

FCC PART 15.239
EMI MEASUREMENT AND TEST REPORT
For
SHENZHEN XINFUDA ELECTRONIC CO., LTD

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FCC ID: T28SZFDADZGS

March 20, 2006

This Report Concerns: ☒ Original Report	Equipment Type: FM Transmitter
Test Engineer: Kamn Hu <i>Kamn hu</i>	
Report No.: RSZ06030206	
Test Date: March 16-17, 2005	
Reviewed By: Chris Zeng <i>[Signature]</i>	
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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The SHENZHEN XINFUDA ELECTRONIC CO.,LTD's product, model: RT-V005, Revision: Rev. 1 or the "EUT" as referred to in this report is a FM Transmitter which measures approximately 7.2cm L x 5.0cm W x 2.2cm H, rated input voltage: DC 5 V battery.

** The test data gathered are from an engineering sample, serial number: xfd06988 provided by the manufacturer, we receive the EUT on 2006-03-02.*

Objective

This document is a test report based on the Electromagnetic Interference (EMI) tests performed on the EUT. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4 - 2003.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.209, 15.35, 15.205, and 15.239 rules.

Related Submittal(s)/Grant(s)

No Related Submittals

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4 - 2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz. All radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Lab Corp. (ShenZhen) to collect radiated and conducted emission measurement data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone, ShenZhen, Guangdong 518038, P.R.China.

Test site at Bay Area Compliance Lab Corp. (ShenZhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 04, 2004. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Lab Corp. (ShenZhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0). The current scope of accreditations can be found at <http://ts.nist.gov/ts/htdocs/210/214/scopes/2007070.htm>

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
NANYAN	Audio Generator	NY2201	007727	DoC

External I/O Cable

Cable Description	Length (M)	From/Port	To
Shielded Audio Cable	0.2	EUT	Audio Generator
Unshielded USB Cable	1.0	EUT	Adapter

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a typical fashion (as normally used by a typical user).

EUT Exercise Software

N/A.

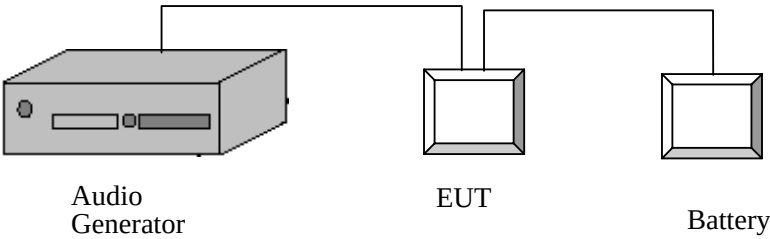
Special Accessories

N/A.

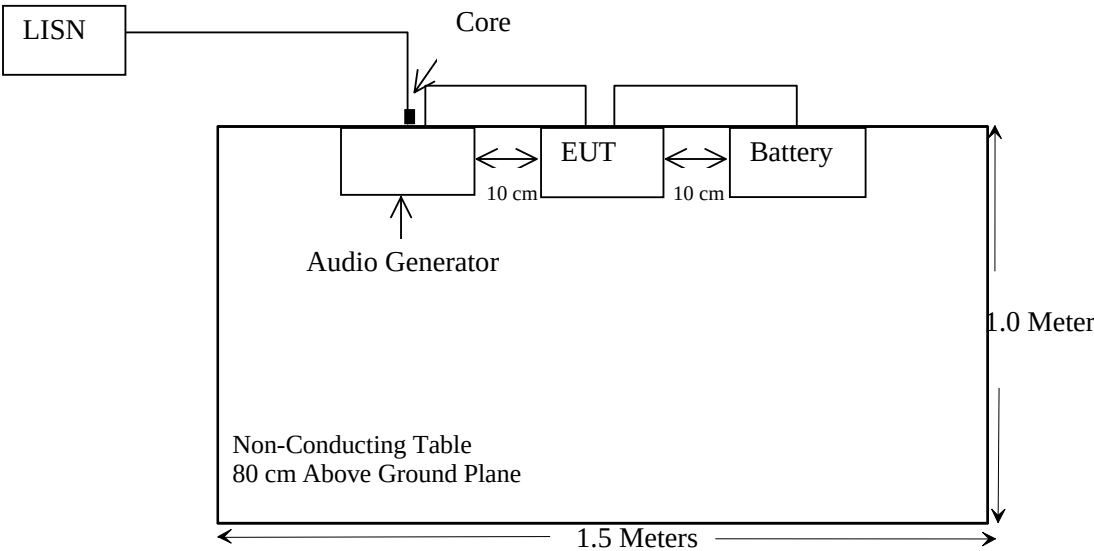
Equipment Modifications

Bay Area Compliance Lab Corp. (ShenZhen) has not done any modification on the EUT.

Configuration of Test Setup



Block Diagram of Test Setup



SUMMARY OF TEST RESULTS

RULES	DESCRIPTION OF TEST	RESULT
§15.209/§15.35/§15.239	Radiated Emission	Compliant*
§15.239	Frequency range	Compliant
§15.205	Restricted Band of operation	Compliant

* Within measurement uncertainty.

