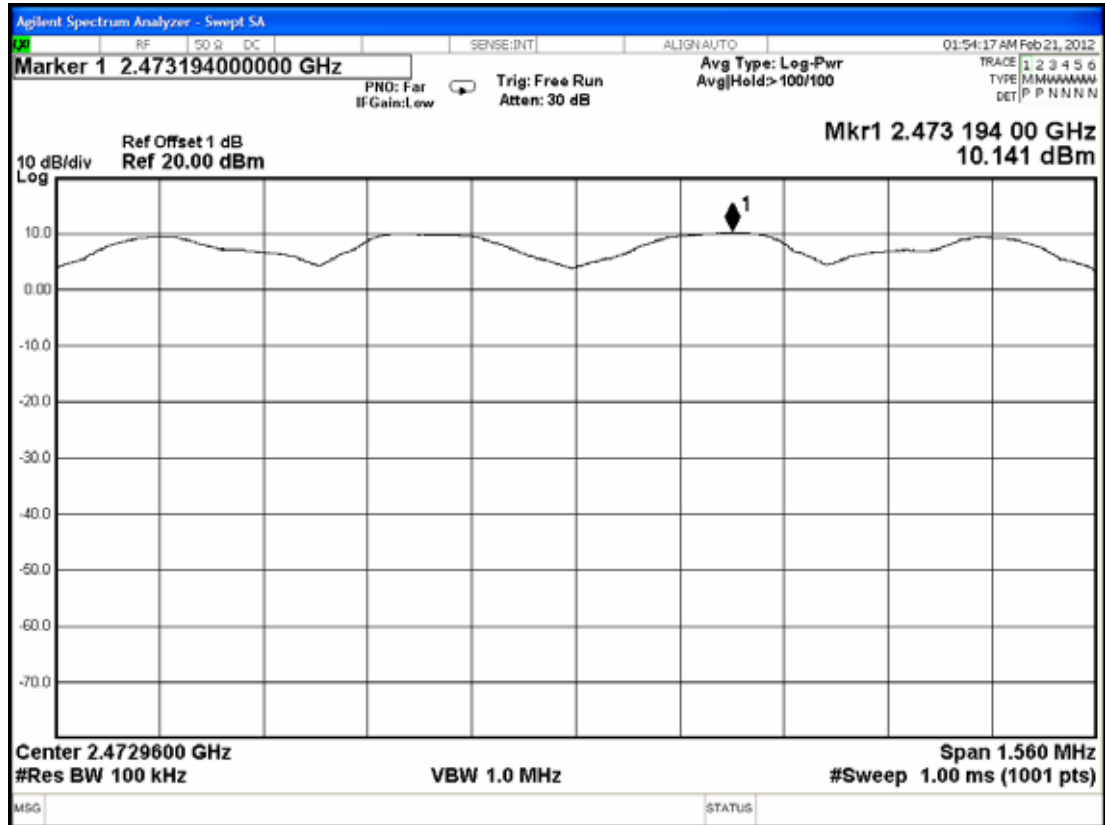
9.6.1. Channel 02, Frequency: 2405.376MHz



9.6.2. Channel 35, Frequency: 2439.168MHz



9.6.3. Channel 68, Frequency: 2472.960MHz



10.DEVIATION TO TEST SPECIFICATIONS

【NONE】