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FEDERAL COMMUNICATIONS COMMISSION  
Registration number: 282399

Report No.: GLEMR070400974RFF  
Page: 1 of 28  
FCC ID:G2R-0716

## TEST REPORT

**Application No. :** GLEMR070400974RF  
**Applicant:** VTech Electronics Limited  
**FCC ID:** G2R-0716  
**Fundamental Carrier  
Frequency :** 2.402GHz to 2.478GHz  
**Equipment Under Test (EUT):**  
Name: ZIP ZAP  
Model: 80-071600  
Serial No.: Not supplied by client  
**Standards:** FCC PART 15, SUBPART C: 2006 (Section 15.247);  
FCC PART 15, SUBPART B:2006  
**Date of Receipt:** 07 April 2007  
**Date of Test:** 07 April 2007 to 28 April 2007  
**Date of Issue:** 16 May 2007

<b>Test Result :</b>	<b>PASS *</b>
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\* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Stephen Guo  
Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing. The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

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## 2 Test Summary

<b>For Transmitter</b>			
<b>Test</b>	<b>Test Requirement</b>	<b>Standard Paragraph</b>	<b>Result</b>
6dB bandwidth Measurement	FCC PART 15 :2006	Section 15.247 (a2)	PASS
Maximum Peak Conducted Output Power	FCC PART 15 :2006	Section 15.247 (b3)	PASS
Radiated Spurious Emission (30MHz to 25GHz)	FCC PART 15 :2006	Section 15.209	PASS
Band Edges Measurement	FCC PART 15 :2006	Section 15.247 (c)	PASS
Power spectral density	FCC PART 15 :2006	Section 15.247 (e)	PASS
Antenna Requirement	FCC PART 15 :2006	Section 15.203 Section 15.247 (b)(c)	PASS
<b>For Receiver</b>			
Radiated Spurious Emission (30MHz to 1GHz)	FCC PART 15 :2006	Section 15.109	PASS



### 3 Contents

	Page
<b>1 COVER PAGE .....</b>	<b>1</b>
<b>2 TEST SUMMARY .....</b>	<b>2</b>
<b>3 CONTENTS .....</b>	<b>3</b>
<b>4 GENERAL INFORMATION .....</b>	<b>4</b>
4.1 CLIENT INFORMATION.....	4
4.2 GENERAL DESCRIPTION OF E.U.T. ....	4
4.3 DESCRIPTION OF SUPPORT UNITS .....	4
4.4 STANDARDS APPLICABLE FOR TESTING.....	4
4.5 TEST LOCATION.....	4
4.6 OTHER INFORMATION REQUESTED BY THE CUSTOMER .....	4
4.7 TEST FACILITY .....	5
<b>5 EQUIPMENTS USED DURING TEST.....</b>	<b>6</b>
<b>6 TEST RESULTS .....</b>	<b>7</b>
6.1 E.U.T. OPERATION .....	7
6.2 6dB BANDWIDTH MEASUREMENT .....	8
6.3 MAXIMUM PEAK CONDUCTED OUTPUT POWER.....	11
6.4 RADIATED SPURIOUS EMISSIONS.....	14
6.4.1 <i>Harmonics Emissions</i> .....	16
6.5 RADIATED EMISSIONS .....	19
6.6 BAND EDGES REQUIREMENT .....	21
6.6.1 <i>100 kHz Bandwidth Outside the Frequency Band</i> .....	21
6.6.2 <i>Radiated Emissions which fall in the restricted bands</i> .....	23
6.7 POWER SPECTRAL DENSITY.....	26
6.8 ANTENNA REQUIREMENT.....	28
6.8.1 <i>Standard Applicable</i> .....	28
6.8.2 <i>Antenna Construction</i> .....	28



## **4 General Information**

### **4.1 Client Information**

Applicant Name: VTech Electronics Limited  
Applicant Address: 23/F, TaiPing Industrial Centre, Block 1, 57 Ting Kok Road, TaiPo, HongKong

### **4.2 General Description of E.U.T.**

Product Name: ZIP ZAP  
Model: 80-071600  
Number of Channels: 20 Channels  
Type of Modulation: DSSS (Direct Sequence Spread Spectrum );  
Antenna Type: Integral  
Power Supply: 4.5V DC ( 1.5V x3'AAA' Battery)  
Test mode: The program used to control the EUT for staying in continuous transmitting and receiving mode is programmed. Channel lowest (2402MHz), middle (2442MHz) and highest (2478MHz) are chosen for full testing.

### **4.3 Description of Support Units**

The EUT has been tested as an independent unit.

### **4.4 Standards Applicable for Testing**

The customer requested FCC tests for a "ZIP ZAP".  
The standard used was FCC PART 15, SUBPART C (2006) section 15.247.

### **4.5 Test Location**

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory, No.198 Kezhu Road, Science Town Economic& Technology Development District Guangzhou, China 510663

Tel: +86 20 82155555 Fax: +86 20 82075059

No tests were sub-contracted.

### **4.6 Other Information Requested by the Customer**

None.



#### **4.7 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

- **NVLAP – Lab Code: 200611-0**

SGS-CSTC Standards Technical Services Co., Ltd., Guangzhou EMC Laboratory is recognized under the National Voluntary Laboratory Accreditation Program (NVLAP/NIST). NVLAP Code: 200611-0.

- **FCC – Registration No.: 282399**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 282399, May 31, 2002. With the above and NVLAP's accreditation, SGS-CSTC is an authorized test laboratory for the DoC process.



## 5 Equipments Used during Test

RE in Chamber/OATS						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
EMC0525	Compact Semi-Anechoic Chamber	ChangZhou ZhongYu	N/A	N/A	06-03-2007	06-03-2008
EMC0522	EMI Test Receiver	Rohde & Schwarz	ESIB26	100249	05-12-2006	05-12-2007
N/A	EMI Test Software	Audix	E3	N/A	N/A	N/A
EMC0514	Coaxial cable	SGS	N/A	N/A	04-12-2006	04-12-2007
EMC0524	Bi-log Type Antenna	Schaffner -Chase	CBL6112B	2966	31-10-2006	31-10-2007
EMC0519	Bilog Type Antenna	Schaffner -Chase	CBL6143	5070	31-07-2006	31-07-2007
EMC0517	Horn Antenna	Rohde & Schwarz	HF906	100095	29-07-2006	29-07-2007
EMC0040	Spectrum Analyzer	Rohde & Schwarz	FSP30	100324	05-12-2006	05-12-2007
EMC0520	0.1-1300 MHz Pre-Amplifier	HP	8447D OPT 010	2944A06252	06-03-2007	06-03-2008
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	06-03-2007	06-03-2008
EMC0523	Active Loop Antenna	EMCO	6502	00042963	09-08-2006	09-08-2008
EMC0530	10m Semi- Anechoic Chamber	ETS	N/A	N/A	22-08-2006	22-08-2007

General used equipment						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
EMC0050- EMC0053	Temperature, & Humidity	ZHENGZHOU BO YANG	WSB	N/A	05-12-2006	05-12-2007
EMC0054	Temperature, & Humidity	Shenzhen Tai Kong	THG-1	N/A	04-01-2007	04-01-2008
EMC0006	DMM	Fluke	73	70681569	27-09-2006	27-09-2007
EMC0007	DMM	Fluke	73	70671122	27-09-2006	27-09-2007



## 6 Test Results

### 6.1 E.U.T. Operation

Input voltage: 4.5V DC ( 1.5V x3'AAA' Battery)

Operating Environment:

Temperature: 24.0 -25.0 °C

Humidity: 50-56 % RH

Atmospheric Pressure: 1008 -1012 mbar

EUT Operation:

Test the EUT as a product which has DSSS (Direct Sequence Spread Spectrum) system. The total operation channels are 20 channels (0 to 19 channels), the fundamental frequencies are from 2.402GHz to 2.478GHz.

