

Saitek Electronics (Shenzhen) Ltd.

RFT 100 Thermometer

Model Number: X142

Prepared for : Saitek Electronics (Shenzhen) Ltd.
139 Da Bao Road, District 33 Bao An, Shenzhen, China

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Ke Feng Rd., 52 Block,
Shenzhen Science & Industrial Park,
Nantou, Shenzhen, Guangdong, China

Tel: (0755) 26639496

Report Number : ACS-F03244
Date of Test : Oct.22, 2003
Date of Report : Oct. 25, 2003

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APPENDIX I (5 pages)

TEST REPORT DECLARATION

Applicant : Saitek Electronics (Shenzhen) Ltd.

Manufacturer : Saitek Electronics (Shenzhen) Ltd.

EUT Description : RFT 100 Thermometer

(A) MODEL NO. : X142

(B) SERIAL NO. : F2003102501

(C) POWER SUPPLY : DC 3V

Test Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Aug 2003.

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits both radiated and conducted emissions.

The test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

This report must not be used by the applicant to claim product endorsement by NVLAP or any agency of the U.S. Government.

Date of Test :

Oct.22, 2003

Prepared by :

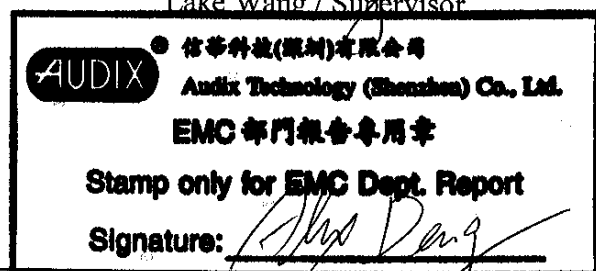
Jane Dai

Jane Dai / Assistant

Reviewer :

Lake Wang / Supervisor

Approved & Authorized Signer :



Alex Deng / Assistant Manager

Name of the Representative of the Responsible Party :

Signature :

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	RFT 100 Thermometer
Model Number	:	X142
Applicant	:	Saitek Electronics (Shenzhen) Ltd. 139 Da Bao Road, District 33 Bao An, Shenzhen, China
Manufacturer	:	Saitek Electronics (Shenzhen) Ltd. 139 Da Bao Road, District 33 Bao An, Shenzhen, China
Date of Test	:	Oct.22, 2003

1.2. Test Facility

Site Description

3m Anechoic Chamber : Certificated by FCC, USA
Aug. 24, 2000

EMC Lab. : Certificated by DATech, German
Feb. 02, 1999

Certificated by NVLAP, USA
NVLAP Code: 200372-0
Mar. 31, 2003

Name of Firm : Audix Technology (Shenzhen) Co., Ltd.

Site Location : No. 6, Ke Feng Rd., 52 Block,
Shenzhen Science & Industrial Park,
Nantou, Shenzhen, Guangdong, China

1.3. Test Uncertainty

Conducted Emission Uncertainty = $\pm 2.66\text{dB}$

Radiated Emission Uncertainty = $\pm 4.26\text{dB}$

2. POWER LINE CONDUCTED EMISSION TEST

According to Paragraph (f) of FCC Part 15 section 15.231, Tests 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.

3. RADIATED EMISSION TEST

3.1. Test Equipment

The following test equipments are used during the radiated emission test:

3.1.1. For Anechoic Chamber

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Spectrum	HP	85422E	3625A00181	May.31, 03	1 Year
2.	Test Receiver	Rohde & Schwarz	ESVS20	830350/005	May.31, 03	1 Year
3.	Amplifier	HP	8447D	2944A07794	Aug.18, 03	1/2 Year
4.	Bilog Antenna	Schaffner	CBL6111C	2598	Jan. 14, 03	1 Year
5.	PC	N/A	586ATX3	N/A	N/A	N/A
6.	Printer	HP	Laserjet6P	SGCF019673	N/A	N/A
7.	RF Cable	MIYAZAKI	5D-2W	3# Chamber No.1	Aug.02, 03	1/2 Year
8.	RF Cable	MIYAZAKI	5D-2W	3# Chamber No.2	Aug.02, 03	1/2 Year
9.	RF Cable	FUJIKURA	RG-55/U	3# Chamber No.3	Aug.02, 03	1/2 Year
10.	RF Cable	FUJIKURA	RG-55/U	3# Chamber No.4	Aug. 02, 03	1/2 Year
11.	Coaxial Switch	Anritsu	MP59B	M73989	May.29, 03	1/2 Year

