



FCC REPORT

Applicant: SHENZHEN AOER ELECTRONICS CO., LTD

Address of Applicant: 3/f, Block A, Wenle Ind. Zone, Xixiang, Bao'an, Shenzhen, Guangdong, China

Equipment Under Test (EUT)

Product Name: FM Transmitter

Model No.: FM165

FCC ID: YDR4FM915

Standards: FCC CFR Title 47 Part 15 Subpart C Section 15.239:2009

Date of Receipt: 08 Oct., 2010

Date of Test: 08-11 Oct., 2010

Date of Issue: 12 Oct., 2010

Test Result : PASS *

* In the configuration tested, the EUT complied with the standards specified above.

Authorized Signature:

Robinson Lo
Laboratory Manager

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 and does not permit the use of the GTS product certification mark. 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 GTS International Electrical Approvals or testing done by GTS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by GTS International Electrical Approvals in writing.

This document cannot be reproduced except in full, without prior written approval of the Company. Any unauthorized alteration, forgery or falsification of the content or appearance of this document is unlawful and offenders may be prosecuted to the fullest extent of the law. Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 90 days only."

2 Contents

	Page
1 COVE OVER PAGE.....	1
2 CONTENTS.....	2
3 TEST SUMMARY	3
4 GENERAL INFORMATION	4
4.1 CLIENT INFORMATION	4
4.2 GENERAL DESCRIPTION OF E.U.T.	4
4.3 TEST ENVIRONMENT AND MODE.....	5
4.4 TEST FACILITY.....	5
4.5 TEST LOCATION	5
4.6 OTHER INFORMATION REQUESTED BY THE CUSTOMER	5
4.7 TEST INSTRUMENTS LIST	6
5 TEST RESULTS AND MEASUREMENT DATA.....	7
5.1 ANTENNA REQUIREMENT:	7
5.2 RADIATED EMISSION.....	8
5.2.1 <i>Field Strength Of The Fundamental Signal</i>	10
5.2.2 <i>Spurious Emissions</i>	11
5.3 26dB BANDWIDTH.....	13

3 Test Summary

Test Item	Section in CFR 47	Result
Antenna requirement	15.203	Passed
AC Power Line Conducted Emission	15.207	Passed
Field strength of the fundamental signal	15.239 (a)	Passed
Spurious emissions	15.239 (c)/15.209	Passed
26dB Bandwidth	ANSI C63.4/15.239 (a)	Passed

Remark:

- *Passed: The EUT complies with the essential requirements in the standard.*
- *Failed: The EUT does not comply with the essential requirements in the standard.*
- *Tx: In this whole report Tx (or tx) means Transmitter.*
- *Rx: In this whole report Rx (or rx) means Receiver.*

4 General Information

4.1 Client Information

Applicant:	SHENZHEN AOER ELECTRONICS CO., LTD
Address of Applicant:	3/f, Block A, Wenle Ind. Zone, Xixiang, Bao'an, Shenzhen, Guangdong, China
Manufacturer/Factory:	SHENZHEN AOER ELECTRONICS CO., LTD
Address of Manufacturer/Factory:	3/f, Block A, Wenle Ind. Zone, Xixiang, Bao'an, Shenzhen, Guangdong, China

4.2 General Description of E.U.T.

Product Name:	FM Transmitter
Model No.:	FM165
Operation Frequency:	88.1MHz~107.8MHz
Channel separation:	100KHz
Modulation type:	FM
Antenna Type:	Integral
Power supply:	Ipod port supply

Note:

In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Channel	Frequency
The lowest channel	88.1MHz
The middle channel	98.1MHz
The Highest channel	107.8MHz

4.3 Test environment and mode

Operating Environment:	
Temperature:	25.0 °C
Humidity:	54 % RH
Atmospheric Pressure:	1010 mbar
Test mode:	
Transmitting mode:	Pre-scan input 20Hz-20KHz audio signal to the EUT, and found 1KHz audio signal which it is worse case.

