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**FEDERAL COMMUNICATIONS COMMISSION**  
Registration number: 282399

Report No.: GLEMR070702247RFT  
FCC ID : VIPFGECMB235  
Page: 1 of 49

## TEST REPORT

**Application No. :** GLEMR070702247RF  
**Applicant:** HUIZHOU FORYOU GENERAL ELECTRONICS CO.,LTD  
**FCC ID:** VIPFGECMB235  
**Fundamental Carrier Frequency :** 2.402GHz to 2.480GHz  
**Equipment Under Test (EUT):**  
**Name:** Car CD/MP3 Player with FM/AM Tuner  
**Model No.:** CMB235, MP6612i\*  
**Standards:** FCC PART 15, SUBPART B: 2006  
FCC PART 15, SUBPART C: 2006 (Section 15.247)  
**Date of Receipt:** 27 June 2007  
**Date of Test:** 27 June to 08 August 2007  
**Date of Issue:** 09 August 2007

<b>Test Result :</b>	<b>PASS *</b>
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\* In the configuration tested, the EUT detailed in this report complied with the standards specified above. Please refer to section 2 of this report for further details.

Authorized Signature:

Stephen Guo  
Manager

This report refers to the General Conditions for Inspection and Testing Services, printed overleaf  
This report details the results of the testing carried out on one sample. The results contained in this test report do not relate to other samples of the same product. The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.

This report may only be reproduced and distributed in full. 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.



## 2 Test Summary

For Bluetooth Function:			
Test	Test Requirement	Standard Paragraph	Result
Maximum Peak Output Power	FCC PART 15 :2006	Section 15.247(b)(1)	PASS
Conducted Emission	FCC PART 15 :2006	Section 15.107 Section 15.207	N/A
Conducted Spurious Emission (30MHz to 25GHz)	FCC PART 15 :2006	15.247(d)	PASS
Radiated Spurious Emission (30MHz to 25GHz)	FCC PART 15 :2006	Section 15.109, Section 15.209 &15.247(d)	PASS
Band Edges Measurement	FCC PART 15 :2006	Section 15.247 (d) &15.205	PASS
Hopping Channel Number	FCC PART 15 :2006	Section 15.247(a)(1)(iii)	PASS
Carrier Frequencies Separated	FCC PART 15 :2006	Section 15.247(a)(1)	PASS
Dwell Time	FCC PART 15 :2006	Section 15.247(a)(1)(iii)	PASS
Antenna Requirement	FCC PART 15 :2006	Section 15.247 (c)	PASS

\* Remark: According to the confirmation from the applicant, model CMB235, MP6612i were the same as in the circuit, PCB layout, electrical parts. The difference was the appearance. Therefore only one model need to be tested.



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## 4 General Information

### 4.1 Client Information

Applicant: HUIZHOU FORYOU GENERAL ELECTRONICS CO.,LTD  
Address of Applicant: NO.6 Zhongkai Songshan Industrial District, Huizhou Guangdong, China

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

Name: Car CD/MP3 Player with FM/AM Tuner  
Model No.: CMB235,MP6612i  
Number of Channels 79 Channels  
Channel Separation 1.0 MHz  
Type of Modulation FHSS (Frequency Hopping Spread Spectrum)  
Dwell time Per channel is less than 0.4S.  
Antenna Type Integral  
Power Supply: Vehicle DC 12V

### 4.3 Description of Support Units

The EUT has been tested independently or connecting with a ipod/mobile phone SonyerissionK618i.

### 4.4 Standards Applicable for Testing

The customer requested FCC tests for the EUT.  
The standard used was FCC PART 15, SUBPART B: 2006  
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.

- **CNAS L0167**

SGS-CSTC Standards Technical Services Co., Ltd., EMC Laboratory has been assessed and in compliance with CNAS-CL01:2006 accreditation criteria for testing laboratories (identical to ISO/IEC 17025:2005 General Requirements) for the Competence of Testing Laboratories.

- **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.

- **Industry Canada (IC)**

The 3m/10m Alternate Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. has been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620B-1.

Date of Registration: Jan 15, 2007. Valid until Jan 15, 2009



## 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	29-07-2007	29-07-2008
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	28-03-2007	28-03-2008
EMC0521	1-26.5 GHz Pre-Amplifier	Agilent	8449B	3008A01649	28-03-2007	28-03-2008
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

Conducted Emission						
No:	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
EMC0306	Shielding Room	Zhong Yu	8 x 3 x 3.8 m <sup>3</sup>	N/A	N/A	N/A
EMC0102	LISN	Schaffner Chase	MNZ050D/1	1421	05-12-2006	05-12-2007
EMC0506	EMI Test Receiver	Rohde & Schwarz	ESCS30	100085	05-12-2006	05-12-2007
EMC0107	Coaxial Cable	SGS	2m	N/A	25-11-2006	25-11-2007
EMC0106	Voltage Probe	SGS	N/A	N/A	N/A	N/A

## 6 Test Results

### 6.1 E.U.T. Operation

Input voltage: DC 12V  
 Type of antenna: Integral  
 Operating Environment:  
 Temperature: 20.0 -25.0 °C  
 Humidity: 38-48 % RH  
 Atmospheric Pressure: 992 -1006 mbar  
 EUT Operation: Test the EUT to transmit and receive data at lowest (**Channel 1: 2.402GHz**), middle (**Channel 39: 2.441GHz**), and highest channel (**Channel 79: 2.480GHz**), frequencies individually for the compliance test.

### 6.2 Maximum Peak Output Power

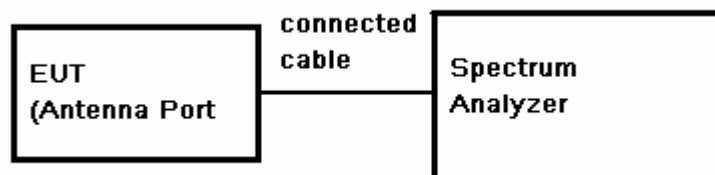
Test Requirement: FCC Part15 C  
 Test Method: Base on ANSI 63.4.  
 Test Date: 10 July 2007  
 Test Limit:

Regulation 15.247 (b)(1)For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

The non-overlapping hopping channels of EUT over 74, the result refer to the result "Hopping channel number" of this document. So 0.125 watt limit applies.

Test mode: Test in transmitting mode: Channel 1, Channel 39, Channel 79.

Test Configuration:




---

Test Procedure:

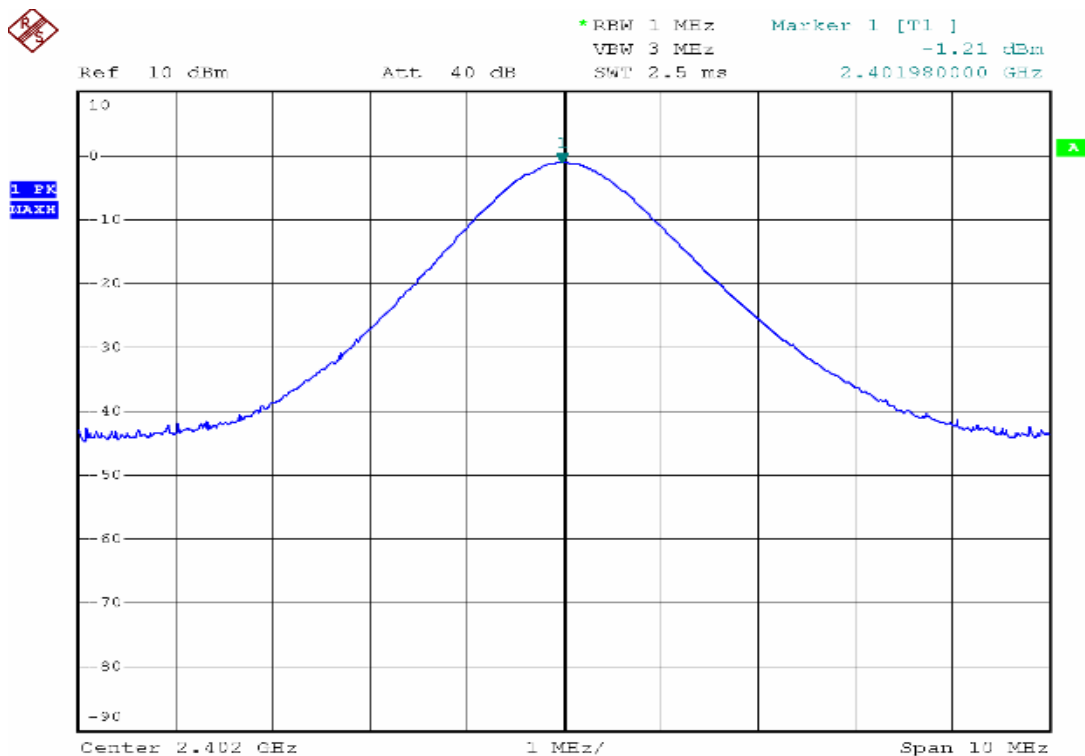
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW = 1 MHz, VBW = 1 MHz, Sweep = auto; Detector Function = Peak.
3. Keep the EUT in transmitting at lowest, medium and highest channel individually. Record the max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

**Test Result:**

Test Channel	Fundamental Frequency (GHz)	Reading Power (dBm)	Cable Loss (dB)	Output Power (dBm)	Limit (dBm)	Margin (dB)
1	2.410	-1.2	0.20	-1.0	30.0	31.0
39	2.440	-2.7	0.20	-2.5	30.0	32.5
79	2.470	-5.8	0.20	-5.6	30.0	35.6

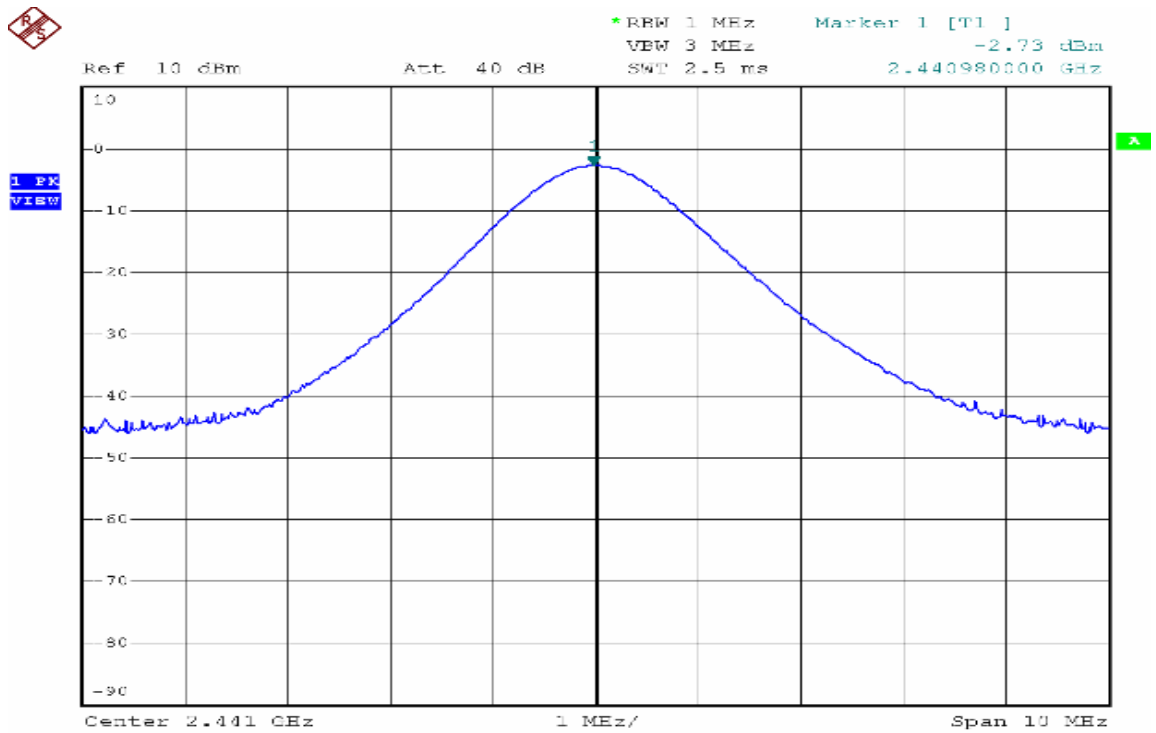
**TEST RESULTS: The unit does meet the FCC requirements.**

**Low Channel :**

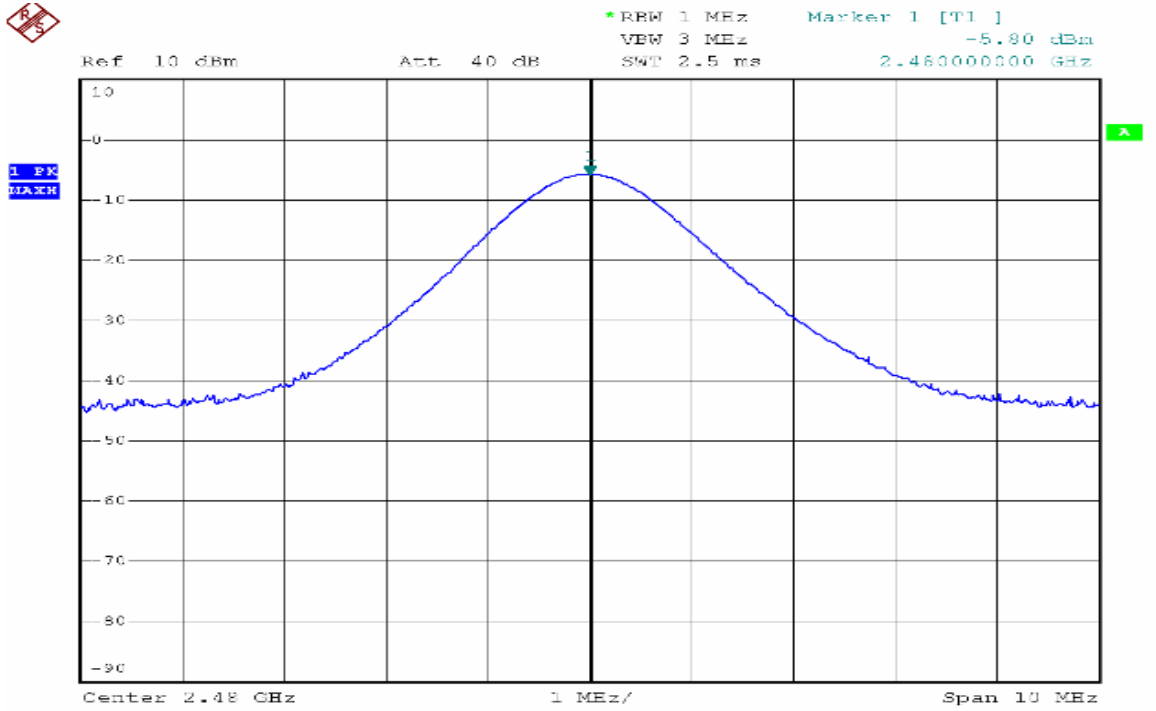


**Middle Channel:**





High Channel :





### 6.3 Conducted Emission

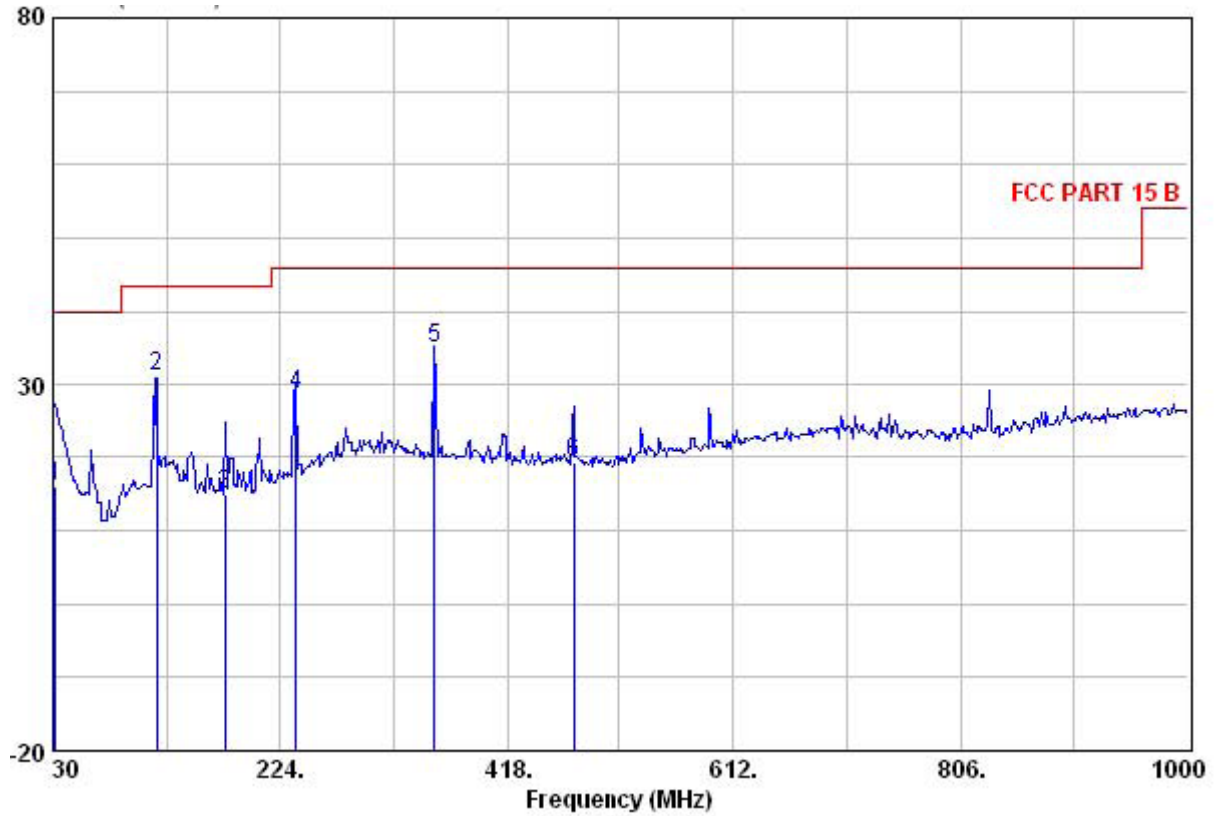
Test Requirement: N/A  
Remark: Measurements to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