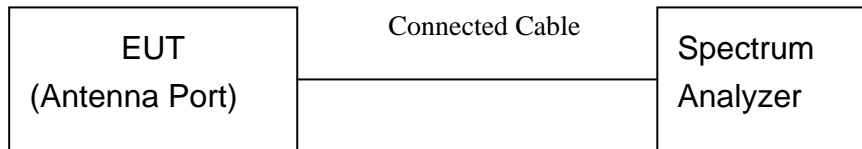
The test procedure provided by applicant enabled the EUT to transmit and receive data at lowest (**Channel 0: 2.402GHz**), middle (**Channel 10: 2.442GHz**), and highest channel (**Channel 19: 2.478GHz**), frequencies individually.

Pre-test all the frequencies mode and their power status, compliance test in the worse case: Channel 19, Channel 10, Channel 0.

## 6.2 6dB Bandwidth Measurement

Test Requirement:	FCC Part15 C
Test Method:	Base on ANSI 63.4
Test Date:	19 April 2007
Test Limit:	System using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6dB bandwidth shall be at least 500 kHz.
Test mode:	Test in transmitting mode: Channel 0, Channel 10, Channel 19.

### Test Configuration:



### Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 100 kHz, VBW = 300 kHz, Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max. reading.

### Test Result:

Test Channel	Fundamental Frequency (GHz)	6dB bandwidth (MHz)	Limit (MHz)	PASS/FAIL
0	2.402	0.635	0.5	Pass
10	2.442	0.612	0.5	Pass
19	2.478	0.631	0.5	Pass

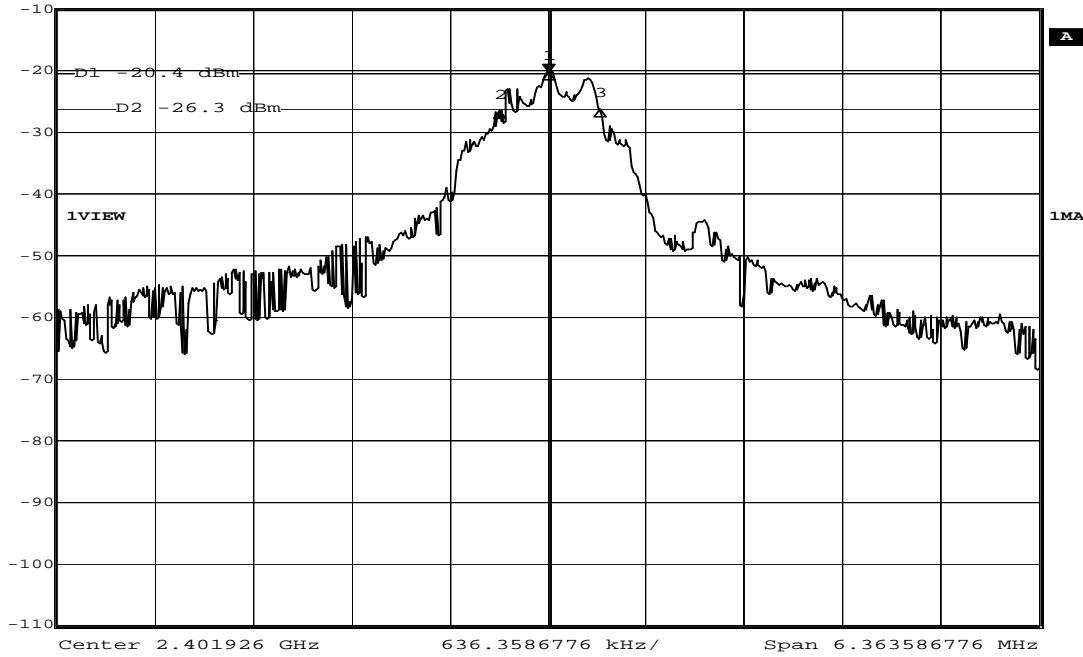
**TEST RESULTS: The unit does meet the FCC requirements.**





1. Lowest channel:

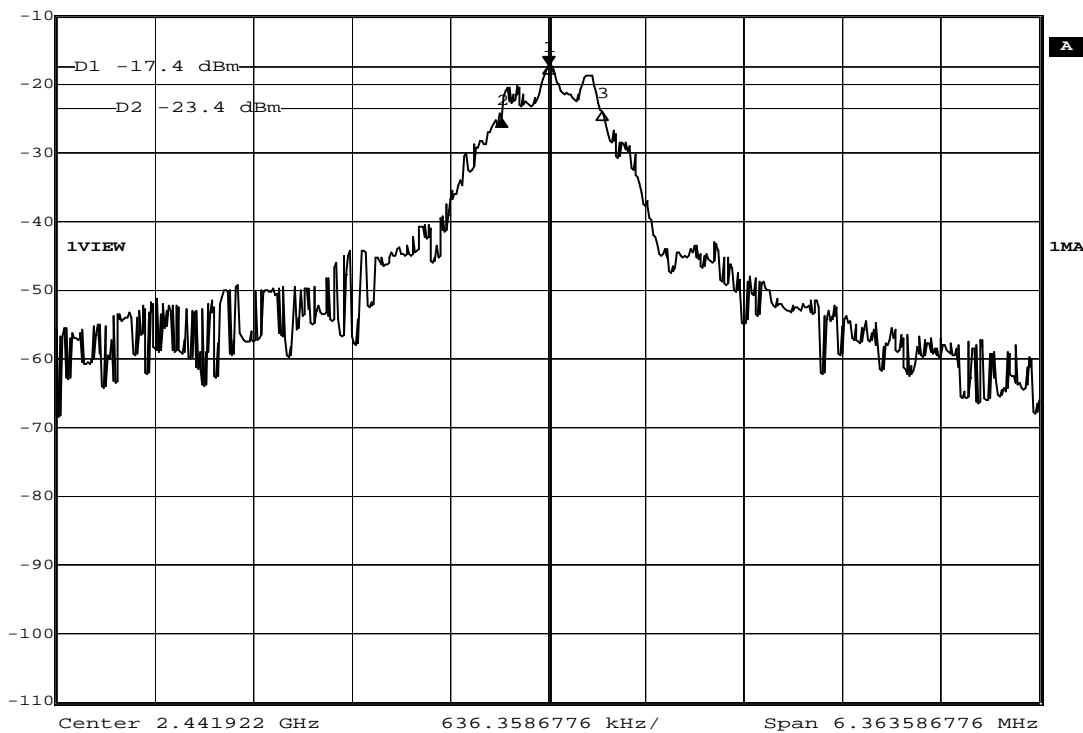
	Delta 2 [T1]	RBW	100 kHz	RF Att	20 dB
Ref Lvl	-6.31 dB	VBW	300 kHz	Unit	dBm
-10 dBm	-318.81697276 kHz	SWT	5 ms		



Date: 19.APR.2007 11:12:49

2. Medium channel:

	Delta 2 [T1]	RBW	100 kHz	RF Att	20 dB
Ref Lvl	-7.60 dB	VBW	300 kHz	Unit	dBm
-10 dBm	-306.06429385 kHz	SWT	5 ms		