4.4 Test Facility

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

● **FCC —Registration No.: 600491**

Global United Technology Service 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 600491, July 20, 2010.

● **Industry Canada (IC)**

The 3m Semi-anechoic chamber of Global United Technology Service Co., Ltd. Has been Registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 9079A-1.

4.5 Test Location

All tests were performed at:
Global United Technology Service Co., Ltd. Address: 2nd Floor, Block No.2, Laodong Industrial Zone, Xixiang Road Baoan District, Shenzhen, China Tel: 0755-27798480 Fax: 0755-27798960

4.6 Other Information Requested by the Customer

None.

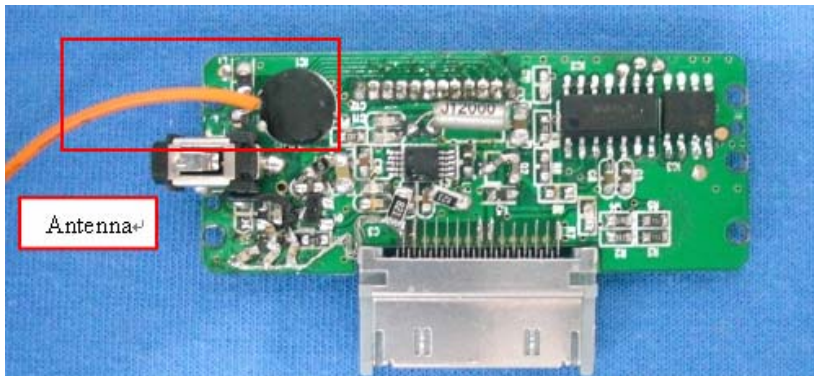
4.7 Test Instruments list

Radiated Emission:						
Item	Test Equipment	Manufacturer	Model No.	Inventory No.	Cal.Date (dd-mm-yy)	Cal.Due date (dd-mm-yy)
1	3m Semi- Anechoic Chamber	ZhongYu Electron	9.2(L)*6.2(W)* 6.4(H)	GTS201	Mar. 30 2010	Mar. 30 2011
2	Control Room	ZhongYu Electron	6.2(L)*2.5(W)* 2.4(H)	GTS202	N/A	N/A
3	EMI Test Receiver	Rohde & Schwarz	ESU26	GTS203	Sep. 10 2010	Sep. 10 2011
4	BiConiLog Antenna	SCHWARZBECK MESS-ELEKTRONIK	VULB9163	GTS204	Sep. 10 2010	Sep. 10 2011
5	Double -ridged waveguide horn	SCHWARZBECK MESS-ELEKTRONIK	9120D-829	GTS205	June 30 2010	June 30 2011
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A
7	Coaxial Cable	GTS	N/A	GTS400	Apr. 01 2010	Apr. 01 2011
8	Coaxial Cable	GTS	N/A	GTS401	Apr. 01 2010	Apr. 01 2011
9	Coaxial cable	GTS	N/A	GTS402	Apr. 01 2010	Apr. 01 2011
10	Coaxial Cable	GTS	N/A	GTS407	Apr. 01 2010	Apr. 01 2011
11	Coaxial Cable	GTS	N/A	GTS408	Apr. 01 2010	Apr. 01 2011
12	Amplifier(10KHz-5GHz)	Sonnoma Instrument	305-1052	GTS210	Aug. 03 2010	Aug. 03 2011
13	Amplifier(2GHz-20GHz)	HP	8349B	GTS231	Aug. 03 2010	Aug. 03 2011

