

APPLICATION FOR CERTIFICATION

On Behalf of

Futaba Corporation

Radio Control

Model No. : TM14-2.4G

FCC ID : AZPTM14-24G

Brand : Futaba

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

Prepared by : Audix Technology Corporation  
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File Number : EM961408  
Report Number : EM-F960523  
Date of Test : Nov. 01 ~ 02, 2007  
Date of Report : Nov. 09, 2007

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**TEST REPORT CERTIFICATION**

Applicant : Futaba Corporation  
 Manufacturer : Futaba Corporation  
 EUT Description : Radio Control  
 FCC ID : AZPTM14-24G  
 (A) MODEL NO. : TM14-2.4G  
 (B) SERIAL NO. : N/A  
 (C) BRAND : Futaba  
 (D) POWER SUPPLY : DC 7.4V  
 (E) TEST VOLTAGE : DC 7.2V (DC Battery)

Measurement Procedure Used:

FCC RULES AND REGULATIONS PART 15 SUBPART C, MAY 2007  
AND ANSI C63.4/2003

(FCC CFR 47 Part 15C, §15.205, §15.207, §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 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: Nov. 01 ~ 02, 2007

Prepared by: Tina Huang Nov. 19, 2007  
(Tina Huang/Assistant)

Test Engineer: Ben Cheng Nov. 19, 2007  
(Ben Cheng/Section Manager)

Approved & Authorized Signer: Leon Liu Nov. 19, 2007  
(Leon Liu/Vice President)

# 1. GENERAL INFORMATION

## 1.1. Description of Device (EUT)

Description	:	Radio Control (Transmitter Unit)
Model Number	:	TM14-2.4G
Serial Number	:	N/A
Brand	:	Futaba
FCC ID	:	AZPTM14-24G
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
Frequency Band	:	2405.376MHz ~ 2479.104MHz
Tested Frequency	:	2405.376MHz (Channel 02) 2442.240MHz (Channel 38) 2479.104MHz (Channel 74)
Frequency Channel	:	36 channels
Antenna (Pencil Antenna)	:	Hidaka Denki Work Antenna Gain: 1.6dBi
DC Battery	:	Futaba, M/N HT6F1700B Capacity: 7.2VDC-1700mA
Receiver	:	Futaba, M/N R6014FS or R608FS FCC by DoC (Report Number: EM-F960524)
Date of Receipt of Sample	:	Oct. 22, 2007
Date of Test	:	Nov. 01 ~ 02, 2007

## 1.2. Tested Supporting System Details

### 1.2.1. PC SYSTEM

Model Number : VECTRA XE320  
 Serial Number : SG21101966  
 FCC ID : By DoC  
 BSMI ID : 3912A318  
 Brand : HP  
 Manufacturer : First International Computer  
 Power Cord : Non-Shielded, Detachable, 1.8m

### 1.2.2. 15" LCD MONITOR

Model Number : D5063  
 Serial Number : CN206A6568  
 FCC ID : ARSLM562H  
 BSMI ID : R33037  
 Manufacturer : Top Victory Electronics (Fujian) Co., Ltd.  
 D-Sub Cable : Shielded, Detachable, 1.8m  
 AC Adapter : Bonded two ferrite cores  
 Delta, M/N ADP-40TB  
 BSMI ID 3892D142  
 Cord: Shielded, Undetachable, 1.8m  
 Bonded a ferrite core  
 Power Cord : Non-Shielded, Detachable, 1.8m

### 1.2.3. USB KEYBOARD

Model Number : SK-8115  
 Serial Number : N/A  
 FCC ID : By DoC  
 BSMI ID : T3A002  
 Manufacturer : DELL (Brand: DELL)  
 Data Cable : Shielded, Undetachable, 2.0m

### 1.2.4. USB MOUSE

Model Number : M056U0A  
 Serial Number : G0D038FE  
 FCC ID : By DoC  
 BSMI ID : R41108  
 Manufacturer : DELL (Brand: DELL)  
 Data Cable : Shielded, Undetachable, 1.8m

### 1.2.5. DC POWER SUPPLY (To Conversion Board)

Model Number : 3303A  
 Serial Number : 721773  
 Manufacturer : TOP WARD  
 DC Power Cable : Non-Shielded, Detachable, 0.6m  
 AC Power Cord : Non-Shielded, Detachable, 1.8m

1.2.6. CONVERSION BOARD (RS-232 Level Conversion Circuit)

Part Number : 050200006  
 Serial Number : N/A  
 Manufacturer : FUTABA  
 RS-232 Cable : Shielded, Detachable, 1.5m (To PC System)  
 Data Cable : Non-Shielded, Detachable, 0.25m (To EUT)

1.3. Description of Test Facility

Name of Firm : **Audix Technology Corporation**  
**EMC Department**  
 No. 53-11, Tin-Fu Tsun, Lin-Kou,  
 Taipei, Taiwan

Test Location & Facility (AC) : **Semi-Anechoic Chamber**  
 No. 53-11, Tin-Fu Tsun, Lin-Kou,  
 Taipei, Taiwan.  
 May 15, 2006 File on  
 Federal Communication Commission  
 Registration Number: 90993

NVLAP Lab. Code : 200077-0  
 (NVLAP is a NATA accredited body under Mutual Recognition Agreement)

1.4. Measurement Uncertainty

Test Item	Frequency Range	Uncertainty (dB), (V/m)
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
Emission Limitations	± 0.13dB
Maximum peak output power	± 0.33dBm
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)

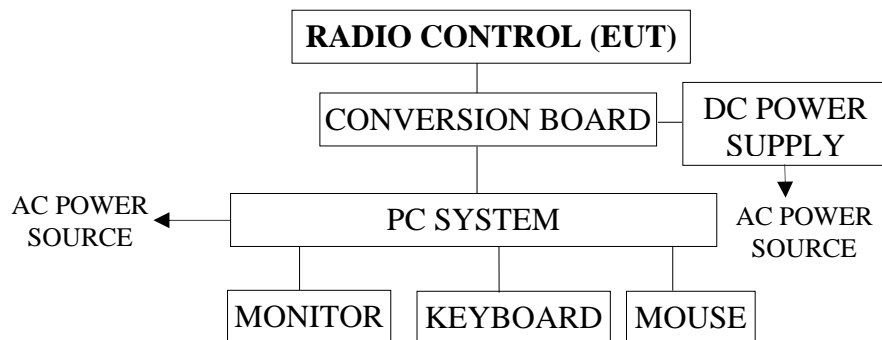
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E7405A	MY42000134	Jun. 27, 07'	Jun. 26, 08'
2.	Test Receiver	R & S	ESCS30	100265	Sep. 04, 07'	Sep. 03, 08'
3.	Pre-Amplifier	HP	8447D	2944A06305	Mar. 03, 07'	Mar. 02, 08'
4.	Biconical Antenna	CHASE	VBA6106A	1264	Apr. 11, 07'	Apr. 10, 08'
5.	Log Periodic Antenna	Schwarzbeck	UHALP91 08-A	0139	Apr. 11, 07'	Apr. 10, 08'

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

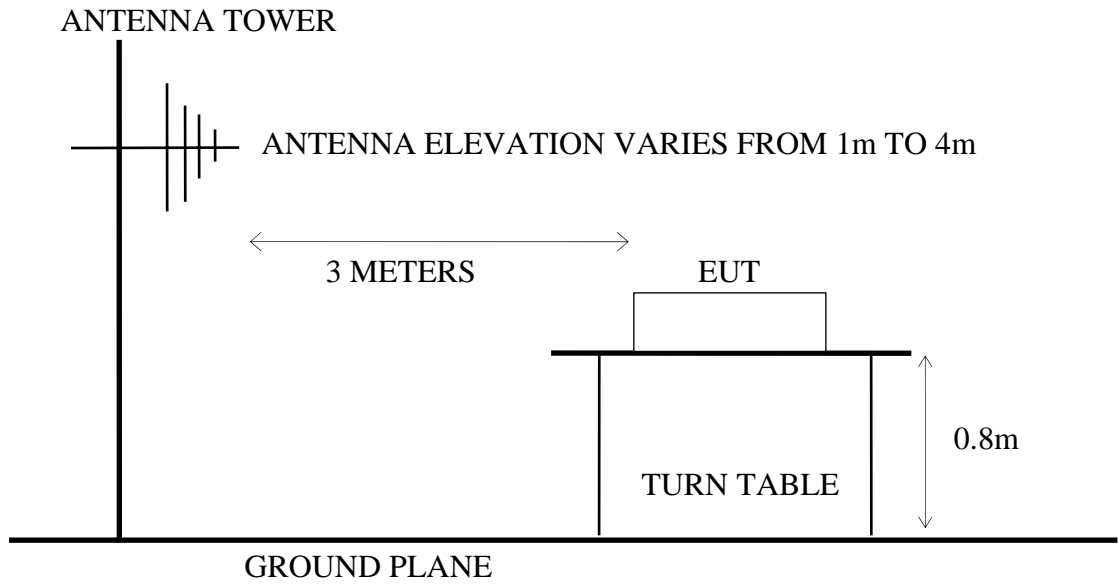
Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E7405A	MY42000134	Jun. 27, 07'	Jun. 26, 08'
2.	Pre-Amplifier	HP	8449B	3008A01284	Jun. 22, 07'	Jun. 21, 08'
3.	2.4GHz Notch Filter	EWT	EWT-14-0 070	G2	Dec. 08, 06'	Dec. 07, 07'
4.	Horn Antenna	EMCO	3115	9112-3775	May 23, 07'	May 22, 08'
5.	Horn Antenna	EMCO	3116	2653	Oct. 04, 07'	Oct. 03, 08'

#### 3.2. Test Setup

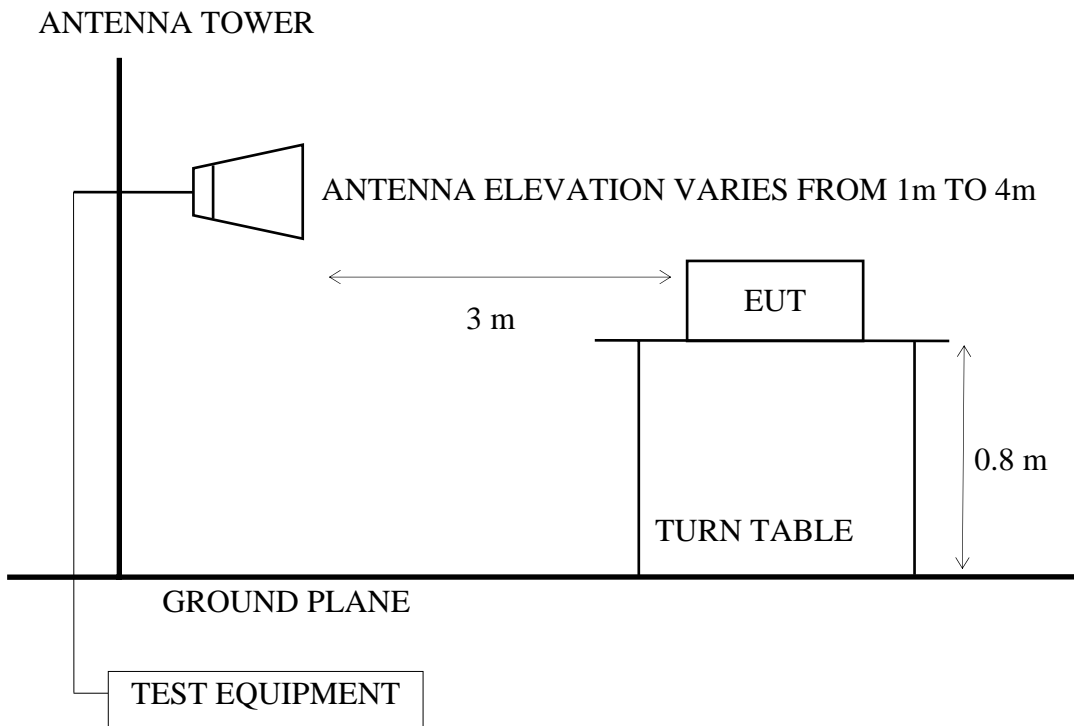
##### 3.2.1. Block Diagram of connection between EUT and simulators



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. Setup the EUT and simulator as shown on 3.2.
- 3.4.2. 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 (stand), 2442.240MHz (stand, side and lie) and 2479.104MHz (stand) during testing.
- 3.4.5. The EUT was set to continuously receive signals at 2442.240MHz (stand) 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 a antenna tower. The antenna 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<sup>th</sup> harmonics from fundamental frequency) was checked.

### 3.6. Test Results

#### **PASSED.**

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

EUT : Radio Control      M/N : TM14-2.4G

Test Date : Nov. 02, 2007      Temperature : 23      Humidity : 43%

#### **For Frequency Range 30MHz~1000MHz:**

The EUT with following test modes were 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.	02	2405.376MHz	Transmit	Stand	# 9	# 10
2.	38	2442.240MHz	Transmit	Stand	# 10	# 9
3.				Side	# 9	# 10
4.				Lie	# 10	# 9
5.	74	2479.104MHz	Transmit	Stand	# 10	# 9
6.	38	2442.240MHz	Receive	Stand	# 10	# 9

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

#### **For Frequency above 1GHz:**

The EUT with following test modes were performed during this section testing and all the test results are listed in section 3.6.2.

Mode	Channel	Frequency	Test Mode	Position
1.	02	2405.376MHz	Transmit	Stand
2.	38	2442.240MHz	Transmit	Stand
3.				Side
4.				Lie
5.	74	2479.104MHz	Transmit	Stand
6.	38	2442.240MHz	Receive	Stand

\* Above all final readings were measured with Peak detector and Average detector.