3.2. Block Diagram of Test Setup

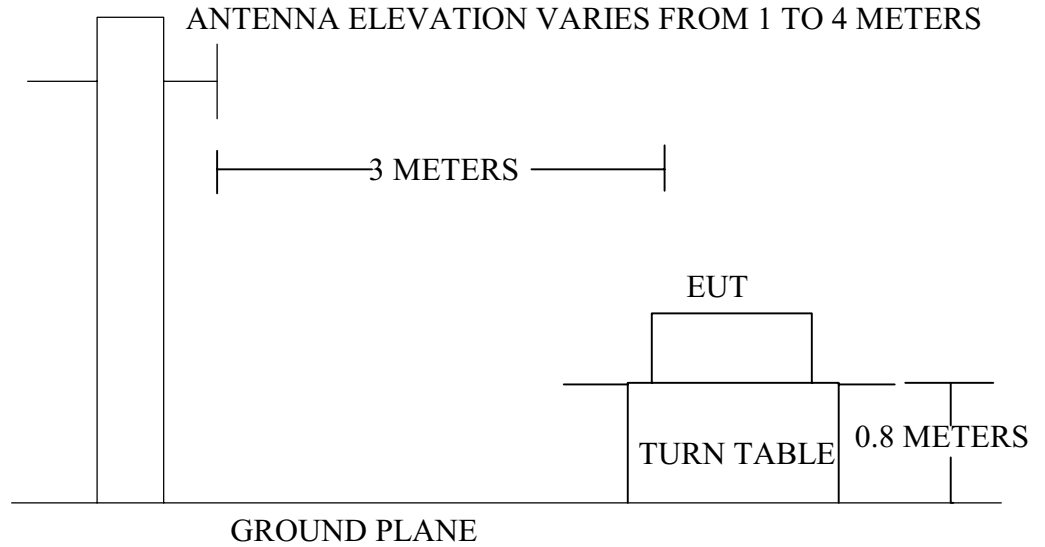
3.2.1. Block diagram of connection between the EUT and simulators

EUT

(EUT: RFT 100 Thermometer)

3.2.2. In Anechoic Chamber

ANTENNA TOWER



3.3. Radiated Emission Limit

FREQUENCY MHz	FIELD STRENGTHS LIMIT
	dB(μ V)/m
30 ~ 260	52.8539
260 ~ 470	72.8539
470 ~ 1000	52.8539
Above 1000	74.0 dB(μ V)/m (Peak) 54.0 dB(μ V)/m (Average)

Remark : (1) Emission level (dB) μ V = 20 log Emission level μ V/m
 μ V/m at 3m = 16.6667 * F - 2833.3333
 (F: Operating Frequency)

- (2) The smaller limit shall apply at the cross point between two frequency bands.
- (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.4.EUT Configuration on Test

The following equipment are installed on Radiated Emission Test to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.4.1.RFT 100 Thermometer (EUT)

Model Number : X142
Serial Number : F2003102501
Manufacturer : Saitek Electronics (Shenzhen) Ltd.

3.4.2.Support Equipment : As Tested Supporting System Detail, in Section 1.2.

3.5.Operating Condition of EUT

1. Setup the EUT as shown in Section 3.2..
2. Let the EUT work in test mode (ON) and test it.

3.6.Test Procedure

EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. Power on the EUT and let it work normally, we use a keyboard test soft ware, let EUT working in test mode, then test it. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the EMI test receiver (R&S ESVS20) is set at 120KHz.

The frequency range from 30MHz to 1000MHz is checked.

The test mode (ON) is tested in Anechoic Chamber, and all the scanning waveforms are attached in Appendix I.

3.7. Radiated Emission Test Result

PASS.

The frequency range from 30MHz to 1000MHz is investigated.
Please see the following pages.

Date of Test :	Oct. 22, 2003	Temperature :	25.2°C
EUT :	RFT 100 Thermometer	Humidity :	56%
Model No. :	X142	Test Mode :	ON
Test Engineer:	Tomy		

Frequency	Antenna	Cable	Meter Reading	Emission Level	Over	Limits
MHz	Factor	Loss	Horizontal	Horizontal	Limits	
	dB/m	dB	dBμV	dBμV/m	dB	dBμV/m
433.540	16.94	4.89	40.90	62.73	-10.27	73.00
934.040	23.03	7.93	8.23	39.19	-13.81	53.00

Remark: 1. All readings are Quasi-Peak values.

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading

3. The worst emission was detected at 433.540MHz with corrected signal level of 62.73dBμV/m (Limit is 73.00 dBμV/m) when the antenna was at horizontal polarization and at 2.3m high and the turn table was at 320 °.

4. 0 ° was the table front facing the antenna. Degree is calculated from 0 ° clockwise facing the antenna.