Date: 19.APR.2007 11:17:27

3. Highest channel:



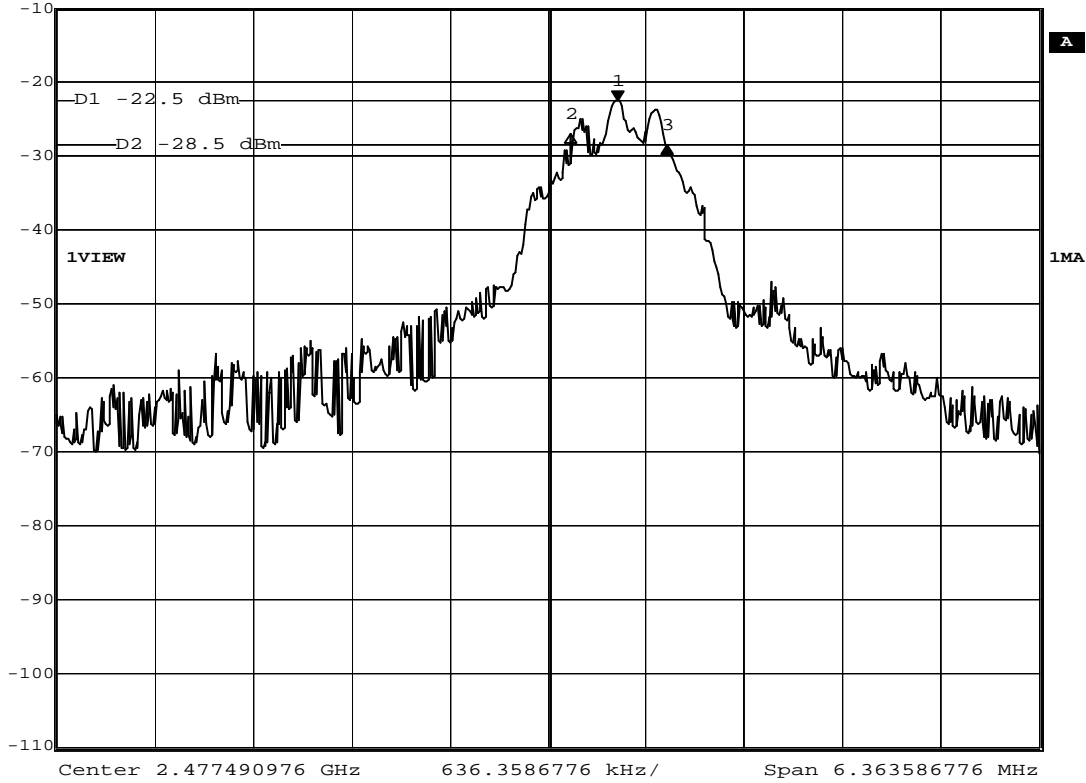
SGS-CSTC Standards  
Technical Services Ltd.

Report No.: GLEMR070400974RFF

Page: 10 of 28



Delta 3 [T1]	RBW 100 kHz	RF Att 20 dB
Ref Lvl -6.17 dB	VBW 300 kHz	
-10 dBm	SWT 5 ms	Unit dBm



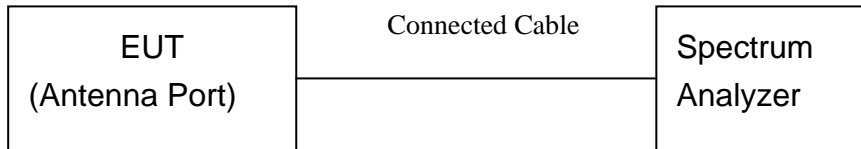
Date: 19.APR.2007 11:07:03



### 6.3 Maximum Peak Conducted Output Power

Test Requirement: FCC Part15 C  
 Test Method: Base on ANSI 63.4  
 Test Date: 26 April 2007  
 Test Limit: Regulation 15.247 (b) The Limit of Maximum Peak Output Power For systems using digital modulation in the 902-928MHz, 2400-2483.5MHz, and 5725-5850 MHz band: 1Watt  
 Test mode: Test in transmitting mode: Channel 0, Channel 10, Channel 19.

#### Test Configuration:



#### Test Procedure:

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1 MHz, VBW = 1 MHz, Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max. reading.

#### Test Result:

Test Channel	Fundamental Frequency (GHz)	Reading Power (dBm)	Cable Loss (dB)	Output Power (dBm)	Limit (dBm)	PASS/FAIL
0	2.402	-9.06	0.20	-8.86	30.0	Pass
10	2.442	-8.92	0.20	-8.72	30.0	Pass
19	2.478	-8.87	0.20	-8.67	30.0	Pass

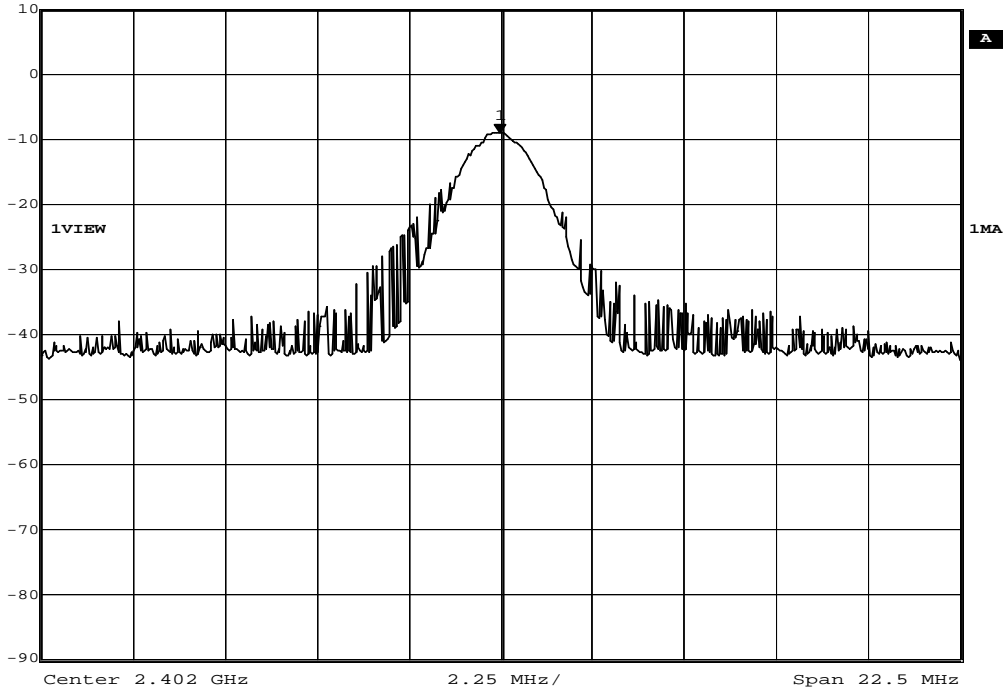
**TEST RESULTS:** The unit does meet the FCC requirements.



Max. Power Output Data Plot:

1. Lowest Channel:

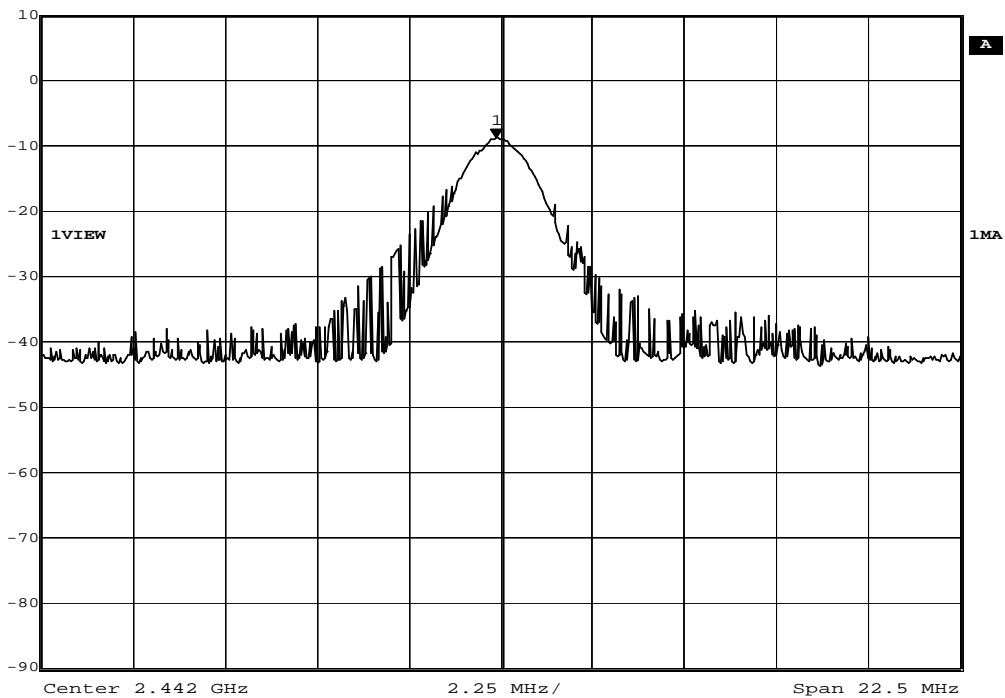
	Marker 1 [T1]	RBW	1 MHz	RF Att	40 dB
Ref Lvl	-9.06 dBm	VBW	1 MHz		
10 dBm	2.40197745 GHz	SWT	5 ms	Unit	dBm