### 6.4 Radiated Emissions

Test Requirement: FCC Part15 B  
Test Method: ANSI C63.4  
Test Date: 12 July 2007  
Frequency Range: 30MHz to 1000MHz  
Class / Severity: Class B  
Detector: Quasi-Peak if maximised peak within 6dB of Quasi-Peak limit  
EUT Operation: Test the EUT in Audio in playing music , USB playing music, iPod playing music, SD card playing music, FM Tuner(Pre-test in 88MHz,98MHz,108MHz,record the worst mode: tuned in 108MHz).  
Test result:

FM Tuner mode(108MHz was the worst mode):

Horizontal:



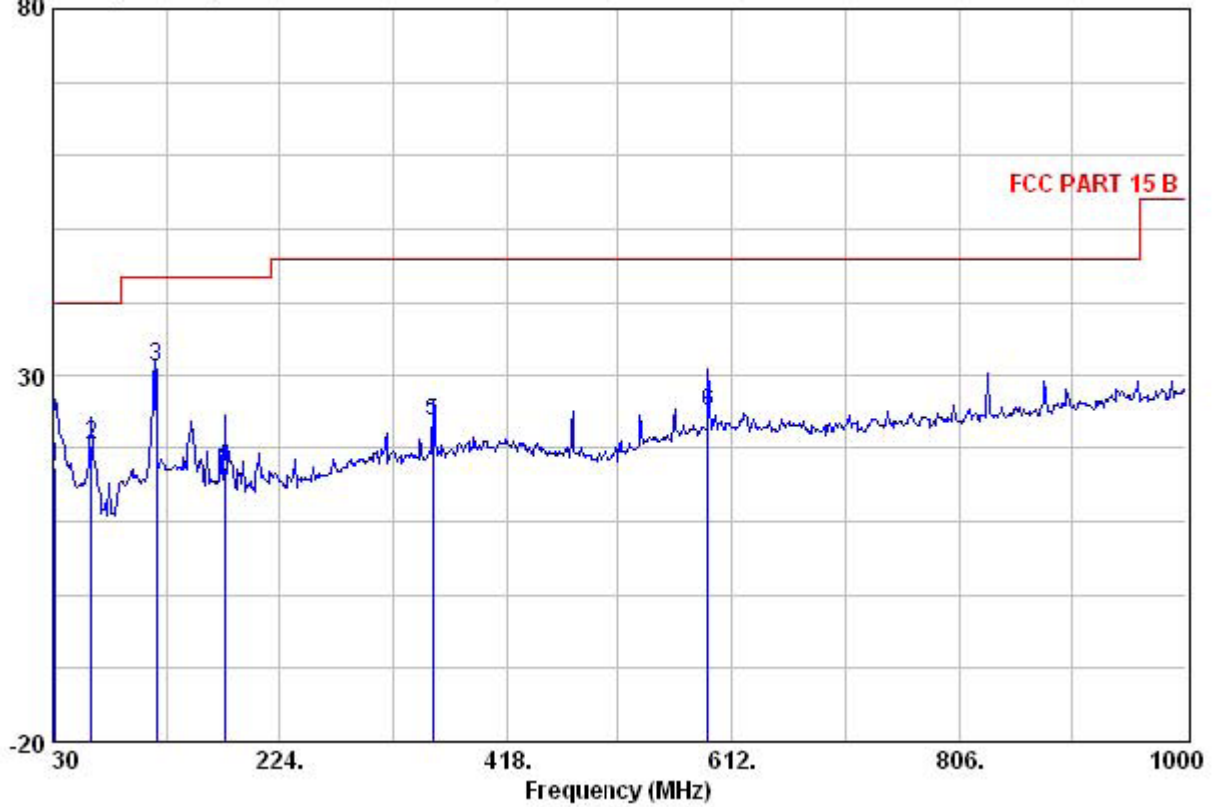
Quasi-peak measurement:

Level = Read Level + Antenna Factor +  
Cable Loss - Preamp Factor

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
31.940	17.45	23.55	0.40	25.42	15.98	40.00	-24.02	QP
118.600	42.26	13.39	0.78	25.10	31.33	43.50	-12.17	QP
176.470	26.97	11.69	0.96	24.80	14.82	43.50	-28.68	QP
237.200	37.65	14.53	1.10	24.45	28.83	46.00	-17.17	QP
355.800	41.17	17.05	1.50	24.75	34.97	46.00	-11.03	QP
474.260	26.92	16.29	1.70	25.69	19.23	46.00	-26.77	QP



Vertical:



Quasi-peak measurement:

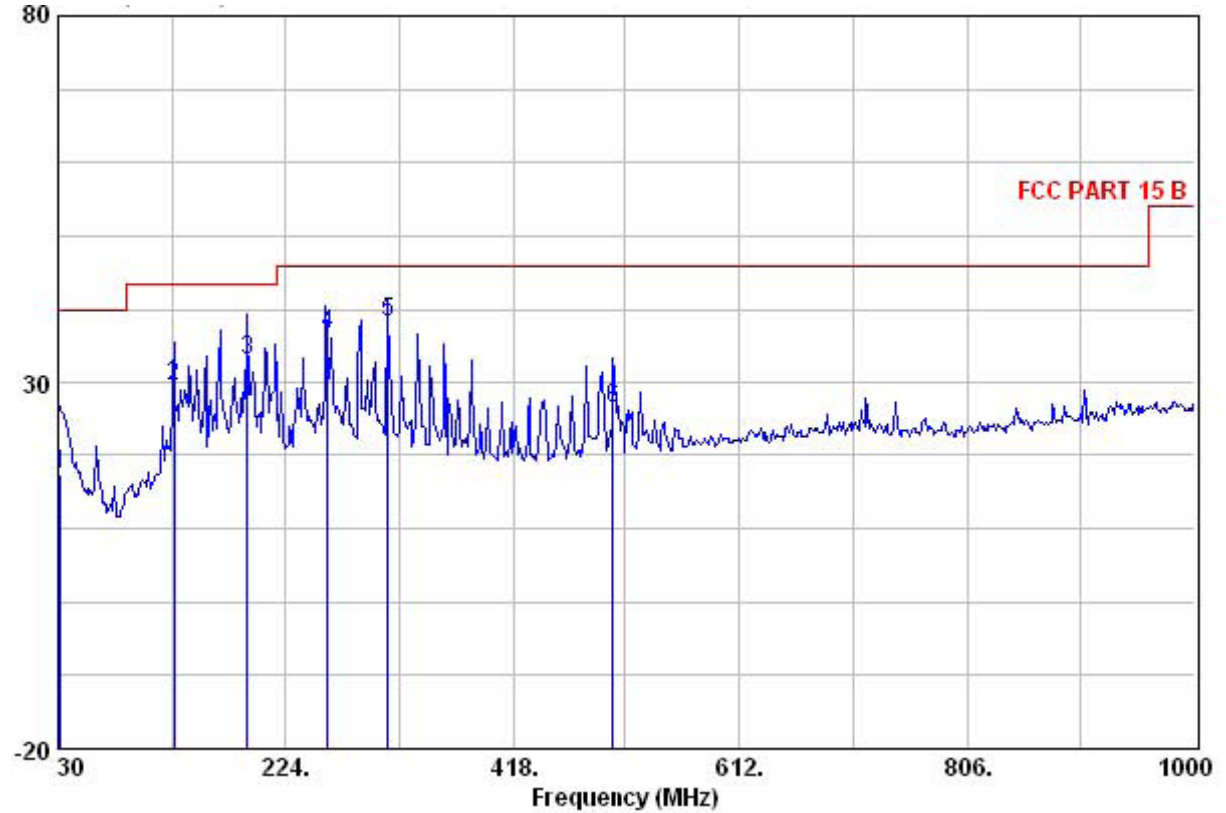
Level = Read Level + Antenna Factor +  
Cable Loss - Preamp Factor

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
31.940	19.92	22.34	0.40	25.42	17.24	40.00	-22.76	QP
62.980	33.92	10.89	0.53	25.10	20.24	40.00	-19.76	QP
118.600	42.39	13.29	0.78	25.10	31.36	43.50	-12.14	QP
176.470	28.81	12.33	0.96	24.80	17.30	43.50	-26.20	QP
354.950	30.98	15.88	1.50	24.75	23.61	46.00	-22.39	QP
591.630	29.54	19.46	1.80	25.81	24.99	46.00	-21.01	QP



iPod playing mode:

Horizontal:



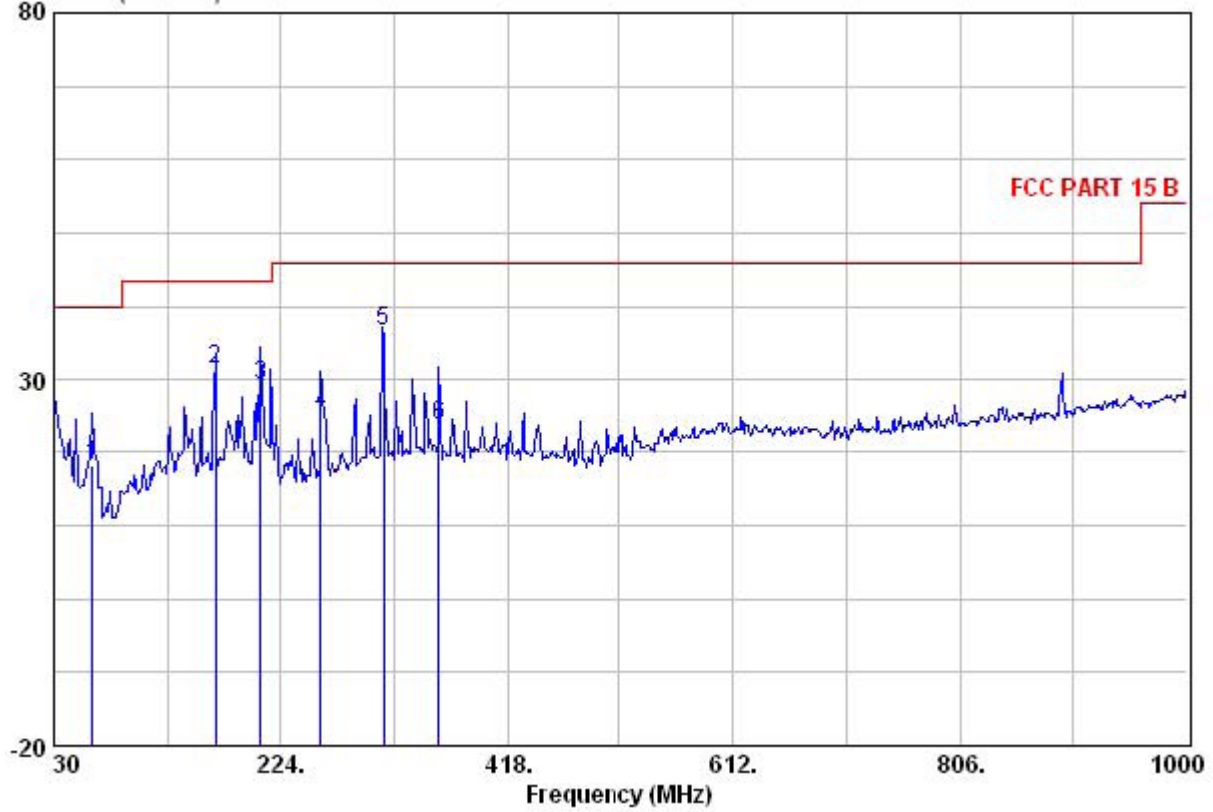
Quasi-peak measurement:

Level = Read Level + Antenna Factor +  
Cable Loss - Preamp Factor

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
31.940	18.83	23.55	0.40	25.42	17.37	40.00	-22.63	QP
128.940	39.81	14.10	0.80	25.10	29.60	43.50	-13.90	QP
191.020	45.22	11.73	1.00	24.69	33.27	43.50	-10.23	QP
260.020	44.12	15.83	1.20	24.40	36.75	46.00	-9.25	QP
311.300	43.95	17.56	1.30	24.47	38.34	46.00	-7.66	QP
502.390	34.46	16.25	1.70	25.90	26.52	46.00	-19.48	QP



Vertical:



Quasi-peak measurement:

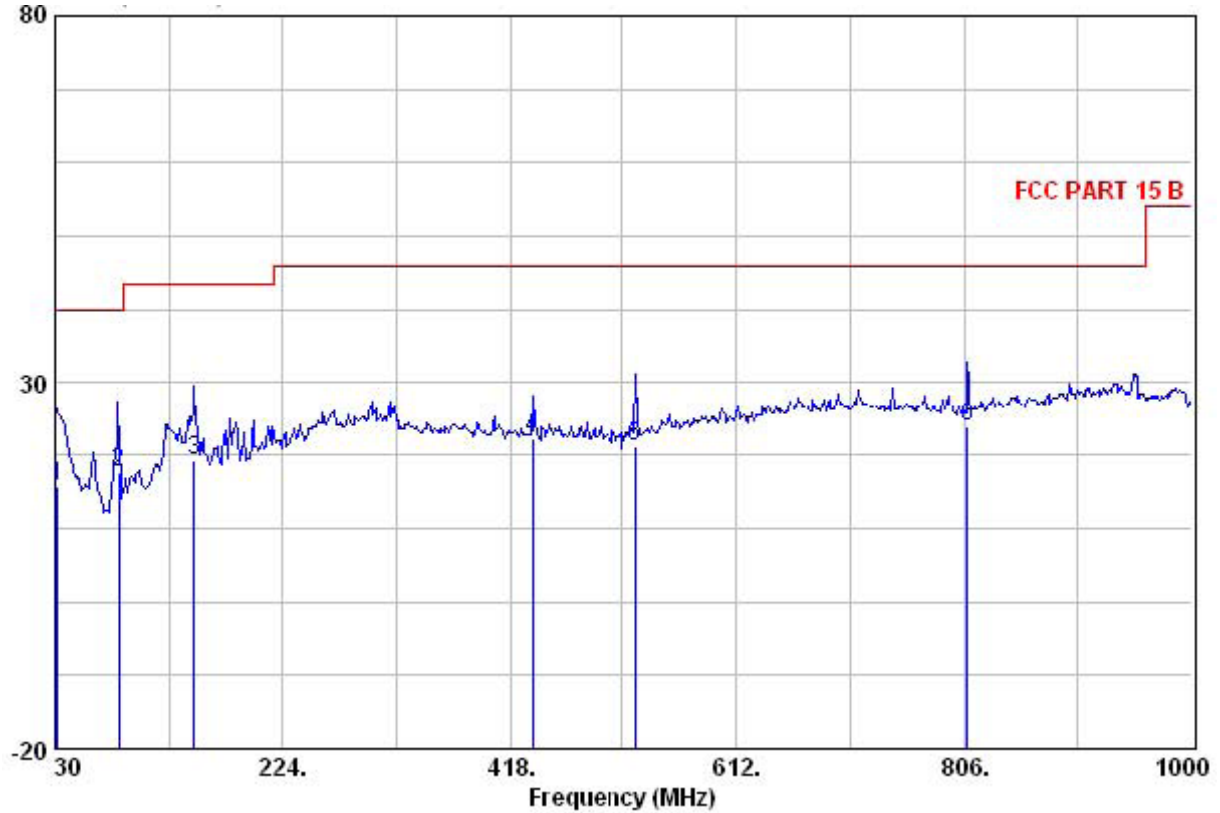
Level = Read Level + Antenna Factor +  
Cable Loss - Preamp Factor