Reviewer :

Lake Wang

Date of Test :	Oct. 22, 2003	Temperature :	25.2°C
EUT :	RFT 100 Thermometer	Humidity :	56%
Model No. :	X142	Test Mode :	ON
Test Engineer:	Tomy		

Frequency	Antenna	Cable	Meter Reading	Emission Level	Over	Limits
MHz	Factor	Loss	Vertical	Vertical	Limits	
	dB/m	dB	dBμV	dBμV/m	dB	dBμV/m
433.540	16.81	4.89	43.60	65.30	-7.70	73.00
866.140	22.89	7.19	34.16	38.55	-14.45	53.00

Remark: 1. All readings are Quasi-Peak values.

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading

3. The worst emission was detected at 433.540MHz with corrected signal level of 65.30dBμV/m(Limit is 73.00 dBμV/m) when the antenna was at vertical polarization and at 1.7m high and the turn table was at 45 °.

4. 0 ° was the table front facing the antenna. Degree is calculated from 0 ° clockwise facing the antenna.

Reviewer :

Lake Wang



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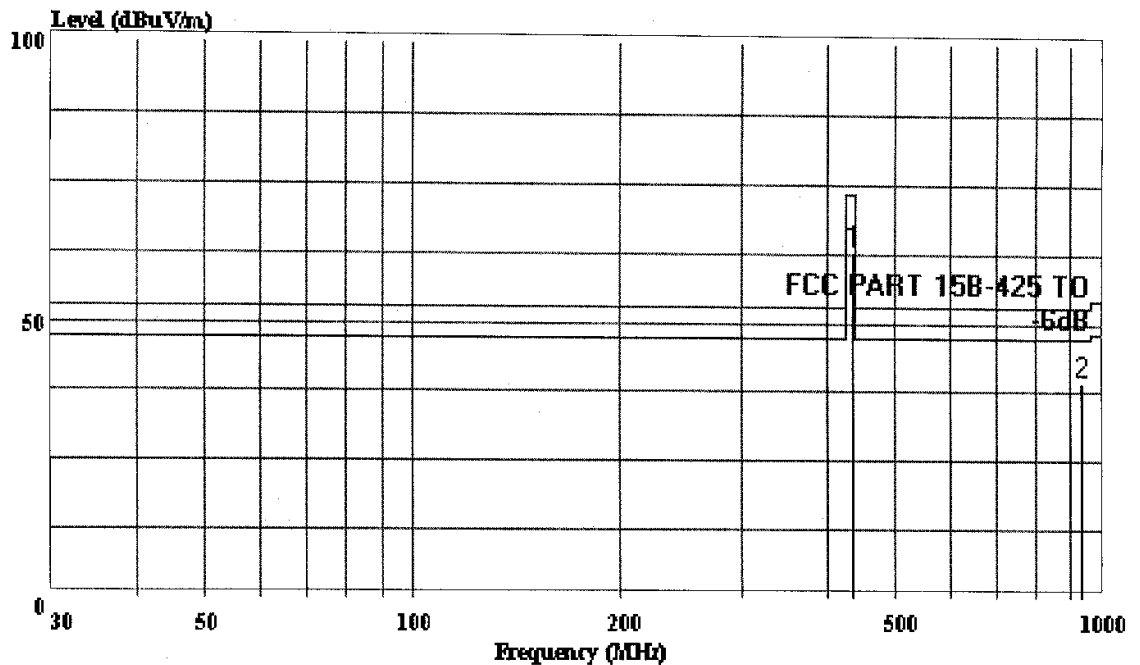
Shenzhen Science & Ind. Park

Tel: 0755-26639495~7

Fax: 0755-26632877

Data#: 1098 File#: Saitek.emi

Date: 2003-10-22 Time: 09:31:17



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (3# Chamber)

Trace:

Ref Trace:

Condition: FCC PART 15B-425 TO 3m 2598FACTOR HORIZONTAL

EUT : RFT 100 thermometer

M/N : X142

Power : DC 3V

Test Engineer: Tomy

Memo : ON

: H:2.3m Deg:320'

Page: 1

	Freq	Level	Limit	Over	Read	Probe	Cable
	MHz	dBuV/m	Line	Limit	Level	Factor	Loss
1	433.540	62.73	73.00	-10.27	40.90	16.94	4.89
2	934.040	39.19	53.00	-13.81	8.23	23.03	7.93