Date: 17.MAY.2007 18:19:09

2. Medium Channel:


	Marker 1 [T1]	RBW	1 MHz	RF Att	40 dB
Ref Lvl	-8.92 dBm	VBW	1 MHz		
10 dBm	2.44188727 GHz	SWT	5 ms	Unit	dBm

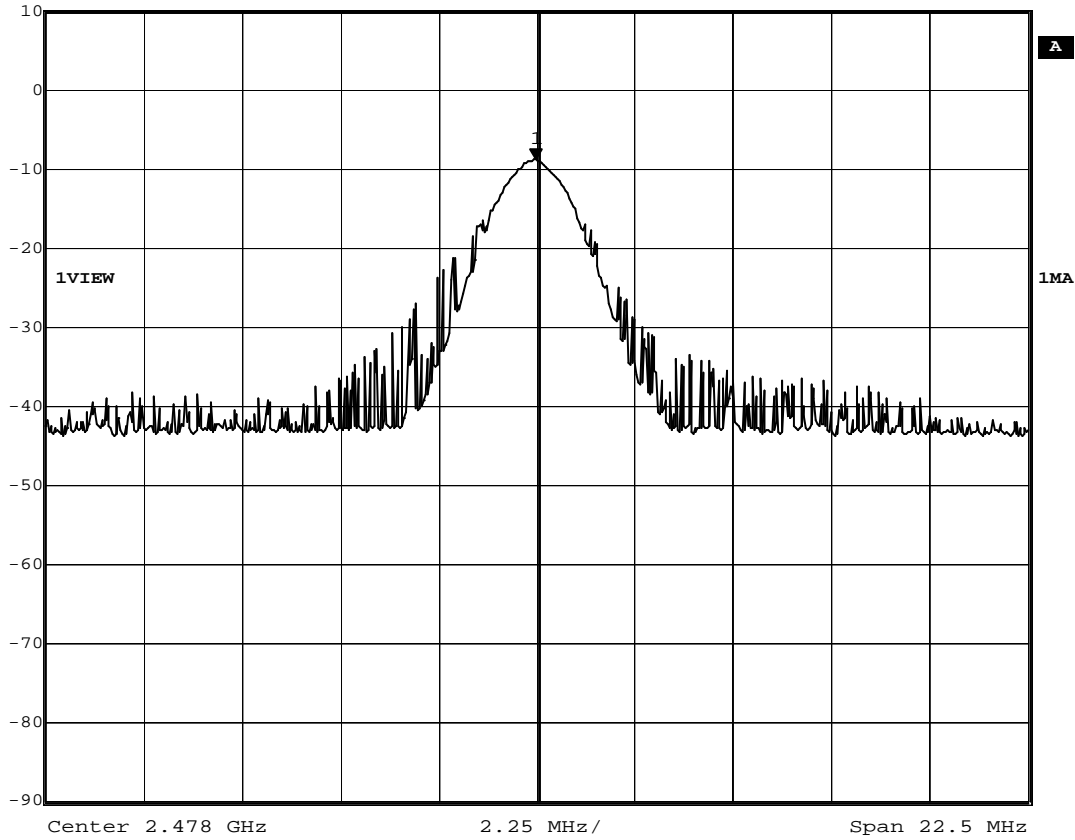


Date: 17.MAY.2007 18:23:32



3. Highest Channel:

	Marker 1 [T1]	RBW	1 MHz	RF Att	40 dB
	Ref Lvl	-8.87 dBm	VBW	1 MHz	
	10 dBm	2.47797745 GHz	SWT	5 ms	Unit dBm



Date: 17.MAY.2007 18:21:40

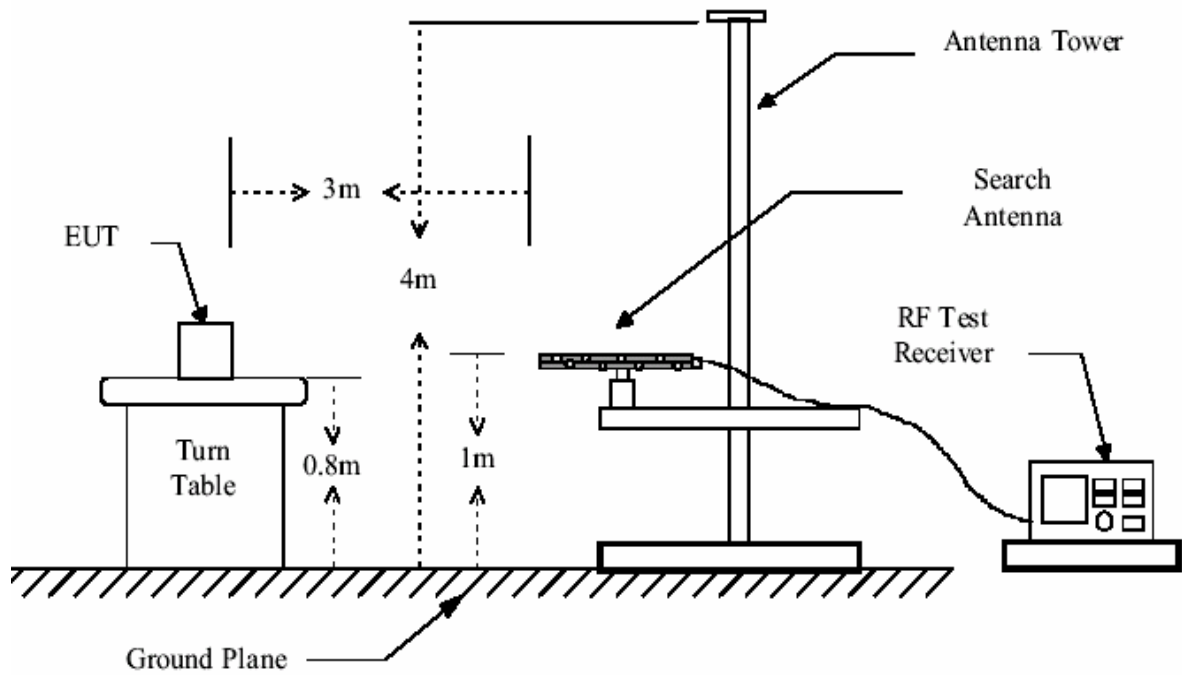
### 6.4 Radiated Spurious Emissions

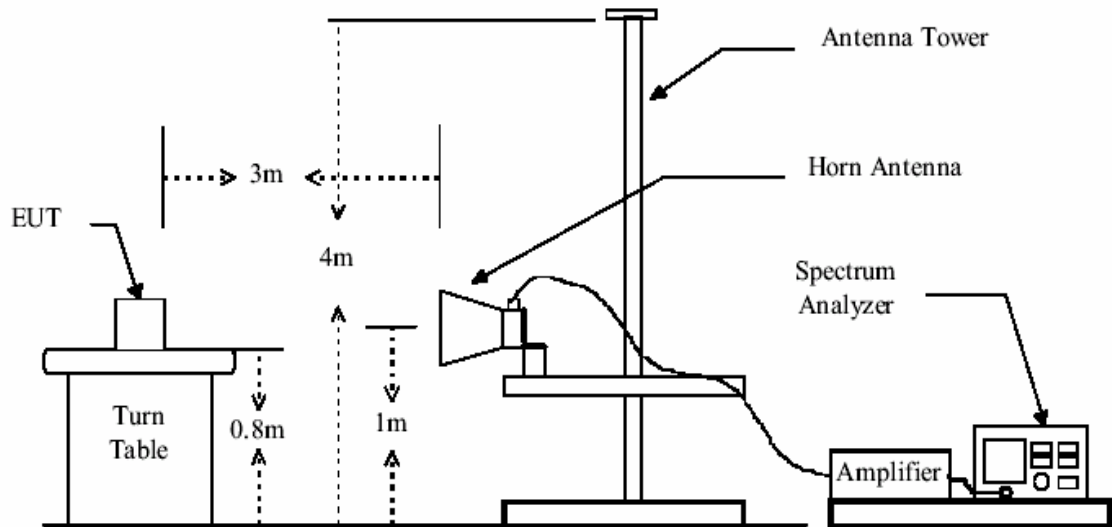
Test Requirement: FCC 15.209 & FCC 15.209  
 Test Method: ANSI C63.4 section 8 & 13  
 Test Date: 23 April 2007  
 Measurement Distance: 3m (Semi-Anechoic Chamber)  
 Frequency range: 30 MHz – 25GHz for transmitting mode.  
 Test instrumentation: resolution bandwidth 120 kHz (30 MHz - 1000 MHz)  
 1 MHz (1000 MHz – 25GHz)