**For Restricted Bands:**

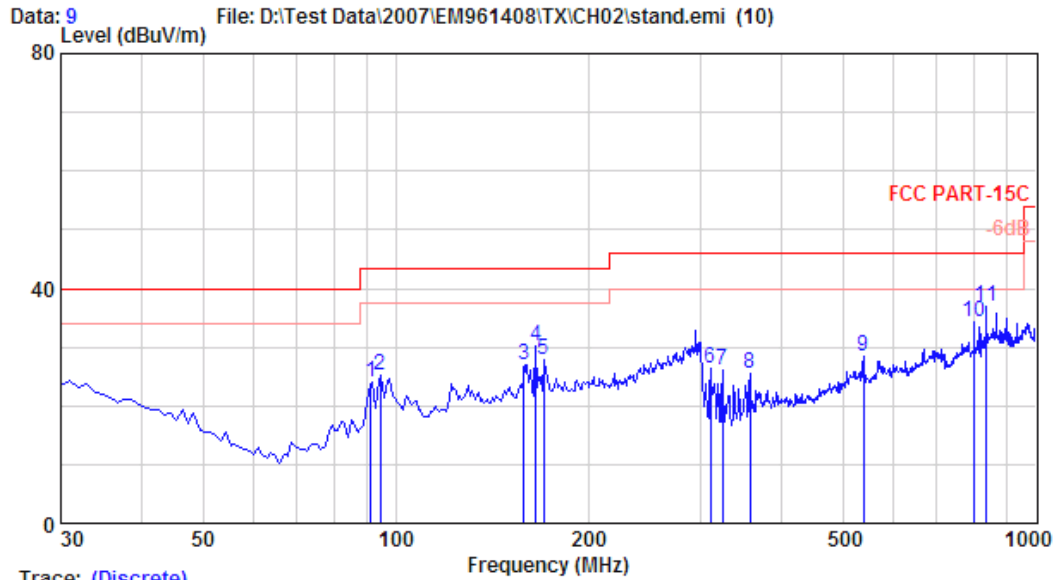
The EUT was tested in restricted bands and all the test results are listed in section 3.6.3. (The restricted bands defined in part 15.205(a))

Mode	Channel	Frequency	Test Mode
1.	02	2405.376MHz	Transmit
2.	74	2479.104MHz	Transmit

3.6.1. Frequency Range 30-1000MHz



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Trace: (Discrete)

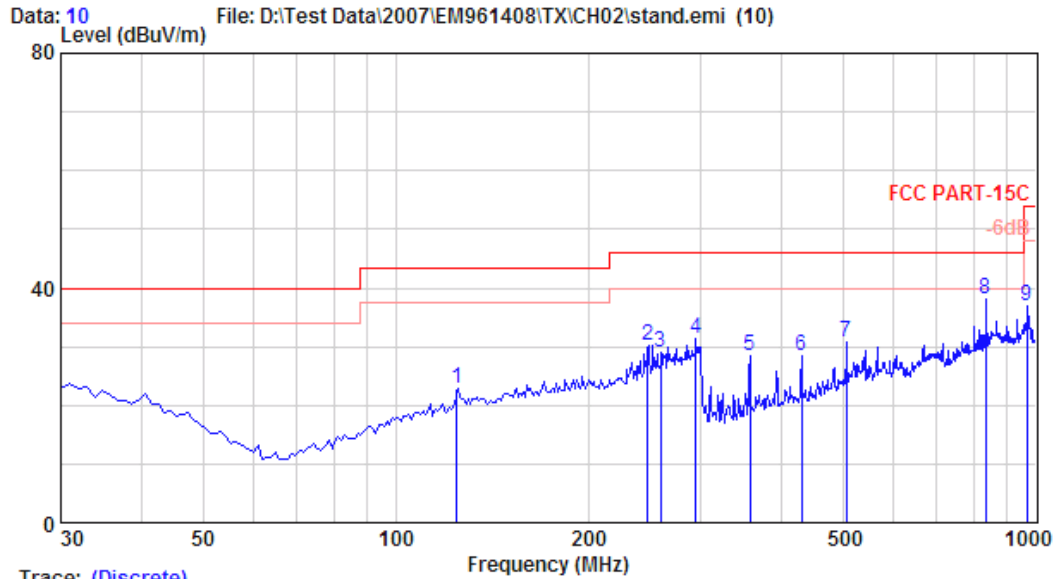
Site no.	: A/C Chamber	Data no.	: 9
Dis. / Ant.	: 3m VBA6106A/UHALP9108A	Ant. pol.	: HORIZONTAL
Limit	: FCC PART-15C		
Env. / Ins.	: E7405A 23*C/43%	Engineer	: Jarwei Wang
EUT	: Radio Control M/N:TM14-2.4G		
Power Rating	: DC 7.2V		
Test Mode	: CH02 (Stand)		

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	91.560	15.90	2.00	6.25	24.15	43.50	19.35	
2	94.530	16.51	2.00	6.60	25.11	43.50	18.39	
3	158.790	20.78	2.70	3.63	27.10	43.50	16.40	
4	165.810	20.93	2.70	6.49	30.12	43.50	13.38	
5	170.400	21.03	2.80	4.05	27.88	43.50	15.62	
6	309.800	14.93	4.00	7.51	26.44	46.00	19.56	
7	323.800	15.10	4.14	6.75	25.99	46.00	20.01	
8	357.400	15.90	4.40	5.25	25.55	46.00	20.45	
9	537.300	19.41	7.10	1.84	28.35	46.00	17.65	
10	799.800	24.14	6.90	3.14	34.17	46.00	11.83	
11	834.800	24.90	7.10	4.90	36.90	46.00	9.10	

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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Trace: (Discrete)

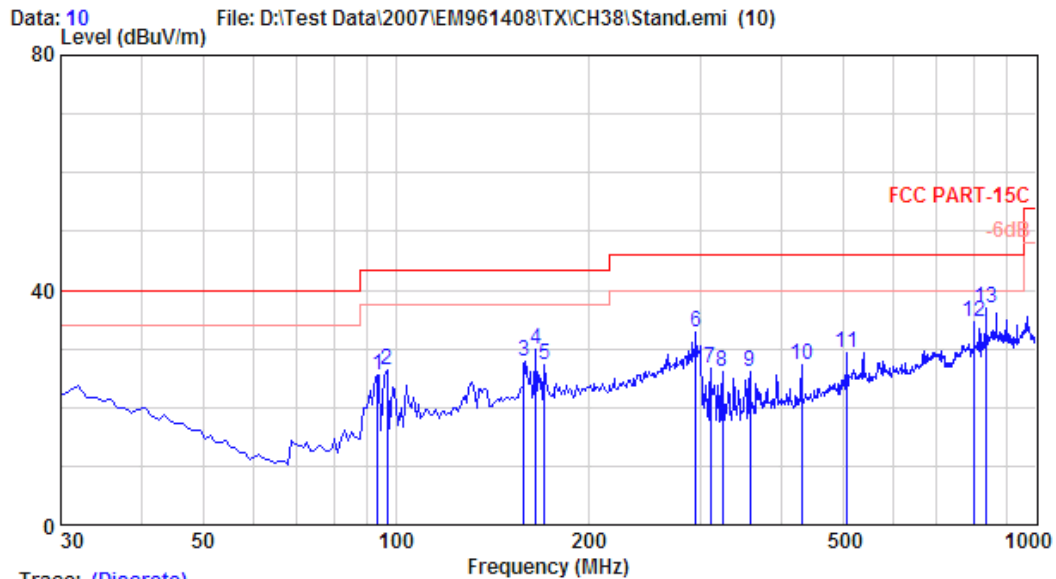
Site no. : A/C Chamber Data no. : 10  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E7405A 23\*C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH02 (Stand)

	Ant. Factor	Cable Loss	Emission				
Freq. (MHz)	(dB/m)	(dB)	Reading (dBµV)	Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	19.38	2.30	1.14	22.82	43.50	20.68	
2	23.66	3.50	3.09	30.26	46.00	15.74	
3	24.55	3.53	0.96	29.04	46.00	16.96	
4	26.43	3.99	0.96	31.38	46.00	14.62	
5	15.90	4.40	8.06	28.36	46.00	17.64	
6	17.26	5.20	6.07	28.53	46.00	17.47	
7	18.99	6.72	5.17	30.88	46.00	15.12	
8	24.90	7.10	6.05	38.05	46.00	7.95	
9	26.90	7.69	2.34	36.93	54.00	17.07	

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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Trace: (Discrete)

Site no.	: A/C Chamber	Data no.	: 10
Dis. / Ant.	: 3m VBA6106A/UHALP9108A	Ant. pol.	: HORIZONTAL
Limit	: FCC PART-15C		
Env. / Ins.	: E7405A 23*C/43%	Engineer	: Jarwei Wang
EUT	: Radio Control M/N:TM14-2.4G		
Power Rating	: DC 7.2V		
Test Mode	: CH38 (Stand)		

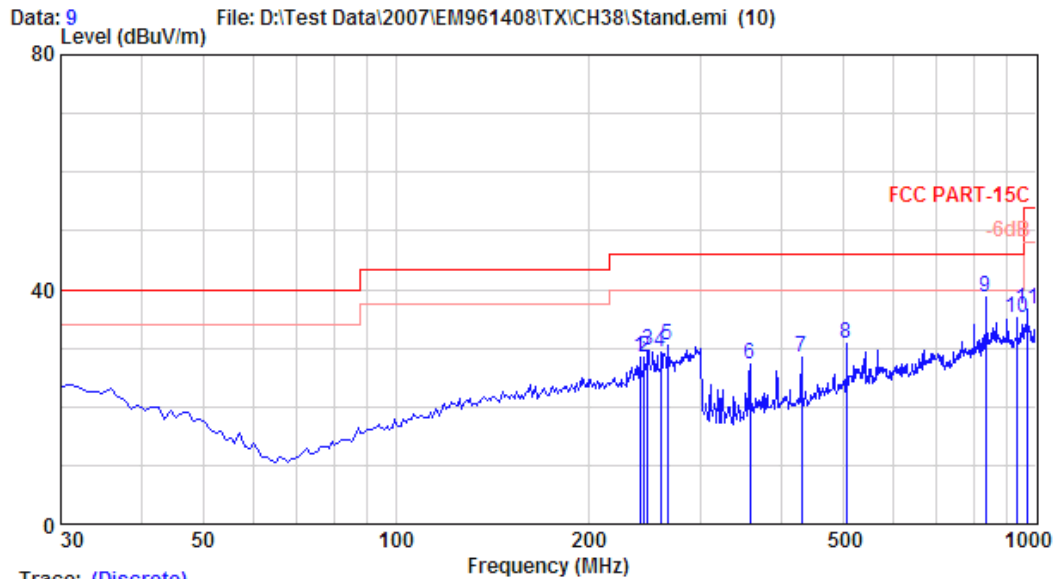
	Ant. Factor	Cable Loss	Reading	Emission Level	Limits	Margin	Remark
Freq. (MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)	
1	93.720	16.37	2.00	7.17	25.54	43.50	17.96
2	96.960	16.75	2.05	7.62	26.42	43.50	17.08
3	158.790	20.78	2.70	4.50	27.98	43.50	15.52
4	165.810	20.93	2.70	6.38	30.01	43.50	13.49
5	170.670	21.03	2.80	3.39	27.22	43.50	16.28
6	294.600	26.43	3.99	2.40	32.82	46.00	13.18
7	309.800	14.93	4.00	7.84	26.77	46.00	19.23
8	323.800	15.10	4.14	6.75	25.99	46.00	20.01
9	357.400	15.90	4.40	5.89	26.18	46.00	19.82
10	430.900	17.26	5.20	4.78	27.24	46.00	18.76
11	505.800	18.99	6.72	3.58	29.29	46.00	16.71
12	799.800	24.14	6.90	3.61	34.65	46.00	11.35
13	834.800	24.90	7.10	4.90	36.90	46.00	9.10

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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Trace: (Discrete)

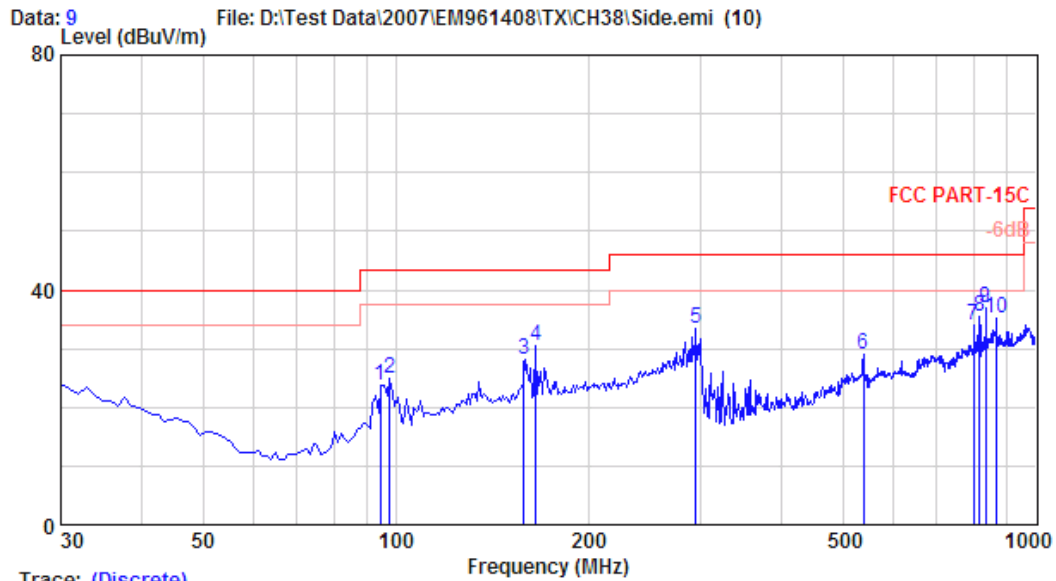
Site no. : A/C Chamber Data no. : 9  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E7405A 23\*C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH38 (Stand)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	240.600	23.10	3.40	1.78	28.29	46.00	17.71	
2	244.380	23.40	3.50	1.40	28.30	46.00	17.70	
3	247.890	23.66	3.50	2.46	29.62	46.00	16.38	
4	259.500	24.55	3.53	1.18	29.26	46.00	16.74	
5	265.980	24.67	3.70	2.24	30.62	46.00	15.38	
6	357.400	15.90	4.40	6.93	27.22	46.00	18.78	
7	430.900	17.26	5.20	6.04	28.50	46.00	17.50	
8	505.800	18.99	6.72	4.97	30.68	46.00	15.32	
9	834.800	24.90	7.10	6.81	38.81	46.00	7.19	
10	934.900	25.42	7.50	2.23	35.16	46.00	10.84	
11	967.800	26.90	7.69	2.01	36.60	54.00	17.40	

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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 Email:ttemc@ttemc.