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

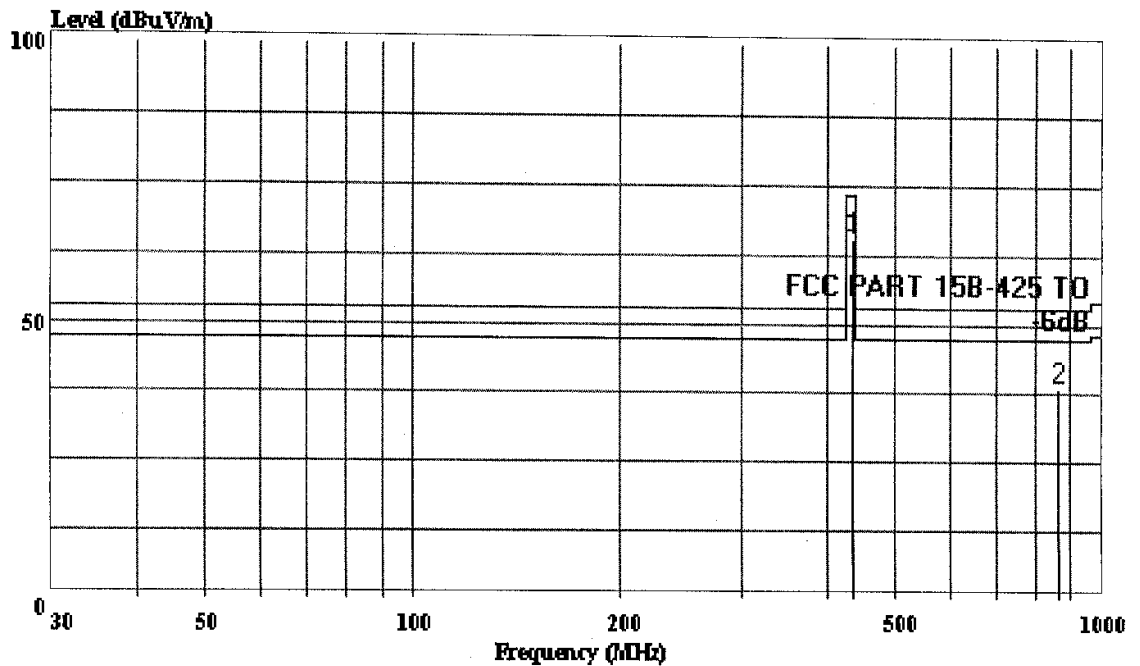
Shenzhen Science & Ind. Park

Tel: 0755-26639495~7

Fax: 0755-26632877

Data#: 1100 File#: Saitek.emi

Date: 2003-10-22 Time: 09:37:51



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (3# Chamber)

Trace:

Ref Trace:

Condition: FCC PART 15B-425 TO 3m 2598FACTOR VERTICAL

EUT : RFT 100 thermometer

M/N : X142

Power : DC 3V

Test Engineer: Tomy

Memo : ON

: H:1.7m Deg:45'

Page: 1

	Freq	Level	Limit	Over	Read	Probe	Cable
	MHz	dBuV/m	Line	Limit	Level	Factor	Loss
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB
1	433.540	65.30	73.00	-7.70	43.60	16.81	4.89
2	866.140	38.55	53.00	-14.45	34.16	22.89	7.19

4. BANDWIDTH TEST

4.1. Test Equipment

The following test equipments are used during the bandwidth test:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4407B	MY41440292	Jun 22, 03	1 Y
2.	Antenna	EMCO	3115	9607-4877	Dec 02, 02	1.5 Y
3.	Print				N/A	N/A

4.2. Test Standard

The test completeness FCC 15C (231).

4.3. Bandwidth Limit

Bandwidth is determined at the points 20dB down from the modulated:

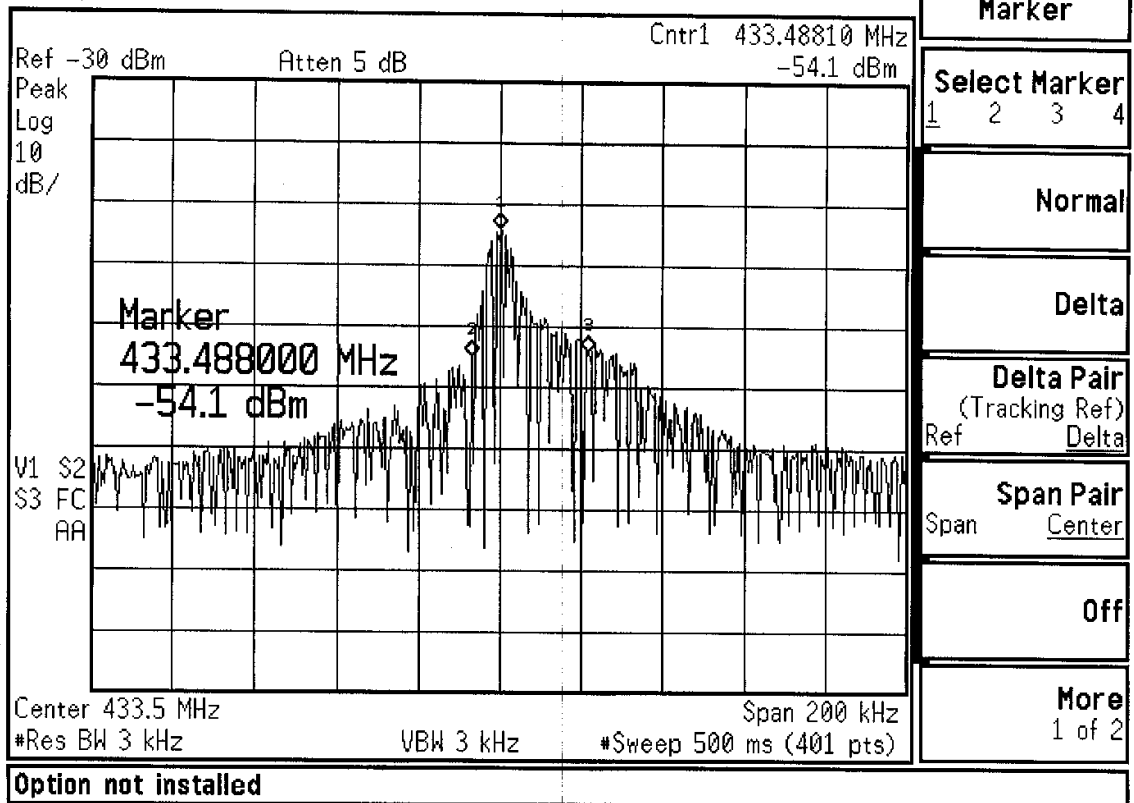
$$433.4881 * 0.25\% = 1.0837 \text{ MHz}$$

$$433.50950 - 433.48116 = 0.02834$$

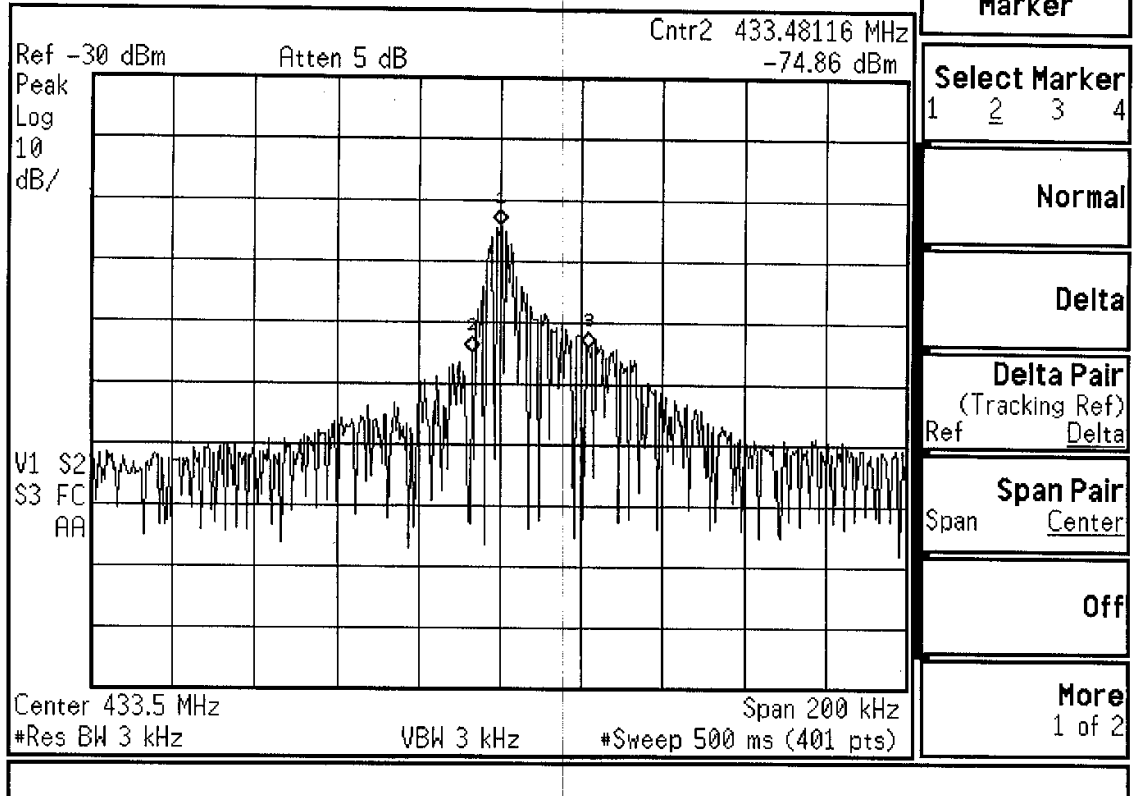
4.4. Test Result

PASS.