Receive antenna scan height 1 m - 4 m, polarization Vertical / Horizontal

Limit:  
 40.0 dB $\mu$ V/m between 30MHz & 88MHz  
 43.5 dB $\mu$ V/m between 88MHz & 216MHz  
 46.0 dB $\mu$ V/m between 216MHz & 960MHz  
 54.0 dB $\mu$ V/m above 960MHz

**Test Configuration:**





**Test Procedure:** The procedure used was ANSI Standard C63.4-2001. The receiver was scanned from 30MHz to 25GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

$$\text{Final Test Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Preamplifier Factor}$$

The following test results were performed on the EUT

t



### 6.4.1 Harmonics Emissions

Test in Channel 0 in transmitting status:

(a) Antenna polarization: Horizontal

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4803.852	63.8	33.2	6.6	33.0	70.6	74.0	-3.4	PEAK
4803.852	35.6	33.2	6.6	33.0	42.3	54.0	-11.7	AVERAGE
7205.778	56.9	36.1	8.6	32.2	69.4	74.0	-4.6	PEAK
7205.778	31.1	36.1	8.6	32.2	43.6	54.0	-10.4	AVERAGE
9607.704	49.3	37.4	7.6	31.8	62.5	74.0	-11.5	PEAK
9607.704	30.5	37.4	7.6	31.8	43.7	54.0	-10.3	AVERAGE
12009.630	45.7	31.3	11.8	31.2	57.7	74.0	-16.3	PEAK
12009.630	30.4	31.3	11.8	31.2	42.3	54.0	-11.7	AVERAGE

(b) Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4803.852	59.1	33.2	6.6	33.0	65.9	74.0	-8.1	PEAK
4803.852	34.3	33.2	6.6	33.0	41.0	54.0	-13.0	AVERAGE
7205.778	59.8	36.1	8.6	32.2	72.2	74.0	-1.8	PEAK
7205.778	30.1	36.1	8.6	32.2	42.6	54.0	-11.4	AVERAGE
9607.704	51.0	37.4	7.6	31.8	64.2	74.0	-9.8	PEAK
9607.704	30.6	37.4	7.6	31.8	43.8	54.0	-10.3	AVERAGE
12009.630	49.6	31.3	11.8	31.2	61.6	74.0	-12.5	PEAK
12009.630	30.4	31.3	11.8	31.2	42.3	54.0	-11.7	AVERAGE





**Test in Channel 10 in transmitting status:**

(a) Antenna polarization: Horizontal

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4883.844	63.4	33.3	6.7	33.0	70.4	74.0	-3.6	PEAK
4883.844	35.0	33.3	6.7	33.0	41.9	54.0	-12.1	AVERAGE
7325.766	57.1	36.2	7.0	32.3	67.9	74.0	-6.1	PEAK
7325.766	32.6	36.2	7.0	32.3	43.5	54.0	-10.5	AVERAGE
9767.688	45.1	37.5	8.2	31.8	59.0	74.0	-15.0	PEAK
9767.688	30.7	37.5	8.2	31.8	44.6	54.0	-9.4	AVERAGE
12209.610	45.0	32.2	7.6	30.9	53.8	74.0	-20.2	PEAK
12209.610	30.3	32.2	7.6	30.9	39.1	54.0	-14.9	AVERAGE

(b) Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4883.844	61.3	33.3	6.7	33.0	68.3	74.0	-5.7	PEAK
4883.844	35.0	33.3	6.7	33.0	41.9	54.0	-12.1	AVERAGE
7325.766	60.3	36.2	7.0	32.3	71.2	74.0	-2.9	PEAK
7325.766	32.7	36.2	7.0	32.3	43.5	54.0	-10.5	AVERAGE
9767.688	45.0	37.5	8.2	31.8	58.8	74.0	-15.2	PEAK
9767.688	30.8	37.5	8.2	31.8	44.7	54.0	-9.3	AVERAGE
12209.610	44.6	32.2	7.6	30.9	53.4	74.0	-20.6	PEAK
12209.610	30.2	32.2	7.6	30.9	39.1	54.0	-14.9	AVERAGE



**Test in Channel 19 in transmitting status:**

(a) Antenna polarization: Horizontal

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4955.886	63.5	33.4	6.8	32.9	70.7	74.0	-3.3	PEAK
4955.886	34.1	33.4	6.8	32.9	41.3	54.0	-12.7	AVERAGE
7433.829	59.0	36.2	6.1	32.4	69.0	74.0	-5.0	PEAK
7433.829	31.3	36.2	6.1	32.4	41.3	54.0	-12.7	AVERAGE
9911.772	44.5	37.6	9.1	31.8	59.4	74.0	-14.6	PEAK
9911.772	30.2	37.6	9.1	31.8	45.0	54.0	-9.0	AVERAGE
12389.710	31.2	33.1	10.6	30.7	44.2	54.0	-9.8	AVERAGE
12389.710	45.5	33.1	10.6	30.7	58.5	74.0	-15.5	PEAK

(b) Antenna polarization: Vertical

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	Remark
4955.886	61.7	33.4	6.8	32.9	68.9	74.0	-5.1	PEAK
4955.886	33.3	33.4	6.8	32.9	40.5	54.0	-13.5	AVERAGE
7433.829	59.0	36.2	6.1	32.4	69.0	74.0	-5.0	PEAK
7433.829	30.2	36.2	6.1	32.4	40.2	54.0	-13.8	AVERAGE
9911.772	30.0	37.6	9.1	31.8	44.9	54.0	-9.1	AVERAGE
9911.772	47.5	37.6	9.1	31.8	62.4	74.0	-11.6	PEAK
12389.710	30.1	33.1	10.6	30.7	43.1	54.0	-10.9	AVERAGE
12389.710	45.8	33.1	10.6	30.7	58.9	74.0	-15.2	PEAK

**Remark:**

- 1). According to 15.249 (d) As shown in Section 15.35(b), for frequencies above 1000 MHz, the above field strength limits are based on average limits. However, the peak field strength of any emission shall not exceed the maximum permitted average limits specified above by more than 20 dB under any condition of modulation.
- 3). The test only perform the EUT in transmitting status since the test frequencies were over 1GHz only required transmitting status.

TEST RESULTS: The unit does meet the FCC requirements.



**6.5 Radiated Emissions**

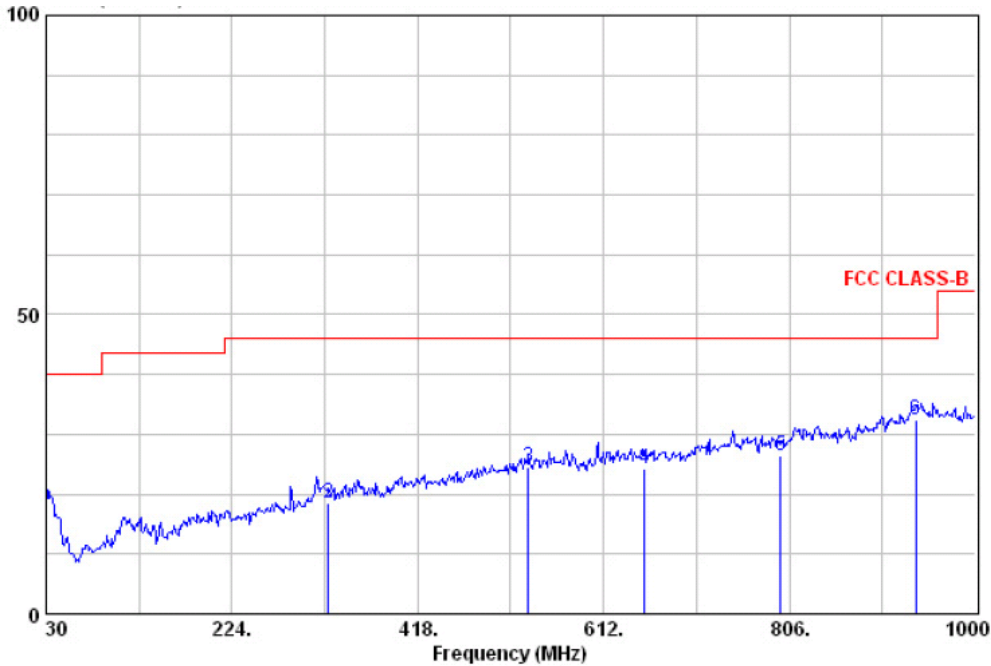
Test Requirement: FCC Part15 Section 15.109  
 Test Method: Based on ANSI C63.4  
 Test Date: April 23 2007  
 Measurement Distance: 3m  
 Limit: 40.0 dB $\mu$ V/m between 30MHz & 88MHz  
 43.5 dB $\mu$ V/m between 88MHz & 216MHz  
 46.0 dB $\mu$ V/m between 216MHz & 960MHz  
 54.0 dB $\mu$ V/m above 960MHz  
 Detector: Peak for pre-scan, 120kHz resolution bandwidth within 1GHz,  
 Quasi-Peak if maximised peak within 6dB of limit

Test EUT in receiving mode.