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
62.980	31.85	10.89	0.53	25.10	18.17	40.00	-21.83	QP
167.740	44.05	11.48	0.90	24.85	31.59	43.50	-11.91	QP
206.540	41.87	11.03	1.06	24.57	29.39	43.50	-14.11	QP
257.950	35.69	12.86	1.20	24.40	25.35	46.00	-20.65	QP
312.000	45.15	14.81	1.30	24.48	36.78	46.00	-9.22	QP
358.830	30.95	15.98	1.50	24.77	23.65	46.00	-22.35	QP



Audio in mode:

Horizontal:



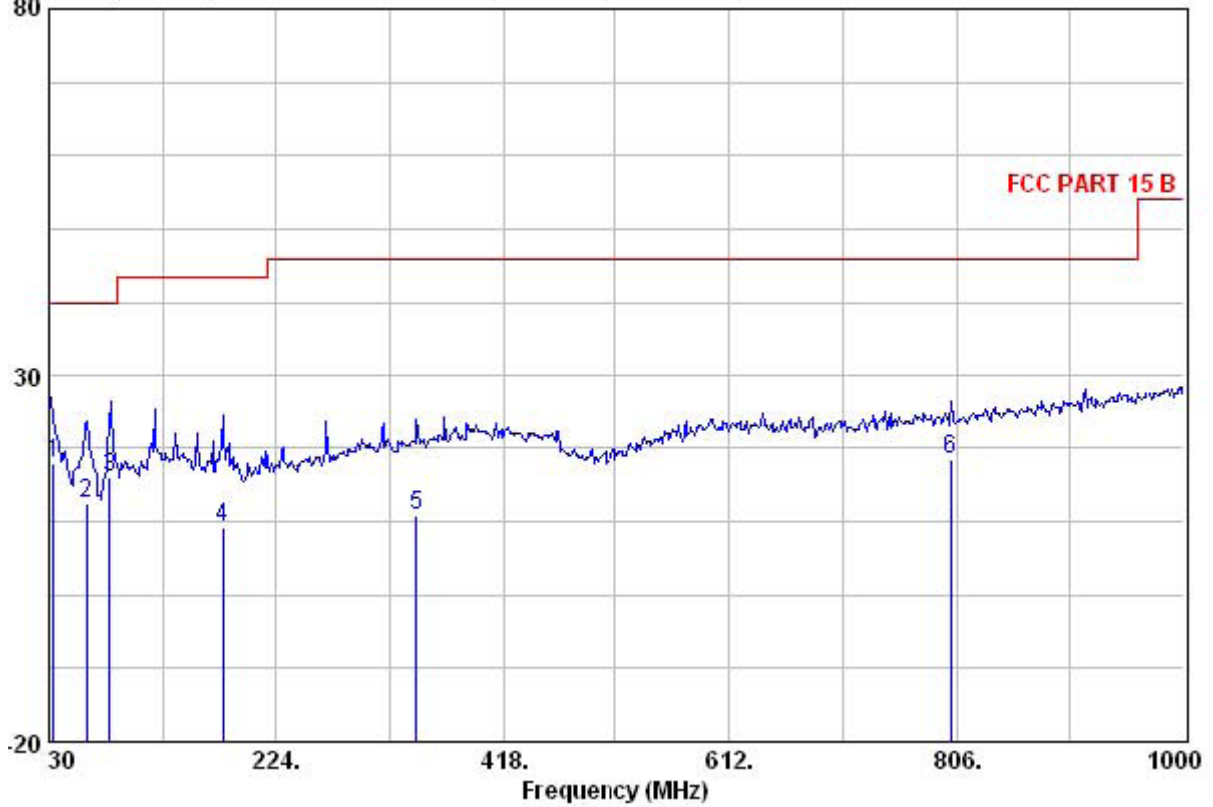
Quasi-peak measurement:

Level = Read Level + Antenna Factor +  
Cable Loss - Preamp Factor

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
31.940	17.15	23.55	0.40	25.42	15.69	40.00	-24.31	QP
83.960	32.91	9.21	0.60	25.14	17.58	40.00	-22.42	QP
148.340	30.60	12.76	0.80	24.93	19.23	43.50	-24.27	QP
436.430	29.66	16.45	1.50	25.36	22.25	46.00	-23.75	QP
525.670	28.44	16.93	1.76	25.87	21.26	46.00	-24.74	QP
808.910	27.61	19.72	2.19	25.53	23.99	46.00	-22.01	QP



Vertical:



Quasi-peak measurement:

Level = Read Level + Antenna Factor +  
Cable Loss - Preamp Factor

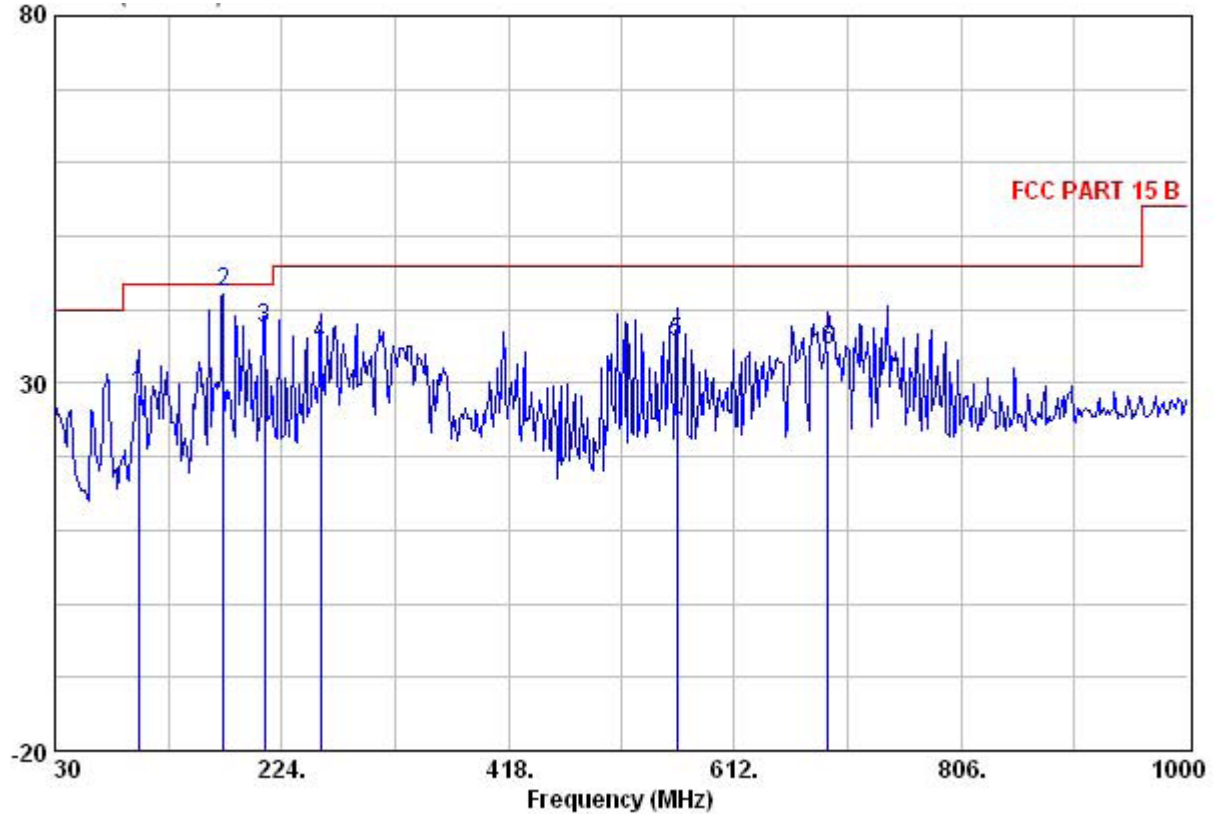
Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
33.660	22.42	20.51	0.40	25.35	17.99	40.00	-22.01	QP
62.010	25.79	11.23	0.52	25.10	12.44	40.00	-27.56	QP
81.500	32.89	7.70	0.60	25.12	16.08	40.00	-23.92	QP
178.410	20.73	12.37	0.98	24.80	9.28	43.50	-34.22	QP
343.310	18.42	15.61	1.43	24.68	10.78	46.00	-35.22	QP
801.150	21.26	20.60	2.11	25.58	18.39	46.00	-27.61	QP





SD Card playing mode:

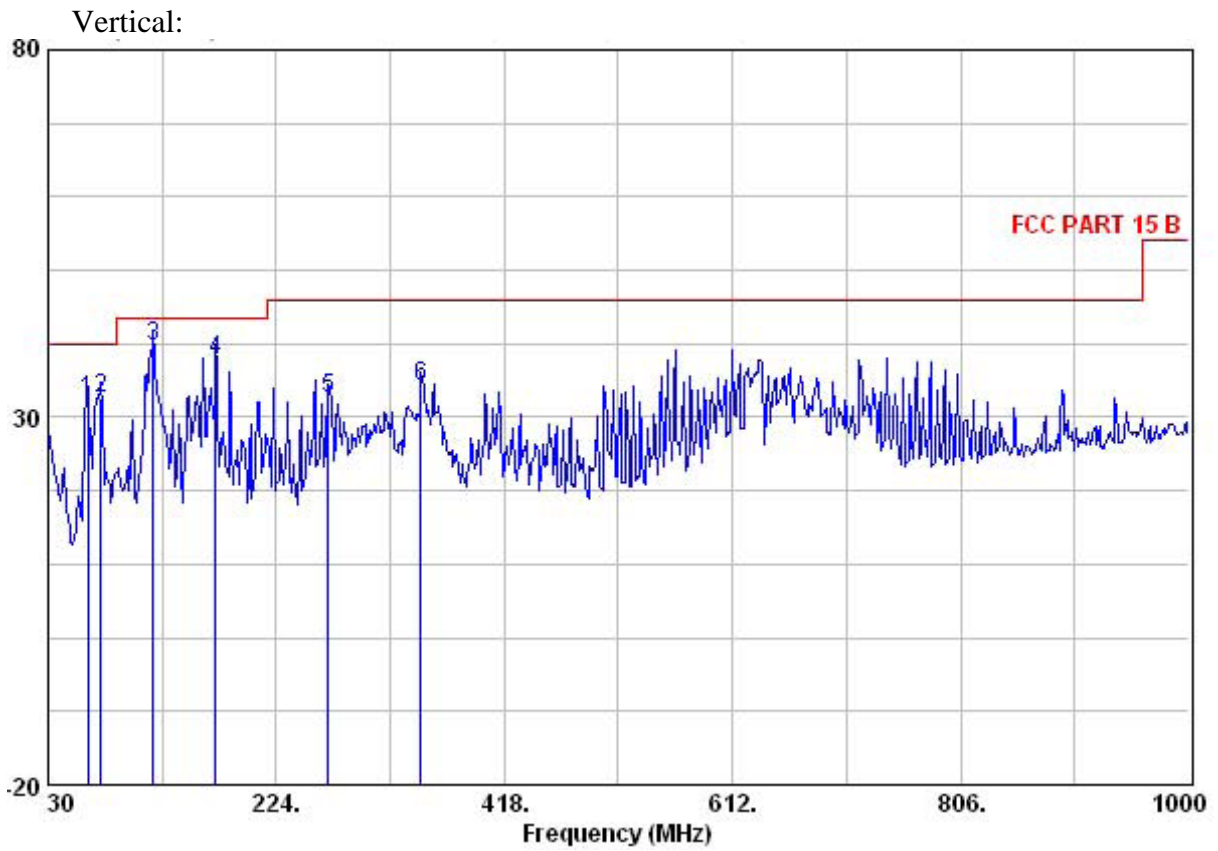
Horizontal:



Quasi-peak measurement:

$$\text{Level} = \text{Read Level} + \text{Antenna Factor} + \text{Cable Loss} - \text{Preamp Factor}$$

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
101.780	41.06	11.88	0.70	25.10	28.54	43.50	-14.96	QP
174.010	54.50	11.79	0.94	24.81	42.42	43.50	-1.08	QP
209.450	48.18	12.66	1.09	24.56	37.37	43.50	-6.13	QP
256.980	42.78	15.68	1.20	24.40	35.26	46.00	-10.74	QP
563.500	41.70	17.92	1.74	25.83	35.52	46.00	-10.48	QP
692.510	38.08	20.19	1.93	25.71	34.49	46.00	-11.51	QP



Quasi-peak measurement:

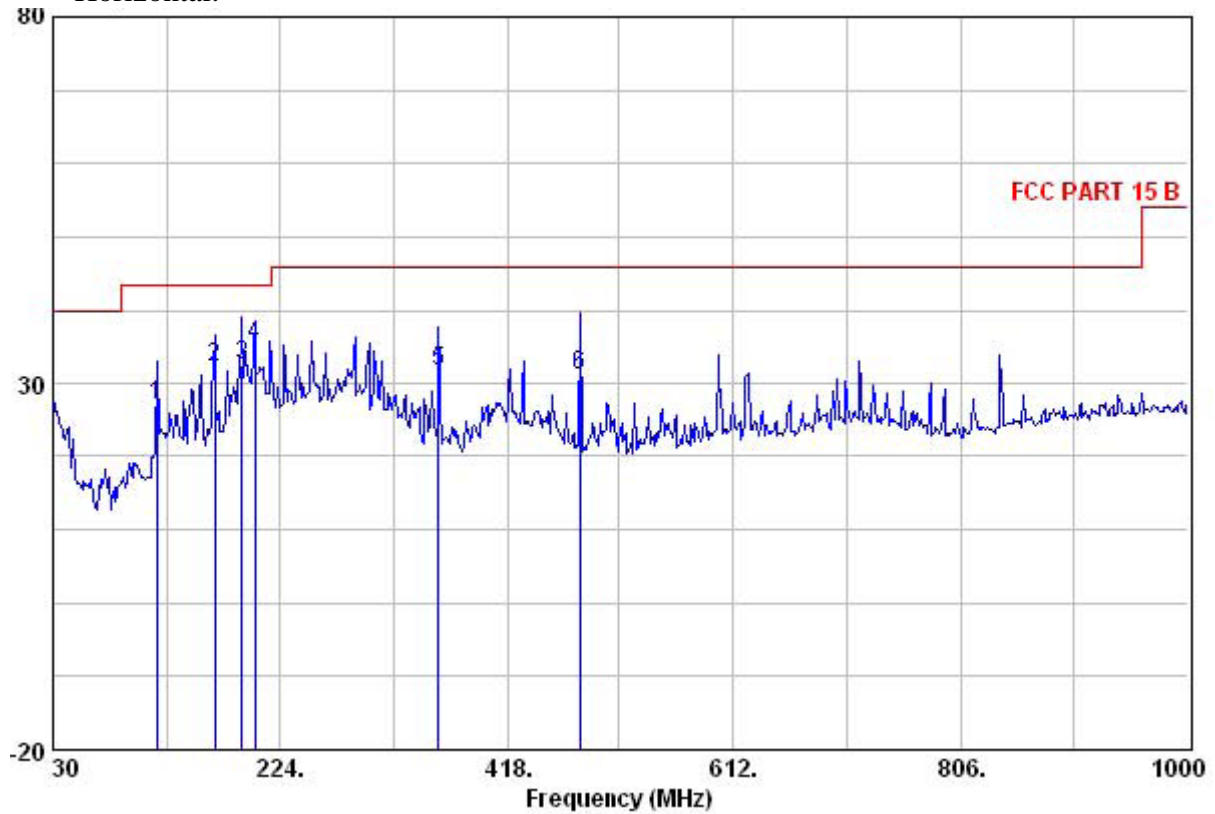
$$\text{Level} = \text{Read Level} + \text{Antenna Factor} + \text{Cable Loss} - \text{Preamp Factor}$$

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
63.950	46.30	10.46	0.54	25.10	32.20	40.00	-7.80	QP
74.520	49.16	7.98	0.60	25.10	32.64	40.00	-7.36	QP
119.240	50.56	13.43	0.79	25.10	39.68	43.50	-3.82	QP
172.590	49.76	12.03	0.93	24.82	37.90	43.50	-5.60	QP
268.520	42.58	13.30	1.11	24.40	32.59	46.00	-13.41	QP
347.190	41.67	15.70	1.47	24.70	34.14	46.00	-11.86	QP



USB playing mode:

Horizontal:



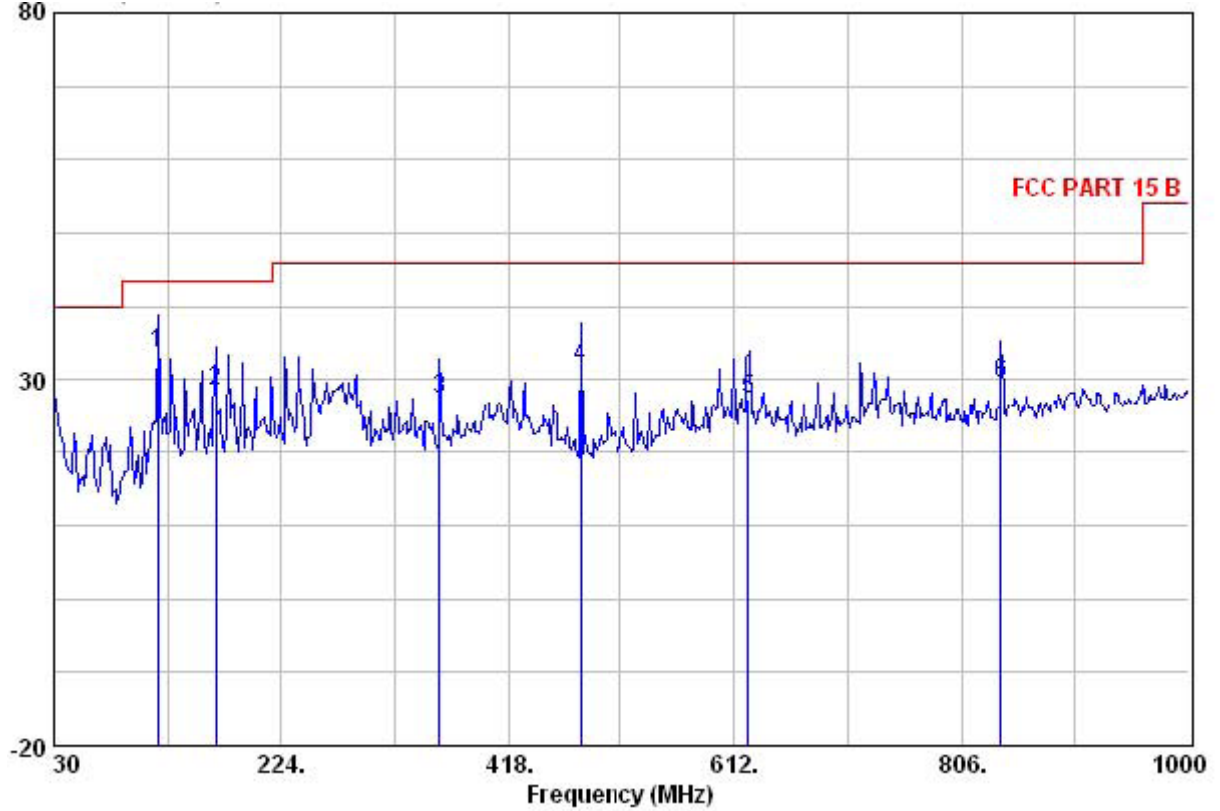
Quasi-peak measurement:

$$\text{Level} = \text{Read Level} + \text{Antenna Factor} + \text{Cable Loss} - \text{Preamp Factor}$$

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
118.270	38.22	13.35	0.78	25.10	27.25	43.50	-16.25	QP
167.740	44.62	11.75	0.90	24.85	32.43	43.50	-11.07	QP
191.020	44.54	11.73	1.00	24.69	32.58	43.50	-10.92	QP
202.660	46.83	12.17	1.03	24.59	35.43	43.50	-8.07	QP
358.830	38.12	17.02	1.50	24.77	31.87	46.00	-14.13	QP
479.110	39.06	16.27	1.70	25.73	31.31	46.00	-14.69	QP



Vertical:



Quasi-peak measurement:

Level = Read Level + Antenna Factor +  
Cable Loss - Preamp Factor

Freq	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Level	Limit Line	Over Limit	Remark
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	
118.270	44.90	13.22	0.78	25.10	33.80	43.50	-9.70	QP
167.740	41.09	11.48	0.90	24.85	28.63	43.50	-14.87	QP
358.830	34.61	15.98	1.50	24.77	27.31	46.00	-18.69	QP
479.110	40.09	15.84	1.70	25.73	31.90	46.00	-14.10	QP
623.640	31.67	19.68	1.94	25.78	27.51	46.00	-18.49	QP
839.950	31.77	20.81	2.30	25.35	29.53	46.00	-16.47	QP

### 6.5 Conducted Spurious Emissions

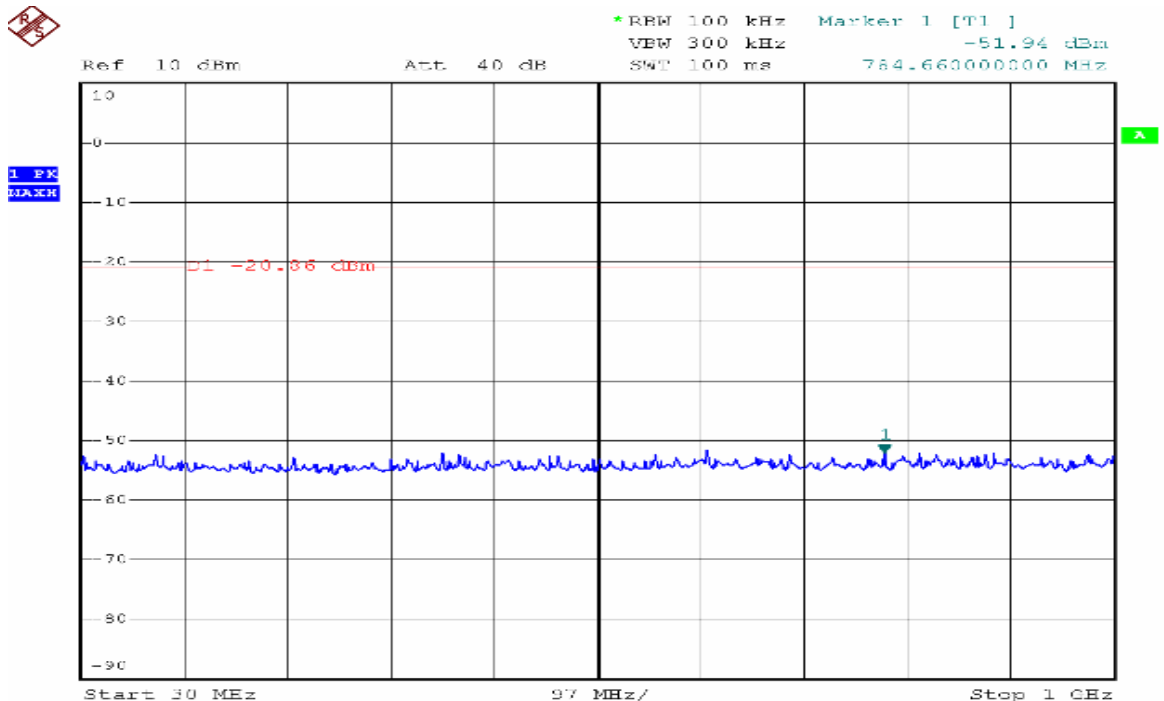
Test Requirement: FCC Part 15 C  
 Test Method: Based on FCC Part15 C Section 15.247:  
 Test Date: 10 July 2007.  
 Test requirements: (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 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, provided the transmitter demonstrates compliance with the peak conducted power limits.

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 = 100KHz, VBW >= RBW(100KHz) , Sweep = auto; Detector Function = Peak (Max. hold).