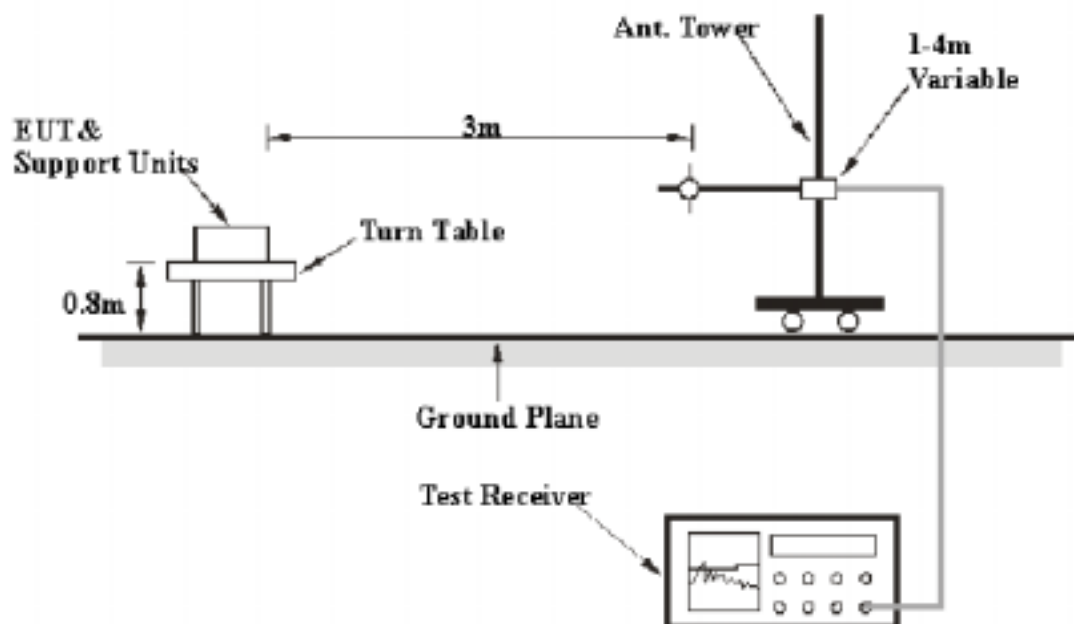
§15.209/§15.35/§15.239- RADIATED EMISSION

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Lab Corp. (ShenZhen) is ± 4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4 - 2003. The specification used was the FCC Part 15.209 and FCC Part 15.239.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The Audio Generator was connected to a 120 VAC/60 Hz power source.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 5 GHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

<i>Frequency Range</i>	<i>RBW</i>	<i>VBW</i>
30 – 1000 MHz	100 kHz	300 kHz
1000 MHz –5 GHz	1 MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2005-12-21	2006-12-21
HP	Amplifier	8449B	3008A00277	2005-8-17	2006-8-17
Sunol Sciences	Horn Antenna	DRH-118	A052604	2005-7-20	2006-7-20
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2005-8-17	2006-8-17
HP	Amplifier	HP8447E	1937A01046	2005-8-17	2006-8-17
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2005-4-28	2006-4-28

* **Statement of Traceability:** Bay Area Compliance Lab Corp. (ShenZhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Procedure

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Peak and Average detection mode.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corr. Ampl.} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “**Margin**” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -5.8dB means the emission is 5.8dB below the limit for Class C. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Corr. Ampl.} - \text{Limit}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 and 15.239, with the worst margin reading of:

Low Frequency: -4.9 dB at 88.1048 MHz in the Vertical polarization.
Middle Frequency: -4.1 dB at 98.105 MHz in the Vertical polarization
High Frequency: -3.4 dB at 107.905 MHz in the Vertical polarization

Test Data**Environmental Conditions**

Temperature:	27 ° C
Relative Humidity:	56%
ATM Pressure:	1002mbar

The testing was performed by Kamn Hu on 2006-3-16.

Test Mode: Transmitting