Trace: (Discrete)

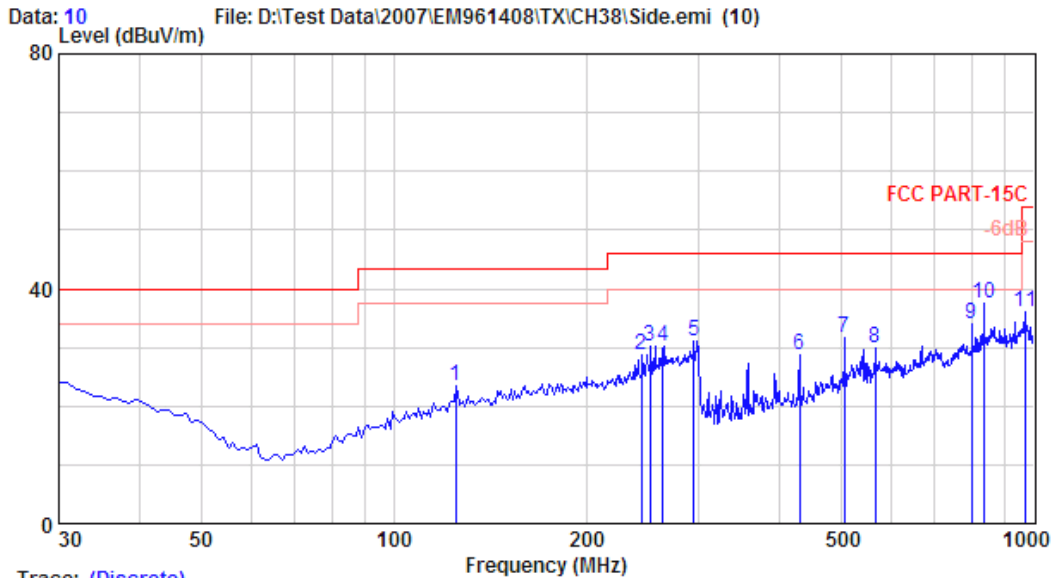
Site no. : A/C Chamber Data no. : 9  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E7405A 23\*C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH38 (Side)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	94.530	16.51	2.00	5.32	23.83	43.50	19.67	
2	97.770	16.84	2.10	6.09	25.03	43.50	18.47	
3	158.790	20.78	2.70	4.69	28.17	43.50	15.33	
4	165.810	20.93	2.70	6.84	30.47	43.50	13.03	
5	294.600	26.43	3.99	3.02	33.44	46.00	12.56	
6	537.300	19.41	7.10	2.45	28.96	46.00	17.04	
7	799.800	24.14	6.90	3.07	34.11	46.00	11.89	
8	817.300	23.76	7.00	4.70	35.45	46.00	10.55	
9	834.800	24.90	7.10	5.03	37.03	46.00	8.97	
10	868.400	25.89	7.20	1.96	35.05	46.00	10.95	

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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Trace: (Discrete)

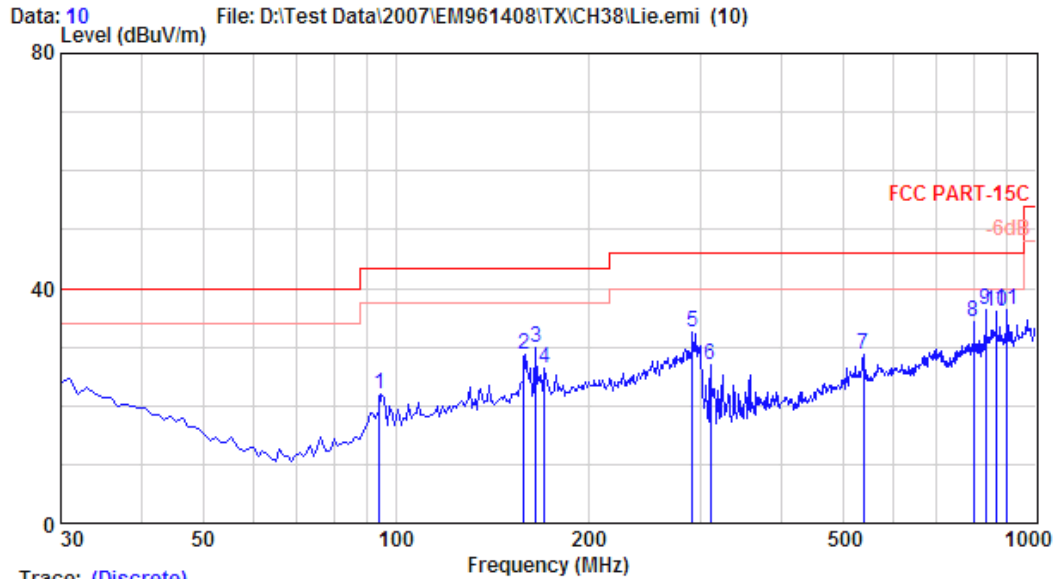
Site no. : A/C Chamber Data no. : 10  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E7405A 23\*C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH38 (Side)

	Ant.	Cable	Emission				Margin	Remark
Freq. (MHz)	Factor (dB/m)	Loss (dB)	Reading (dBµV)	Level (dBµV/m)	Limits (dBµV/m)			
1	125.040	19.38	2.30	1.81	23.49	43.50	20.01	
2	244.110	23.40	3.50	1.67	28.58	46.00	17.42	
3	251.670	23.99	3.59	2.56	30.13	46.00	15.87	
4	263.280	24.58	3.60	1.94	30.11	46.00	15.89	
5	294.600	26.43	3.99	0.68	31.10	46.00	14.90	
6	430.900	17.26	5.20	6.12	28.57	46.00	17.43	
7	505.800	18.99	6.72	5.96	31.67	46.00	14.33	
8	565.300	20.49	6.60	2.89	29.97	46.00	16.03	
9	799.800	24.14	6.90	2.83	33.87	46.00	12.13	
10	834.800	24.90	7.10	5.51	37.51	46.00	8.49	
11	967.800	26.90	7.69	1.51	36.10	54.00	17.90	

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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 Email:ttemc@ttemc.



Trace: (Discrete)

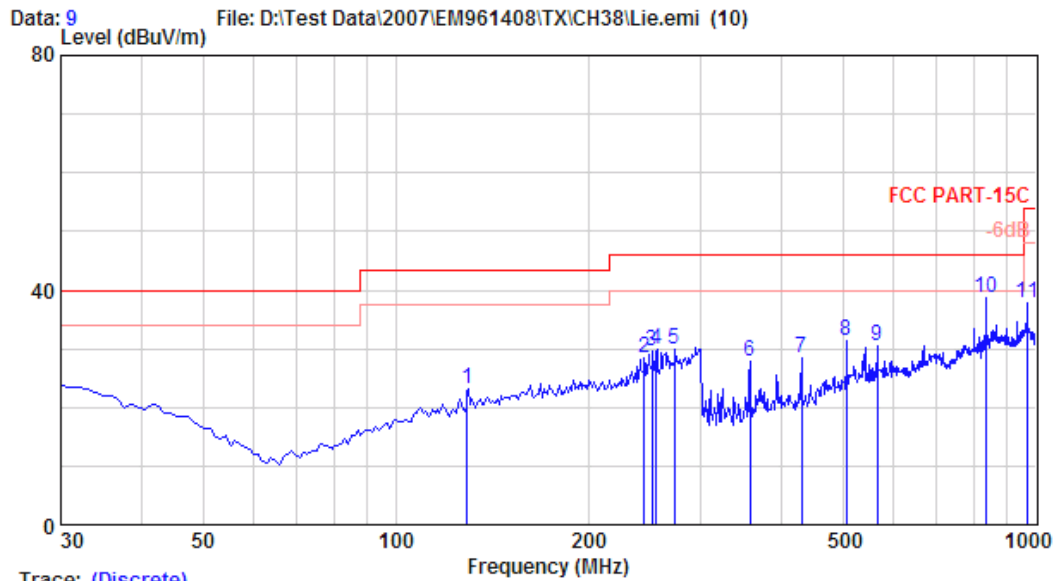
Site no. : A/C Chamber Data no. : 10  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E7405A 23\*C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH38 (Lie)

	Ant.	Cable	Emission				
Freq. (MHz)	Factor (dB/m)	Loss (dB)	Reading (dBµV)	Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	16.37	2.00	3.69	22.06	43.50	21.44	
2	20.78	2.70	5.28	28.75	43.50	14.75	
3	20.93	2.70	6.35	29.98	43.50	13.52	
4	21.03	2.80	2.52	26.35	43.50	17.15	
5	26.14	3.90	2.51	32.55	46.00	13.45	
6	14.93	4.00	8.02	26.95	46.00	19.05	
7	19.41	7.10	2.26	28.77	46.00	17.23	
8	24.14	6.90	3.35	34.39	46.00	11.61	
9	24.90	7.10	4.30	36.30	46.00	9.70	
10	25.89	7.20	2.87	35.96	46.00	10.04	
11	24.95	7.40	3.89	36.24	46.00	9.76	

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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 Email:ttemc@ttemc.



Trace: (Discrete)

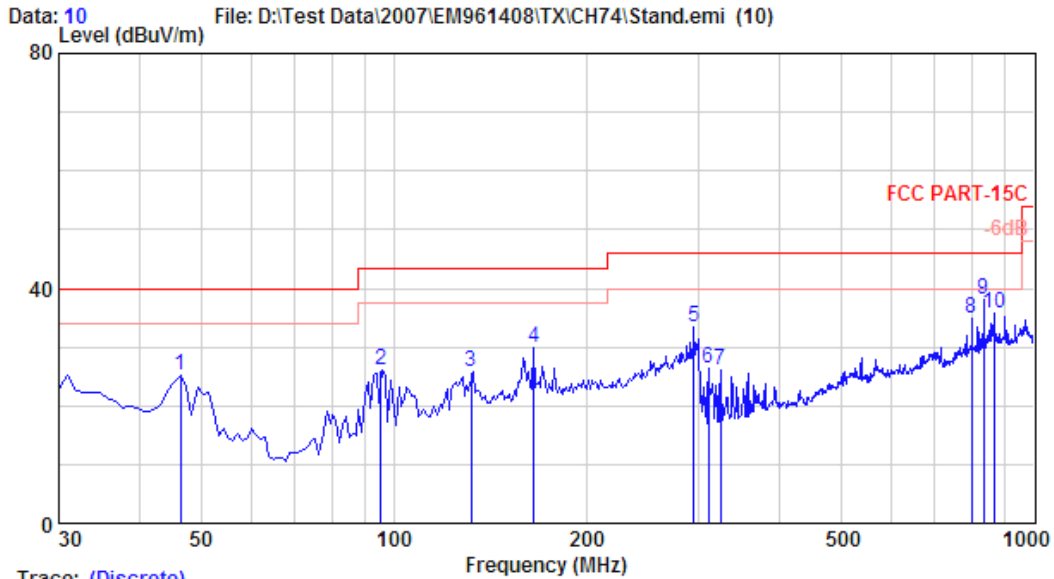
Site no. : A/C Chamber Data no. : 9  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E7405A 23\*C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH38 (Lie)

	Ant. Cable		Emission				
Freq. (MHz)	Factor (dB/m)	Loss (dB)	Reading (dBµV)	Level (dBµV/m)	Limits (dBµV/m)	Margin (dB)	Remark
1	129.360	19.66	2.40	1.11	23.17	43.50	20.33
2	244.380	23.40	3.50	1.41	28.31	46.00	17.69
3	251.670	23.99	3.59	1.89	29.46	46.00	16.54
4	255.450	24.19	3.56	2.05	29.80	46.00	16.20
5	272.730	25.10	3.70	1.00	29.80	46.00	16.20
6	357.400	15.90	4.40	7.55	27.85	46.00	18.15
7	430.900	17.26	5.20	6.02	28.48	46.00	17.52
8	505.800	18.99	6.72	5.51	31.22	46.00	14.78
9	565.300	20.49	6.60	3.50	30.58	46.00	15.42
10	834.800	24.90	7.10	6.72	38.72	46.00	7.28
11	967.800	26.90	7.69	3.07	37.66	54.00	16.34

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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Trace: (Discrete)

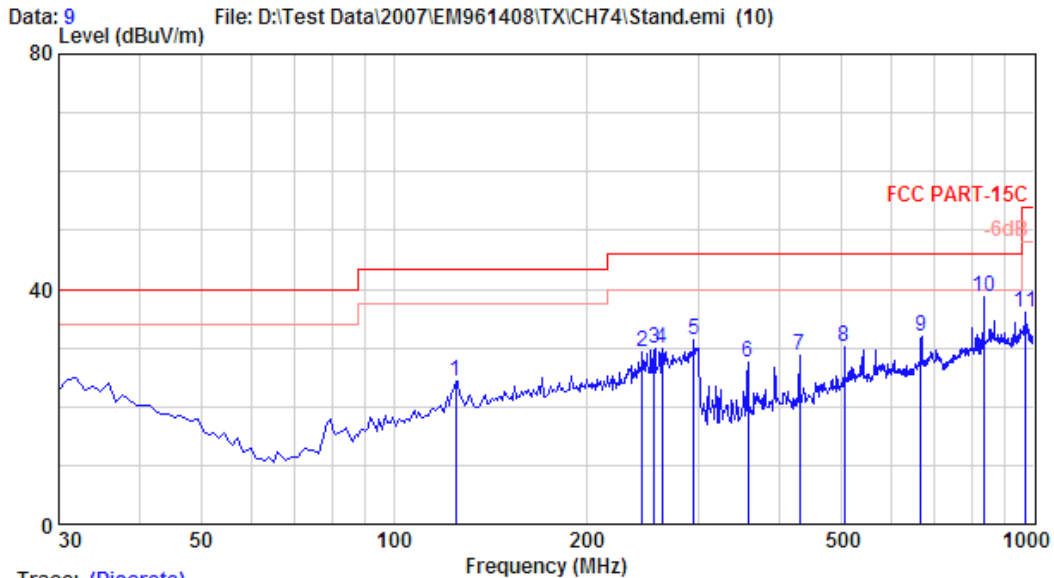
Site no. : A/C Chamber Data no. : 10  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E7405A 23\*C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH74 (Stand)

	Ant. Factor	Cable Loss	Reading	Emission Level	Limits	Margin	Remark
Freq. (MHz)	(dB/m)	(dB)	(dBμV)	(dBμV/m)	(dBμV/m)	(dB)	
1	46.470	18.23	1.40	5.44	25.07	40.00	14.93
2	95.610	16.62	2.00	7.52	26.14	43.50	17.36
3	132.060	19.83	2.40	3.55	25.77	43.50	17.73
4	165.810	20.93	2.70	6.38	30.01	43.50	13.49
5	294.600	26.43	3.99	2.92	33.34	46.00	12.66
6	309.800	14.93	4.00	7.48	26.41	46.00	19.59
7	323.800	15.10	4.14	6.73	25.97	46.00	20.03
8	799.800	24.14	6.90	3.77	34.81	46.00	11.19
9	834.800	24.90	7.10	6.24	38.24	46.00	7.76
10	868.400	25.89	7.20	2.72	35.81	46.00	10.19

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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Trace: (Discrete)

Site no. : A/C Chamber Data no. : 9  
 Dis. / Ant. : 3m VBA6106A/UHALP9108A Ant. pol. : VERTICAL  
 Limit : FCC PART-15C  
 Env. / Ins. : E7405A 23\*C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH74 (Stand)