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	7.0(L)x3.0(W)x3.0(H)	GTS206	Apr. 10 2010	Apr. 10 2011
2	EMI Test Receiver	Rohde & Schwarz	ESCS30	GTS208	Sep. 14 2010	Sep. 14 2011
3	10dB Pulse Limita	Rohde & Schwarz	N/A	GTS209	Sep. 14 2010	Sep. 14 2011
4	LISN	SCHWARZBECK MESS-ELEKTRONIK	NSLK 8127	GTS207	Apr. 14 2010	Apr. 14 2011
5	Coaxial Cable	GTS	N/A	GTS406	Apr. 01 2010	Apr. 01 2011
6	EMI Test Software	AUDIX	E3	N/A	N/A	N/A

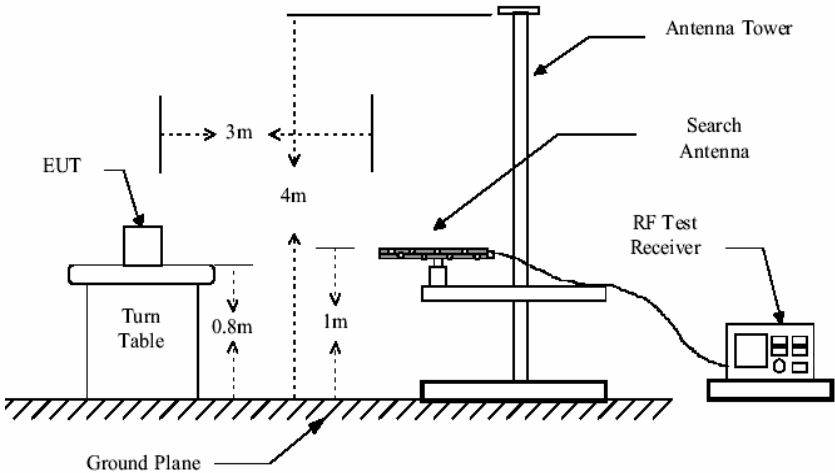
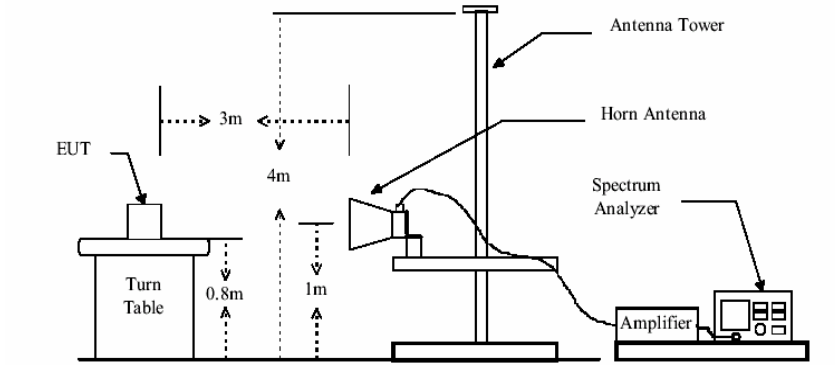
5 Test results and Measurement Data

5.1 Antenna requirement:

Standard requirement:	FCC Part15 C Section 15.203
15.203 requirement: <i>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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, the manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.</i>	
E.U.T Antenna:	
The antenna is integrated on the main PCB and no consideration of replacement. The best case gain of the antenna is 0.5dBi.	
	