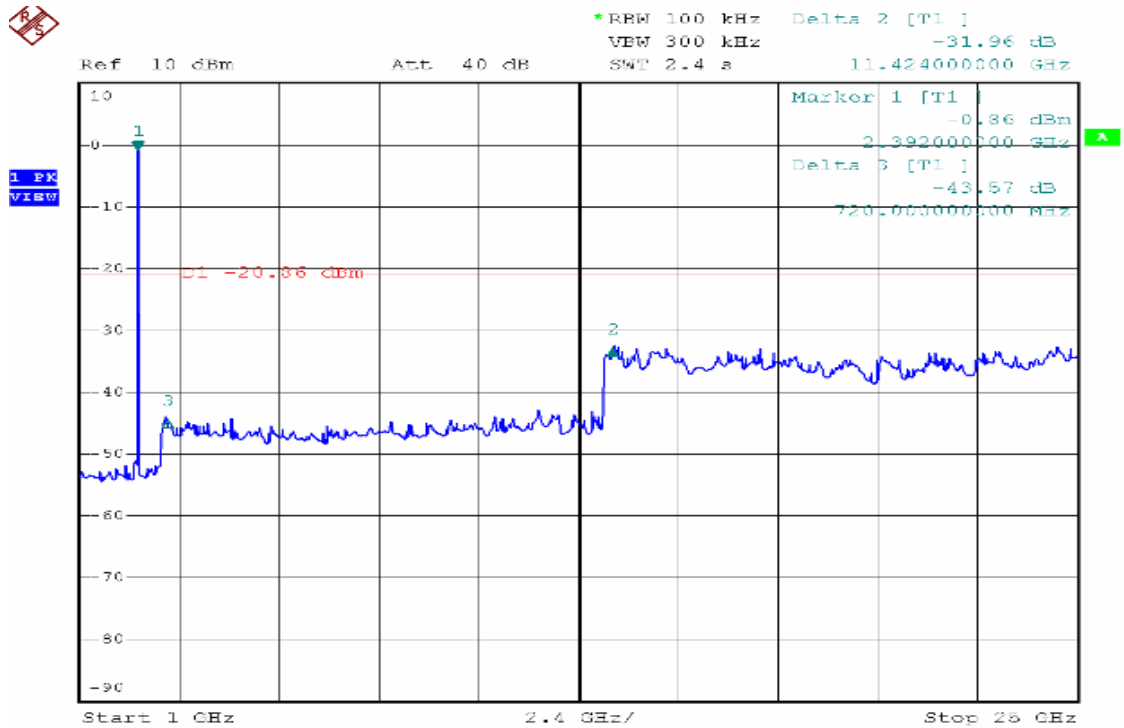
Test result: Pass

Lowest Channel : 30M to 1GHz

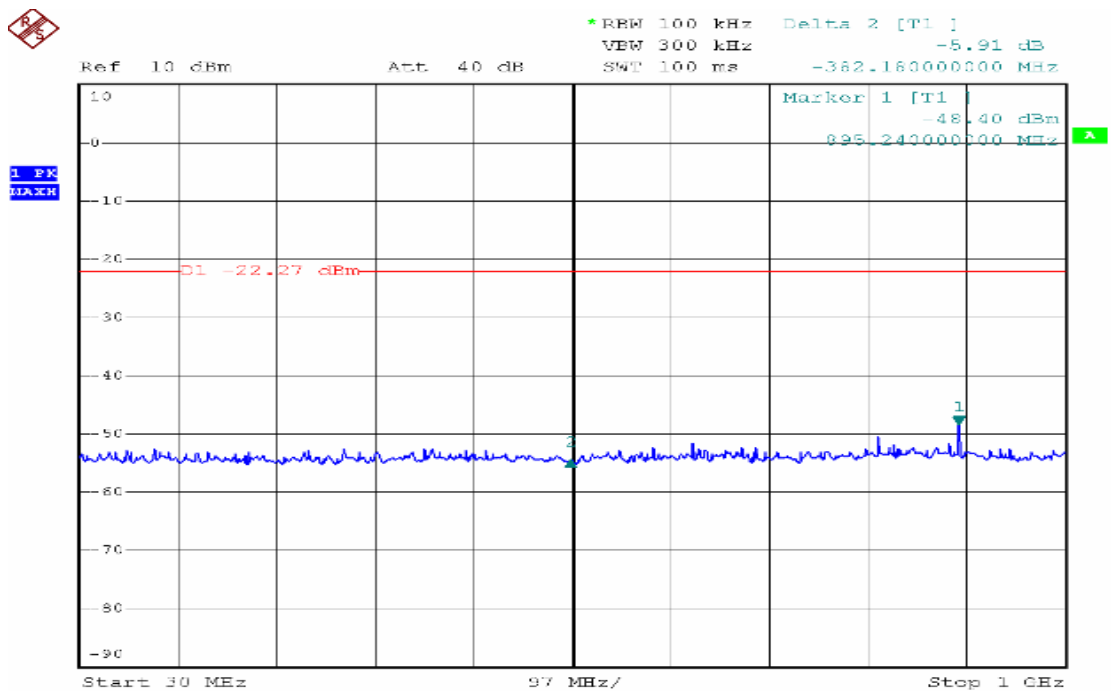




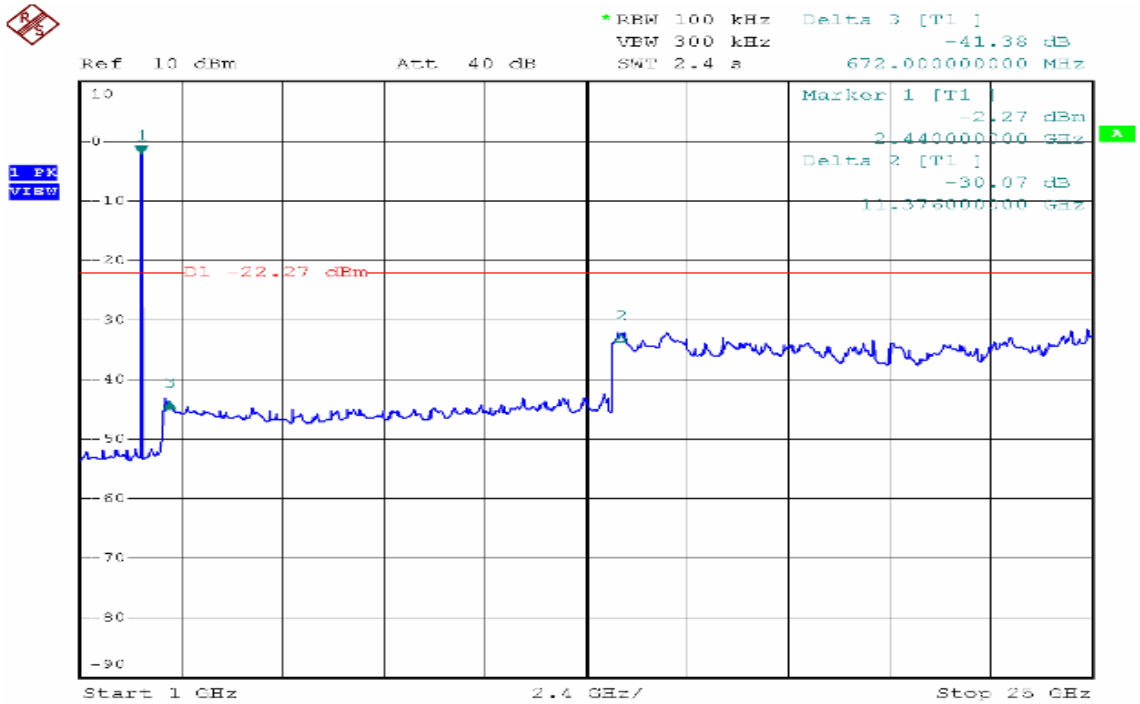
1G to 25GHz



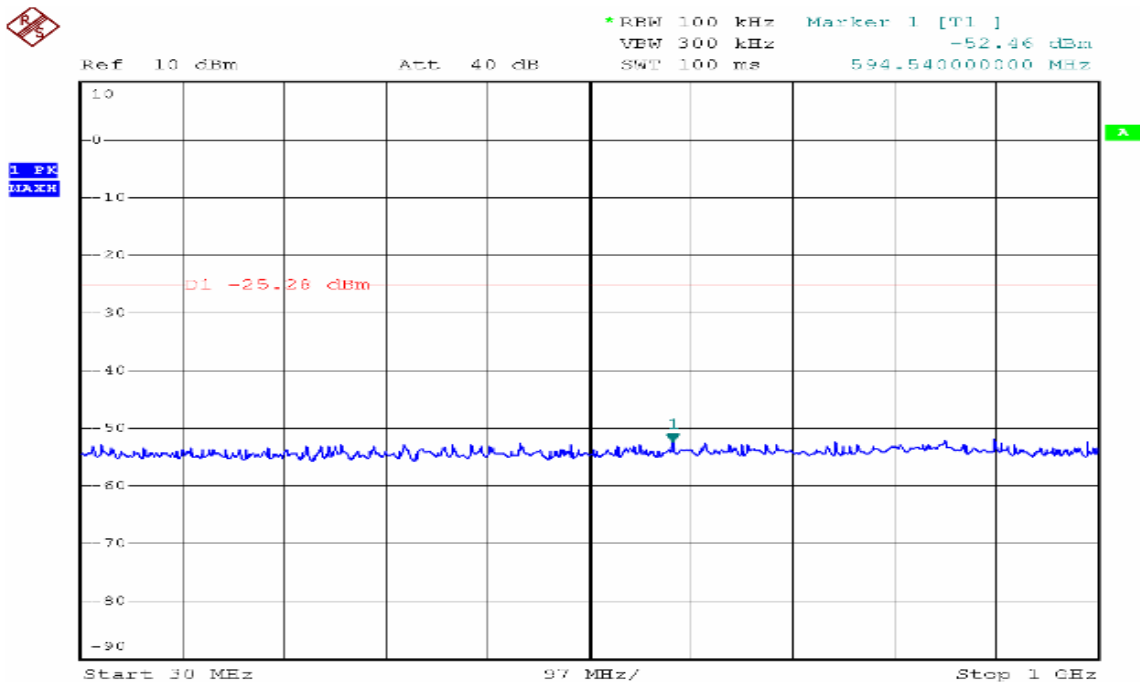
Medium Channel : 30M to 1GHz



1G to 25GHz

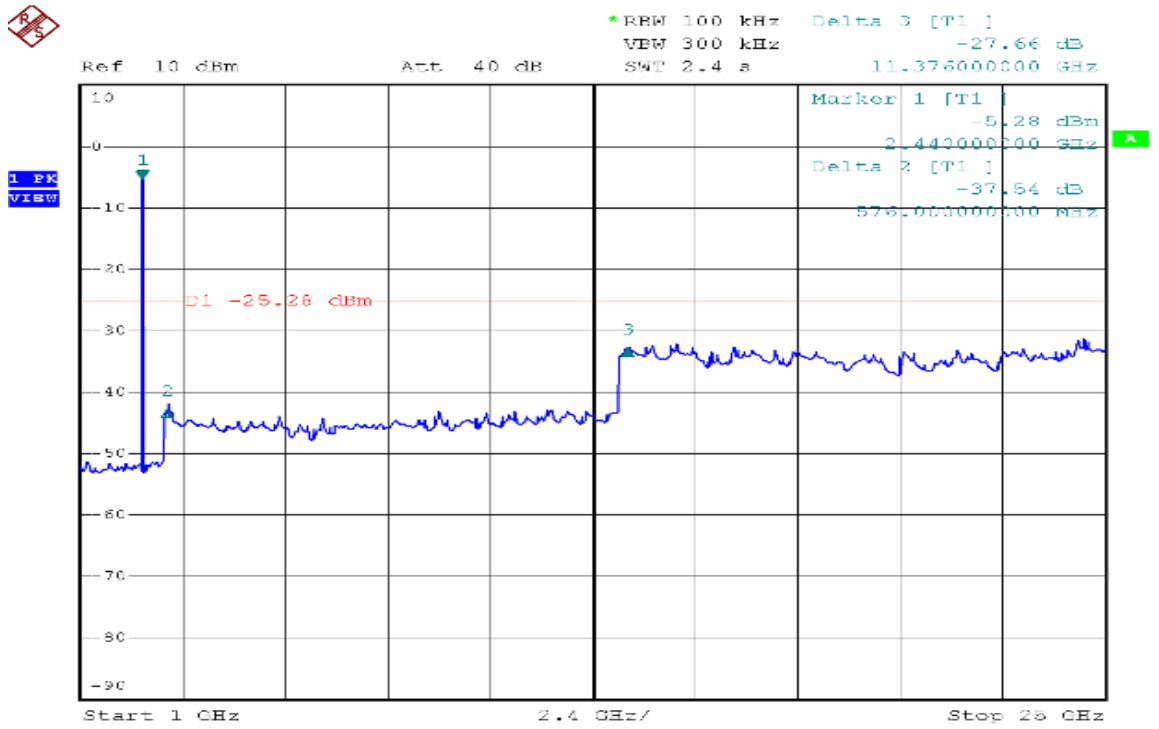


Highest Channel : 30M to 1GHz





1G to 25GHz





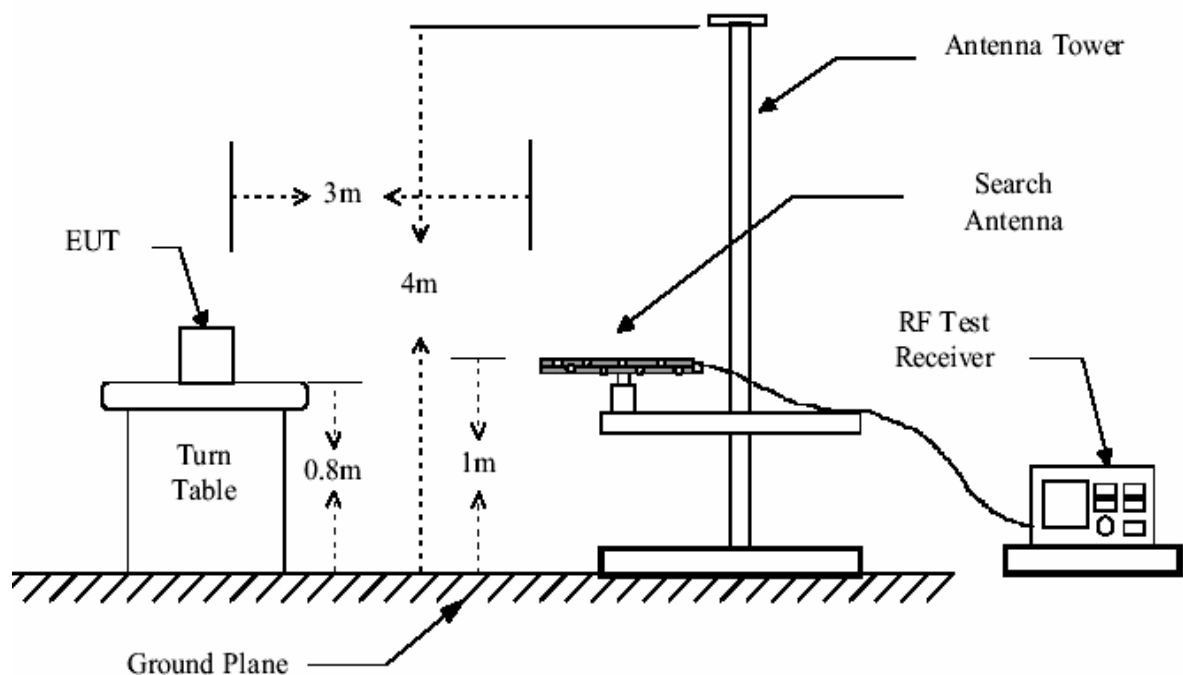
### 6.6 Radiated Spurious Emissions

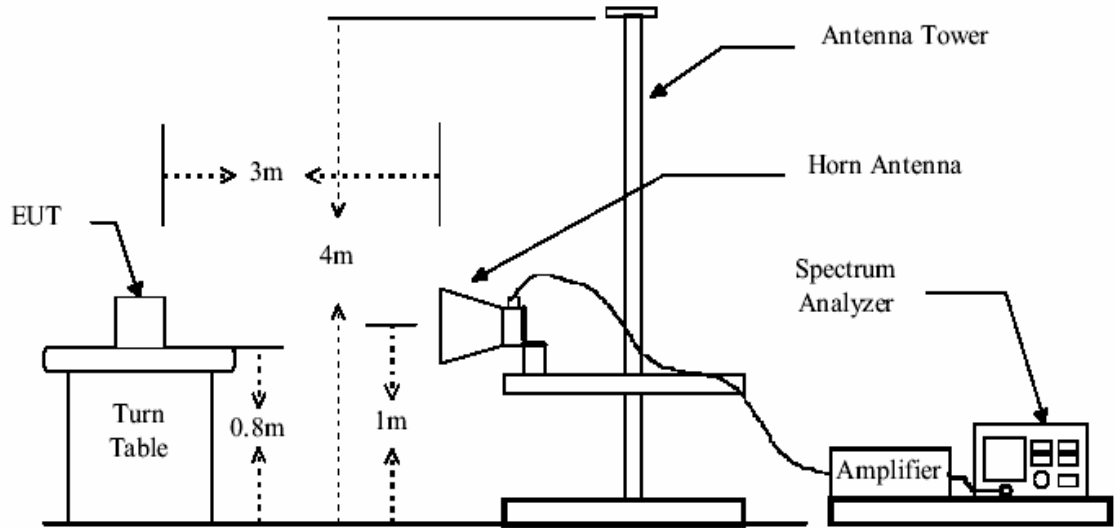
Test Requirement: FCC 15.247(d) & 15.209  
 Test Method: ANSI C63.4 section 8 & 13  
 Test Date: 10 July 2007  
 Test site: Measurement Distance: 3m (Semi-Anechoic Chamber and OATS)  
 Test instrumentation resolution bandwidth 120 kHz and Quasi-Peak detector applies (30 MHz - 1000 MHz), 1MHz resolution bandwidth and Peak and Average-Peak detector apply(1000 MHz – 25GHz).  
 Receive antenna scan height 1 m - 4 m, polarization Vertical / Horizontal

15.209 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

15.247(d) limit: (d) In any 100 kHz 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 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, provided the transmitter demonstrates compliance with the peak conducted power limits.

#### 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.

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

$$\text{Final Emission Level} = \text{Receiver Reading} + \text{Antenna Factor} + \text{Cable Factor} - \text{Pre-amplifier Factor.}$$

The following test results were performed on the EUT.

**Transmitter:**

**Test in Channel 1 in transmitting status-** Vertical polarization

30MHz~1GHz Spurious Emissions ,Quasi-Peak Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
196.400	11.90	1.00	24.63	52.65	40.91	43.5
294.600	17.46	1.25	24.40	43.15	37.46	46.0

1~25 GHz Harmonics & Spurious Emissions, Peak & Average Measurement

**Peak Measurement**

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
4804.000	33.20	6.62	33.00	42.0	48.8	74.0
7206.000	36.08	8.36	32.20	40.8	49.0	74.0

**Average Measurement**

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Reading Level (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
4804.000	33.20	6.62	33.00	28.0	34.9	54.0
7206.000	36.08	8.36	32.20	23.0	35.2	54.0

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBuV)	Average Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)
2402.000	28.55	4.80	34.77	83.8	81.9	82.4	82.5



Remark: No other radiation has been found.

**Test in Channel 1 in transmitting status-** Horizontal polarization

30MHz~1GHz Spurious Emissions ,Quasi-Peak Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
196.400	11.90	1.00	24.63	50.60	38.87	43.5
294.600	17.46	1.25	24.40	42.10	36.34	46.0

1~25 GHz Harmonics & Spurious Emissions, Peak & Average Measurement

**Peak Measurement**

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
4804.000	33.20	6.62	33.00	41.2	48.0	74.0
7206.000	36.08	8.36	32.20	40.8	49.0	74.0

**Average Measurement**

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
4804.000	33.20	6.62	33.00	29.0	35.9	54.0
7206.000	36.08	8.36	32.20	24.0	36.2	54.0

Frequency (MHz)	Antena factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBuV)	Average Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)
2402.000	28.55	4.80	34.77	82.5	80.9	81.1	81.5

**Test in Channel 39 in transmitting status-** Vertical polarization

30MHz~1GHz Spurious Emissions ,Quasi-Peak Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
194.900	11.19	1.00	24.65	46.72	34.26	43.5
392.780	16.75	1.5	24.96	36.22	29.51	46.0

1~25 GHz Harmonics & Spurious Emissions, Peak & Average Measurement



**Peak Measurement**

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
4882.000	33.27	6.67	32.97	41.5	48.4	74.0
7323.000	36.16	6.95	32.29	37.7	48.5	74.0

**Average Measurement**

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
4882.000	33.27	6.67	32.97	25.3	32.2	54.0
7323.000	36.16	6.95	32.29	26.8	34.6	54.0

Frequency (MHz)	Antena factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBuV)	Average Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)
2441.000	28.69	4.80	34.74	81.6	80.1	80.3	78.9

**Test in Channel 39 in transmitting status- Horizontal polarization**

30MHz~1GHz Spurious Emissions ,Quasi-Peak Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
194.900	11.19	1.00	24.65	44.02	32.56	43.5
392.780	16.75	1.5	24.96	35.50	28.82	46.0

1~25 GHz Harmonics & Spurious Emissions, Peak & Average Measurement

**Peak Measurement**

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
4882.000	33.30	6.70	32.95	38.1	45.1	74.0
7323.000	36.16	6.95	32.29	39.2	46.0	74.0



**Average Measurement**

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading Level (dBuV/m)	Emission Level (dBuV/m)	Limit (dBuV/m)
4882.000	33.27	6.67	32.97	25.6	32.5	54.0
7323.000	36.16	6.95	32.29	27.8	35.6	54.0

Frequency (MHz)	Antena factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBuV)	Average Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)
2441.000	28.69	4.80	34.74	83.8	82.0	82.5	80.7

Remark: No other radiation has been found.

**Test in Channel 79 in transmitting status-** Vertical polarization

30MHz~1GHz Spurious Emissions ,Quasi-Peak Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
194.900	11.19	1.00	24.65	49.70	37.20	43.5
392.780	16.75	1.50	24.96	37.50	30.80	46.0

1~25 GHz Harmonics & Spurious Emissions, Peak & Average Measurement

**Peak Measurement**

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
4960.000	33.34	6.75	32.93	40.8	48.0	74.0
7440.000	36.23	6.05	32.37	38.6	48.5	74.0

**Average Measurement**

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
4960.000	33.34	6.75	32.93	27.8	35.0	54.0
7440.000	36.23	6.05	32.37	25.6	35.5	54.0

Frequency (MHz)	Antena factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBuV)	Average Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)
2480.000	28.74	4.80	34.73	82.3	80.4	80.9	79.0



**Test in Channel 79 in transmitting status-** Horizontal polarization

30MHz~1GHz Spurious Emissions ,Quasi-Peak Measurement

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
194.900	11.19	1.00	24.65	51.69	39.23	43.5
392.780	16.75	1.50	24.96	37.56	30.85	46.0

1~25 GHz Harmonics & Spurious Emissions, Peak & Average Measurement

**Peak Measurement**

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
4960.000	33.34	6.75	32.93	39.8	47.0	74.0
7440.000	36.23	6.05	32.37	38.1	48.0	74.0

**Average Measurement**

Frequency (MHz)	Antenna factors(dB/m)	Cable loss(dB)	Preamp factor(dB)	Emission Reading (dBuV)	Emission Level (dBuV/m)	Limit (dBuV/m)
4960.000	33.34	6.75	32.93	27.8	35.0	54.0
7440.000	36.23	6.05	32.37	26.1	36.0	54.0

Frequency (MHz)	Antena factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBuV)	Average Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)
2480.000	28.74	4.80	34.73	81.4	79.8	80.2	78.2

Remark: No other radiation has been found.



**Receiver:** 30MHz~25 GHz Harmonics & Spurious Emissions

Vertical polarization:

Frequency (MHz)	Antena factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBuV)	Average Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)
1600.000	25.91	3.30	35.33	52.1	39.5	46.0	31.5
4915.000	33.31	6.71	32.95	40.9	40.9	48.0	32.0

Horizontal polarization:

Frequency (MHz)	Antena factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBuV)	Average Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)
1600.000	25.91	3.30	35.33	52.6	38.1	46.5	32.0
4915.000	33.31	6.71	32.95	41.9	26.0	49.0	33.1

**None of radiation has been found in receiving mode.**

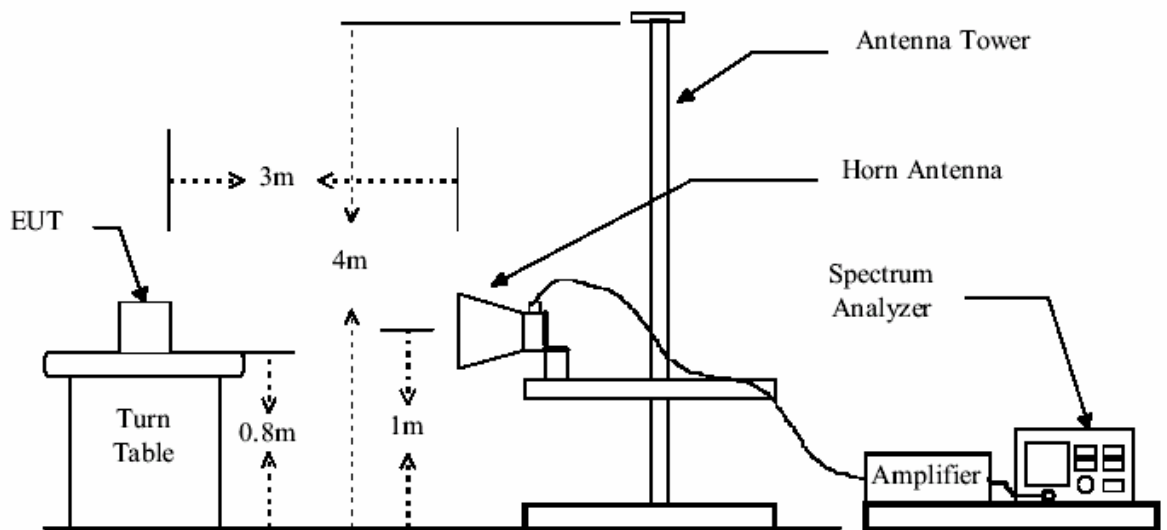
**TEST RESULTS: The unit does meet the FCC requirements.**



### 6.6.1 Radiated Emissions which fall in the restricted bands

Test Requirement:	Section 15.247 (d) 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:	10 July 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.