Frequency	Meter Reading	Detector	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifer Gain	Corr. Ampl.	FCC PART 15.239		
MHz	dBuV/m	PK/QP/AV	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB	
Low Frequency												
88.1048	62.8	AV	180	1.0	V	8.1	0.9	28.7	43.1	48	-4.9	Fundamental
30.853	36.9	PK	45	1.0	V	24.1	0.6	28.8	32.8	40	-7.2	Harmonic
88.1048	59.3	AV	180	1.0	H	8.1	0.9	28.7	39.6	48	-8.4	Fundamental
33.328	35.4	PK	180	1.5	V	24.1	0.6	28.8	31.3	40	-8.7	Harmonic
35.708	41.4	PK	180	1.0	H	17.7	0.6	28.8	30.9	40	-9.1	Harmonic
35.499	41.2	PK	270	1.2	V	17.7	0.6	28.8	30.6	40	-9.4	Harmonic
31.07	33.4	PK	45	1.0	H	24.1	0.6	28.8	29.3	40	-10.7	Harmonic
351.708	39.8	PK	360	1.2	V	15.0	1.8	27.6	29.0	46	-17.0	Harmonic
938.883	28.7	PK	90	1.0	H	23.1	3.6	27.7	27.7	46	-18.3	Harmonic
175.652	39.1	PK	120	1.5	H	11.9	1.2	28.2	24.0	43.5	-19.5	Harmonic
263.819	37.3	PK	60	1.0	H	12.4	1.4	27.6	23.5	46	-22.5	Harmonic
88.1048	63.0	PK	180	1.0	V	8.1	0.9	28.7	43.3	68	-24.7	Fundamental
263.819	34.9	PK	45	1.2	V	12.4	1.4	27.6	21.1	46	-24.9	Harmonic
88.1048	60.3	PK	60	1.0	H	8.1	0.9	28.7	40.6	68	-27.4	Fundamental
Middle Frequency												
98.105	63.4	AV	60	1.0	V	8.2	0.9	28.6	43.9	48.0	-4.1	Fundamental
30.000	27.9	PK	45	1.0	H	24.1	0.6	28.8	23.8	30.0	-6.2	Harmonic
34.036	36.8	PK	45	1.0	V	24.1	0.6	28.8	32.7	40.0	-7.3	Harmonic
98.105	58.8	AV	60	1.0	V	8.2	0.9	28.6	39.3	48.0	-8.7	Fundamental
869.130	38.2	PK	90	1.0	H	22.2	3.4	28.1	35.7	46.0	-10.3	Harmonic
393.472	43.3	PK	60	1.0	H	16.0	1.9	28.1	33.1	46.0	-12.9	Harmonic
295.147	45.2	PK	120	1.5	H	13.8	1.6	27.6	33.0	46.0	-13.0	Harmonic
393.472	42.0	PK	45	1.2	V	16.0	1.9	28.1	31.8	46.0	-14.2	Harmonic
295.147	41.3	PK	300	1.0	V	13.8	1.6	27.6	29.1	46.0	-16.9	Harmonic
44.120	34.7	PK	180	1.5	V	14.3	0.6	28.8	20.7	40.0	-19.3	Harmonic
196.509	36.2	PK	60	1.0	H	12.0	1.3	28	21.5	43.5	-22.0	Harmonic
98.105	63.7	PK	60	1.0	V	8.2	0.9	28.6	44.2	68.0	-23.8	Fundamental
985.794	28.7	PK	360	1.2	V	23.5	3.7	27.6	28.3	54.0	-25.7	Harmonic
98.105	59.7	PK	180	1.0	H	8.2	0.9	28.6	40.2	68.0	-27.8	Fundamental