5.2 Radiated Emission

Test Requirement:	FCC Part15 C Section 15.239 and 15.209																								
Test Method:	ANSI C63.4: 2003																								
Test Frequency Range:	30MHz to 1100MHz																								
Test site:	Measurement Distance: 3m (Semi-Anechoic Chamber)																								
Receiver setup:	<table><tr><td>Frequency</td><td>Detector</td><td>RBW</td><td>VBW</td><td>Remark</td></tr><tr><td>30MHz-1GHz</td><td>Quasi-peak</td><td>100KHz</td><td>300KHz</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Peak Value</td></tr><tr><td>Peak</td><td>1MHz</td><td>3MHz</td><td>Average Value</td></tr></table>					Frequency	Detector	RBW	VBW	Remark	30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value	Above 1GHz	Peak	1MHz	3MHz	Peak Value	Peak	1MHz	3MHz	Average Value	
Frequency	Detector	RBW	VBW	Remark																					
30MHz-1GHz	Quasi-peak	100KHz	300KHz	Quasi-peak Value																					
Above 1GHz	Peak	1MHz	3MHz	Peak Value																					
	Peak	1MHz	3MHz	Average Value																					
Limit: (Field strength of the fundamental signal)	<table><tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr><tr><td rowspan="2">88.1MHz-107.9MHz</td><td>48.0</td><td>Average Value</td></tr><tr><td>68.0</td><td>Peak Value</td></tr></table>					Frequency	Limit (dBuV/m @3m)	Remark	88.1MHz-107.9MHz	48.0	Average Value	68.0	Peak Value												
Frequency	Limit (dBuV/m @3m)	Remark																							
88.1MHz-107.9MHz	48.0	Average Value																							
	68.0	Peak Value																							
Limit: (Spurious Emissions)	<table><tr><td>Frequency</td><td>Limit (dBuV/m @3m)</td><td>Remark</td></tr><tr><td>30MHz-88MHz</td><td>40.0</td><td>Quasi-peak Value</td></tr><tr><td>88MHz-216MHz</td><td>43.5</td><td>Quasi-peak Value</td></tr><tr><td>216MHz-960MHz</td><td>46.0</td><td>Quasi-peak Value</td></tr><tr><td>960MHz-1GHz</td><td>54.0</td><td>Quasi-peak Value</td></tr><tr><td rowspan="2">Above 1GHz</td><td>54.0</td><td>Average Value</td></tr><tr><td>74.0</td><td>Peak Value</td></tr></table>					Frequency	Limit (dBuV/m @3m)	Remark	30MHz-88MHz	40.0	Quasi-peak Value	88MHz-216MHz	43.5	Quasi-peak Value	216MHz-960MHz	46.0	Quasi-peak Value	960MHz-1GHz	54.0	Quasi-peak Value	Above 1GHz	54.0	Average Value	74.0	Peak Value
Frequency	Limit (dBuV/m @3m)	Remark																							
30MHz-88MHz	40.0	Quasi-peak Value																							
88MHz-216MHz	43.5	Quasi-peak Value																							
216MHz-960MHz	46.0	Quasi-peak Value																							
960MHz-1GHz	54.0	Quasi-peak Value																							
Above 1GHz	54.0	Average Value																							
	74.0	Peak Value																							
Test Procedure:	<p>1>. The E.U.T and its simulators are placed on a turn table which is 0.8meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level.</p> <p>2>. Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission, all of the interface cables must be manipulated according to ANSI C63.4:2003 on radiated measurement.</p> <p>3>. Has verified the construction and function in typical operation, The EUT was placed on three different polar directions; i.e. X axis, Y axis, Z axis. which was shown in this test report and defined as follows</p> <table><tr><td colspan="4">Pre-Test Mode: frequency=88.1MHz</td></tr><tr><td>Axis</td><td>X</td><td>Y</td><td>Z</td></tr><tr><td>Field Strength(dBuV/m)</td><td>39.18</td><td>45.95</td><td>37.83</td></tr></table> <p>Final Test Mode:</p> <p>According to ANSI C63.4 standards, the test results are both the “worst case” and “worst setup”</p> <p>Y axis</p>					Pre-Test Mode: frequency=88.1MHz				Axis	X	Y	Z	Field Strength(dBuV/m)	39.18	45.95	37.83								
Pre-Test Mode: frequency=88.1MHz																									
Axis	X	Y	Z																						
Field Strength(dBuV/m)	39.18	45.95	37.83																						

<p>Test setup:</p>	<p>Below 1GHz</p>  <p>Above 1GHz</p> 
<p>Test Instruments:</p>	<p>Refer to section 4.7 for details</p>
<p>Test mode:</p>	<p>Refer to section 4.3 for details</p>
<p>Test results:</p>	<p>Passed</p>