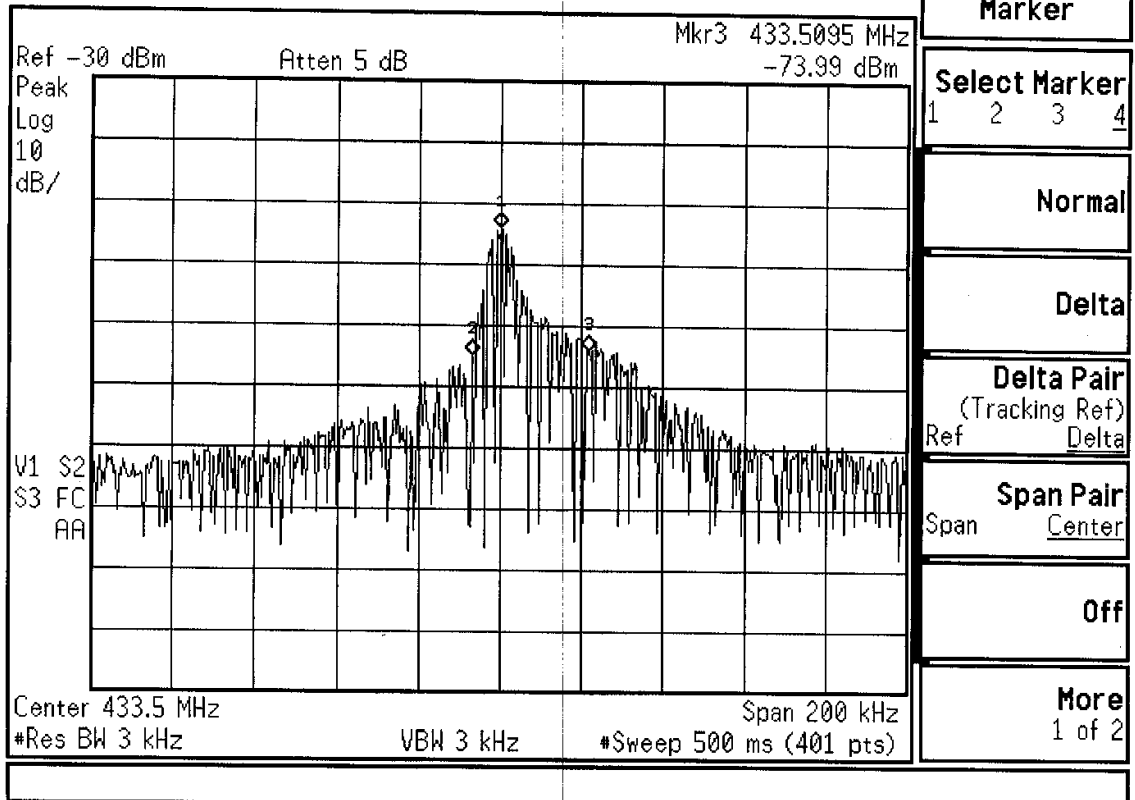
* Agilent



* Agilent



* Agilent



5. DEVIATION TO TEST SPECIFICATIONS

(None.)

