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Registration number: 556682

Report No.: SZEMO09070362601
Page: 1 of 14

TEST REPORT

Application No.: SZEMO090703626RF
Applicant: SPI, Inc.
Address of Applicant: 3506 Cedar Springs Rd. Dallas, Texas 75219 United States
FCC ID: UFX3726AND2050
Fundamental Frequency : 88.94MHz
Equipment Under Test (EUT):
Name: Wireless Transmitter
Model No.: 3726, 2050♣
♣ Please refer to section 2 of this report which indicates which item was actually tested and which were electrically identical.
Standards: FCC PART 15, SUBPART C : 2008 (Section 15.239)
Date of Receipt: 02 July 2009
Date of Test: 02 to 16 July 2009
Date of Issue: 17 July 2009

Test Result :	PASS *
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* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory 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

Test	Test Requirement	Standard Paragraph	Result
Conducted Emissions	FCC PART 15:2008	Section 15.107	PASS
Radiated Emission (30MHz to 1GHz)	FCC PART 15 : 2008	Section 15.239/15.33	PASS
Occupied Bandwidth	FCC PART 15 : 2008	Section 15.239(a)	PASS

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

Remark:

Item No: 3726, 2050

Only the Item 3726 was tested. As the client declared, for above two models, their electrical circuit design, layout components used and internal wiring were identical, only the color & outlook were different.



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4 General Information

4.1 Details of E.U.T

Name: Wireless Transmitter
Model No.: 3726, 2050
Power Supply: DC4.5V(3*1.5V"AAA"Size Batteries)
Power Cord: N/A

4.2 Description of Support Units

The EUT was tested as an independent unit: a FM transmitter

4.3 Standards Applicable for Testing

The customer requested FCC tests for a FM transmitter

The standard used was FCC PART 15, SUBPART C: 2008 section 15.239.

4.4 Test Location

All tests were performed at:

No. 1 Workshop, M-10, Middle Section, Science & Technology Park, District Shenzhen, China
518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

4.5 Other Information Requested by the Customer

None.



4.6 Test Facility

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

- **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **VCCI**

The 3m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-2197 and C-2383 respectively.

Date of Registration: September 29, 2008. Valid until September 28, 2011.

- **FCC – Registration No.: 556682**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen 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 556682, June 27, 2008.

- **Industry Canada (IC)**

The 3m 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.: 4620C-1.



5 Test Results

5.1 Test Instruments

RE in Chamber						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi-Anechoic Chamber	ETS-LINDGREN	N/A	SEL0017	16-06-2009	15-06-2010
2	EMI Test Receiver	Rohde & Schwarz	ESIB26	SEL0023	12-12-2008	11-12-2009
3	EMI Test software	AUDIX	E3	SEL0050	N/A	N/A
4	Coaxial cable	SGS	N/A	SEL0028	18-06-2009	17-06-2010
5	BiConiLog Antenna (26-3000MHz)	ETS-LINDGREN	3142C	SEL0014	12-08-2008	11-08-2009
6	Pre-amplifier (0.1-1300MHz)	Agilent Technologies	8447D	SEL0053	18-06-2009	17-06-2010
7	Double-ridged horn (1-18GHz)	ETS-LINDGREN	3117	SEL0005	12-08-2008	11-08-2009
8	Horn Antenna (18-26GHz)	ETS-LINDGREN	3160	SEL0076	12-08-2008	11-08-2009
9	Pre-amplifier (1-18GHz)	Rohde & Schwarz	AFS42-00101 800-25-S-42	SEL0081	18-06-2009	17-06-2010
10	Pre-amplifier (18-26GHz)	Rohde & Schwarz	AFS33-18002 650-30-8P-44	SEL0080	18-06-2009	17-06-2010
11	Band filter	Amindeon	82346	SEL0094	18-06-2009	17-06-2010
12	Active Loop Antenna	Beijing Daze	ZN30900A	SEL0097	15-06-2009	14-06-2010

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	Shielding Room	ZhongYu Electron	GB-88	SEL0042	N/A	N/A
2	LISN	ETS-LINDGREN	3816/2	SEL0021	18-06-2009	17-06-2010
3	8 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T8-02	EMC0120	21-02-2009	21-02-2010
4	4 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T4-02	EMC0121	21-02-2009	21-02-2010
5	2 Line ISN	Fischer Custom Communications Inc.	FCC-TLISN-T2-02	EMC0122	21-02-2009	21-02-2010
6	EMI Test Receiver	Rohde & Schwarz	ESCI	SEL0022	18-06-2009	17-06-2010
7	Coaxial Cable	SGS	N/A	SEL0024	18-06-2009	17-06-2010