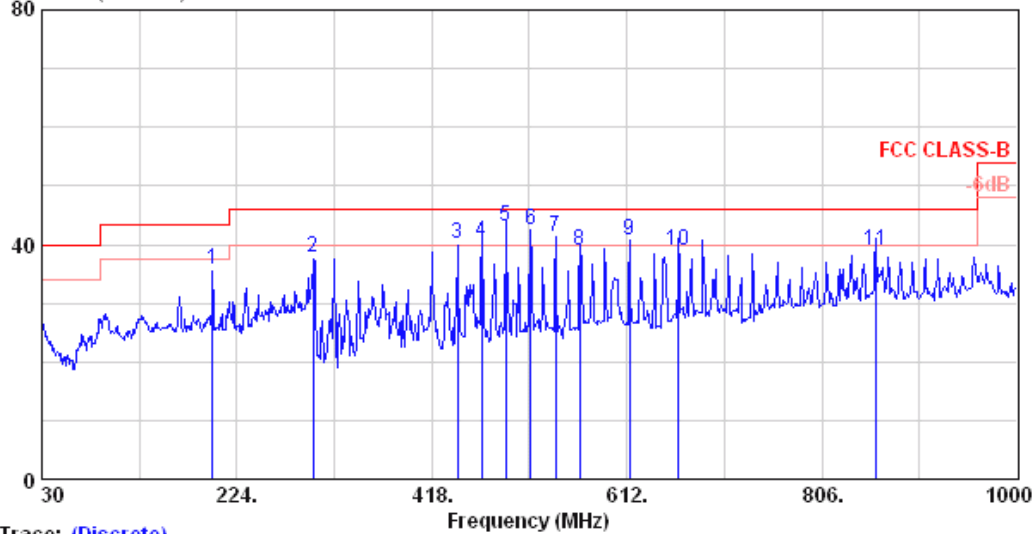
Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBµV)	Emission		Limits (dBµV/m)	Margin (dB)	Remark
				Level (dBµV/m)				
1	125.040	19.38	2.30	24.33	43.50	19.17		
2	244.380	23.40	3.50	29.17	46.00	16.83		
3	255.450	24.19	3.56	29.75	46.00	16.25		
4	262.200	24.57	3.60	30.03	46.00	15.97		
5	294.600	26.43	3.99	31.42	46.00	14.58		
6	357.400	15.90	4.40	27.43	46.00	18.57		
7	430.900	17.26	5.20	28.71	46.00	17.29		
8	505.800	18.99	6.72	30.10	46.00	15.90		
9	666.800	22.78	6.40	31.86	46.00	14.14		
10	834.800	24.90	7.10	38.70	46.00	7.30		
11	967.800	26.90	7.69	35.97	54.00	18.03		

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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Data: 10 File: D:\Test&Photo\2007 DATA\EM961408(FUTABA 2.4G)\FCC\Radiated\DATA\CH38-RX\St  
 Level (dBuV/m)



Trace: (Discrete)  
 Site no. : A/C Chamber Data no. : 10  
 Dis. / Ant. : 3m VBA6106A/UHALP9108-A Ant. pol. : HORIZONTAL  
 Limit : FCC CLASS-B  
 Env. / Ins. : E7405A 26°C/62% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC7.2V  
 Test Mode : RX(CH38)

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Emission Level (dBuV/m)	Limits (dBuV/m)	Margin (dB)	Remark
1	199.750	22.09	3.00	10.74	35.83	43.50	7.67	QP
2	299.660	26.77	3.90	7.14	37.81	46.00	8.19	QP
3	443.220	17.62	5.33	17.14	40.09	46.00	5.91	QP
4	467.470	18.21	5.80	16.30	40.31	46.00	5.69	QP
5	491.720	18.61	6.33	17.99	42.93	46.00	3.07	QP
6	515.970	19.98	6.80	15.70	42.48	46.00	3.52	QP
7	541.190	19.25	7.01	14.96	41.22	46.00	4.78	QP
8	565.440	20.49	6.60	11.82	38.91	46.00	7.09	QP
9	614.910	0.00	6.30	34.51	40.81	46.00	5.19	QP
10	663.410	22.52	6.32	10.06	38.90	46.00	7.10	QP
11	859.350	26.01	7.20	5.78	38.98	46.00	7.02	QP

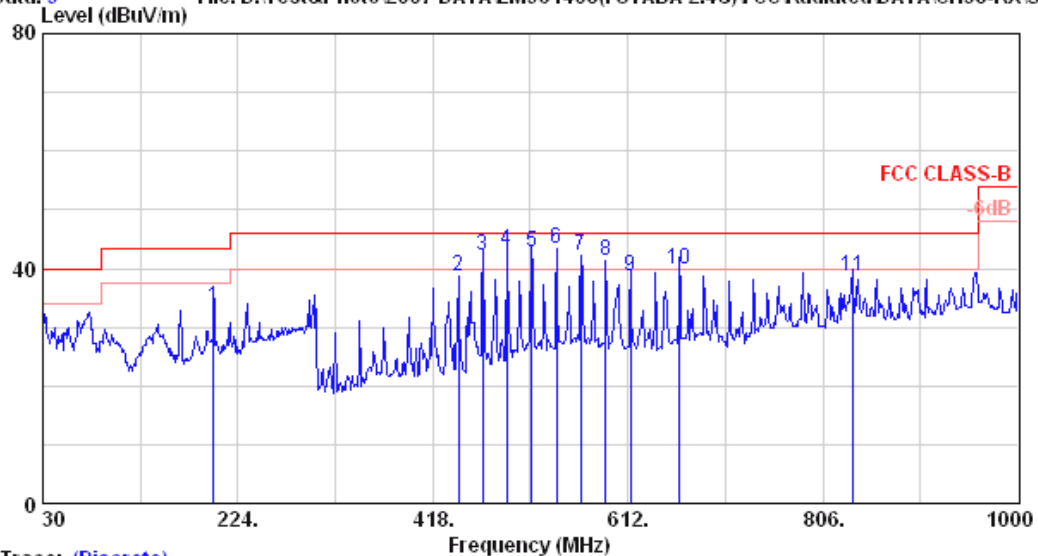
Remarks: 1. Emission Level= Antenna Factor + Cable Loss + Reading.  
 2. The emission levels that are 20dB below the official limit are not reported.





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 Email:ttemc@ttemc.

Data: 9 File: D:\Test&Photo\2007 DATA\EM961408(FUTABA 2.4G)\FCC\Radiated\DATA\CH38-RX\St



Trace: (Discrete)  
 Site no. : A/C Chamber Data no. : 9  
 Dis. / Ant. : 3m VBA6106A/UHALP9108-A Ant. pol. : VERTICAL  
 Limit : FCC CLASS-B  
 Env. / Ins. : E7405A 26°C/62% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC7.2V  
 Test Mode : RX (CH38)

	Ant.	Cable	Emission			Limits	Margin	Remark
Freq. (MHz)	Factor (dB/m)	Loss (dB)	Reading (dBuV)	Level (dBuV/m)	Limits (dBuV/m)	(dB)		
1	22.86	3.00	7.48	33.34	43.50	10.16	QP	
2	17.42	5.33	15.97	38.73	46.00	7.27	QP	
3	18.99	5.80	17.52	42.32	46.00	3.68	QP	
4	18.72	6.33	17.88	42.93	46.00	3.07	QP	
5	20.86	6.80	15.21	42.86	46.00	3.14	QP	
6	20.48	7.01	15.88	43.37	46.00	2.63	QP	
7	22.08	6.60	13.37	42.05	46.00	3.95	QP	
8	0.00	6.30	35.07	41.37	46.00	4.63	QP	
9	21.35	6.30	11.11	38.76	46.00	7.24	QP	
10	22.22	6.32	11.25	39.79	46.00	6.21	QP	
11	26.32	7.10	5.30	38.72	46.00	7.28	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 : Nov. 02, 2007 Temperature : 23

EUT : Radio Control Humidity : 43%

Test Mode : Transmit, Channel: 02 (Frequency: 2405.376MHz), 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
Peak	1011.746	25.21	4.21	15.37	44.79	74.00	29.21
	1199.682	25.29	4.59	14.38	44.26	74.00	29.74
	1607.436	25.98	6.18	16.21	48.37	74.00	25.63
Average	1011.746	25.21	4.21	8.37	37.79	54.00	16.21
	1199.682	25.29	4.59	6.38	36.26	54.00	17.74
	1607.436	25.98	6.18	8.21	40.37	54.00	13.63

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Peak	1011.746	25.21	4.21	16.09	45.51	74.00	28.49
	1196.326	25.29	4.58	16.50	46.37	74.00	27.63
	1401.042	25.37	5.14	15.46	45.97	74.00	28.03
	1607.436	25.98	6.18	15.95	48.11	74.00	25.89
Average	1011.746	25.21	4.21	8.09	37.51	54.00	16.49
	1196.326	25.29	4.58	8.50	38.37	54.00	15.63
	1401.042	25.37	5.14	8.46	38.97	54.00	15.03
	1607.436	25.98	6.18	6.95	39.11	54.00	14.89

- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.  
 2. Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

Date of Test : Nov. 02, 2007 Temperature : 23  
 EUT : Radio Control Humidity : 43%  
 Test Mode : Transmit, Channel: 38 (Frequency: 2442.240MHz), 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
Peak	1011.746	25.21	4.21	14.66	44.08	74.00	29.92
	1199.682	25.29	4.59	14.76	44.64	74.00	29.36
	1594.012	25.90	6.12	14.41	46.43	74.00	27.57
	2072.242	27.96	5.95	13.27	47.18	74.00	26.82
Average	1011.746	25.21	4.21	6.66	36.08	54.00	17.92
	1199.682	25.29	4.59	7.76	37.64	54.00	16.36
	1594.012	25.90	6.12	6.41	38.43	54.00	15.57
	2072.242	27.96	5.95	5.27	39.18	54.00	14.82

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Peak	1011.746	25.21	4.21	16.52	45.94	74.00	28.06
	1196.326	25.29	4.58	16.59	46.46	74.00	27.54
	1602.402	25.95	6.14	15.52	47.61	74.00	26.39
	2256.822	28.35	6.17	17.48	52.00	74.00	22.00
Average	1011.746	25.21	4.21	9.52	38.94	54.00	15.06
	1196.326	25.29	4.58	8.59	38.46	54.00	15.54
	1602.402	25.95	6.14	7.52	39.61	54.00	14.39
	2256.822	28.35	6.17	9.48	44.00	54.00	10.00

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.  
 2. Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

Date of Test : Nov. 02, 2007 Temperature : 23  
 EUT : Radio Control Humidity : 43%  
 Test Mode : Transmit, Channel: 38 (Frequency: 2442.240MHz), Position: Side

	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	1011.746	25.21	4.21	13.74	43.16	74.00	30.84
	1199.682	25.29	4.59	14.57	44.45	74.00	29.55
	1761.812	26.74	7.12	20.40	54.26	74.00	19.74
	2035.326	27.88	5.90	13.94	47.72	74.00	26.28
Average	1011.746	25.21	4.21	5.74	35.16	54.00	18.84
	1199.682	25.29	4.59	5.57	35.45	54.00	18.55
	1761.812	26.74	7.12	11.40	45.26	54.00	8.74
	2035.326	27.88	5.90	6.94	40.72	54.00	13.28

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Peak	1011.746	25.21	4.21	14.94	44.36	74.00	29.64
	1199.682	25.29	4.59	16.22	46.10	74.00	27.90
	1599.046	25.93	6.14	14.99	47.06	74.00	26.94
	1745.032	26.67	7.12	17.77	51.56	74.00	22.44
	1761.012	26.74	7.12	21.03	54.89	74.00	19.11
Average	1011.746	25.21	4.21	6.94	36.36	54.00	17.64
	1199.682	25.29	4.59	8.22	38.10	54.00	15.90
	1599.046	25.93	6.14	5.99	38.06	54.00	15.94
	1745.032	26.67	7.12	8.77	42.56	54.00	11.44
	1761.012	26.74	7.12	12.03	45.89	54.00	8.11

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.  
 2. Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

Date of Test : Nov. 02, 2007 Temperature : 23  
 EUT : Radio Control Humidity : 43%  
 Test Mode : Transmit, Channel: 38 (Frequency: 2442.240MHz), Position: Lie

	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	1011.746	25.21	4.21	15.63	45.05	74.00	28.95
	1196.326	25.29	4.58	15.17	45.04	74.00	28.96
	1594.012	25.90	6.12	15.20	47.22	74.00	26.78
	1632.606	26.12	6.38	14.13	46.63	74.00	27.37
Average	1011.746	25.21	4.21	6.63	36.05	54.00	17.95
	1196.326	25.29	4.58	7.17	37.04	54.00	16.96
	1594.012	25.90	6.12	6.20	38.22	54.00	15.78
	1632.606	26.12	6.38	6.13	38.63	54.00	15.37

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Peak	1011.746	25.21	4.21	16.23	45.65	74.00	28.35
	1199.682	25.29	4.59	16.36	46.24	74.00	27.76
	1397.686	25.37	5.14	16.27	48.41	74.00	29.91
	1602.402	25.95	6.14	16.32	48.41	74.00	25.59
Average	1011.746	25.21	4.21	8.23	37.65	54.00	16.35
	1199.682	25.29	4.59	7.36	37.24	54.00	16.76
	1397.686	25.37	5.14	9.27	39.41	54.00	17.91
	1602.402	25.95	6.14	7.32	39.41	54.00	14.59

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.  
 2. Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

Date of Test : Nov. 02, 2007 Temperature : 23  
 EUT : Radio Control Humidity : 43%  
 Test Mode : Transmit, Channel: 74 (Frequency: 2479.104MHz), Position: Stand

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading	Emission Level		Margin dB
				Horizontal dBμV	Horizontal dBμV/m	Limits dBμV/m	
Peak	1199.682	25.29	4.59	15.33	45.21	74.00	28.79
	1602.402	25.95	6.14	14.51	46.60	74.00	27.40
	1652.742	26.22	6.52	19.07	51.81	74.00	22.19
Average	1199.682	25.29	4.59	7.33	37.21	54.00	16.79
	1602.402	25.95	6.14	6.51	38.60	54.00	15.40
	1652.742	26.22	6.52	11.07	43.81	54.00	10.19