APPENDIX I



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

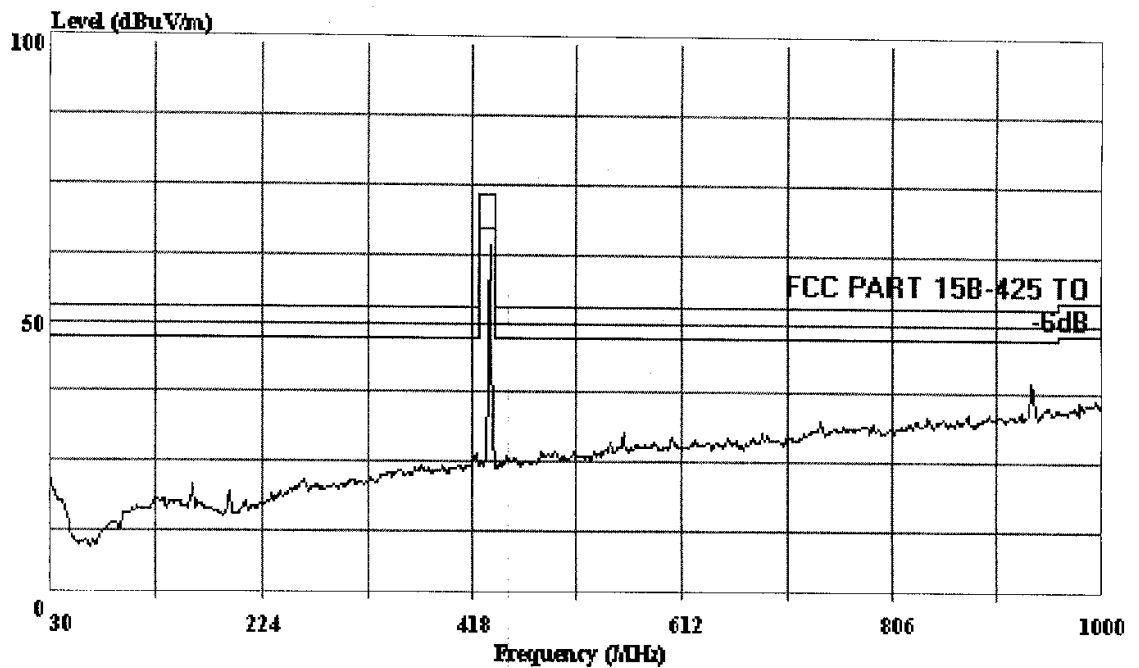
Shenzhen Science & Ind. Park

Tel: 0755-26639495~7

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Data#: 1097 File#: Saitek.emi

Date: 2003-10-22 Time: 09:25:44



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (3# Chamber)

Trace:

Ref Trace:

Condition: FCC PART 15B-425 TO 3m 2598FACTOR HORIZONTAL

EUT : RFT 100 thermometer

M/N : X142

Power : DC 3V

Test Engineer: Tomy

Memo : ON



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

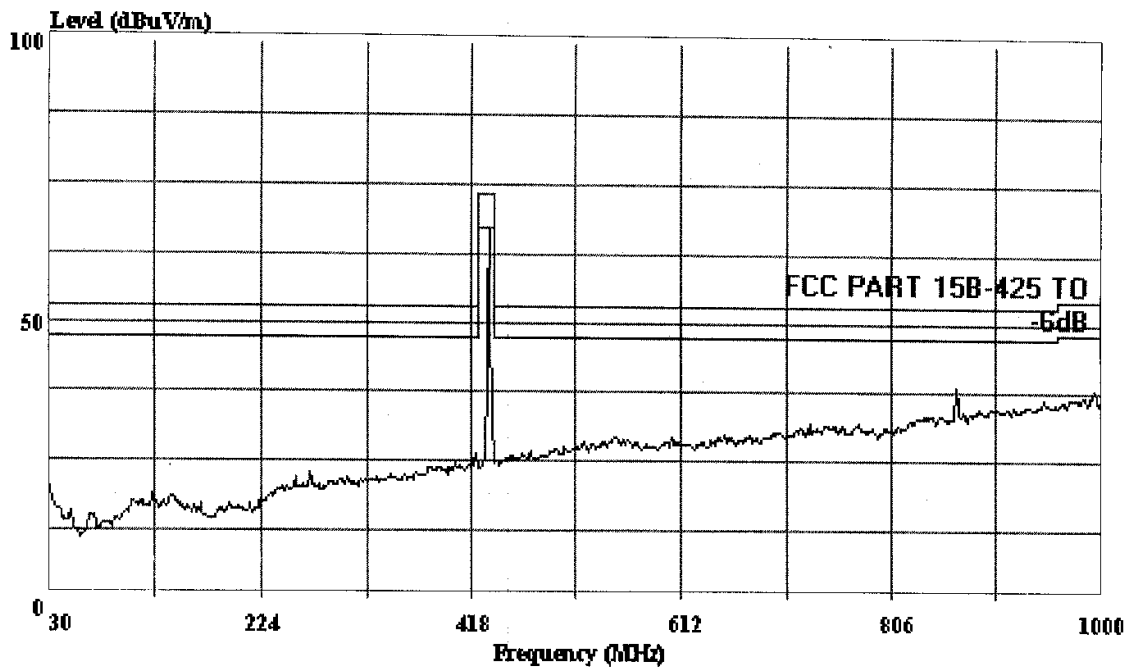
Shenzhen Science & Ind. Park

Tel: 0755-26639495~7

Fax: 0755-26632877

Data#: 1099 File#: Saitek.emi

Date: 2003-10-22 Time: 09:34:34



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (3# Chamber)

Trace:

Ref Trace:

Condition: FCC PART 15B-425 TO 3m 2598FACTOR VERTICAL

EUT : RFT 100 thermometer

M/N : X142

Power : DC 3V

Test Engineer: Tomy

Memo : ON

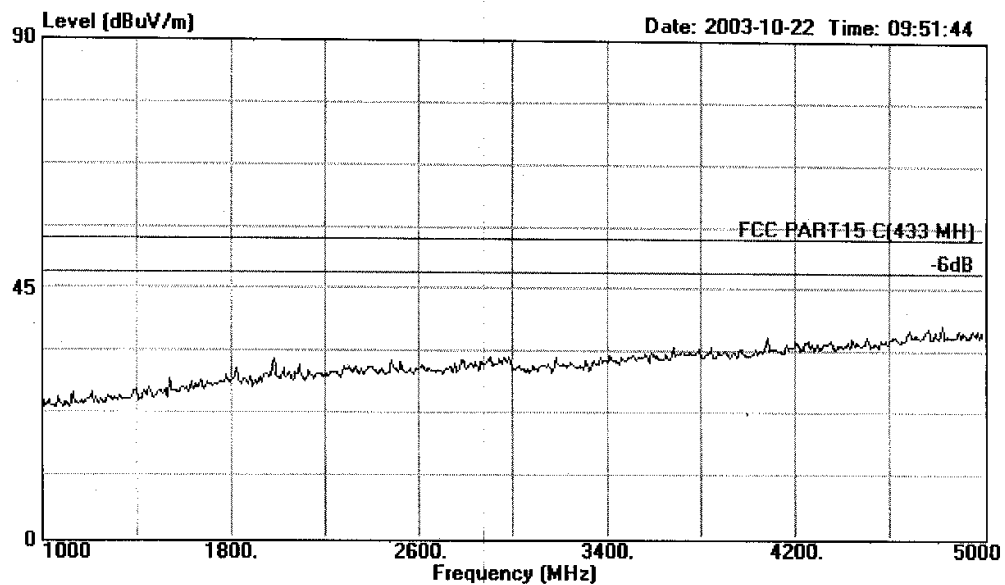


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Shenzhen Science & Industry Park
Nantou, Shenzhen, Guangdong, China
Tel: +86-755-26639496 Fax: +86-755-26632877

Data#: 313 File#: C:\EMI TEST DATA\S\Saitek.EMI



Site : 1# Chamber
Condition : FCC PART15 C(433 MH) 3m 3115FACTOR HORIZONTAL
EUT : RFT 100 thermometer
M/N : X142
Power : DC 3V
Test Engineer : Tomy
Memo : ON

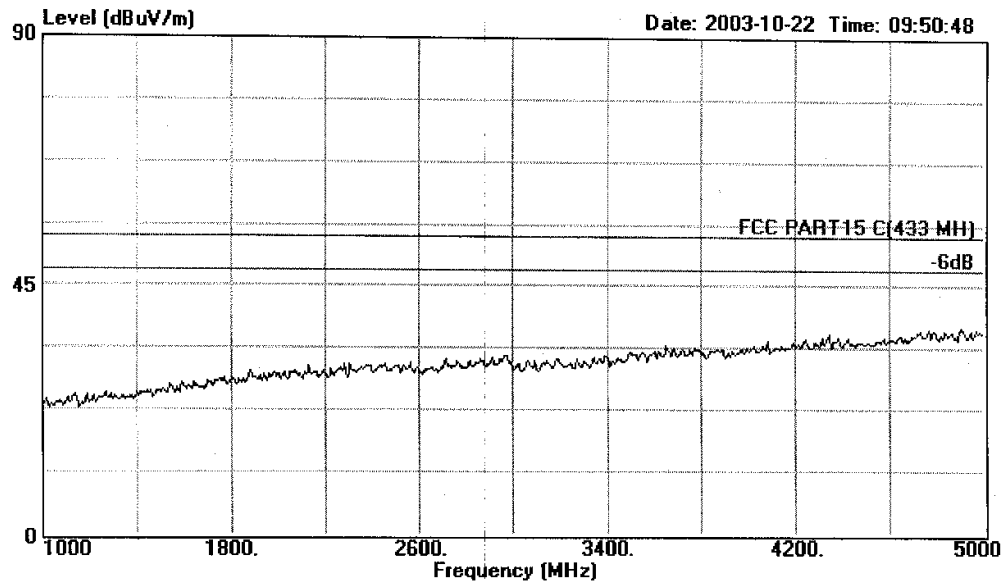


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Tel: +86-755-26639496 Fax: +86-755-26632877

Data#: 312 File#: C:\EMI TEST DATA\S\Saitek.EMI



Site : 1# Chamber
Condition : FCC PART15 C(433 MH) 3m 3115FACTOR VERTICAL
EUT : RFT 100 thermometer
M/N : X142
Power : DC 3V
Test Engineer : Tomy
Memo : ON