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5.2 E.U.T. Operation

Operating Environment:

Temperature: 24.0 °C

Humidity: 52 % RH

Atmospheric Pressure: 1010 mbar

5.3 Test Procedure & Measurement Data

5.3.1 Conducted Emissions

Test Requirement: FCC Part15 C Section 15.207

Test Method: ANSI C63.4:2003

Frequency Range: 150KHz to 30MHz

Class / Severity: Class B

Detector: RBW=9KHz VBW=30KHz

Operating Environment:

Temperature: 24.0 °C

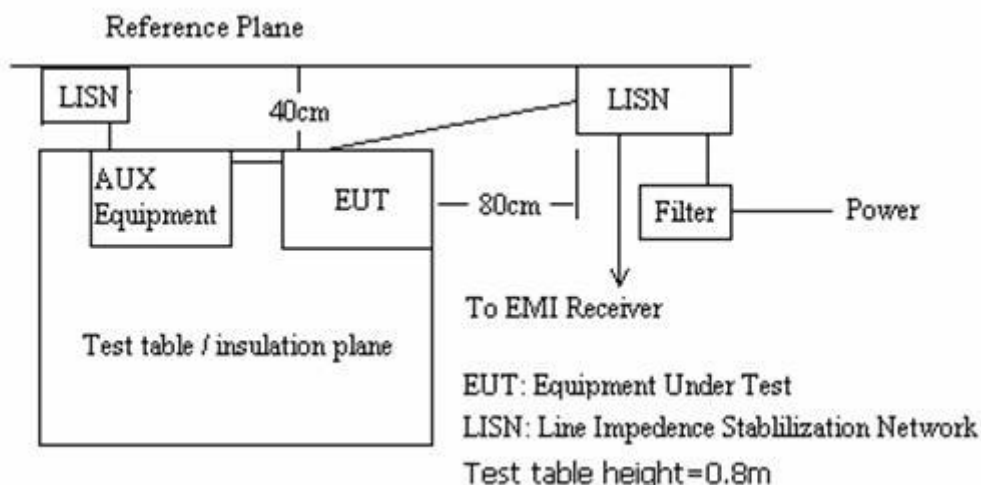
Humidity: 52 % RH

Atmospheric Pressure: 1015 Mbar

EUT Operation: Test in normal mode. 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.

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

Plan View of Test Setup





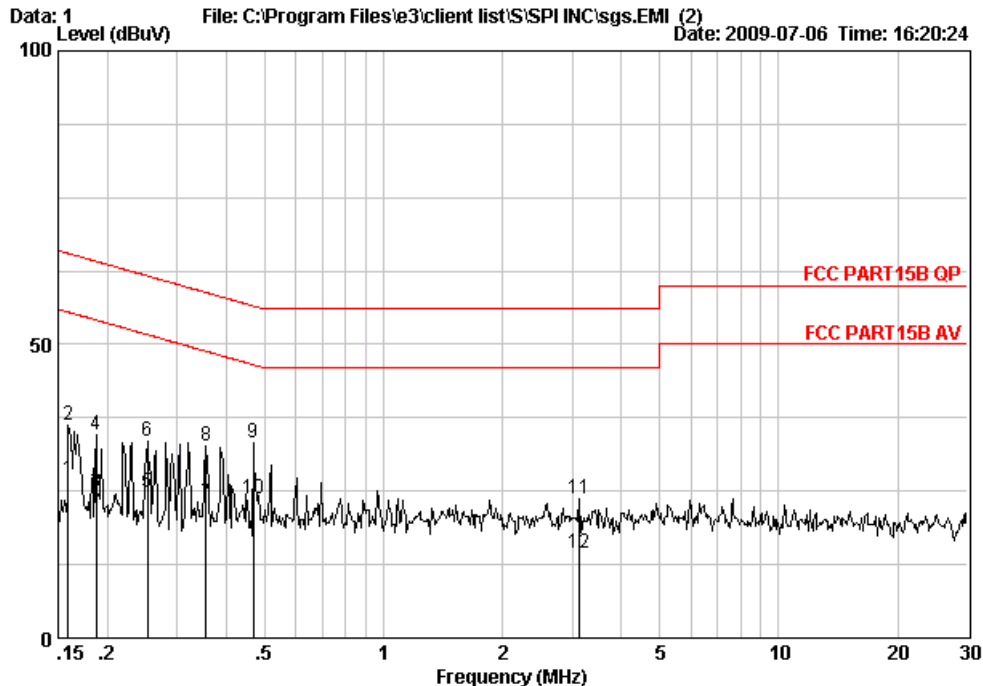
5.3.1.1 Measurement Data

An initial pre-scan was performed on the live and neutral lines with peak detector.

Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission were detected.

The following Quasi-Peak and Average measurements were performed on the EUT:

Line

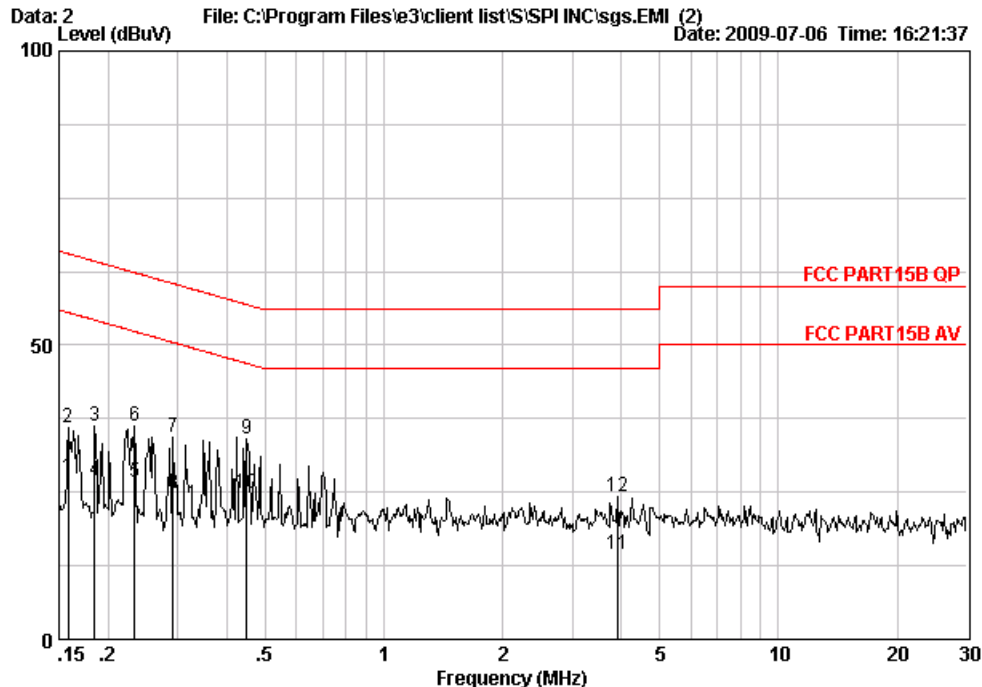


Site : Shielding Room
Condition : FCC PART15B QP CE LINE
EUT : WIRELESS TRANSMITTER
JOB NO : 3626RF
TEST MODE : TRANSMITTER

	Freq	Cable	LISN	Read	Limit	Over	
	MHz	Loss	Factor	Level	Level	Line	Limit Remark
		dB		dBuV	dBuV	dBuV	dB
1	0.15900	0.04	-0.05	26.90	26.89	55.52	-28.63 Average
2	0.15900	0.04	-0.05	36.35	36.34	65.52	-29.18 QP
3	0.18738	0.04	-0.05	24.80	24.79	54.15	-29.36 Average
4	0.18738	0.04	-0.05	34.60	34.60	64.15	-29.55 QP
5	0.25211	0.05	-0.04	24.80	24.80	51.69	-26.89 Average
6	0.25211	0.05	-0.04	33.48	33.48	61.69	-28.20 QP
7	0.35576	0.05	-0.04	22.80	22.81	48.83	-26.02 Average
8	0.35576	0.05	-0.04	32.77	32.78	58.83	-26.05 QP
9	0.46861	0.06	-0.04	33.16	33.17	56.54	-23.37 QP
10	0.46861	0.06	-0.04	23.80	23.82	46.54	-22.72 Average
11	3.140	0.14	-0.08	23.75	23.82	56.00	-32.18 QP
12	3.140	0.14	-0.08	14.50	14.57	46.00	-31.43 Average



Neutral:



Site : Shielding Room
Condition : FCC PART15B QP CE NEUTRAL
EUT : WIRELESS TRANSMITTER
JOB NO : 3626RF
TEST MODE : TRANSMITTER