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

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

**Test Result:**

**1. Channel 1**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBuV)	Average Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)
2390.000	28.55	4.80	34.77	46.4	35.4	45.0	34.0
2483.500	28.78	4.80	34.72	46.1	35.1	45.0	34.0

**2. Channel 39**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBuV)	Average Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)
2390.000	28.55	4.80	34.77	47.4	34.1	46.0	33.0
2483.500	28.78	4.80	34.72	46.1	33.6	45.0	32.5

**3. Channel 79**

Frequency (MHz)	Antenna factors (dB/m)	Cable loss(dB)	Preamp factor(dB)	Peak Reading Level (dBuV)	Average Reading Level (dBuV)	Peak Emission Level (dBuV/m)	Average Emission Level (dBuV/m)
2390.000	28.55	4.80	34.77	47.4	35.1	46.0	34.0
2483.500	28.78	4.80	34.72	46.6	36.1	45.5	35.0

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 Band Edges Requirement

Test Requirement:	FCC Part 15 C
Test Method:	Based on ANSI 63.4 Operation within the band 2400 – 2483.5 MHz
Test Date:	10 July 2007
Requirements:	Section 15.247 (d) In any 100 kHz 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 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, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. 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)).

### 6.7.1 100 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.
------------------------	---

#### Test Result:

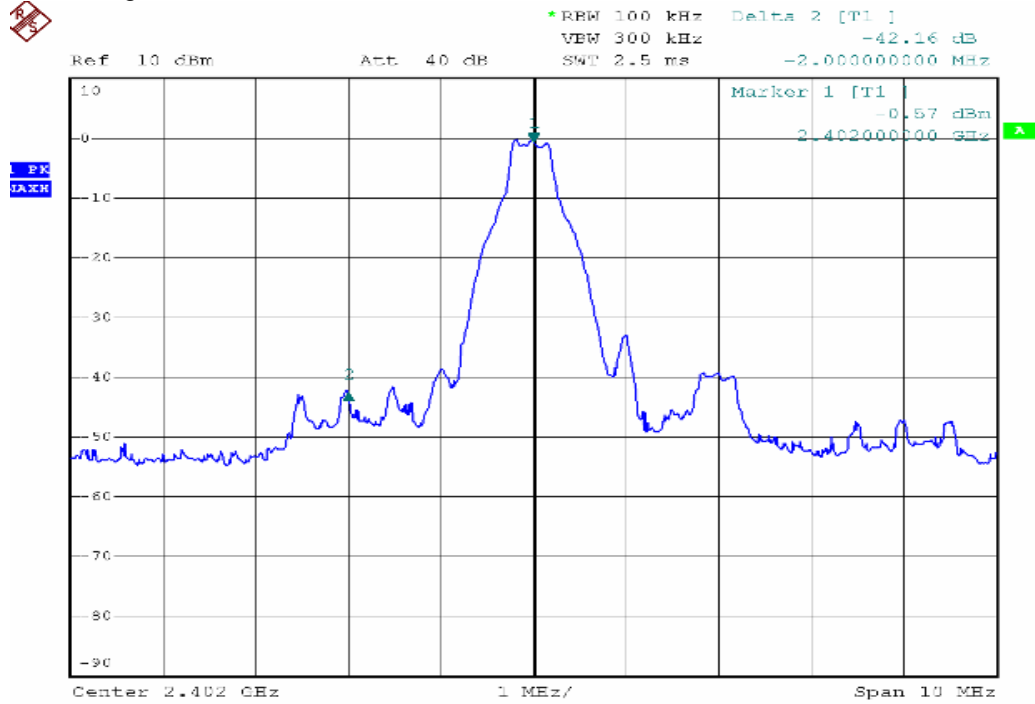
The Lower Edge 2.4000GHz: the value is -42.16dB that is attenuated more than 20dB.

The Upper Edge 2.4835GHz: the value is -47.46dB that is attenuated more than 20dB.

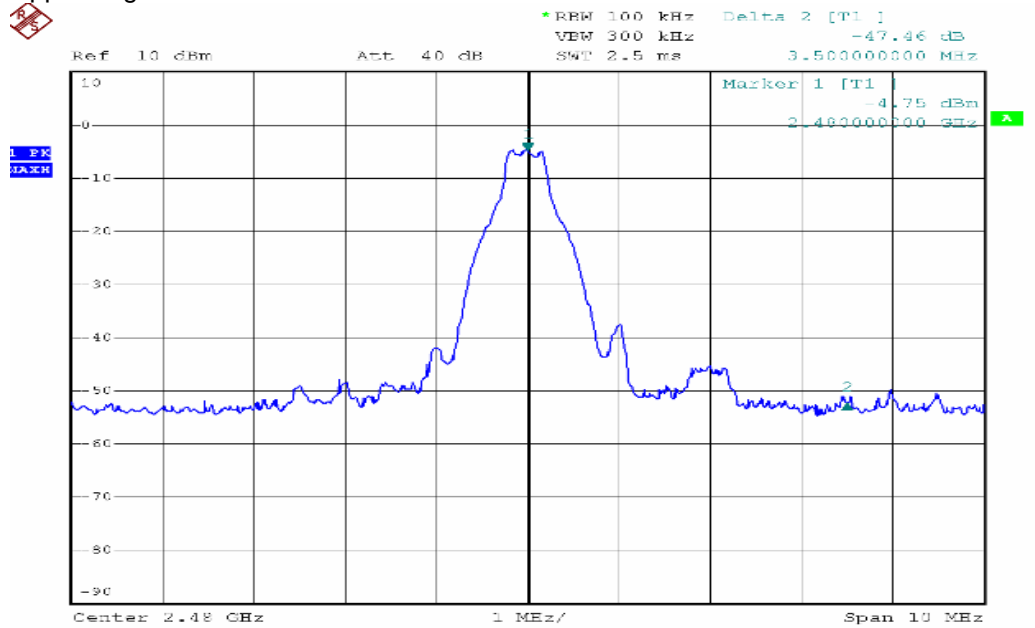
**The unit does meet the FCC requirements.**

Refer plots:

Lower Edge:



Upper Edge:





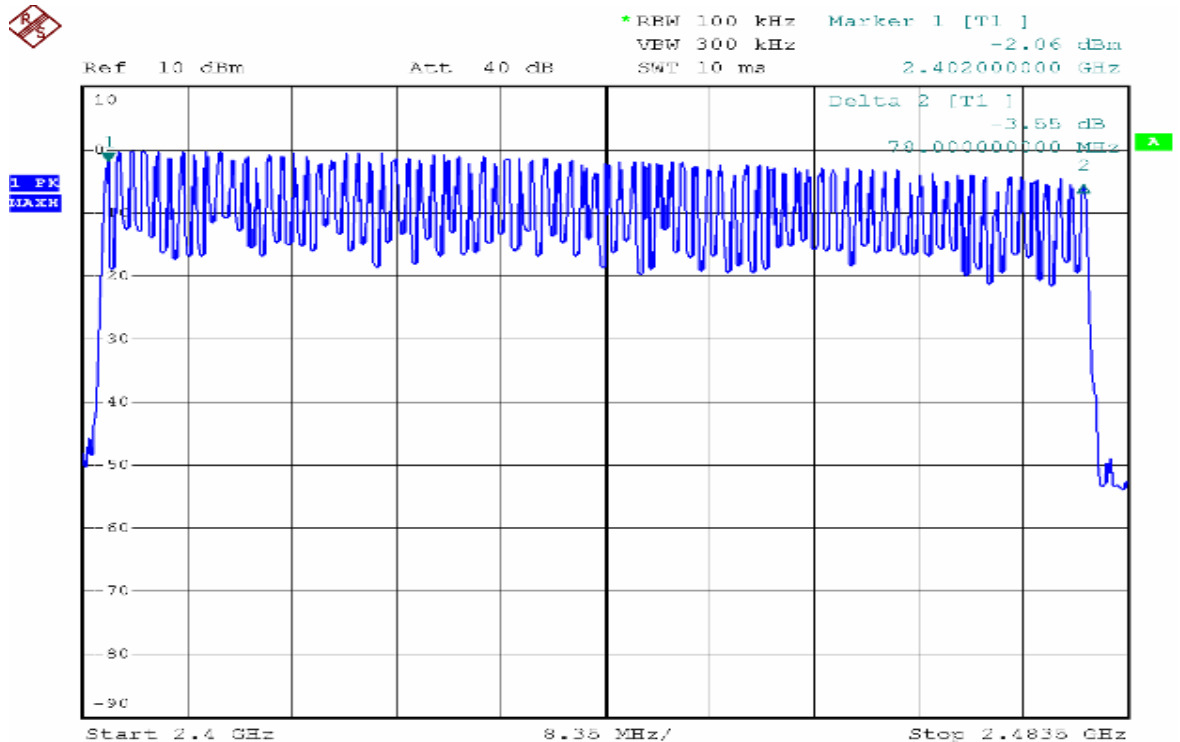
### 6.8 Hopping Channel Number

Test Requirement: FCC Part15 C  
Test Method: Based on FCC Part15 C Section 15.247  
Test Date: 10 July 2007  
Requirements: Regulation 15.247 (a) (1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels.

- 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 = 100KHz, VBW = 100KHz, Sweep = auto; Detector Function = Peak.
  3. Set the spectrum analyzer: start frequency = 2400MHz, stop frequency = 2483.5MHz. Record the max. hold reading graph.

**Test result:** Total channels are 79 channels.

It also comply with the demand of frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 15 non-overlapping hopping channels. The Maximum peak conducted output power limit apply 0.125 watt according to regulation 15.247 (b)(1).



### 6.9 Occupied Bandwidth

Test Requirement: FCC Part 15 C

Test Method: Based on FCC Part15 C Section 15.247:

Test Date: 12 July 2007

Test Procedure:

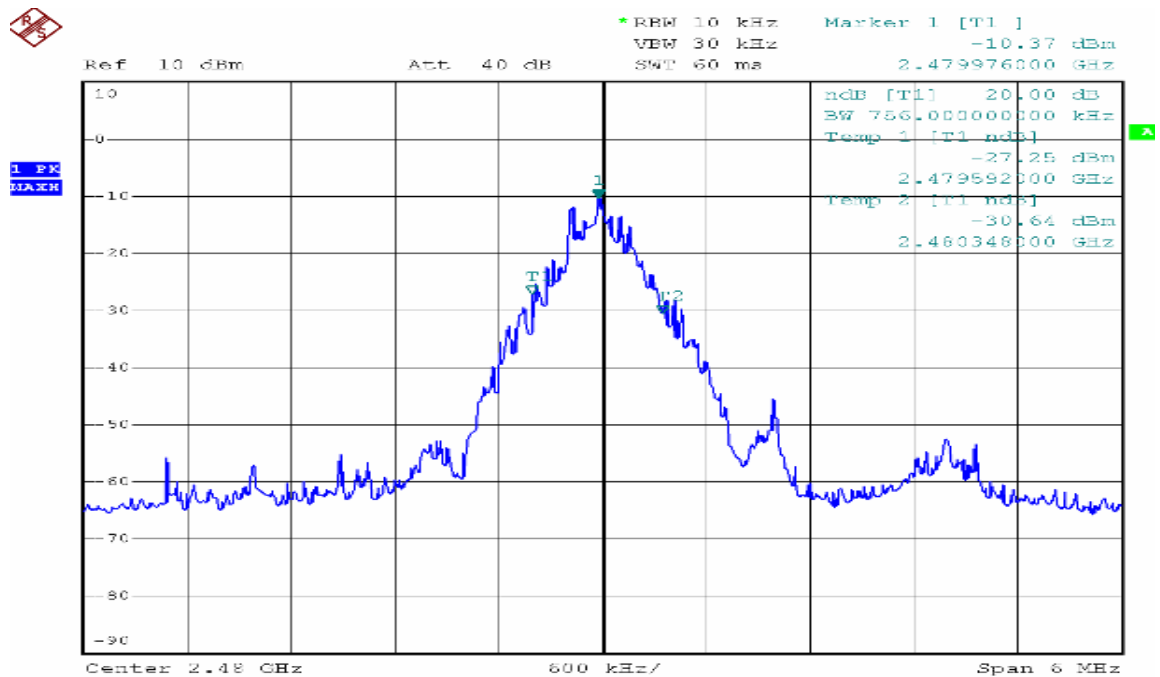
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW  $\geq$  1% of the 20dB bandwidth (set 10KHz), VBW  $\geq$  RBW , Sweep = auto; Detector Function = Peak (Max. hold).
3. Mark the peak frequency and -20dB points.

**Test result:**

Test Channel	20 dB bandwidth
1	756kHz
39	780kHz
79	800kHz

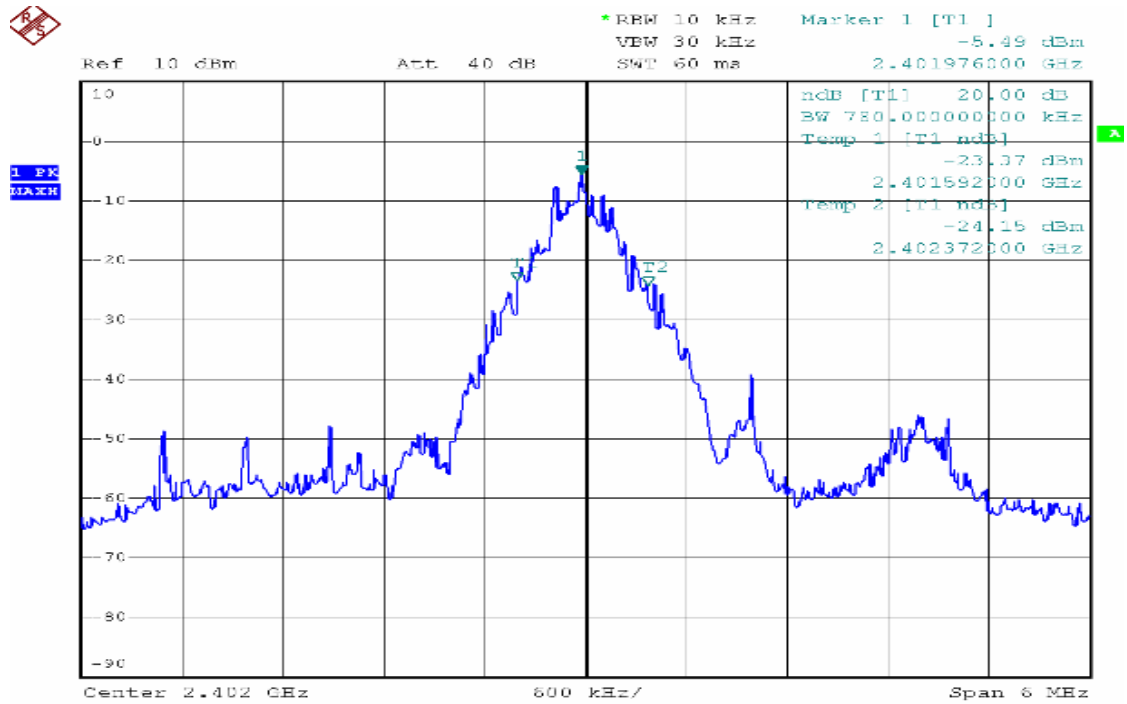
Refer plots:

Low Channel:

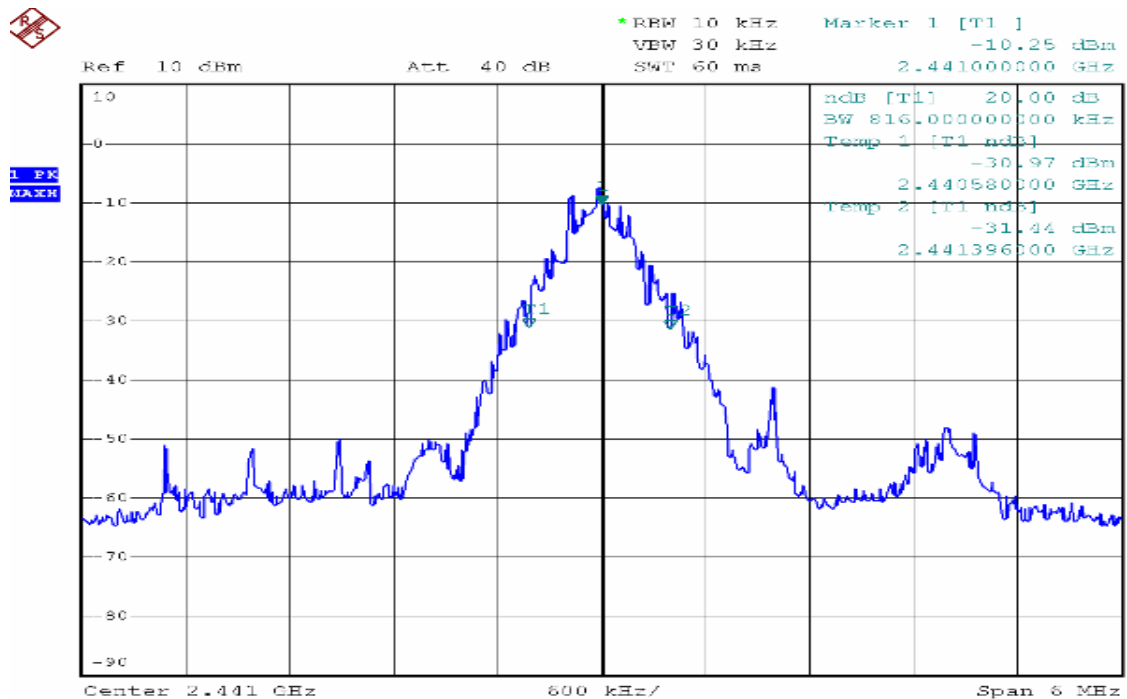




Middle Channel:



High Channel:







### 6.10 Carrier Frequencies Separated

Test Requirement: FCC Part 15 C  
 Test Method: Based on FCC Part15 C Section 15.247:  
 Test Date: 10 July 2007  
 Test requirements: Regulation 15.247(a)(1) Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.