Note:

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

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

Measurement Data
5.2.1 Field Strength Of The Fundamental Signal

Peak value:

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)	polarization
88.10	45.78	8.80	1.04	25.68	29.94	68.00	-38.06	Horizontal
88.10	57.45	13.14	1.04	25.68	45.95	68.00	-22.05	Vertical
98.10	43.71	11.25	1.14	25.67	30.43	68.00	-37.57	Horizontal
98.10	53.98	14.18	1.14	25.67	43.63	68.00	-24.37	Vertical
107.80	32.58	12.44	1.22	25.66	20.58	68.00	-47.42	Horizontal
107.80	46.55	12.43	1.22	25.66	34.54	68.00	-33.46	Vertical

Average value:

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)	polarization
88.10	42.17	8.80	1.04	25.68	26.33	48.00	-21.67	Horizontal
88.10	52.32	13.14	1.04	25.68	40.82	48.00	-7.18	Vertical
98.10	41.46	11.25	1.14	25.67	28.18	48.00	-19.82	Horizontal
98.10	50.76	14.18	1.14	25.67	40.41	48.00	-7.59	Vertical
107.80	29.47	12.44	1.22	25.66	17.47	48.00	-30.53	Horizontal
107.80	43.25	12.43	1.22	25.66	31.24	48.00	-16.76	Vertical

5.2.2 Spurious Emissions

Test mode:	Transmitting	Test channel:	Lowest
------------	--------------	---------------	--------

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)	polarization
43.97	35.79	11.34	0.65	25.73	22.05	40.00	-17.95	Horizontal
95.76	39.30	10.85	1.11	25.67	25.59	43.50	-17.91	Horizontal
132.22	33.82	10.89	1.40	25.65	20.46	43.50	-23.04	Horizontal
254.73	29.00	13.05	1.96	25.60	18.41	46.00	-27.59	Horizontal
588.91	25.25	22.69	2.66	25.54	25.06	46.00	-20.94	Horizontal
44.02	47.80	14.41	0.66	25.73	37.14	40.00	-2.86	Vertical
96.06	51.00	14.18	1.12	25.67	40.63	43.50	-2.87	Vertical
132.22	48.81	10.17	1.40	25.65	34.73	43.50	-8.77	Vertical
176.27	34.49	14.07	1.66	25.63	24.59	43.50	-18.91	Vertical
256.52	40.67	14.98	1.97	25.60	32.02	46.00	-13.98	Vertical

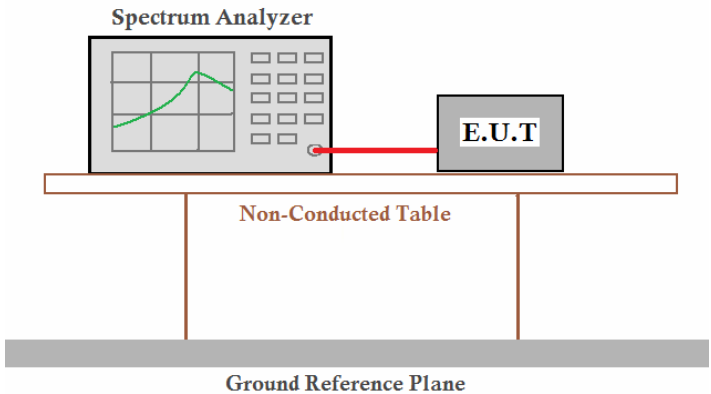
Test mode:	Transmitting	Test channel:	Middle
------------	--------------	---------------	--------