	Freq	Cable Loss	LISN Factor	Read Level	Limit Level	Limit Line	Over Limit	Remark
	MHz	dB	dB	dBuV	dBuV	dBuV	dB	
1	0.15816	0.04	-0.05	27.50	27.49	55.56	-28.07	Average
2	0.15816	0.04	-0.05	36.11	36.10	65.56	-29.46	QP
3	0.18443	0.04	-0.04	36.26	36.26	64.28	-28.02	QP
4	0.18443	0.04	-0.04	26.90	26.90	54.28	-27.39	Average
5	0.23285	0.04	-0.04	26.80	26.80	52.35	-25.54	Average
6	0.23285	0.04	-0.04	36.31	36.32	62.35	-26.03	QP
7	0.29243	0.05	-0.04	34.44	34.45	60.46	-26.01	QP
8	0.29243	0.05	-0.04	24.90	24.91	50.46	-25.54	Average
9	0.44916	0.06	-0.04	34.00	34.02	56.89	-22.87	QP
10 @	0.44916	0.06	-0.04	24.80	24.82	46.89	-22.07	Average
11	3.901	0.16	-0.10	14.50	14.56	46.00	-31.44	Average
12	3.901	0.16	-0.10	24.20	24.26	56.00	-31.74	QP



5.3.2 Radiated Emissions

Test Requirement: FCC Part15 C Section 15.239, 15.33

Test Method: ANSI C63.4: 2003

Measurement Distance: 3m (Semi-Anechoic Chamber)

Test mode:

Transmit with
un-modulation

Keep the EUT in transmitting mode with un-modulation, and the power supply by battery.

Transmit with
modulation

Keep the EUT in transmitting mode by input audio signal, and the power supply by AC adapter.

Test procedure: Pre-scan the Transmit with un-modulation, Transmit with modulation mode, and found the worse case which it is transmit with modulation.

Frequency range: 30 MHz – 1GHz

Receiver setup: RBW=120kHz VBW=300KHz

Requirements:

According to FCC 15.239 requirements:

(b)The field strength of any emissions within the permitted 200 kHz band shall not exceed 250 microvolts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector. The provisions in Section 15.35 for limiting peak emissions apply.

(c) The field strength of any emissions radiated on any frequency outside of the specified 200 kHz band shall not exceed the general radiated emission limits in Section 15.209.

The limit for average field strength dBuV/m for the fundamental frequency = 48.0 dBuV/m.

And the limit for peak field strength dBuV/m for the fundamental frequency = 68.0 dBuV/m



Test Procedure:

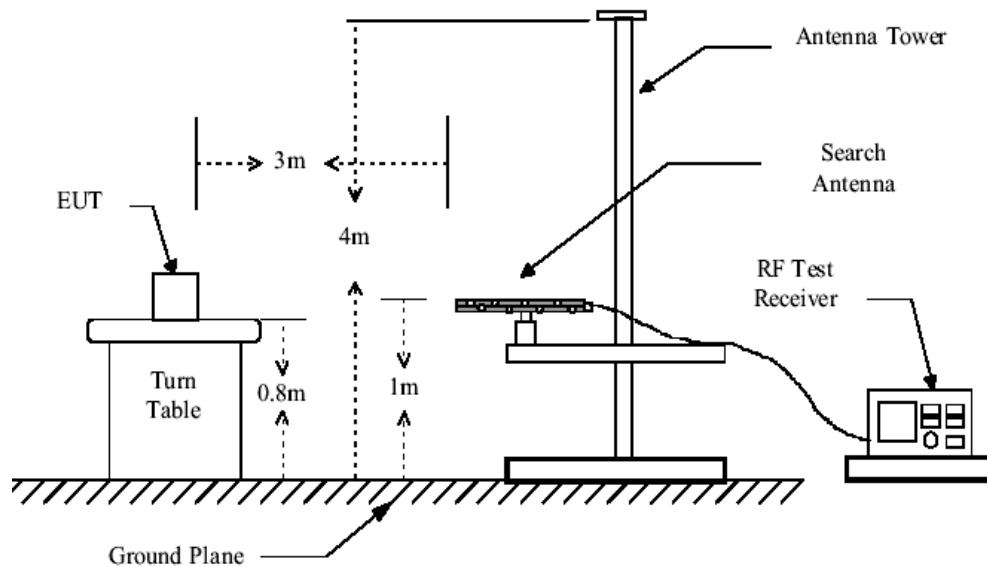
The procedure used was ANSI Standard C63.4-2003. The receiver was scanned from 30MHz to 1GHz. When an emission was found, the table was rotated to produce the maximum signal strength. An initial pre-scan was performed for in peak detection mode using the receiver. The EUT was measured for both the Horizontal 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:

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

An initial pre-scan was performed in the 3m chamber using the spectrum analyzer in peak detection mode. Quasi-peak measurements were conducted based on the peak sweep graph. The EUT was measured by Bilog antenna with 2 orthogonal polarities.