Test Procedure:

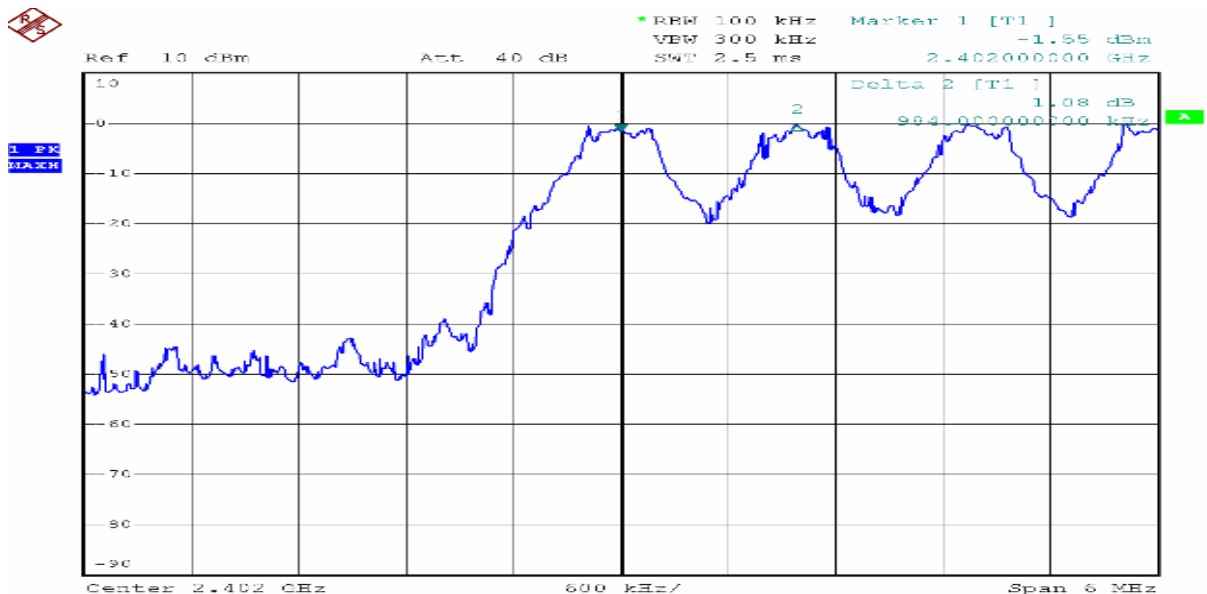
1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum.
2. Set the spectrum analyzer: RBW >= 1% of the span (set 100KHz), VBW >= RBW (set 300KHz), Span = 10MHz, Sweep = auto; Detector Function = Peak (Max. hold).
3. Mark the peak frequency and -20dB.

Test result:

Test Channel	Carrier Frequencies Separated	Limit	Verdict
Lower Channels (channel 1 and channel 2)	1.020MHz	>20dBm Occupied bandwidth	Pass
Middle Channels (channel 38 and channel 39)	0.976MHz		Pass
Upper Channels (channel 78 and channel 79)	1.020MHz		Pass

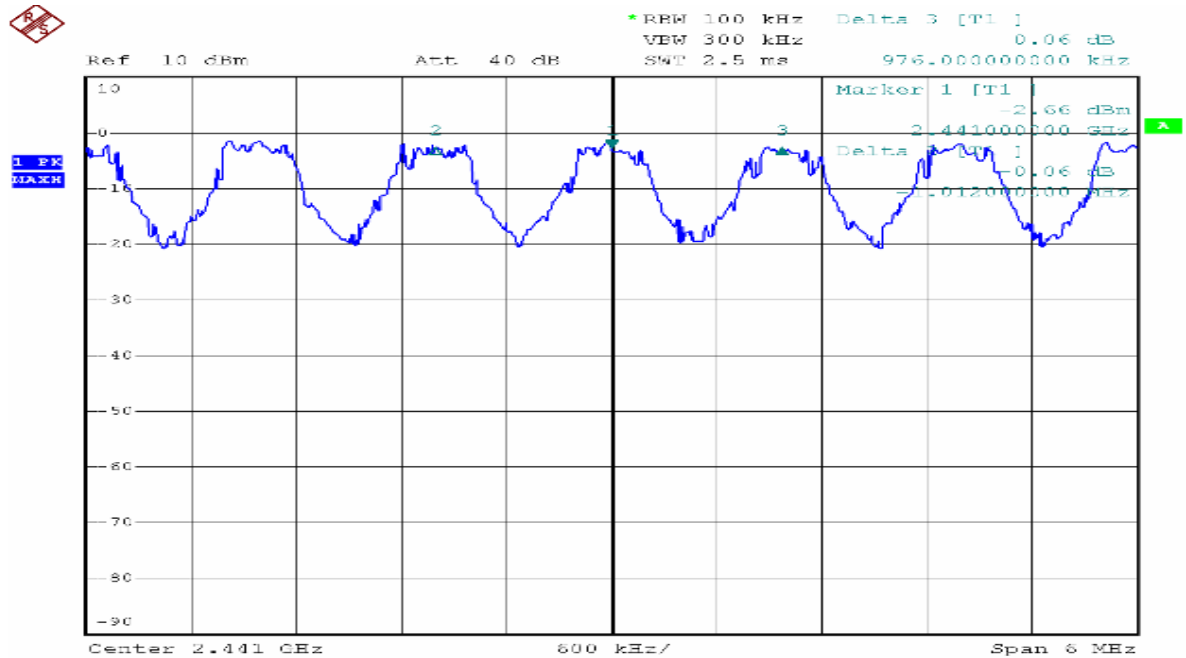
Refer plots:

Low Channel:

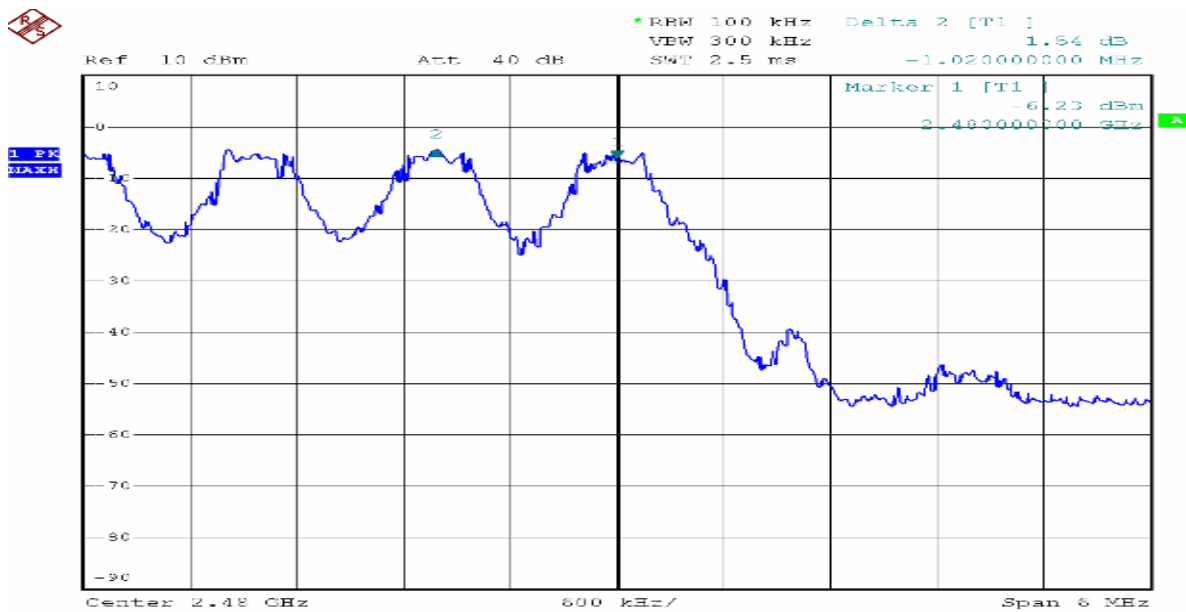




Middle Channel:



High Channel:





### 6.11 Dwell Time

Test Requirement: FCC Part 15 C  
Test Method: Based on FCC Part15 C Section 15.247:  
Test Date: 10 July 2007  
Test requirements: Regulation 15.247(a)(1)(iii) Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

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 RBW of spectrum analyzer to 1MHz and VBW of spectrum analyzer to 1MHz, Set the test channel frequency span to 0.

Test Result:

The test period:  $T = 0.4 \text{ Second/Channel} \times 79 \text{ Channel} = 31.6 \text{ s}$

1. **Channel 1:**

DH1 time slot =  $0.384 \text{ (ms)} \times (1600/(2 \times 79)) \times 31.6 = 124.400 \text{ ms}$   
DH3 time slot =  $1.640 \text{ (ms)} \times (1600/(4 \times 79)) \times 31.6 = 267.520 \text{ ms}$   
DH5 time slot =  $2.880 \text{ (ms)} \times (1600/(6 \times 79)) \times 31.6 = 312.600 \text{ ms}$

2. **Channel 39:**

DH1 time slot =  $0.396 \text{ (ms)} \times (1600/(2 \times 79)) \times 31.6 = 128.800 \text{ ms}$   
DH3 time slot =  $1.640 \text{ (ms)} \times (1600/(4 \times 79)) \times 31.6 = 267.520 \text{ ms}$   
DH5 time slot =  $2.910 \text{ (ms)} \times (1600/(6 \times 79)) \times 31.6 = 312.840 \text{ ms}$

3. **Channel 79:**

DH1 time slot =  $0.392 \text{ (ms)} \times (1600/(2 \times 79)) \times 31.6 = 128.250 \text{ ms}$   
DH3 time slot =  $1.640 \text{ (ms)} \times (1600/(4 \times 79)) \times 31.6 = 267.520 \text{ ms}$   
DH5 time slot =  $2.910 \text{ (ms)} \times (1600/(6 \times 79)) \times 31.6 = 312.840 \text{ ms}$

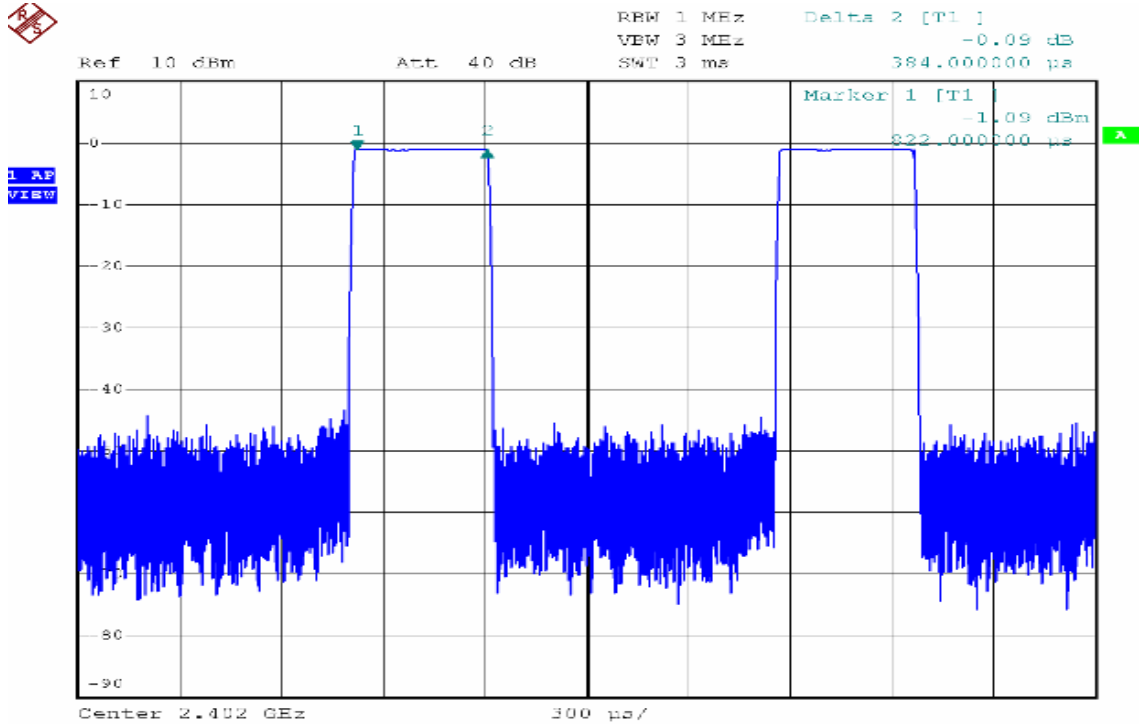
The results are not be greater than 0.4 seconds.

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

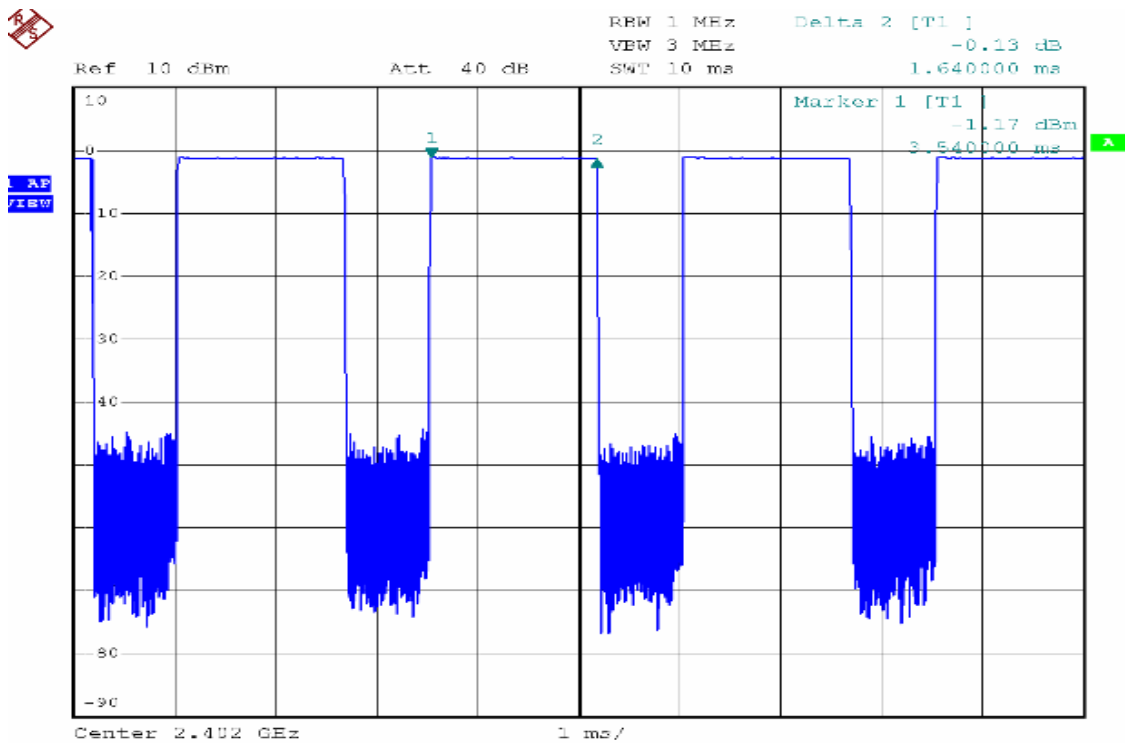


Refer plots: Low Channel:

DH1

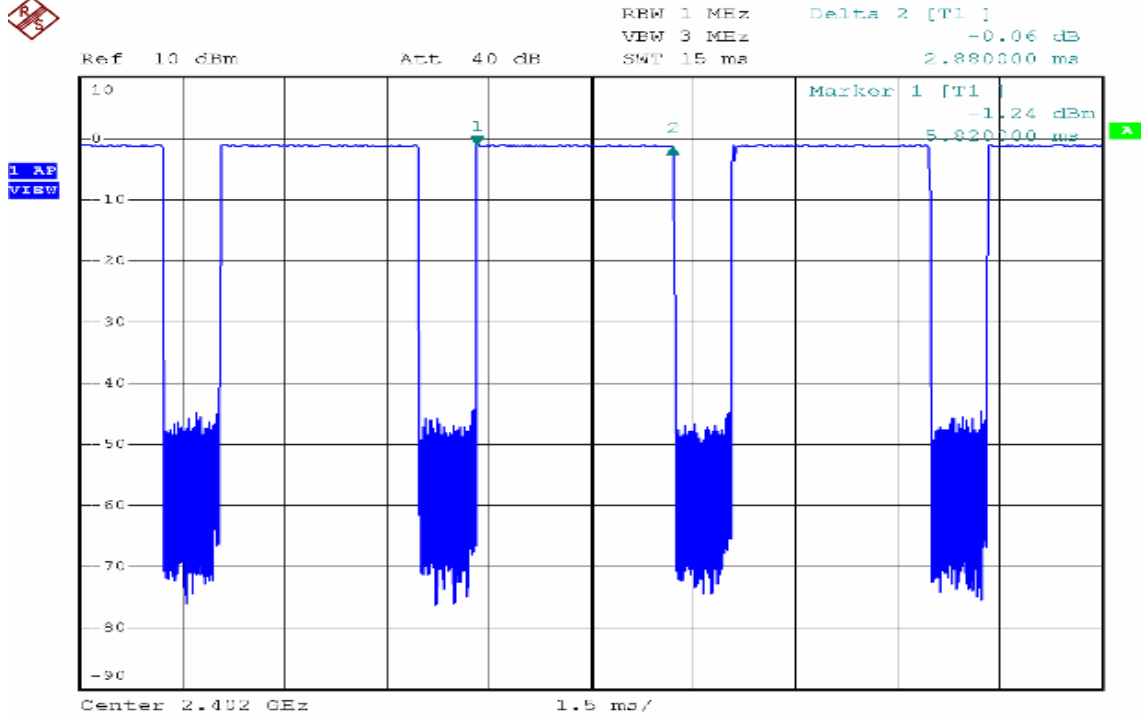


DH3



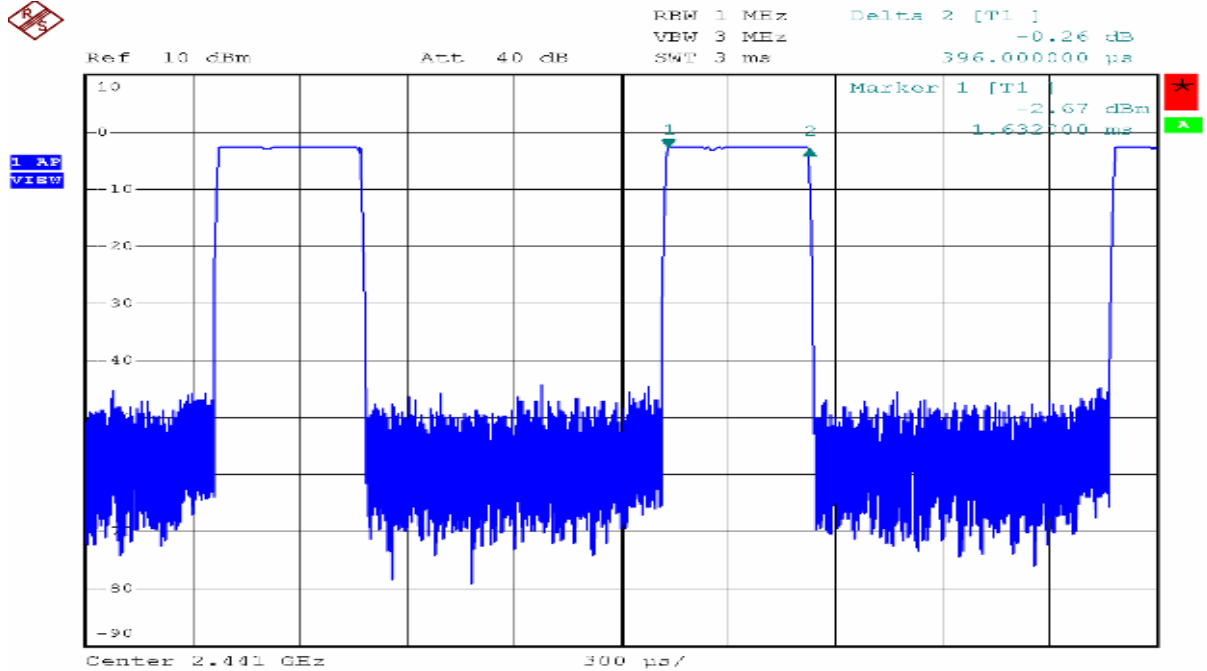


DH5



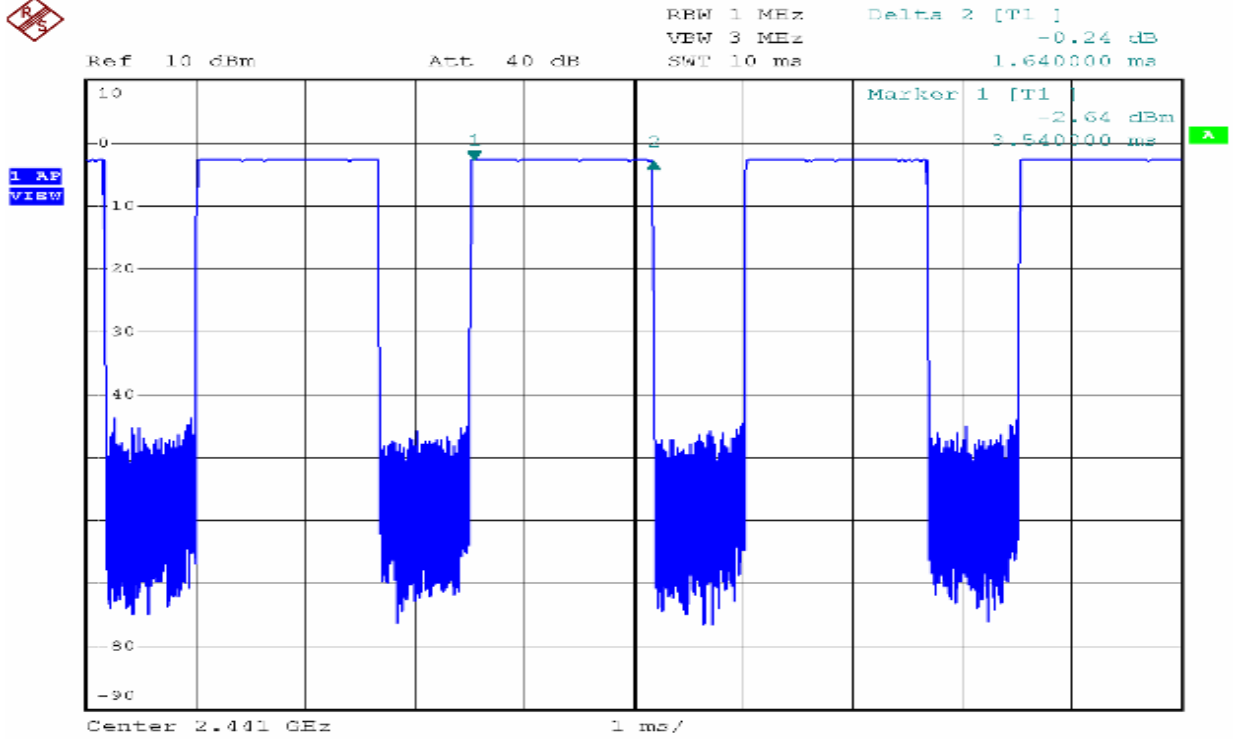
Middle Channel:

DH1

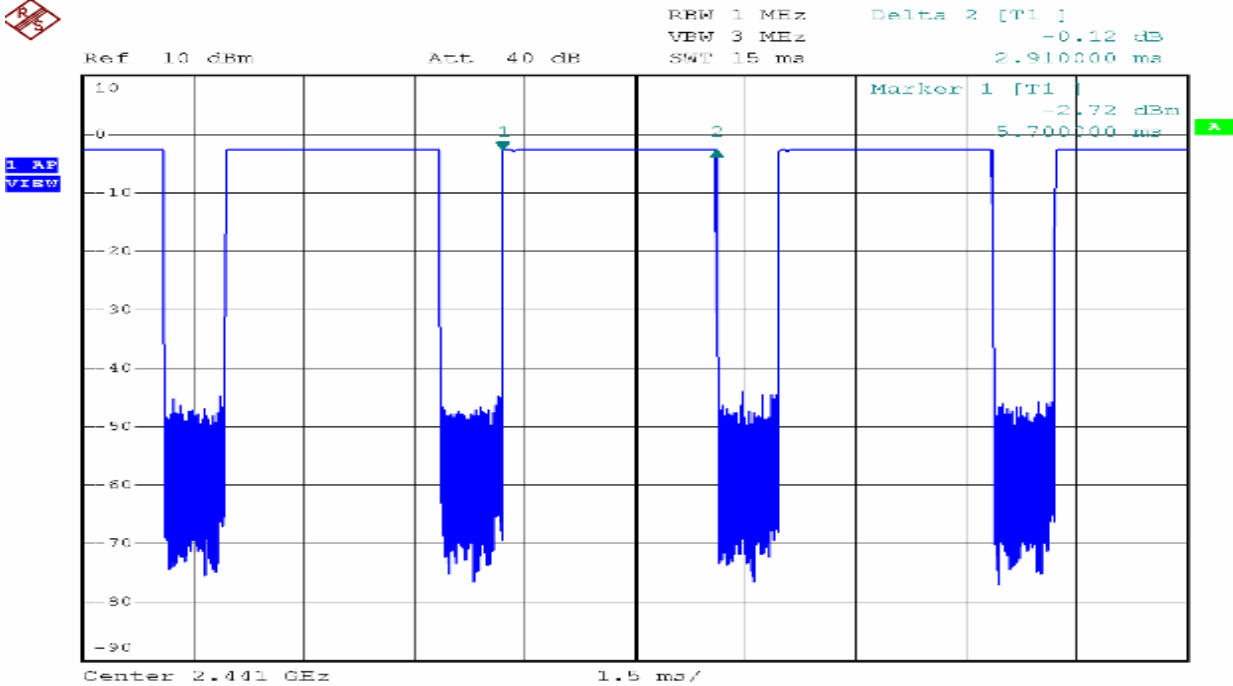




DH3



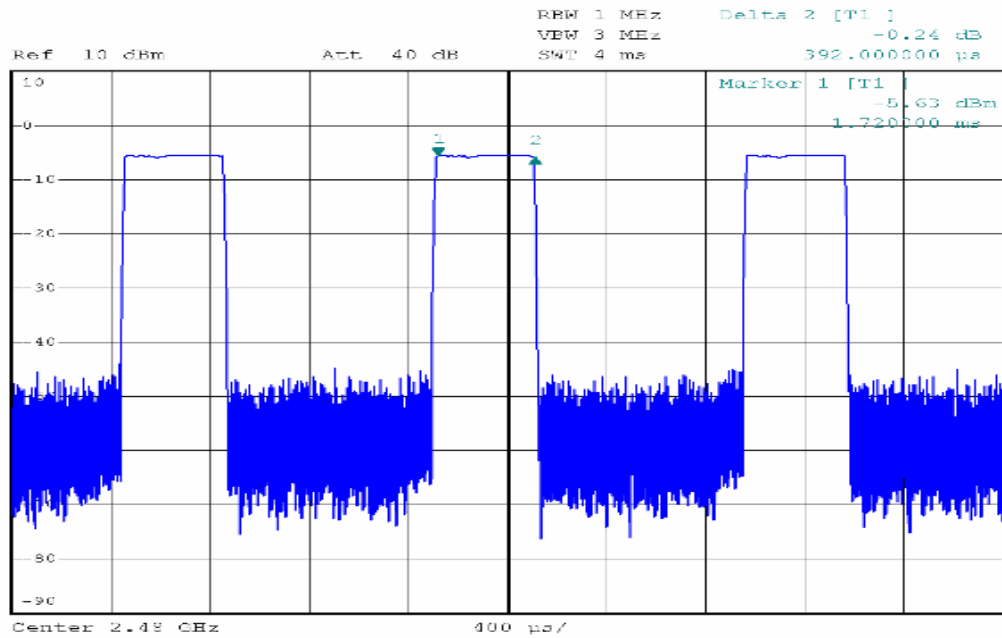
DH5



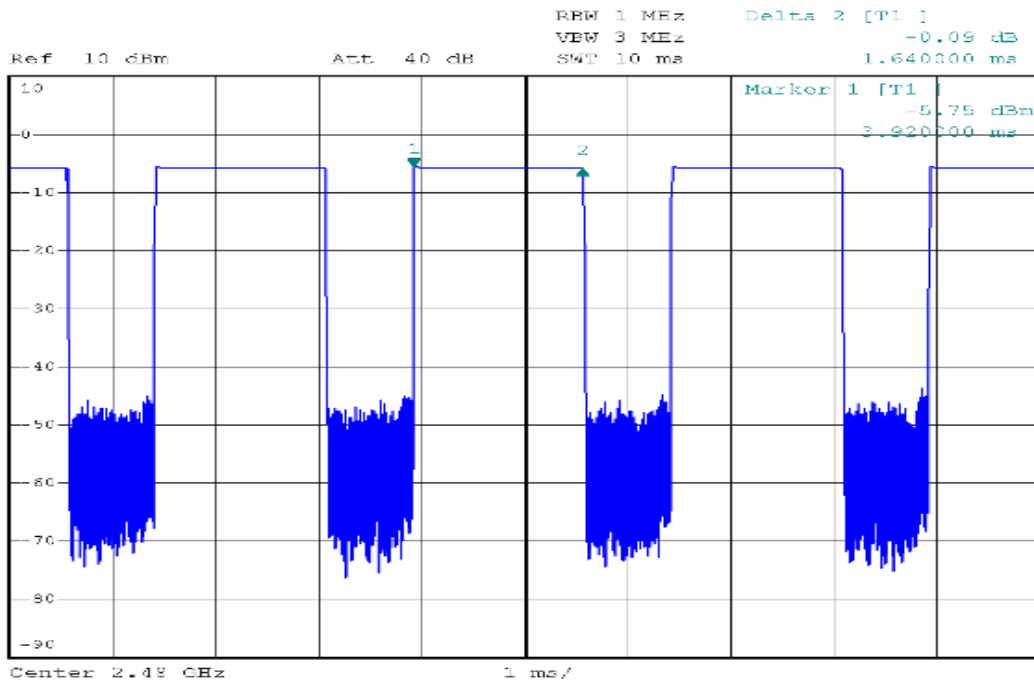


High Channel:

DH1

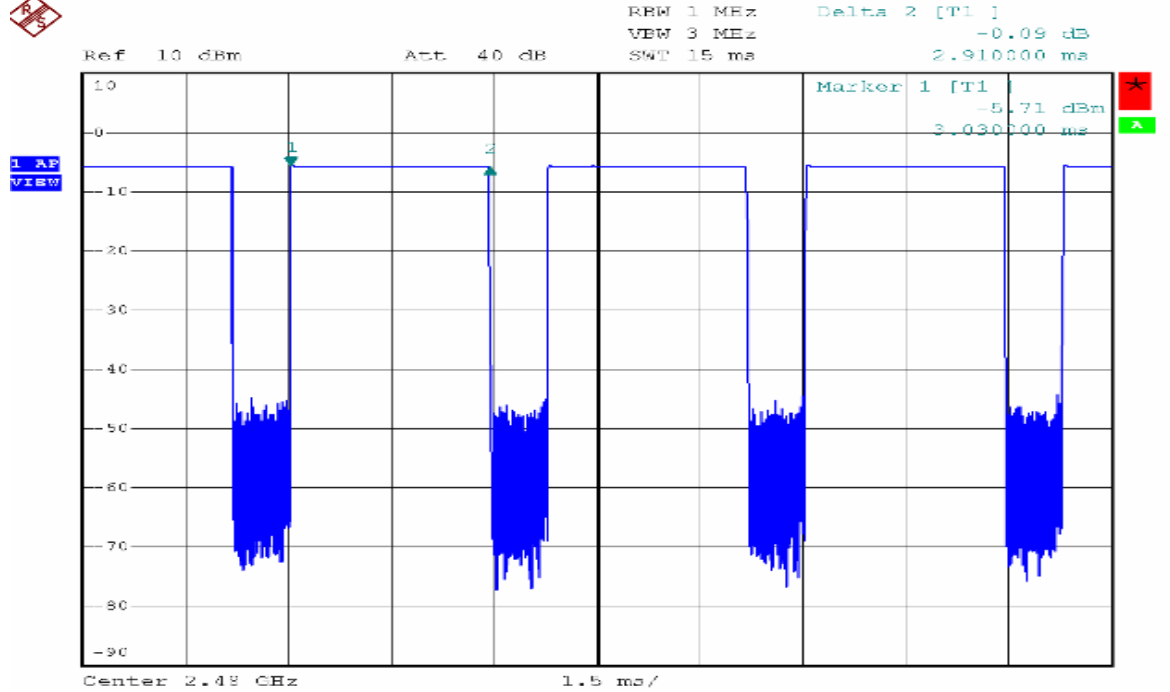


DH3





DH5







## **6.12 Antenna Requirement**

### **6.12.1 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.

Regulation 15.247(c) (1)(i) 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 3 dB that the directional gain of the antenna exceeds 6 dBi.

### **6.12.2 Antenna Construction**

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