The following measurement result were performed on the EUT:

Vertical:

Peak scan



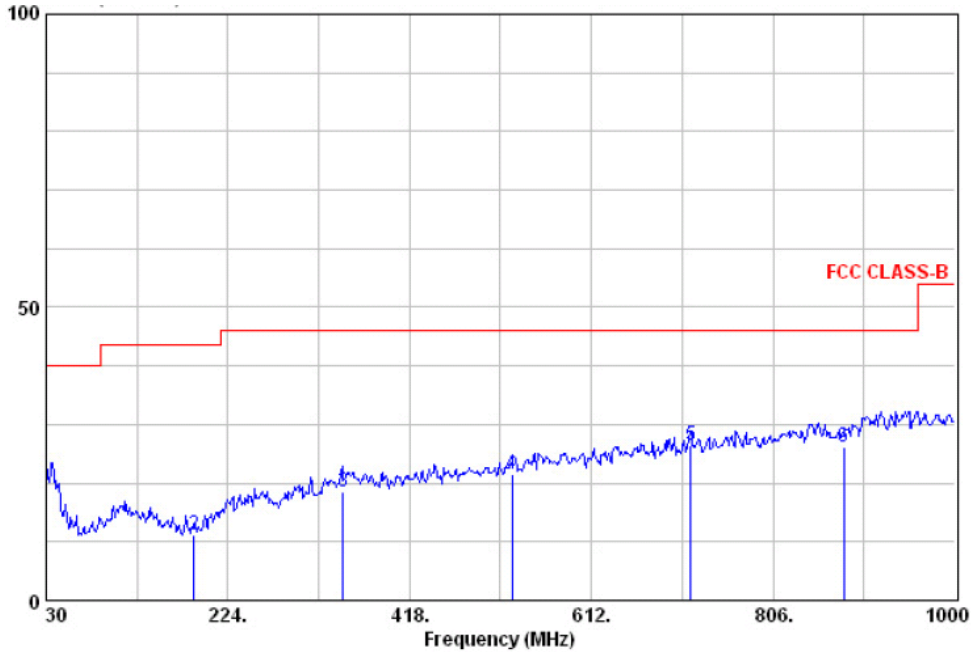
Quasi-peak measurement

Read Antenna	Cable	Preamp	Limit	Over				
Freq	Level	Factor	Loss	Factor	Level			
MHz	dBuV	dB/m	dB	dB	dBuV/m			
30.000	25.57	19.18	0.40	25.50	19.65	40.00	-20.35	QP
324.880	26.68	14.99	1.30	24.56	18.41	46.00	-27.59	QP
533.430	29.03	19.59	1.80	25.86	24.55	46.00	-21.45	QP
654.680	27.56	20.59	1.95	25.74	24.36	46.00	-21.64	QP
797.270	27.41	22.43	2.10	25.60	26.34	46.00	-19.66	QP
937.920	29.37	25.35	2.64	24.84	32.52	46.00	-13.48	QP

Horizontal:



Peak scan



Quasi-peak measurement

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit	Over	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
30.000	24.78	21.58	0.40	25.50	21.26	40.00	-18.74	QP
188.110	26.02	8.82	1.00	24.71	11.12	43.50	-32.38	QP
347.190	25.23	16.47	1.47	24.70	18.47	46.00	-27.53	QP
527.610	27.36	18.39	1.78	25.87	21.66	46.00	-24.34	QP
717.730	27.64	22.18	2.18	25.68	26.32	46.00	-19.68	QP
881.660	26.08	22.71	2.44	25.11	26.11	46.00	-19.89	QP

The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows:

Final Test Level = Receiver Reading + Antenna Factor + Cable Factor – Preamplifier Factor

**TEST RESULTS: The unit does meet the FCC requirements**



## 6.6 Band Edges Requirement

Test Requirement:	FCC Part 15 C
Test Method:	Based on FCC Part15 C Section 15.247 Operation within the band 2400 – 2483.5 MHz
Test Date:	23 April 2007
Requirements:	Section 15.247 (d) .In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on 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 the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

### 6.6.1 100 kHz Bandwidth Outside the Frequency Band

Method of Measurement:	Set RBW of spectrum analyzer to 100 kHz and VBW of spectrum analyzer to 100 kHz with suitable frequency span including 100 kHz bandwidth from band edge. The band edges was measured and recorded.
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#### Test Result:

The Lower Edges: the value is -33.1dB that is attenuated more than 20dB.

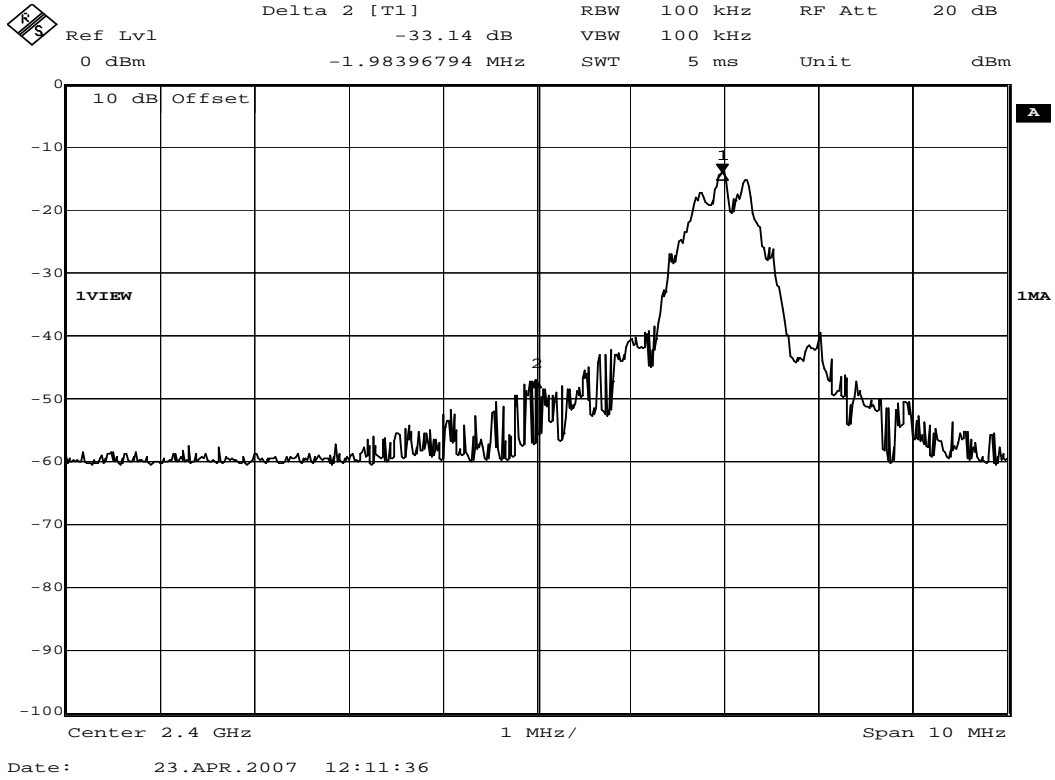
The Upper Edges: the value is -46.1dB that is attenuated more than 20dB.