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)	polarization
49.01	37.68	11.65	0.67	25.72	24.28	40.00	-15.72	Horizontal
147.40	36.23	10.20	1.50	25.64	22.29	43.50	-21.21	Horizontal
196.51	30.36	11.37	1.76	25.62	17.87	43.50	-25.63	Horizontal
485.61	26.09	20.84	2.38	25.55	23.76	46.00	-22.24	Horizontal
734.49	25.96	29.41	3.01	25.52	32.86	46.00	-13.14	Horizontal
49.06	48.20	14.16	0.67	25.72	37.31	40.00	-2.69	Vertical
147.40	46.56	10.06	1.50	25.64	32.48	43.50	-11.02	Vertical
196.51	34.26	12.44	1.76	25.62	22.84	43.50	-20.66	Vertical
378.58	26.20	17.10	2.22	25.57	19.95	46.00	-26.05	Vertical
649.66	26.87	21.44	2.81	25.53	25.59	46.00	-20.41	Vertical

Test mode:	Transmitting	Test channel:	Highest
------------	--------------	---------------	---------

Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamplifier Factor (dB)	Level (dBuV/m)	Limit Line (dBuV/m)	Over Limit (dB)	polarization
53.88	41.51	10.94	0.68	25.71	27.42	40.00	-12.58	Horizontal
161.47	30.93	10.36	1.58	25.63	17.24	43.50	-26.26	Horizontal
215.27	27.97	11.69	1.84	25.61	15.89	43.50	-27.61	Horizontal
447.98	25.49	20.18	2.33	25.56	22.44	46.00	-23.56	Horizontal
824.60	26.01	29.70	3.20	25.51	33.40	46.00	-12.60	Horizontal
53.89	48.60	13.60	0.68	25.71	37.17	40.00	-2.83	Vertical
161.47	44.66	11.34	1.58	25.63	31.95	43.50	-11.55	Vertical
216.02	37.43	11.05	1.84	25.61	24.71	46.00	-21.29	Vertical
373.31	26.23	17.08	2.21	25.57	19.95	46.00	-26.05	Vertical
580.70	25.04	20.13	2.63	25.54	22.26	46.00	-23.74	Vertical

5.3 26dB Bandwidth

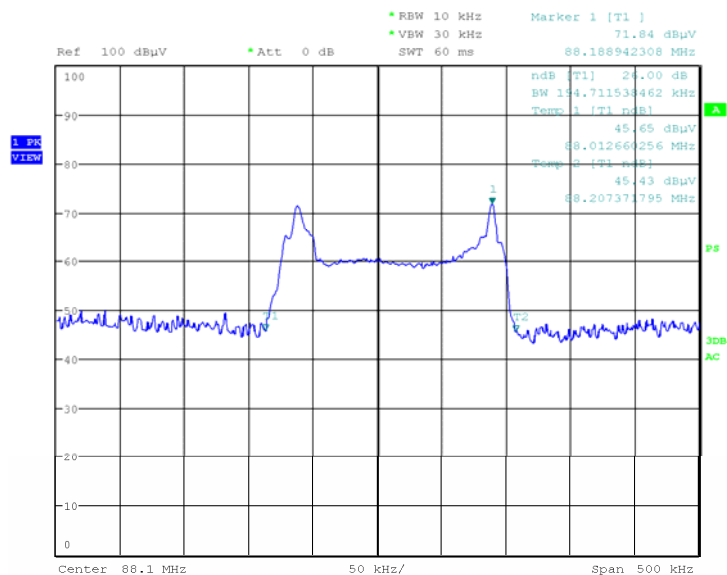
Test Requirement:	FCC Part15 C Section 15.239 (a)
Test Method:	ANSI C63.4:2003
Receiver setup:	RBW=10KHz, VBW=30KHz, detector: Peak
Limit:	Emissions from the intentional radiator shall be confined within a band 200 kHz wide centered on the operating frequency. The 200 kHz band shall lie wholly within the frequency range of 88-108 MHz.
Test Procedure:	<ol style="list-style-type: none"> 1. According to the follow Test-setup, keep the relative position between the artificial antenna and the EUT. 2. Set the EUT to proper test channel. 3. Max hold the radiated emissions, mark the peak power frequency point and the -26dB upper and lower frequency points. 4. Read the frequency delta value between the -26dB upper and lower frequency points.
Test setup:	 <p>The diagram illustrates the test setup. A Spectrum Analyzer is connected via a red cable to the E.U.T. (Equipment Under Test). Both are placed on a Non-Conducted Table. Below the table is a Ground Reference Plane.</p>
Test Instruments:	Refer to section 4.7 for details
Test mode:	Refer to section 4.3 for details
Test results:	Passed