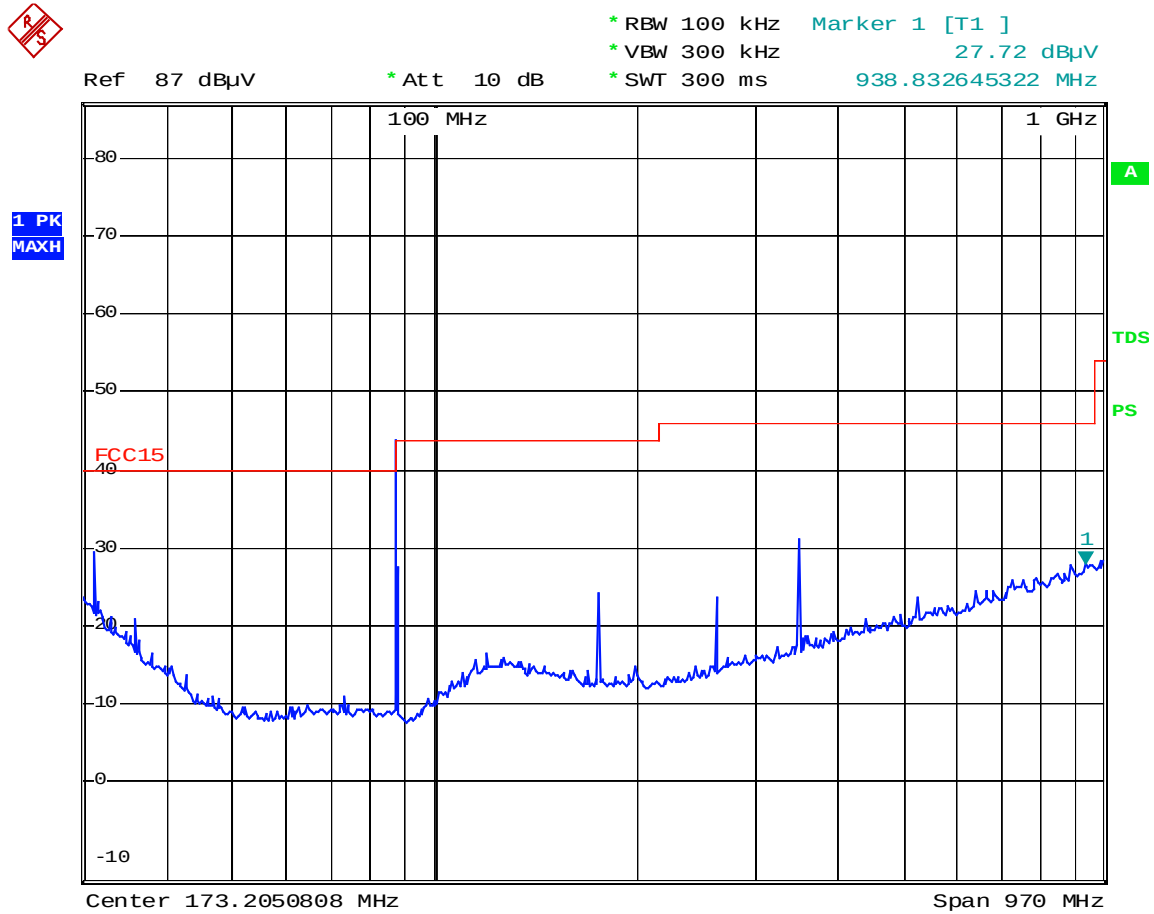
Continues:

Frequency	Meter Reading	Detector	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifer Gain	Corr. Ampl.	FCC PART 15.239		
MHz	dBuV/m	PK/QP/AV	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB	
High Frequency												
107.905	61.1	AV	45	1.0	V	11.0	1.0	28.5	44.6	48	-3.4*	Fundamental
325.596	53.9	PK	120	1.5	H	14.3	1.7	27.7	42.2	46	-3.8*	Harmonic
893.860	42.2	PK	360	1.2	V	22.6	3.5	28.1	40.2	46	-5.8	Harmonic
107.905	58.3	AV	45	1.0	V	11.0	1.0	28.5	41.8	48	-6.2	Fundamental
35.005	42.0	PK	180	1.5	V	17.7	0.6	28.8	31.5	40	-8.5	Harmonic
30.638	35.1	PK	45	1.0	V	24.1	0.6	28.8	31.0	40	-9.1	Harmonic
216.783	48.2	PK	60	1.0	H	11.4	1.3	27.8	33.1	46	-12.9	Harmonic
216.783	47.7	PK	45	1.2	V	11.4	1.3	27.8	32.6	46	-13.5	Harmonic
30.638	29.0	PK	45	1.0	H	24.1	0.6	28.8	24.9	40	-15.1	Harmonic
434.065	38.5	PK	60	1.0	H	16.8	2.2	28.3	29.2	46	-16.8	Harmonic
900.148	30.6	PK	90	1.0	H	22.9	3.5	27.9	29.1	46	-16.9	Harmonic
73.321	39.0	PK	270	1.2	V	8.6	0.8	28.7	19.7	40	-20.3	Harmonic
107.905	60.3	PK	300	1.0	V	11.0	1.0	28.5	44.8	68	-23.2	Fundamental
107.905	58.6	PK	180	1.0	H	11.0	1.0	28.5	42.1	68	-25.9	Fundamental

* Within measurement uncertainty.

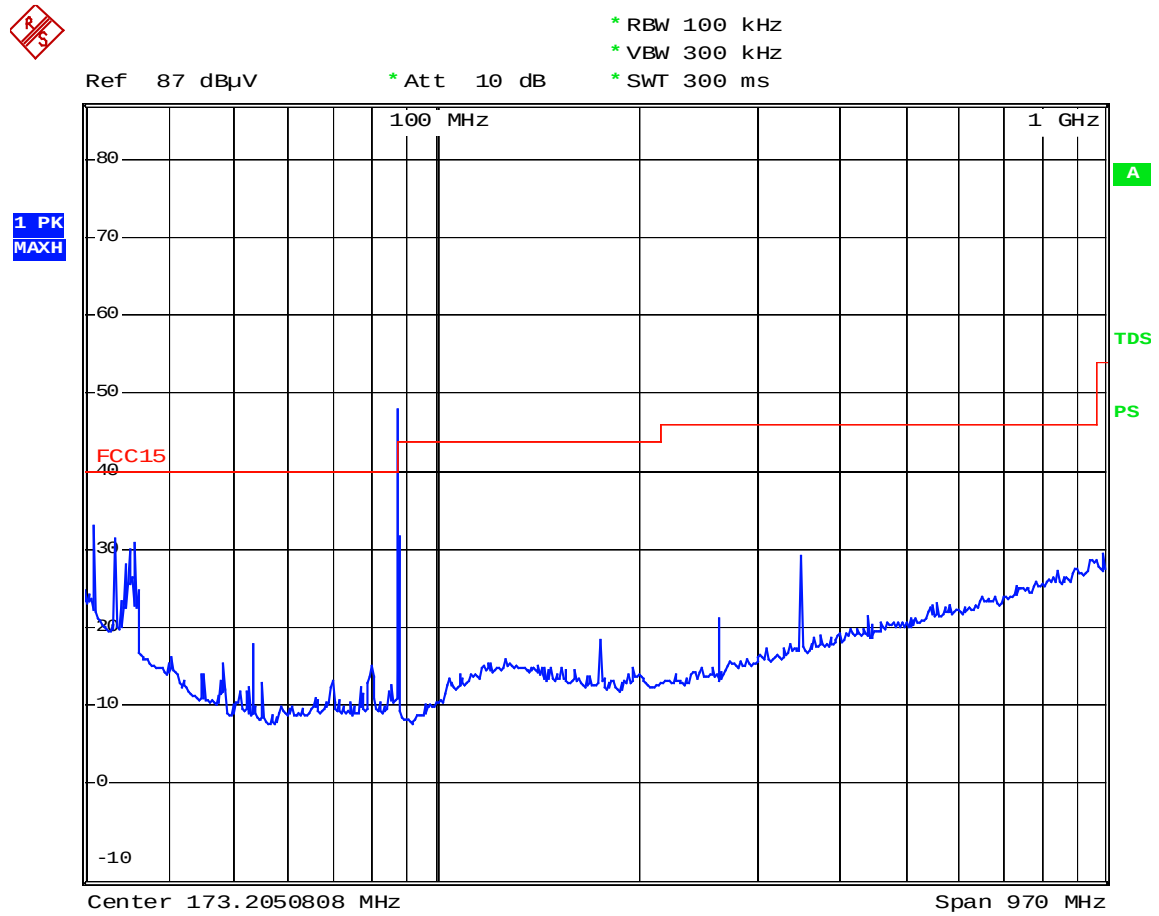
Plot(s) of Test Data

Plot(s) of Test Data is presented hereinafter as reference.