Configuration of Measurement:





The following test results were performed on the EUT

1. Fundamental emission

Test Frequency (MHz)	Peak (dB μ V/m)		Limits (dB μ V/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
88.94	42.75	44.25	68.0	25.25	23.75

Test Frequency (MHz)	Average (dB μ V/m)		Limits (dB μ V/m)	Margin (dB)	
	Vertical	Horizontal		Vertical	Horizontal
88.94	42.56	43.85	48.0	5.44	4.15

2. Harmonics & Spurious Emissions

Transmitting mode:

Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
176.470	1.36	9.77	27.28	35.90	19.75	43.50	-23.75
322.940	1.98	14.76	26.90	38.61	28.45	46.00	-17.55
431.580	2.34	16.52	27.51	47.30	38.65	46.00	-7.35
485.900	2.55	17.80	27.67	39.40	32.08	46.00	-13.92
537.310	2.64	18.72	27.67	38.90	32.59	46.00	-13.41

Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Preamp Factor (dB)	Read Level (dBuV)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)
176.470	1.36	9.77	27.28	44.17	28.02	43.50	-15.48
265.710	1.75	12.63	26.85	39.89	27.42	46.00	-18.58
322.940	1.98	14.76	26.90	46.75	36.59	46.00	-9.41
358.830	2.09	15.62	27.15	44.81	35.37	46.00	-10.63
431.580	2.34	16.52	27.51	49.41	40.76	46.00	-5.24

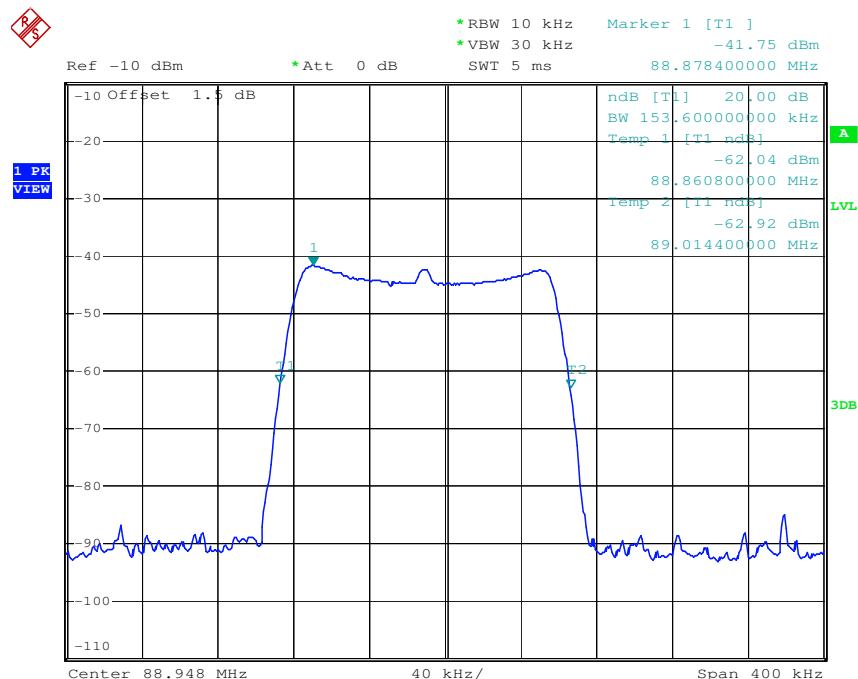
TEST RESULTS: The unit does meet the FCC Part 15 C Section 15.239 requirements.



5.3.3 Occupied Bandwidth

Test Requirement:	FCC Part15 C
Test Method:	ANSI C63.4: 2003
Requirements:	15.239 (a) Emissions from the intentional radiator shall be confined within a band 200 kHz wide centred on the operating frequency. The 200 kHz band shall lie wholly on the frequency of 88.94 MHz.
Receiver setup:	RBW=10KHz, VBW=30KHz, Span=400KHz, Sweep time=auto.
Limit:	20dB bandwidth <200KHz
Method of measurement:	1>. A small sample of the transmitter output was fed into the Spectrum Analyzer and the attached plot was taken. 2>. Input the audio signal which Frequency is between 20Hz to 20KHz. And found the worse frequency which it is 2.5KHz 3>. The input audio signal level is 10dBuv by the manufactory declared.

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



Date: 17.JUL.2009 10:05:33

The results: The unit does meet the FCC Part 15C Section 15.239 requirements.