**The unit does meet the FCC requirements.**

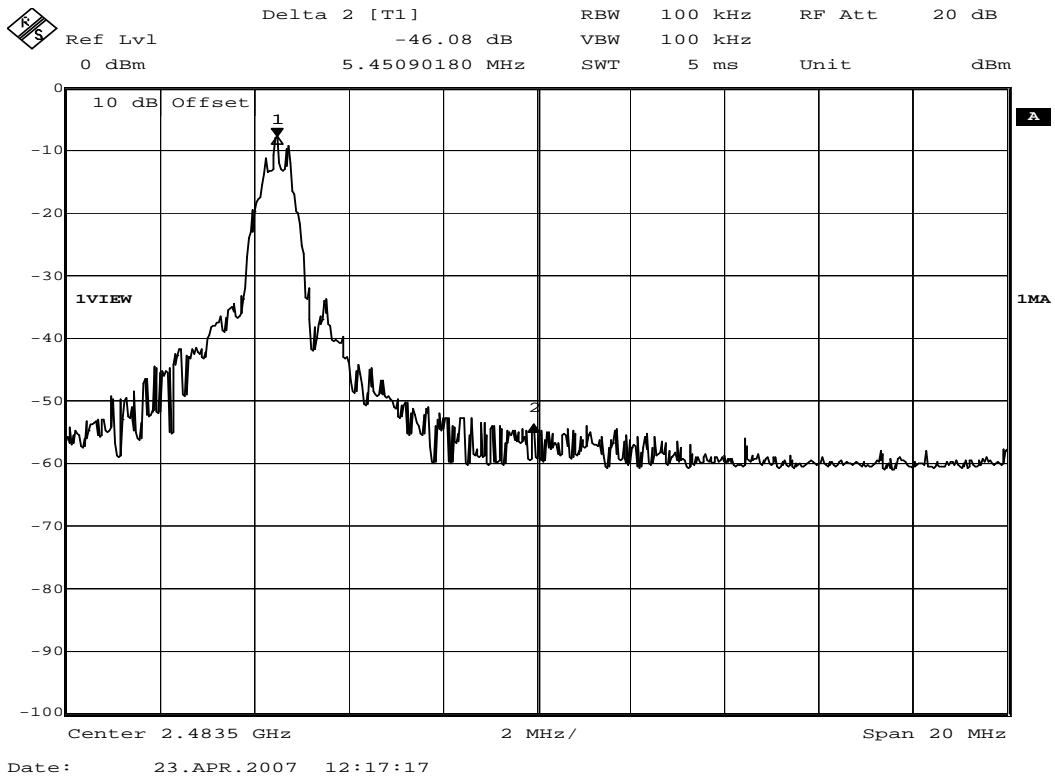
The graph as below, represents the emissions take for this device.



1. For Lowest Channel: the fundamental frequency is **2.402G Hz.**



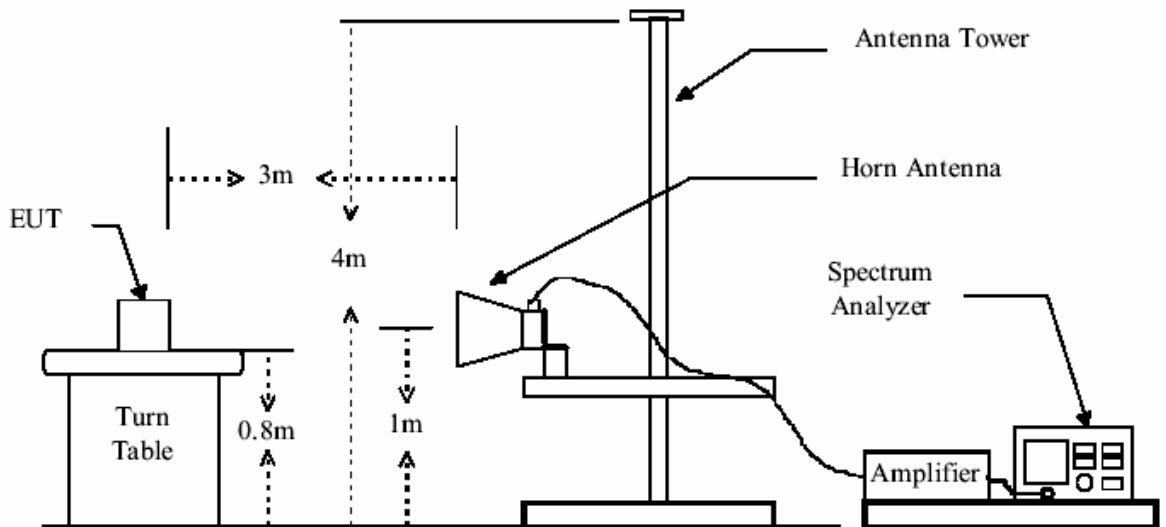
2. For Highest Channel: the fundamental frequency is **2.478GHz.**



**6.6.2 Radiated Emissions which fall in the restricted bands**

Test Requirement:	Section 15.247 (c). In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
Test Method:	Base on ANSI 63.4.
Test Date:	23 April 2007
Measurement Distance:	3m (Semi-Anechoic Chamber)
Limit:	40.0 dB $\mu$ V/m between 30MHz & 88MHz 43.5 dB $\mu$ V/m between 88MHz & 216MHz 46.0 dB $\mu$ V/m between 216MHz & 960MHz 54.0 dB $\mu$ V/m above 960MHz
Detector:	Peak for pre-scan , 120kHz resolution bandwidth within 1GHz, 1MHz resolution bandwidth above 1GHz

**Test Configuration:**



**Test Procedure:**

The procedure used was ANSI Standard C63.4-2003. The receiver was scanned from 30MHz to 25GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal and Vertical polarities and performed a pre-test three orthogonal planes. For intentional radiators, measurements of the variation of the input power or the radiated signal level of the fundamental frequency component of the emission, as appropriate, shall be performed with the supply voltage varied between 85% and 115% of the nominal rated supply voltage. The worst case emissions were reported.



**Test Result:**

**1. Channel 0 (2.402 GHz)**

Test Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	
					Peak	AV
2390.000	42.6	31.5	74.0	54.0	31.4	22.5
2483.500	48.2	34.0	74.0	54.0	25.8	20.0

**2. Channel 10 (2.442 GHz)**

Test Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	
					Peak	AV
2390.000	41.8	31.2	74.0	54.0	32.2	22.8
2483.500	49.6	35.2	74.0	54.0	24.4	18.8

**3. Channel 19 (2.478 GHz)**

Test Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Peak Limit (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	
					Peak	AV
2390.000	43.0	32.9	74.0	54.0	31.0	21.1
2483.500	48.9	36.5	74.0	54.0	25.1	17.5

**The unit does meet the FCC requirements.**





Section 15.205 Restricted bands of operation.

(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
<sup>1</sup> 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2655 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	( <sup>2</sup> )
13.36 - 13.41			

### 6.7 Power Spectral Density

Test Requirement: FCC Part 15 C  
 Test Method: Based on FCC Part15 C Section 15.247(e)  
 Test Date: 26 April 2007  
 Test requirements: For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. The same method of determining the conducted output power shall be used to determine the power spectral density.