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading	Emission Level		Margin dB
				Vertical dBμV	Vertical dBμV/m	Limits dBμV/m	
Peak	1199.682	25.29	4.59	16.17	46.05	74.00	27.95
	1401.042	25.37	5.14	15.18	45.69	74.00	28.31
	1652.742	26.22	6.52	17.16	49.90	74.00	24.10
	2270.246	28.37	6.19	16.61	51.17	74.00	22.83
	2295.416	28.41	6.22	19.36	53.99	74.00	20.01
Average	1199.682	25.29	4.59	8.17	38.05	54.00	15.95
	1401.042	25.37	5.14	7.18	37.69	54.00	16.31
	1652.742	26.22	6.52	8.16	40.90	54.00	13.10
	2270.246	28.37	6.19	9.61	44.17	54.00	9.83
	2295.416	28.41	6.22	11.36	45.99	54.00	8.01

Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.  
 2. Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

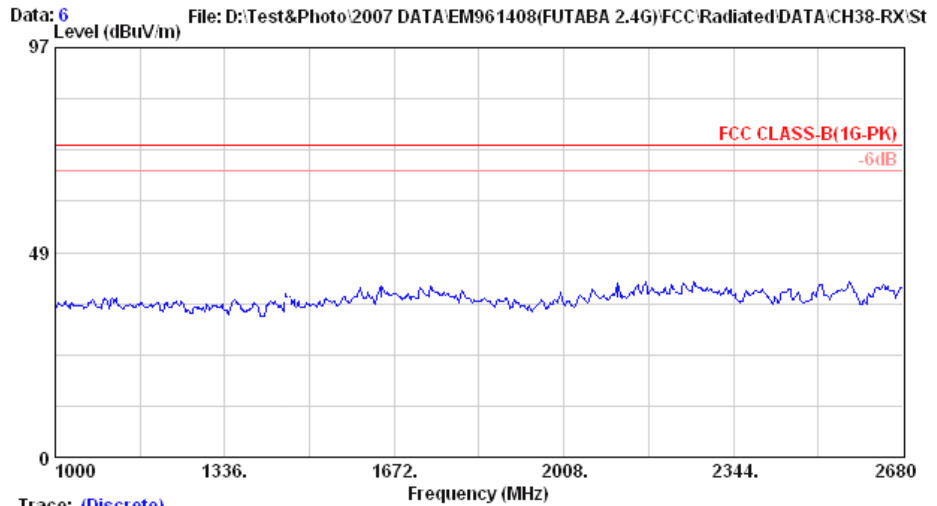
Date of Test : Nov. 02, 2007 Temperature : 23

EUT : Radio Control Humidity : 43%

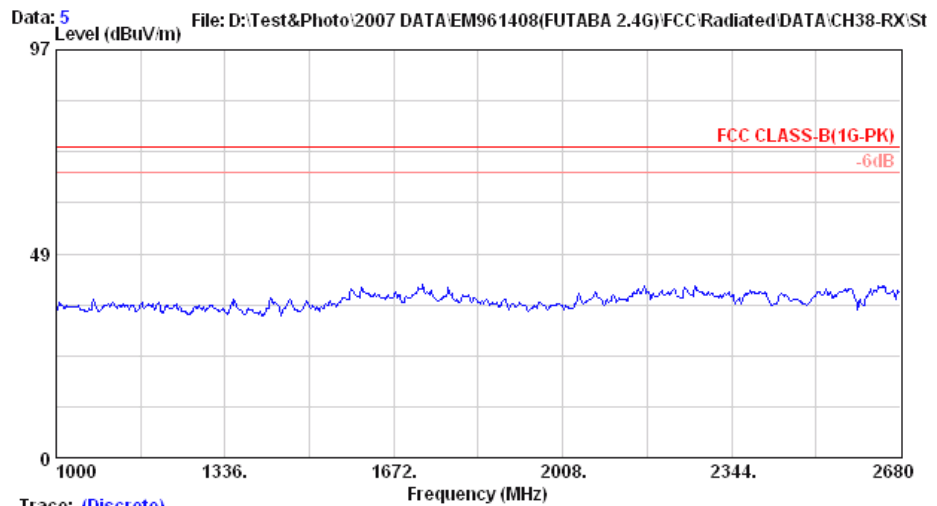
Test Mode : Receive, Channel: 38 (Frequency: 2442.240MHz), Position: Stand



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Site no. : A/C Chamber Data no. : 6  
 Dis. / Ant. : 3m 3115 Ant. pol. : HORIZONTAL  
 Limit : FCC CLASS-B(1G-PK)  
 Env. / Ins. : 8593EM 26°C/62% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:PK-FSM-2.4G  
 Power Rating : DC7.2V  
 Test Mode : RX(CH38)



Site no. : A/C Chamber Data no. : 5  
 Dis. / Ant. : 3m 3115 Ant. pol. : VERTICAL  
 Limit : FCC CLASS-B(1G-PK)  
 Env. / Ins. : 8593EM 26°C/62% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:PK-FSM-2.4G  
 Power Rating : DC7.2V  
 Test Mode : RX(CH38)

Remark : Measurement was up to 25GHz, but the emissions level were too low against the official limit and not report.

3.6.3. Restricted Bands Measurement Results

Date of Test : Nov. 02, 2007 Temperature : 23

EUT : Radio Control Humidity : 43%

Test Mode : Transmit, Channel: 02, 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
Peak *	2388.960	28.59	6.34	9.52	44.45	74.00	29.55
Average *	2352.560	28.53	6.29	-4.09	30.73	54.00	23.27

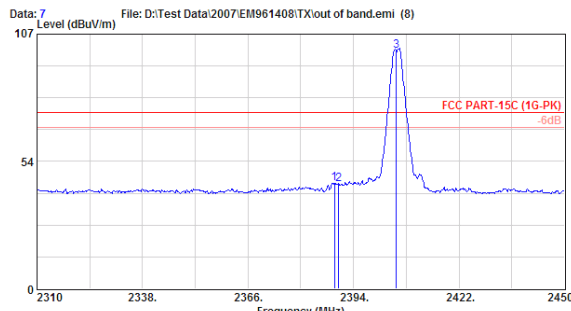
- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.  
 2. Low frequency section (spurious in the restricted band 2310-2390MHz).  
 3. ‘\*’ The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



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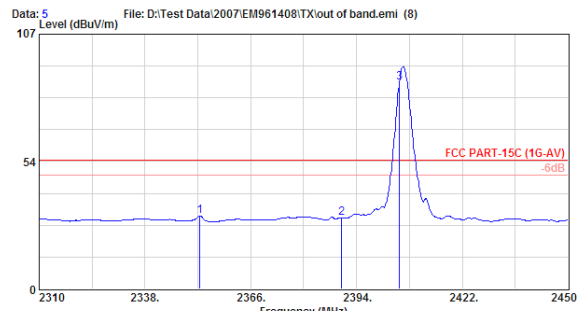
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Trace: (Discrete)  
 Site no. : A/C Chamber Data no. : 7  
 Dis. / Ant. : 3m 3115 Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C (1G-PK)  
 Env. / Ins. : E7405A 23°C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH02

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1 2388.960	28.59	6.34	9.52	44.45	74.00	29.55	Peak
2 2390.000	28.59	6.34	9.13	44.07	74.00	29.93	Peak
3 2405.376	28.63	6.36	65.07	100.06	74.00	-26.06	Peak

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



Trace: (Discrete)  
 Site no. : A/C Chamber Data no. : 5  
 Dis. / Ant. : 3m 3115 Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C (1G-AV)  
 Env. / Ins. : E7405A 23°C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH02

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1 2352.560	28.53	6.29	-4.09	30.73	54.00	23.27	Average
2 2390.000	28.59	6.34	-5.15	29.79	54.00	24.21	Average
3 2405.376	28.63	6.36	51.68	86.67	54.00	-32.67	Average

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 : Nov. 02, 2007 Temperature : 23

EUT : Radio Control Humidity : 43%

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

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Peak *	2389.380	28.59	6.34	12.14	47.07	74.00	26.93
Average *	2387.560	28.59	6.34	1.10	36.03	54.00	17.97

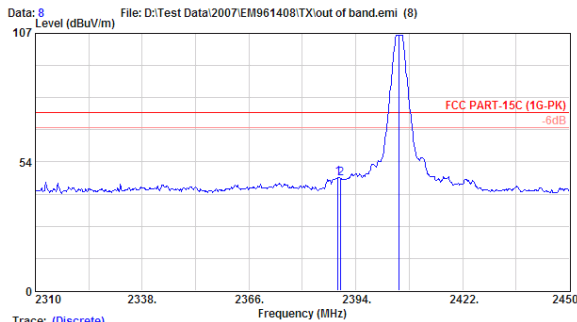
- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.  
 2. Low frequency section (spurious in the restricted band 2310-2390MHz).  
 3. ‘\*’ The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



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 Email:ttenc@ttenc.



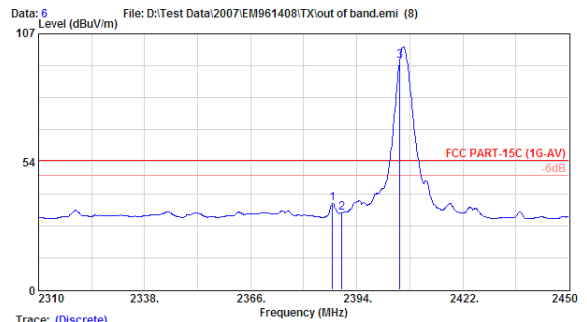
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Trace: (Discrete)  
 Site no. : A/C Chamber Data no. : 8  
 Dis. / Ant. : 3m 3115 Ant. pol. : VERTICAL  
 Limit : FCC PART-15C (1G-PK)  
 Env. / Ins. : E7405A 23°C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH02

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2389.380	28.59	6.34	12.14	47.08	74.00	26.92	Peak
2	2390.000	28.59	6.34	11.88	46.81	74.00	27.19	Peak
3	2405.376	28.63	6.36	71.16	106.15	74.00	-32.15	Peak

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



Trace: (Discrete)  
 Site no. : A/C Chamber Data no. : 6  
 Dis. / Ant. : 3m 3115 Ant. pol. : VERTICAL  
 Limit : FCC PART-15C (1G-AV)  
 Env. / Ins. : E7405A 23°C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH02

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2387.560	28.59	6.34	1.10	36.03	54.00	17.97	Average
2	2390.000	28.59	6.34	-2.78	32.15	54.00	21.85	Average
3	2405.376	28.63	6.36	60.81	95.80	54.00	-41.80	Average

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 : Nov. 02, 2007 Temperature : 23

EUT : Radio Control Humidity : 43%

Test Mode : Transmit, Channel: 74, Frequency: 2479.104MHz

	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 *	2485.360	28.77	6.45	15.79	51.01	74.00	22.99
Average *	2483.500	28.77	6.45	11.62	46.84	54.00	7.16

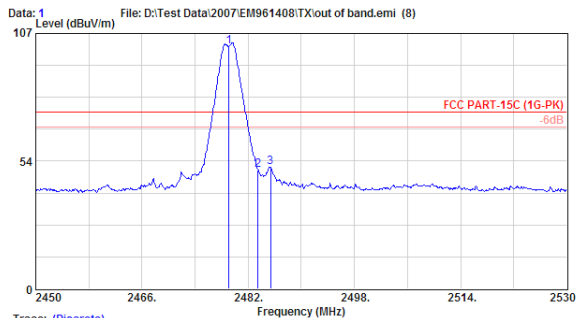
- Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.  
 2. High frequency section (spurious in the restricted band 2483.5-2500MHz).  
 3. '\*' The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



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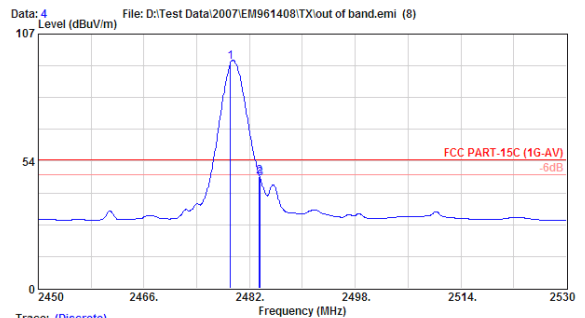
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Trace: (Discrete)  
 Site no. : A/C Chamber Data no. : 1  
 Dis. / Ant. : 3m 3115 Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C (1G-PK)  
 Env. / Ins. : E7405A 23°C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH74

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2479.104	28.76	6.44	66.42	101.62	74.00	-27.62	Peak
2	2483.500	28.77	6.45	14.65	49.87	74.00	24.13	Peak
3	2485.360	28.77	6.45	15.79	51.02	74.00	22.98	Peak

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



Trace: (Discrete)  
 Site no. : A/C Chamber Data no. : 4  
 Dis. / Ant. : 3m 3115 Ant. pol. : HORIZONTAL  
 Limit : FCC PART-15C (1G-AV)  
 Env. / Ins. : E7405A 23°C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH74

	Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1	2479.104	28.76	6.44	59.94	95.14	54.00	-41.14	Average
2	2483.500	28.77	6.45	11.62	46.84	54.00	7.16	Average
3	2483.600	28.77	6.45	11.06	46.29	54.00	7.71	Average

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 : Nov. 02, 2007 Temperature : 23

EUT : Radio Control Humidity : 43%

Test Mode : Transmit, Channel: 74, Frequency: 2479.104MHz

	Emission Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Limits dBμV/m	Margin dB
Peak *	2485.120	28.77	6.45	20.90	56.12	74.00	17.88
Average *	2483.500	28.77	6.45	16.85	52.07	54.00	1.93

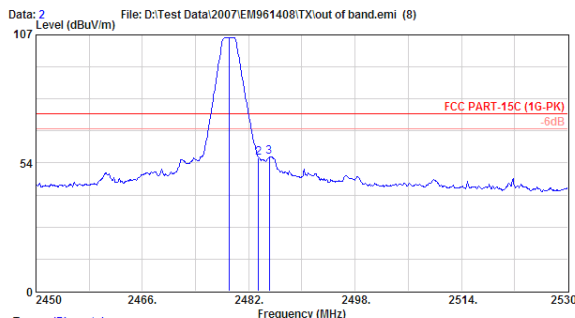
Remark : 1. Emission Level = Antenna Factor + Cable Loss + Meter Reading.  
 2. High frequency section (spurious in the restricted band 2483.5-2500MHz).  
 3. ‘\*’ The field strength of emission appearing within Part 15.205(a) shall not exceed the limits shown in section 15.209.