Measurement Data

Test channel	Lower Frequency point (MHz)	Upper Frequency point (MHz)	26dB bandwidth(KHz)	Limit(KHz)
Lowest	88.01266	88.20737	194.71	200
Middle	98.01346	98.20657	193.12	200
Highest	107.71346	107.90496	191.51	200

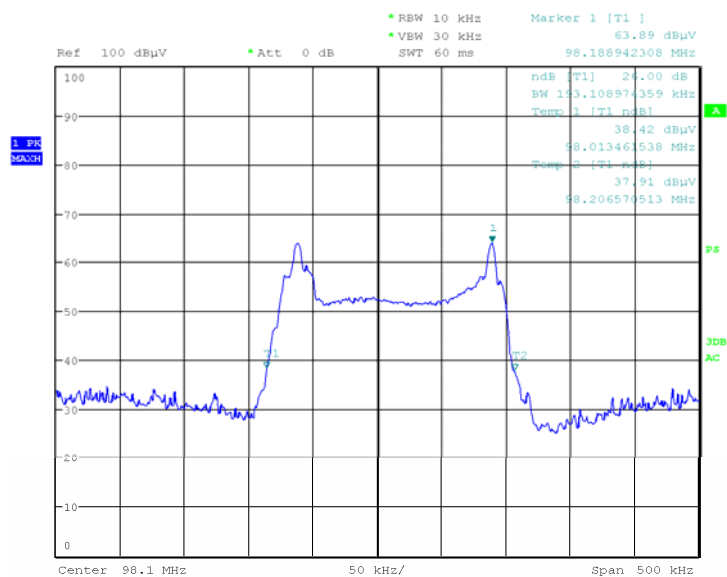
Test plot as follows:

Test channel:	Lowest	
---------------	--------	--



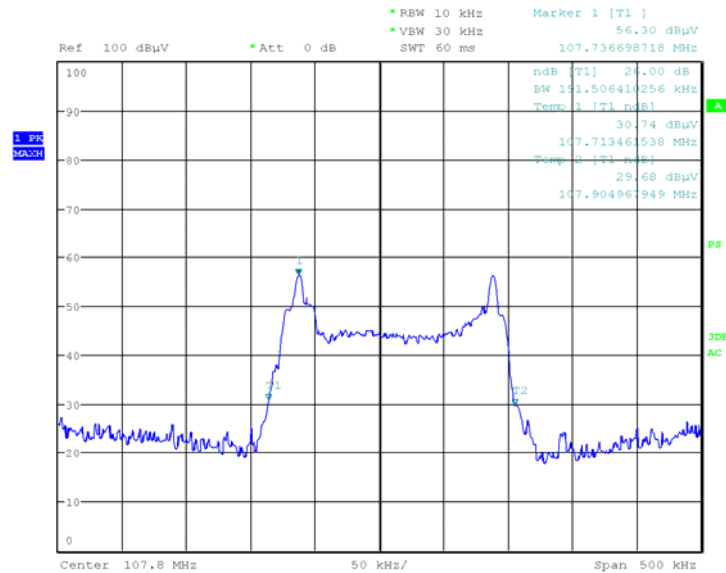
Date: 14.OCT.2010 10:14:38

Test channel:	Middle	
---------------	--------	--



Date: 14.OCT.2010 10:15:53

Test channel:	Highest	
---------------	---------	--



Date: 14.OCT.2010 10:16:49