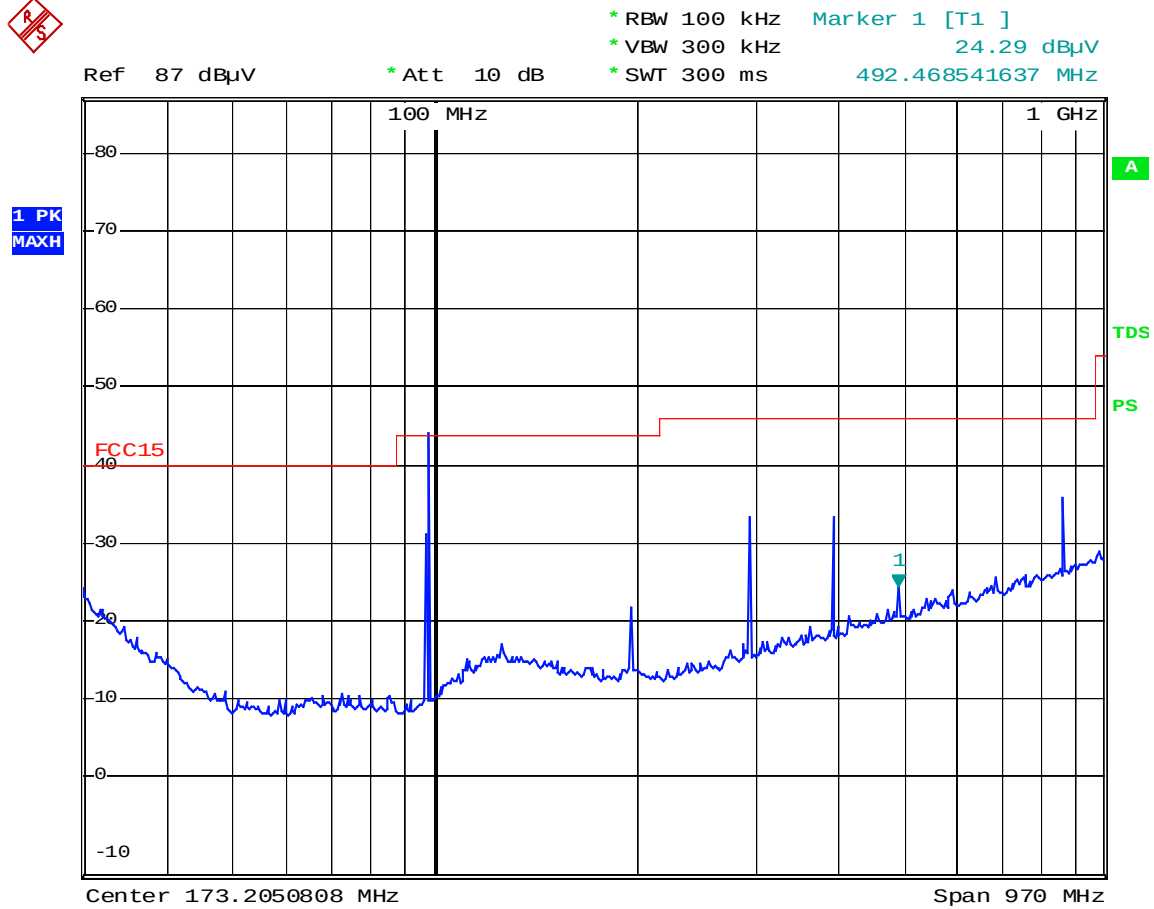
XINFUDA RT-V005 88MHZ H

Date: 16.MAR.2006 19:23:58



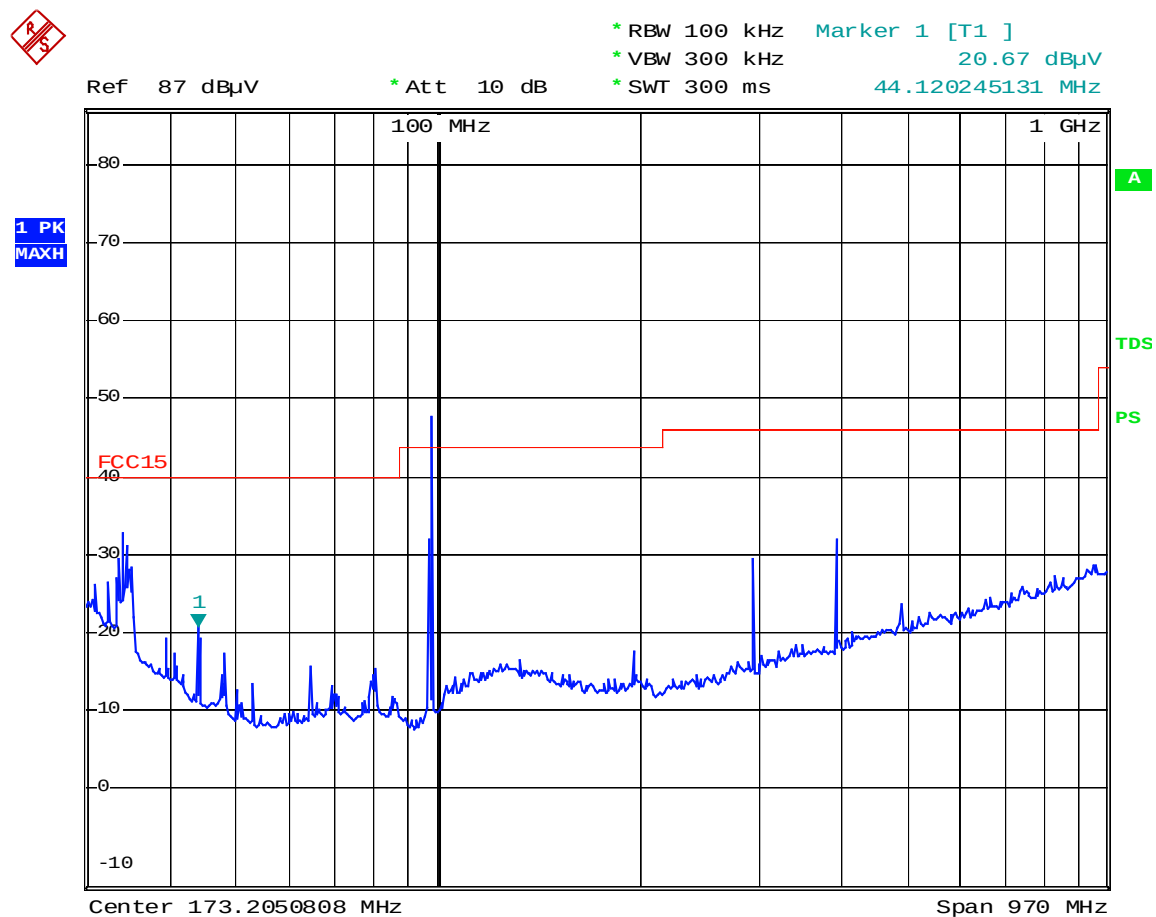
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Date: 16.MAR.2006 19:14:44