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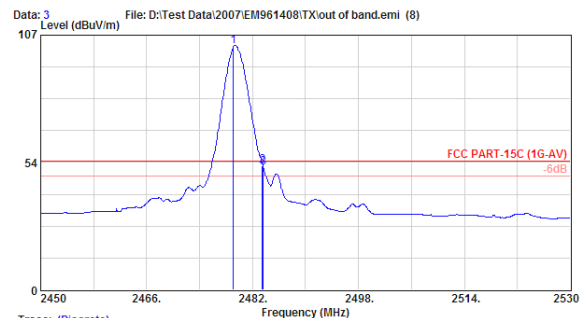
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Trace: (Discrete)  
 Site no. : A/C Chamber Data no. : 2  
 Dis. / Ant. : 3m 3115 Ant. pol. : VERTICAL  
 Limit : FCC PART-15C (1G-PK)  
 Env. / Ins. : E7405A 23°C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH74

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1 2479.104	28.76	6.44	70.49	105.69	74.00	-31.69	Peak
2 2483.500	28.77	6.45	20.58	55.80	74.00	18.20	Peak
3 2485.120	28.77	6.45	20.90	56.13	74.00	17.87	Peak

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



Trace: (Discrete)  
 Site no. : A/C Chamber Data no. : 3  
 Dis. / Ant. : 3m 3115 Ant. pol. : VERTICAL  
 Limit : FCC PART-15C (1G-AV)  
 Env. / Ins. : E7405A 23°C/43% Engineer : Jarwei Wang  
 EUT : Radio Control M/N:TM14-2.4G  
 Power Rating : DC 7.2V  
 Test Mode : CH74

Freq. (MHz)	Ant. Factor (dB/m)	Cable Loss (dB)	Reading (dBμV)	Emission Level (dBμV/m)	Limits (dBμV/m)	Margin (dB)	Remark
1 2479.104	28.76	6.44	67.16	102.36	54.00	-48.36	Average
2 2483.500	28.77	6.45	16.85	52.07	54.00	1.93	Average
3 2483.600	28.77	6.45	16.22	51.45	54.00	2.55	Average

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

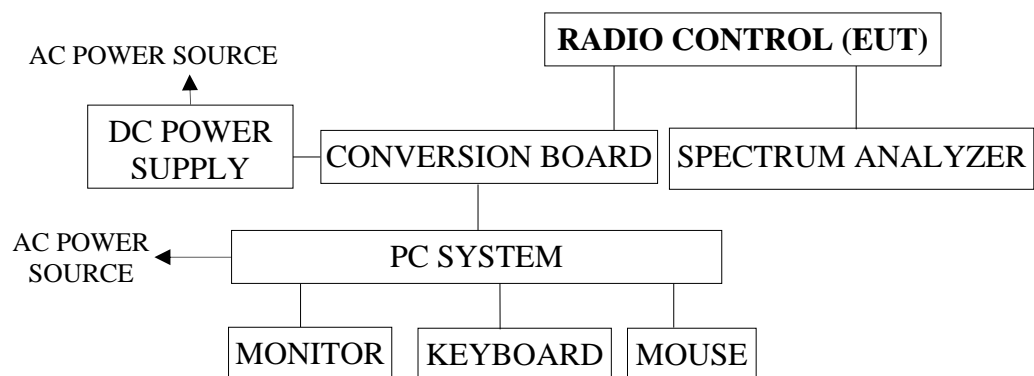
## 4. 6dB BANDWIDTH MEASUREMENT

### 4.1. Test Equipment

The following test equipment was used during the Emission Bandwidth measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Next Cal.
1.	Spectrum Analyzer	Agilent	E4446A	US44300366	Aug. 13, 07'	Aug. 12, 08'

### 4.2. Block Diagram of Test Setup



### 4.3. Specification Limits (§15.247(a)(2))

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

### 4.4. Operating Condition of EUT

The test program “Futaba Term” was used to enable the EUT to transmit data at different channel frequency individually.

### 4.5. 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 100kHz VBW. The 6dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 6dB.

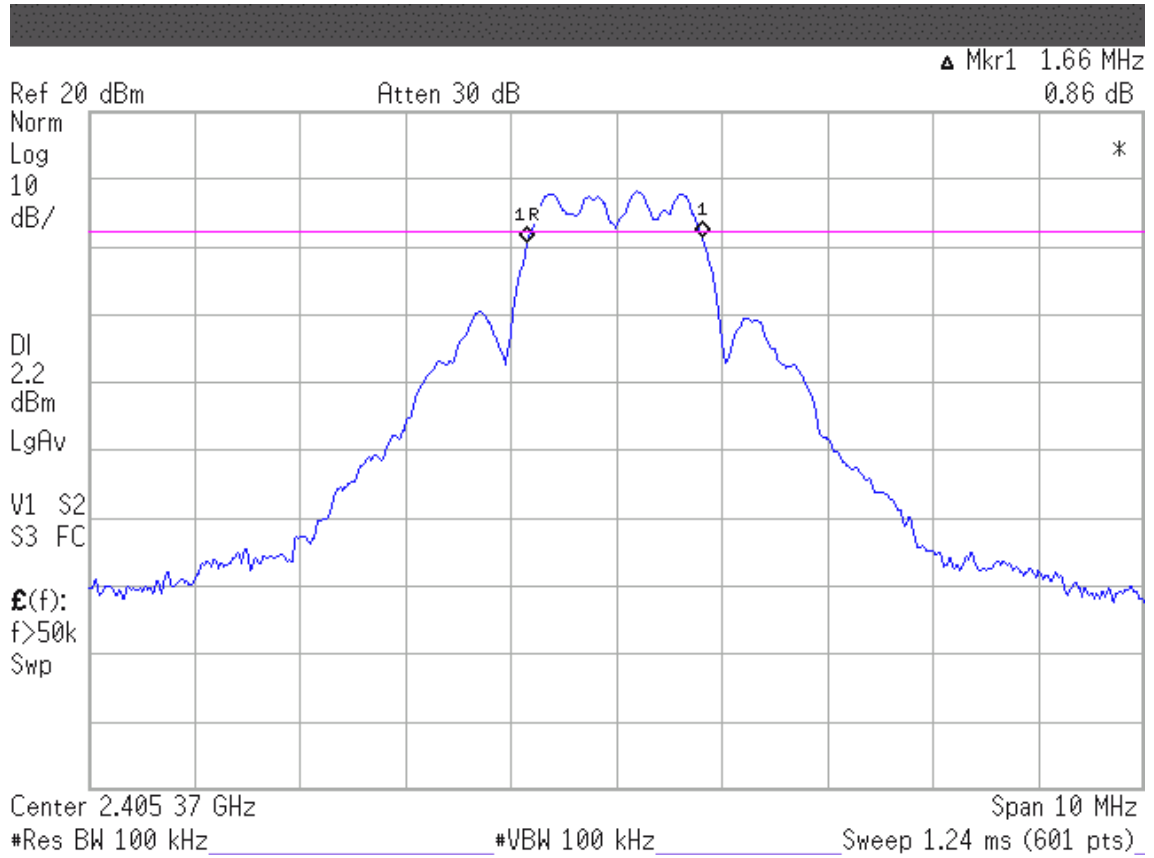
#### 4.6. Test Results

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

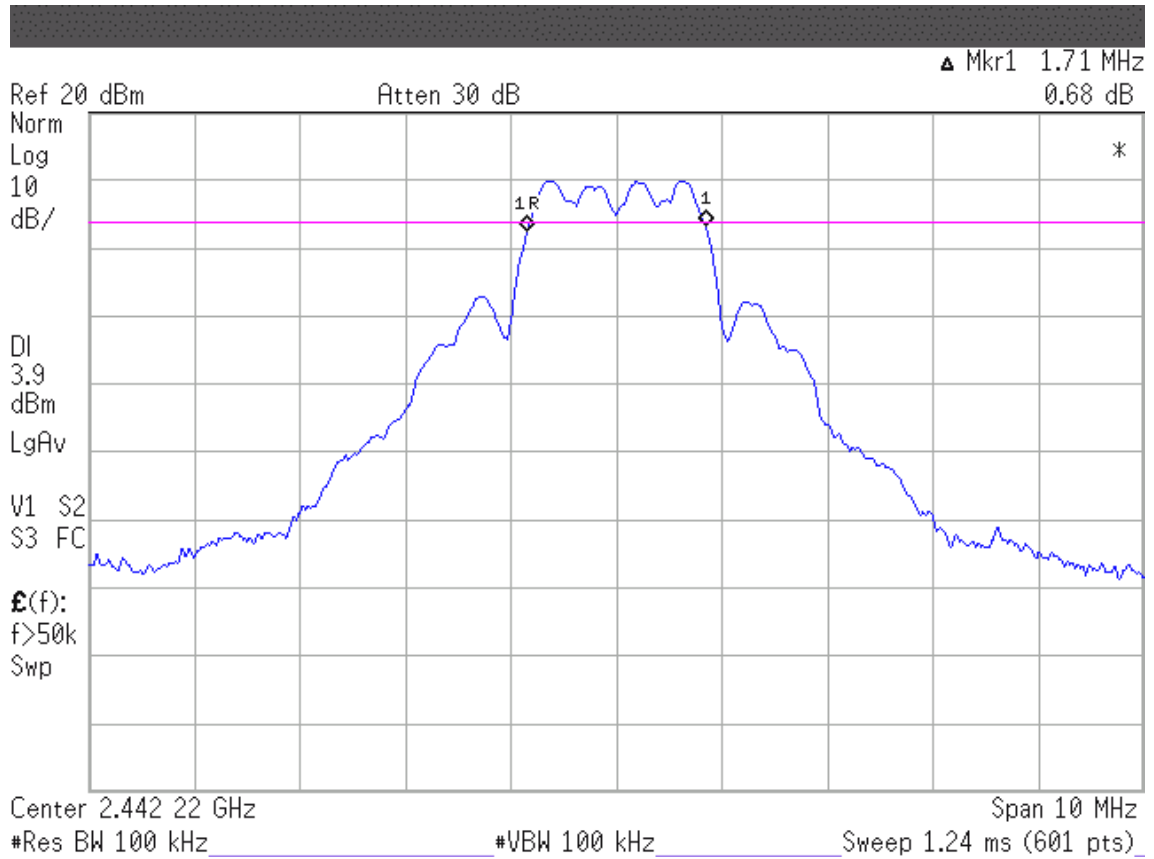
(Test Date : Nov. 01, 2007 Temperature : 21 Humidity : 61 %)

Channel	Frequency	6dB Bandwidth
0	2405.376MHz	<b>1.66MHz</b>
38	2442.240MHz	<b>1.71MHz</b>
74	2479.104MHz	<b>1.61MHz</b>

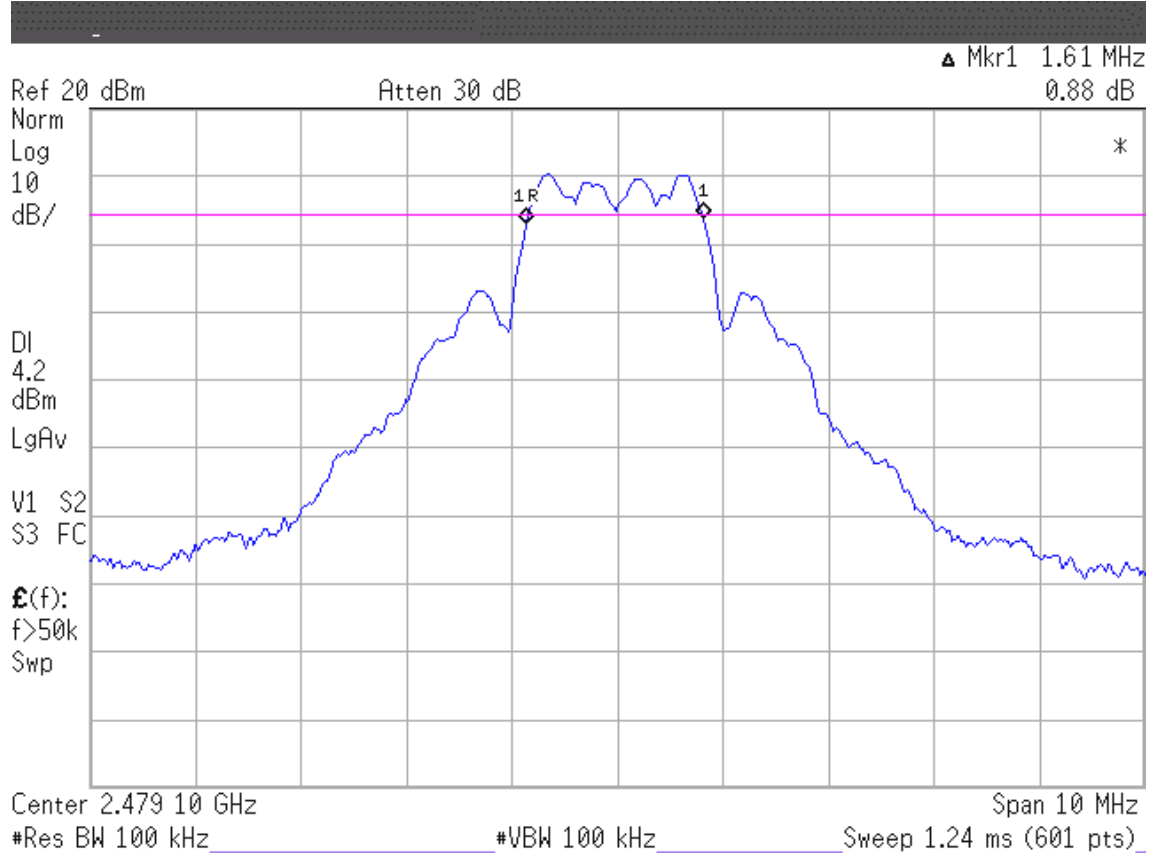
**Frequency: 2405.376MHz**



**Frequency: 2442.240MHz**



**Frequency: 2479.104MHz**



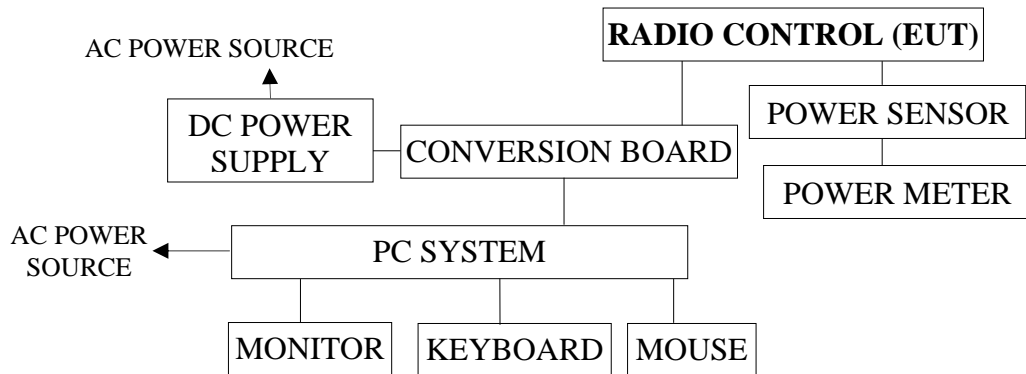
## 5. MAXIMUM PEAK OUTPUT POWER MEASUREMENT

### 5.1. 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	ML2487A	6K00005406	Jan. 10, 07'	Jan. 09, 08'
2.	Power Sensor	Anritsu	MA2491A	030873	Jan. 10, 07'	Jan. 09, 08'

### 5.2. Block Diagram of Test Setup



### 5.3. Specification Limits (§15.247(b)-(3))

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

### 5.4. Operating Condition of EUT

The test program “Futaba Term” was used to enable the EUT to transmit data at different channel frequency individually.