**Test Procedure:**

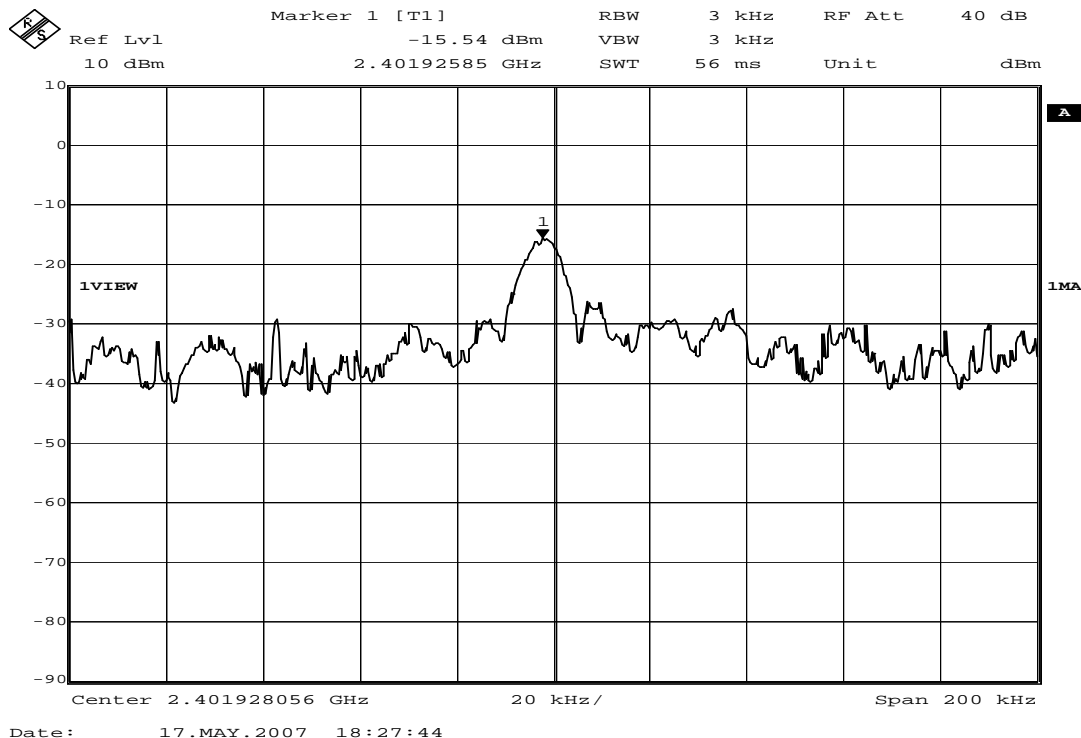
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum analyzer through an attenuator.
2. Set the spectrum analyzer: RBW =3KHz and VBW=3KHz. Span = 200KHz, Sweep = auto; Detector Function = Peak (Max. hold).
3. Mark the peak frequency

Test result:

Test Channel	Channel frequency (MHz)	RF POWER LEVEL IN 3 KHz BW (dBm)	MAXIMUM LIMIT (dBm)
0	2402	-15.5	8
10	2442	-15.2	8
19	2478	-14.7	8

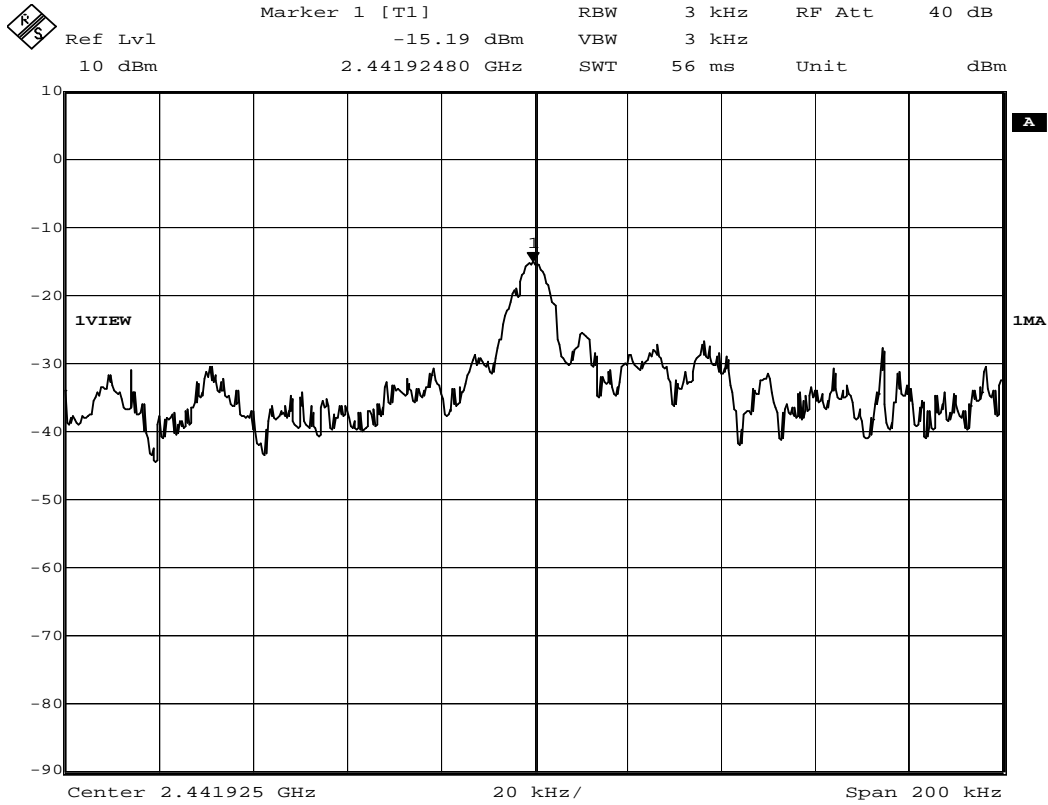
The unit does meet the FCC requirements.

Please refer the graph as below: Lowest Channel



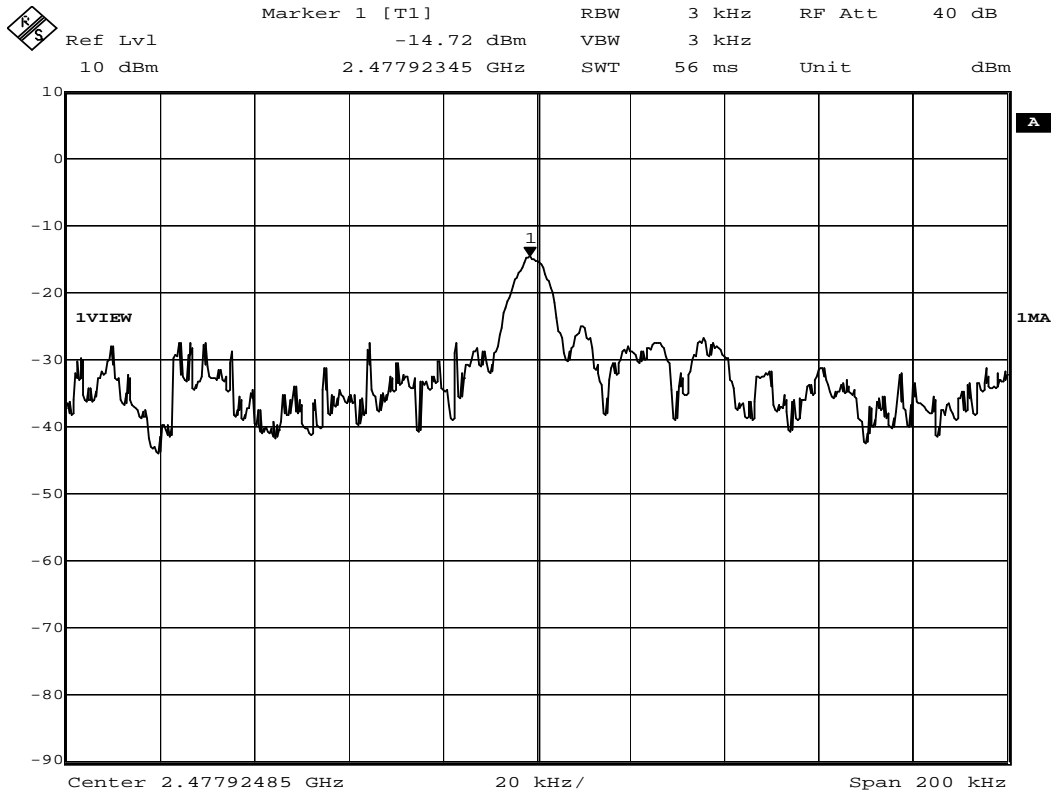


Medium Channel



Date: 17.MAY.2007 18:26:13

Highest Channel



Date: 17.MAY.2007 18:29:13



## **6.8 Antenna Requirement**

### **6.8.1 Standard Applicable**

For intentional device, according to 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3dB that the directional gain of the antenna exceeds 6 dBi.

### **6.8.2 Antenna Construction**

The antenna is integrated on the main PCB and no consideration of replacement.