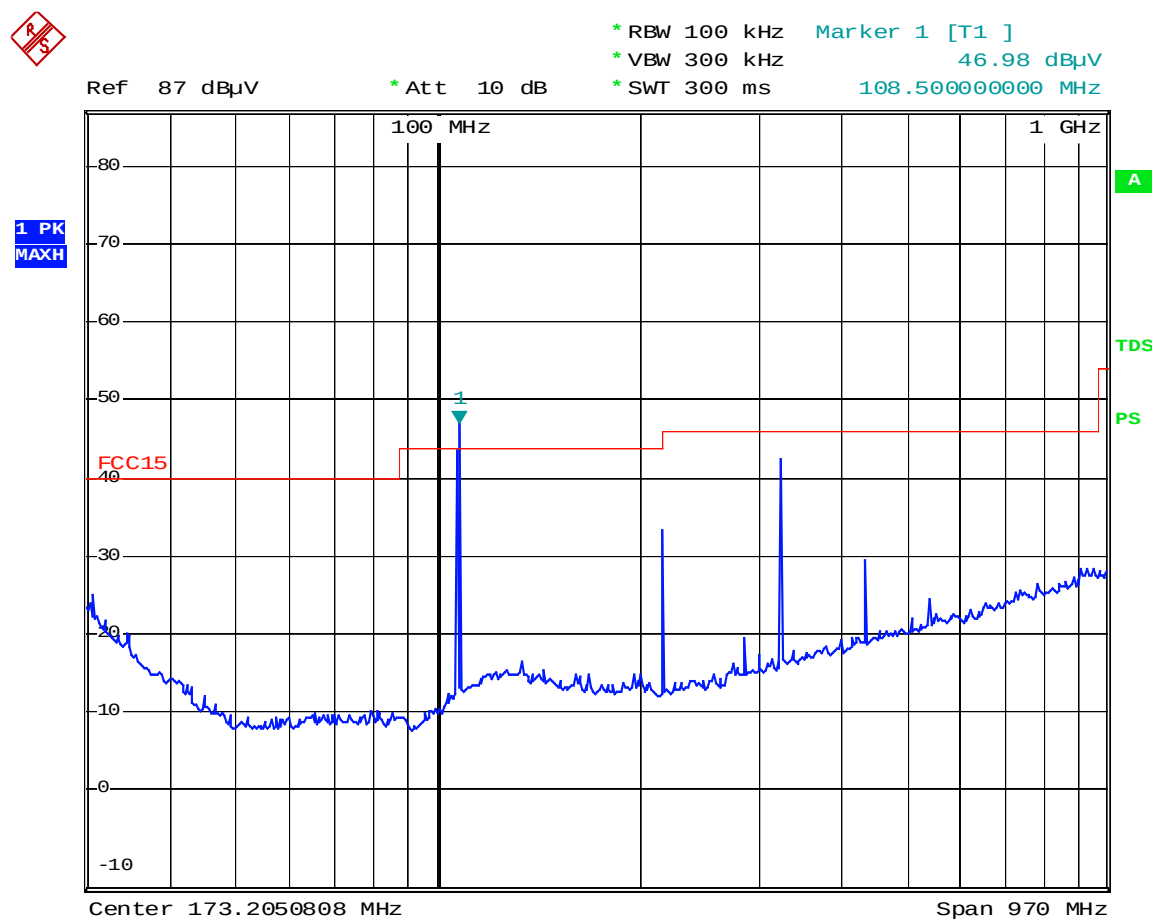
XINFUDA RT-V005 98MHZ H

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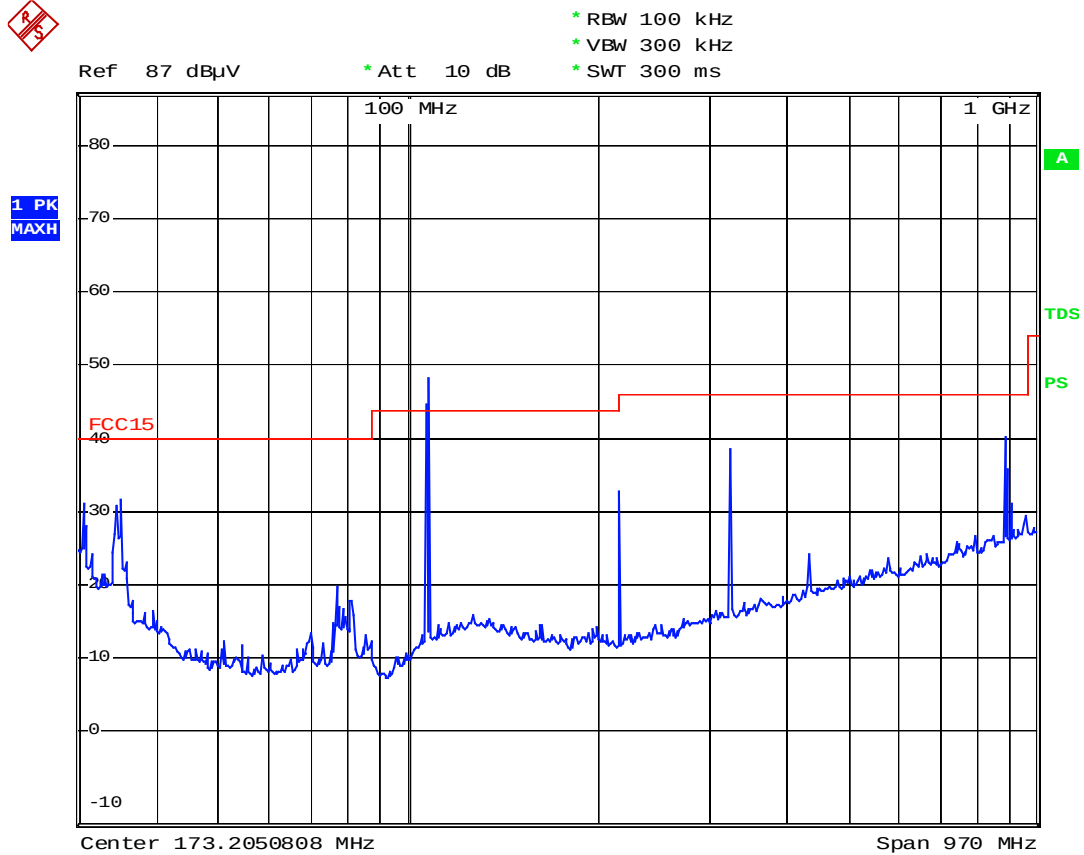
XINFUDA RT-V005 98MHZ V

Date: 16.MAR.2006 19:34:52



XINFUDA RT-V005 108MHZ H

Date: 16.MAR.2006 19:00:01



XINFUDA RT-V005 108MHZ V

Date: 16.MAR.2006 19:05:23

§15.239 –OUT OF BANDEGE

Measurement Uncertainty

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.

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 §15.209.

Test Procedure

With the EUT's antenna attached, the EUT's radiated emission power was received by the test antenna which was connected to the spectrum analyzer with the START and STOP frequencies set to the EUT's operation band.

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2005-12-21	2006-12-21
HP	Amplifier	8449B	3008A00277	2005-8-17	2006-8-17
Sunol Sciences	Horn Antenna	DRH-118	A052604	2005-7-20	2006-7-20
Rohde & Schwarz	EMI Test Receiver	ESCI	100028	2005-8-17	2006-8-17
HP	Amplifier	HP8447E	1937A01046	2005-8-17	2006-8-17
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2005-4-28	2006-4-28