### 5.5. Test Procedure

The transmitter output was connected to the power meter that was designed to detect peak value automatically.



## 5.6. Test Results

**PASSED.** All the test results are listed below.

(Test Date : Nov. 01, 2007 Temperature : 21 Humidity : 61 %)

Channel	Frequency	Peak Output Power	Limit
02	2405.376MHz	<b>16.87dBm</b>	30dBm
38	2442.240MHz	<b>16.95dBm</b>	30dBm
74	2479.104MHz	<b>17.32dBm</b>	30dBm

## 6. EMISSION LIMITATIONS MEASUREMENT

### 6.1. 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	E4446A	US44300366	Aug. 13, 07'	Aug. 12, 08'

### 6.2. Block Diagram of Test Setup

The same as section.4.2.

### 6.3. 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)

### 6.4. Operating Condition of EUT

The test program “Futaba Term” was used to enable the EUT to transmit data at different channel frequency individually.

### 6.5. 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 100kHz VBW.

## 6.6. Test Results

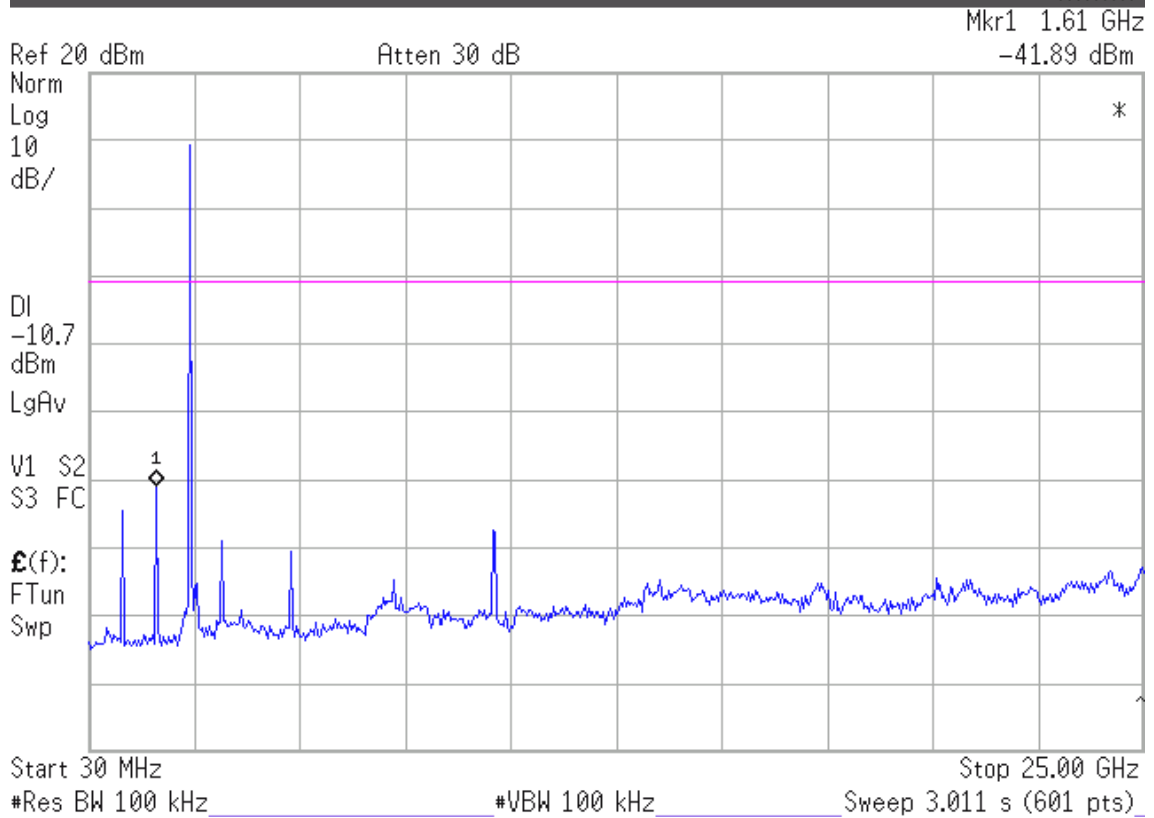
**PASSED.** The testing data was attached in the next pages.

(Test Date : Nov. 01, 2007    Temperature : 21        Humidity : 61 %)

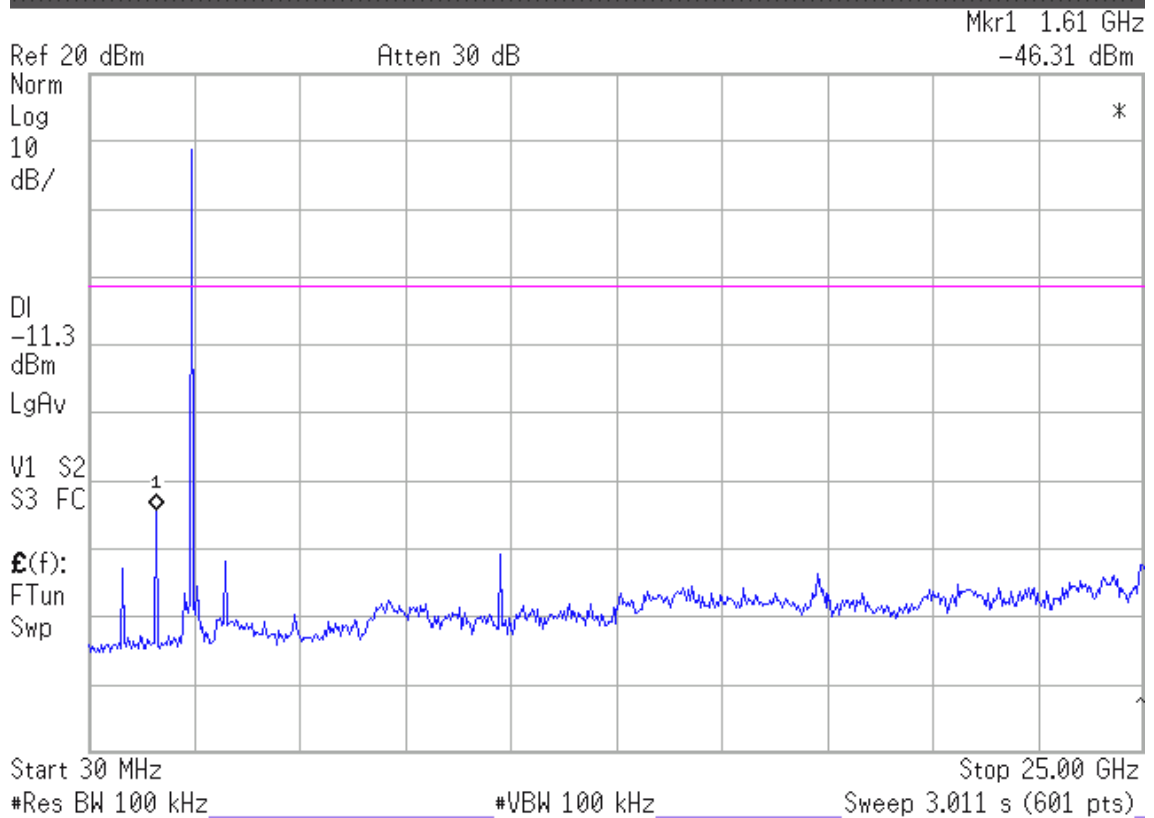
1. 2405.376MHz: During 30MHz~25GHz bandwidth. In the 1.61GHz, the  $-41.89\text{dBm}$  is max value that is lower than 20dB of primary channel.
2. 2442.240MHz: During 30MHz~25GHz bandwidth. In the 1.61GHz, the  $-46.31\text{dBm}$  is max value that is lower than 20dB of primary channel.
3. 2479.104MHz: During 30MHz~25GHz bandwidth. In the 1.65GHz, the  $-38.88\text{dBm}$  is max value that is lower than 20dB of primary channel.

Note: The peak above the limit line is the carrier frequency.

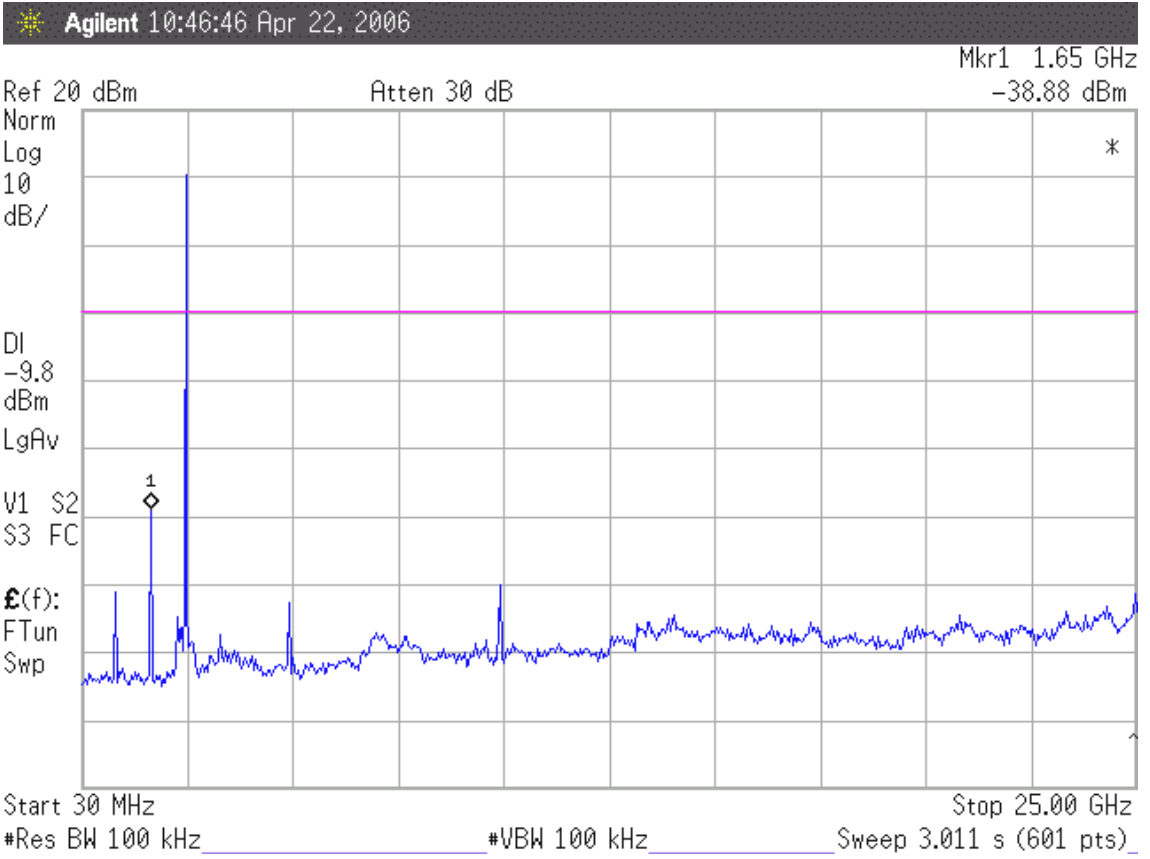
**Frequency: 2405.376MHz**



**Frequency: 2442.240MHz**



### Frequency: 2479.104MHz



## 7. BAND EDGES MEASUREMENT

### 7.1. 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. 13, 07'	Aug. 12, 08'

### 7.2. Block Diagram of Test Setup

The same as section.4.2.

### 7.3. Specification Limits (§15.247(c))

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

### 7.4. Operating Condition of EUT

The test program “Futaba Term” was used to enable the EUT to transmit data at different channel frequency individually.

### 7.5. Test Procedure

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.