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

Test Data

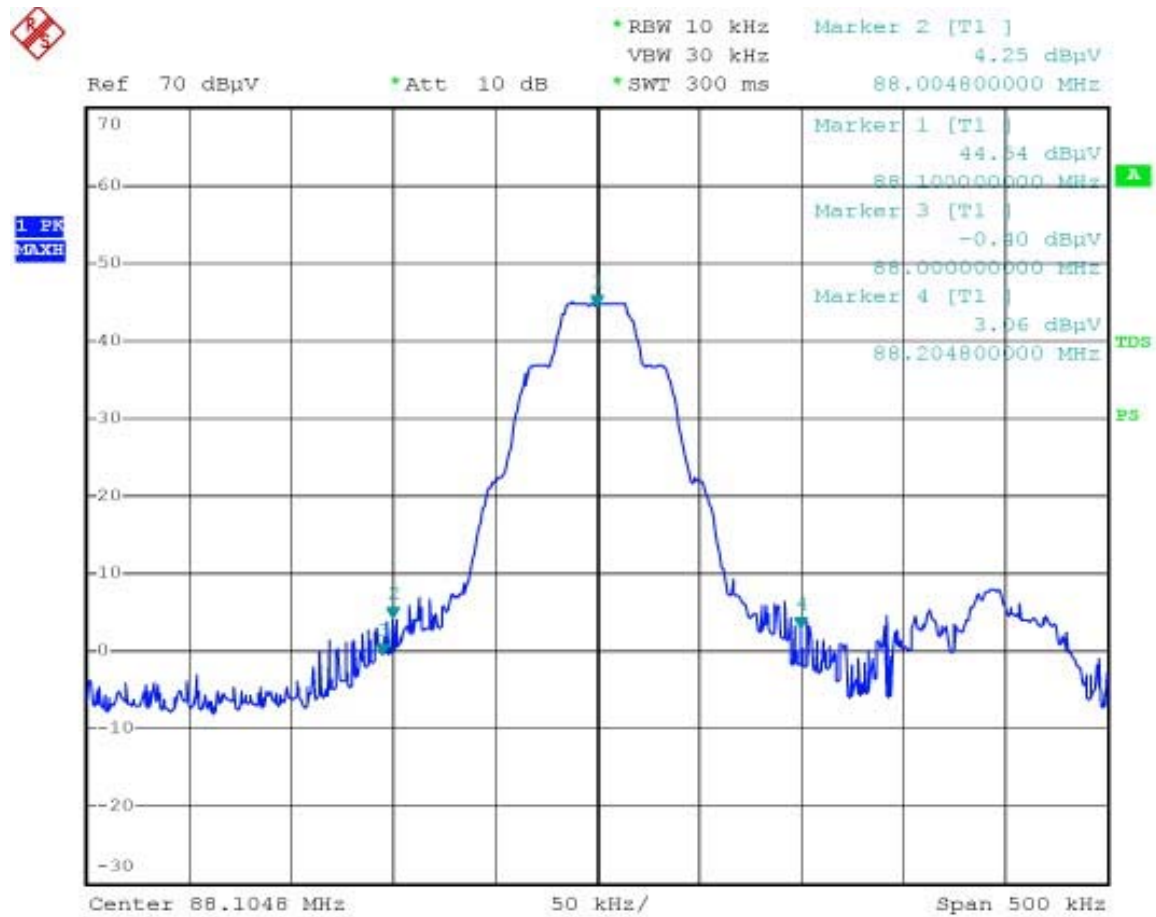
Environmental Conditions

Temperature:	27 ° C
Relative Humidity:	56%
ATM Pressure:	1002mbar

The testing was performed by Kamn Hu on 2006-3-16.

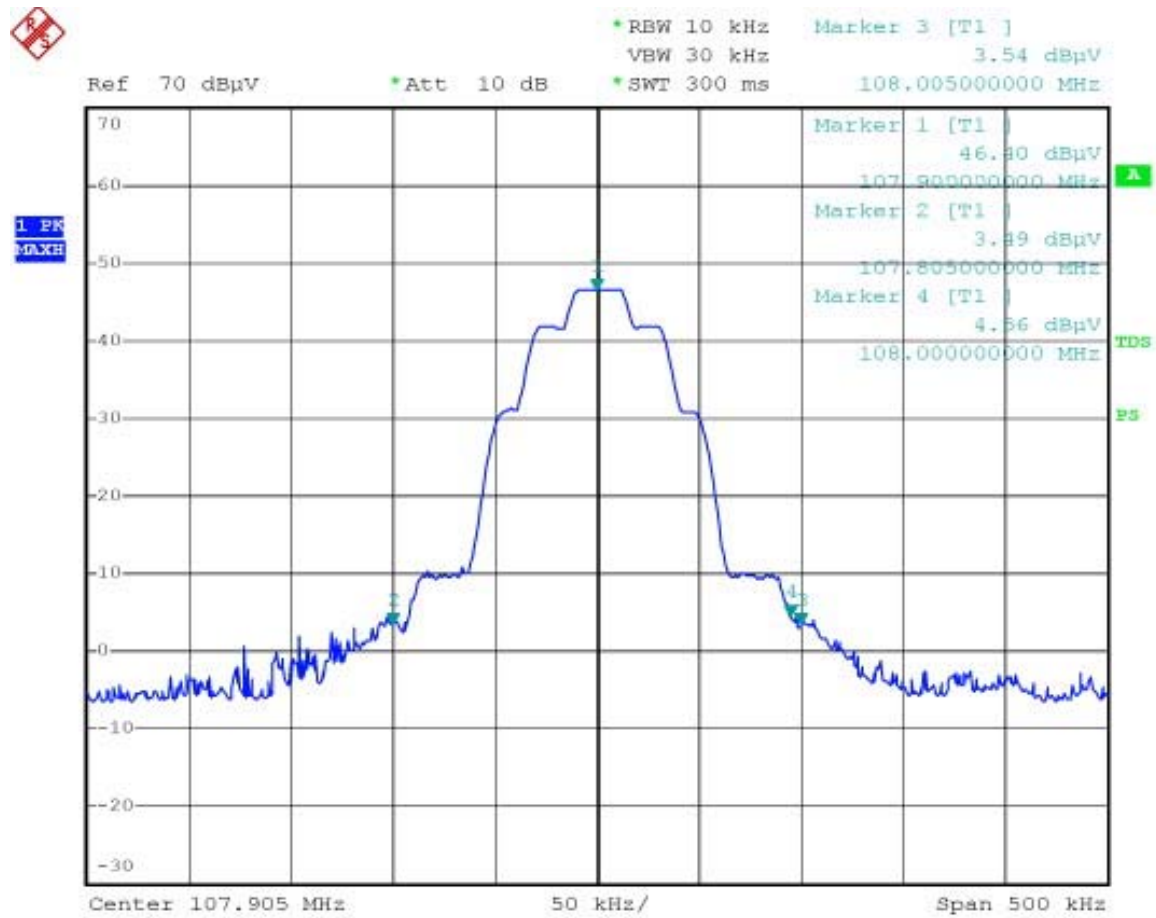
The result has been complied with the 15.239, see the following plot:

Frequency MHz	Emission dB μ V/m	Limit dB μ V/m
88	-0.4	40.0
108	4.56	43.5



XINFUDA BW 88.1MHz

Date: 17.MAR.2006 14:34:42



XINFUDA BW 107.9MHz

Date: 17.MAR.2006 15:12:55