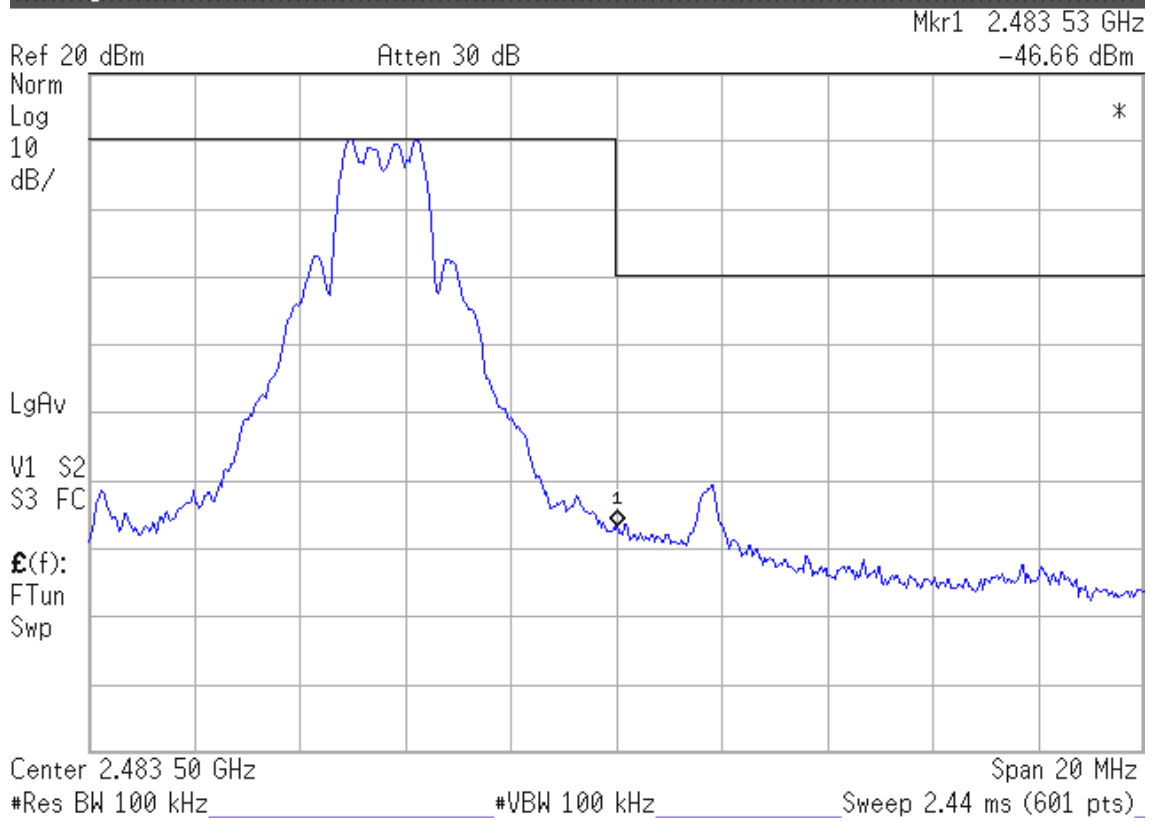
### 7.6. Test Results

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

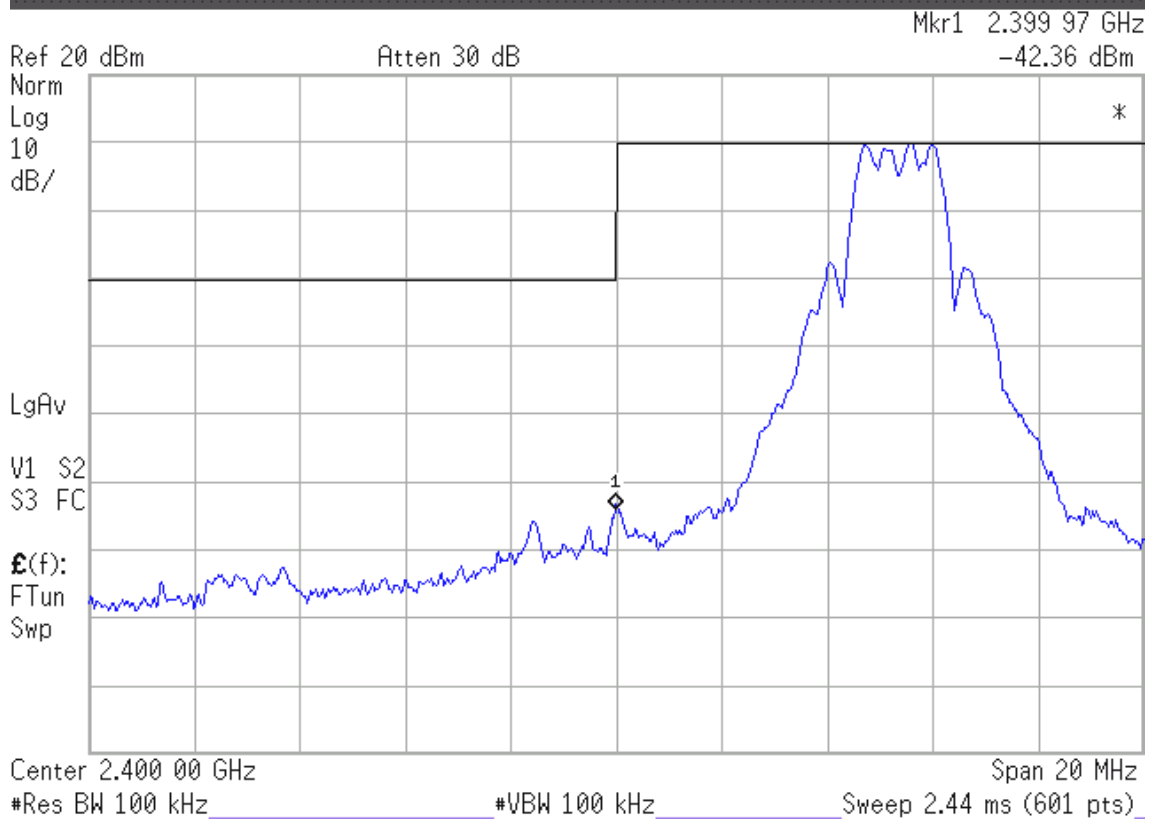
(Test Date : Nov. 01, 2007    Temperature : 21        Humidity : 61 %)

1. Below Band edge: The highest emission level is  $-46.66\text{dBm}$  on  $2.48353\text{GHz}$ .
2. Upper Band edge : The highest emission level is  $-42.36\text{dBm}$  on  $2.39997\text{GHz}$ .

**Below Band edge**



**Upper Band edge**



## 8. POWER SPECTRAL DENSITY MEASUREMENT

### 8.1. 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	E4446A	US44300366	Aug. 13, 07'	Aug. 12, 08'

### 8.2. Block Diagram of Test Setup

The same as section.4.2.

### 8.3. 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.

### 8.4. Operating Condition of EUT

The test program “Futaba Term” was used to enable the EUT to transmit data at different channel frequency individually.

### 8.5. Test Procedure

The transmitter output was connected to the spectrum analyzer. The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 3kHz RBW and 30kHz VBW, set sweep time = span/300kHz.

### 8.6. Test Results

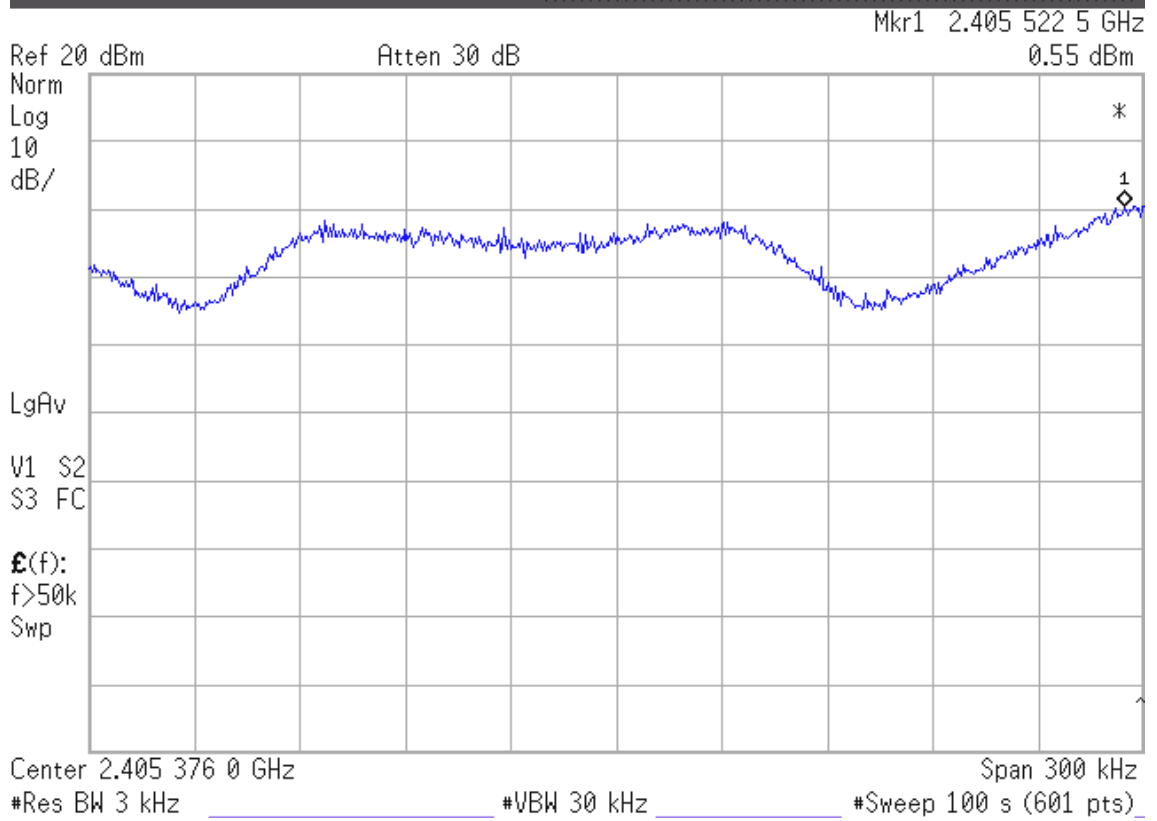
**PASSED.** All the test results are attached in next pages.

(Test Date : Nov. 01, 2007 Temperature : 21 Humidity : 61 %)

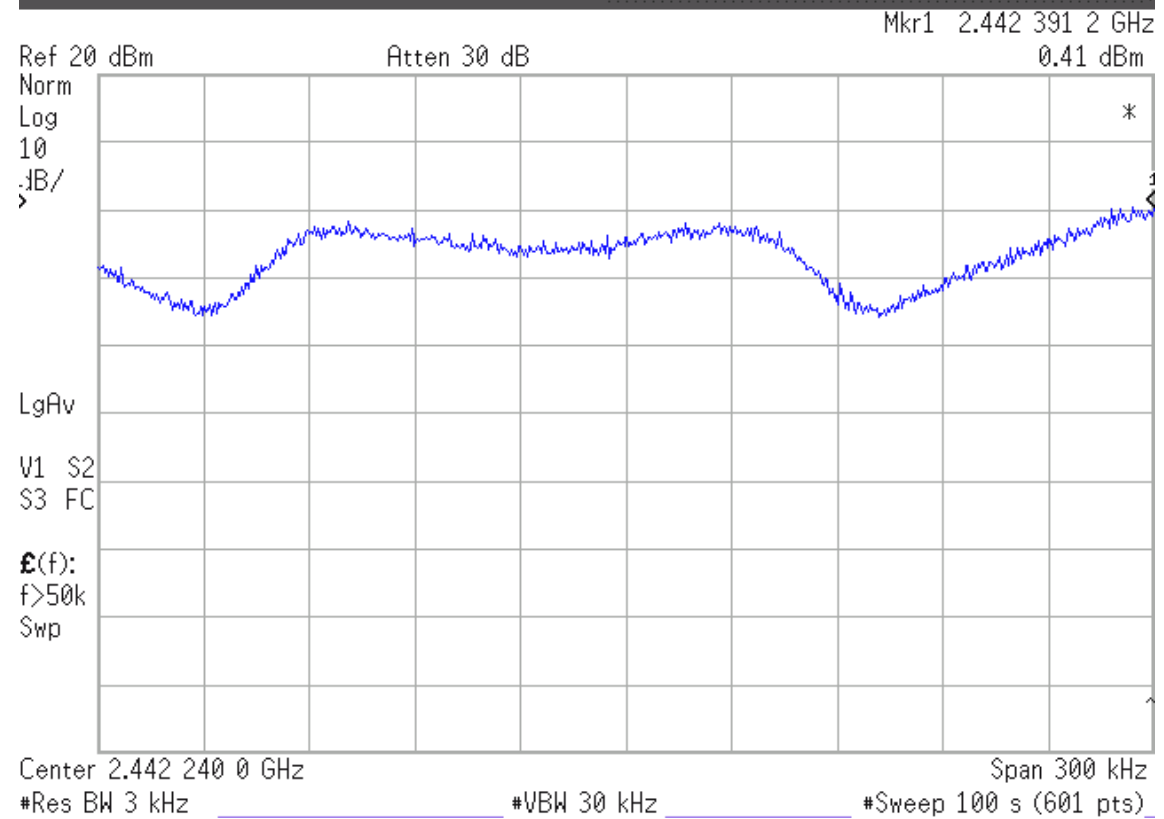
Channel	Frequency	Power Spectral Density	Limit
02	2405.376MHz	<b>0.55dBm</b>	8dBm
38	2442.240MHz	<b>0.41dBm</b>	8dBm
74	2479.104MHz	<b>1.21dBm</b>	8dBm



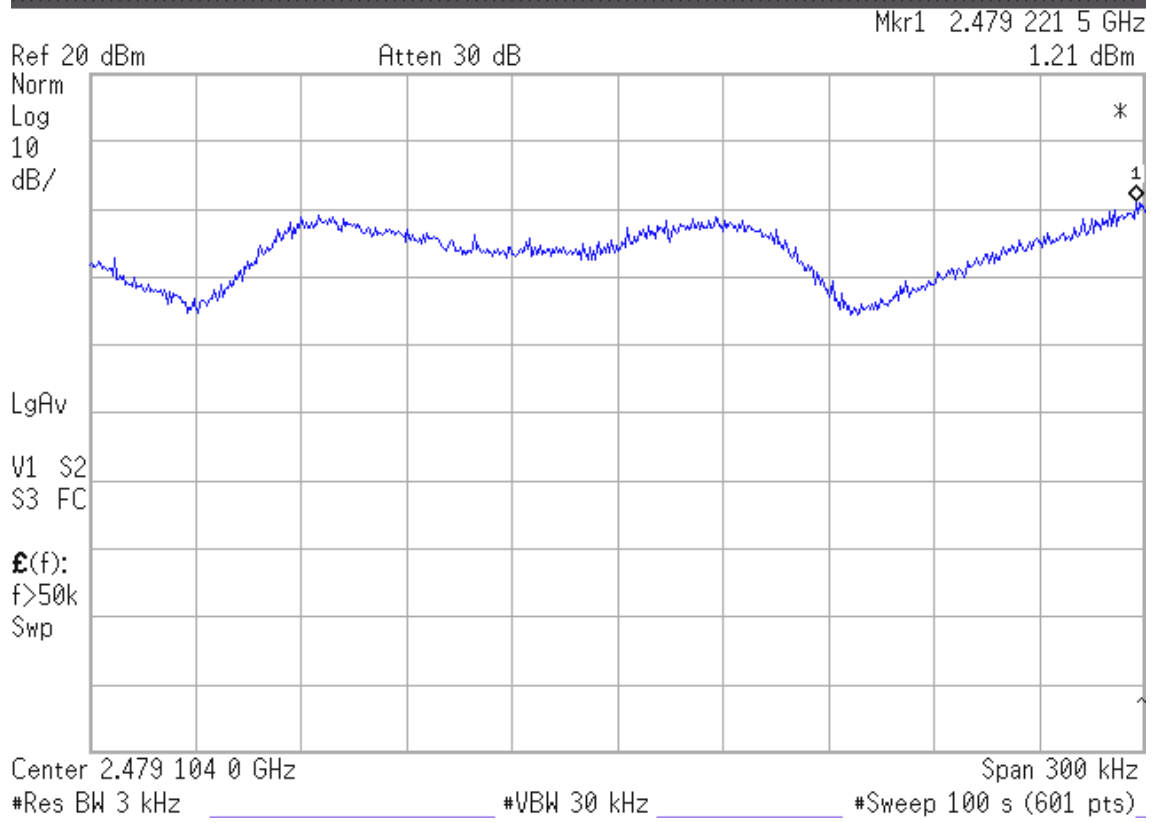
**Frequency: 2405.376MHz**



**Frequency: 2442.240MHz**



### Frequency: 2479.104MHz



## **9. DEVIATION TO TEST SPECIFICATIONS**

**【NONE】**