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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Description

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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 / Assistant

Reviewer : Lake Wang / Supervisor

Approved & Authorized Signer :

AUDIX
Audix Technology (Shenzhen) Co., Ltd.
EMC 部門報告專用章
Stamp only for EMC Dept. Report
Signature:

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	=	±2.66dB
Radiated Emission Uncertainty	=	±4.26dB

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

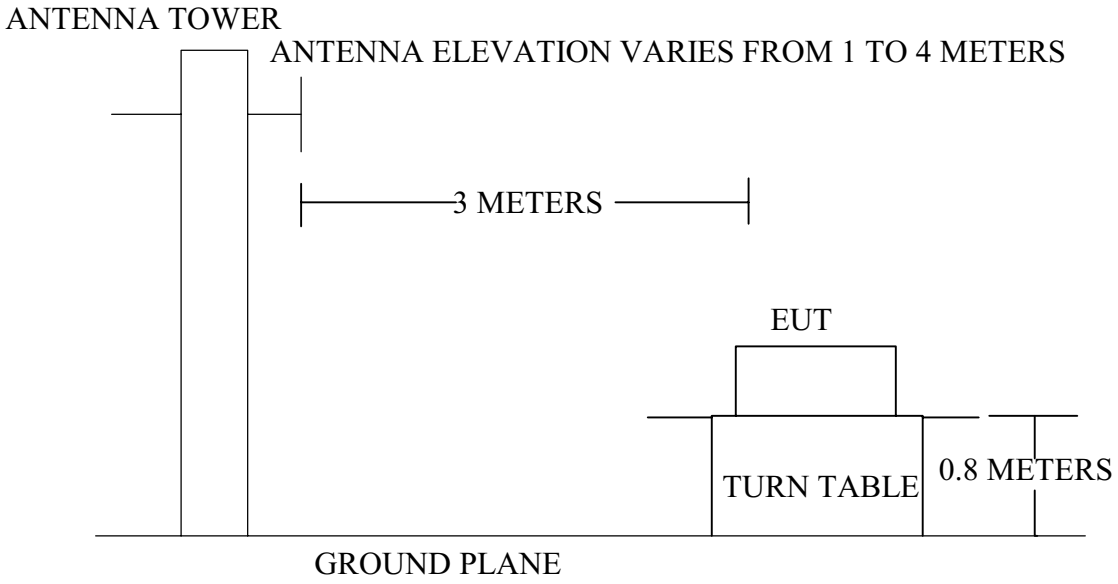
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Spectrum	HP	85422E	3625A00181	May.31, 03	1 Year
2.	Test Receiver	Rohde & Schwarz	ESVS20	830350/005	May.31, 03	1 Year
3.	Amplifier	HP	8447D	2944A07794	Aug.18, 03	1/2 Year
4.	Bilog Antenna	Schaffner	CBL6111C	2598	Jan. 14, 03	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: RFT 100 Thermometer)

3.2.2.In Anechoic Chamber



3.3.Radiated Emission Limit

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

Remark： (1) Emission level (dB)μV = 20 log Emission level μV/m
μV/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

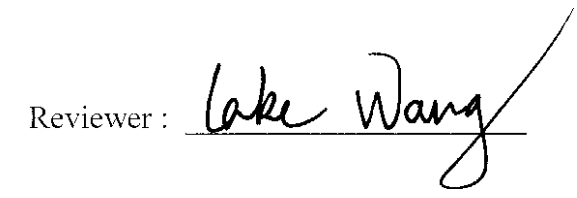
PASS.

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

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

Frequency	Antenna Factor	Cable Loss	Meter Reading Horizontal	Emission Level Horizontal	Over Limits	Limits
MHz	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 : 

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

Frequency	Antenna Factor	Cable Loss	Meter Reading Vertical	Emission Level Vertical	Over Limits	Limits
MHz	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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Fax: 0755-26632877

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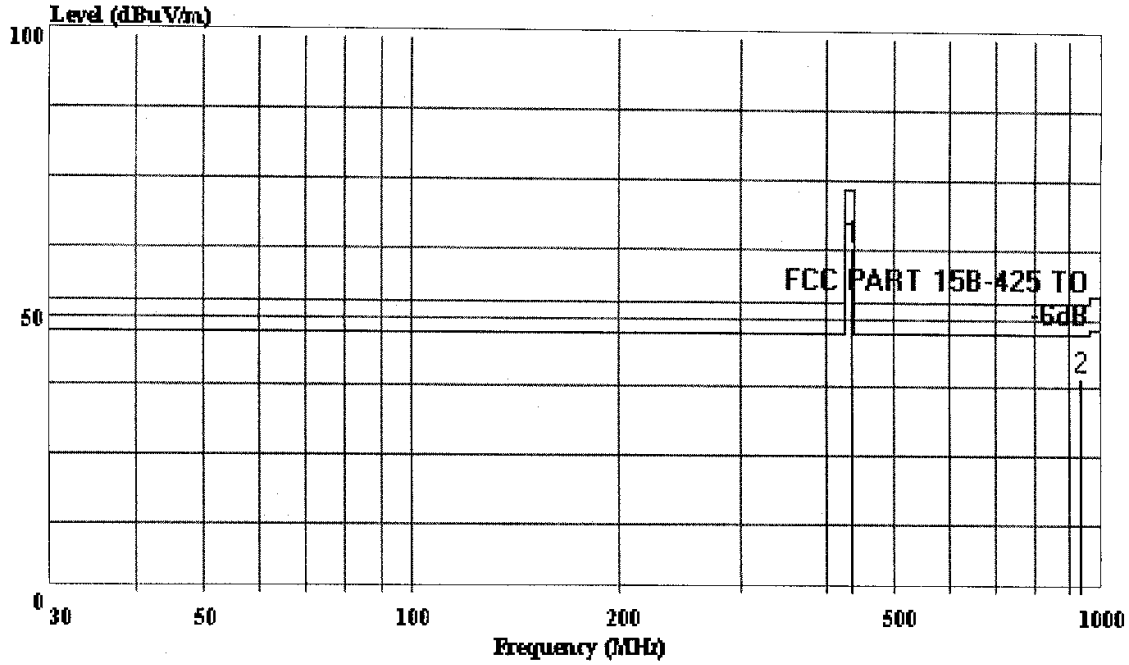

AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (3# Chamber)

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 Line	Over Limit	Read Level	Probe Factor	Cable Loss
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB	dB
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

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Fax: 0755-26632877

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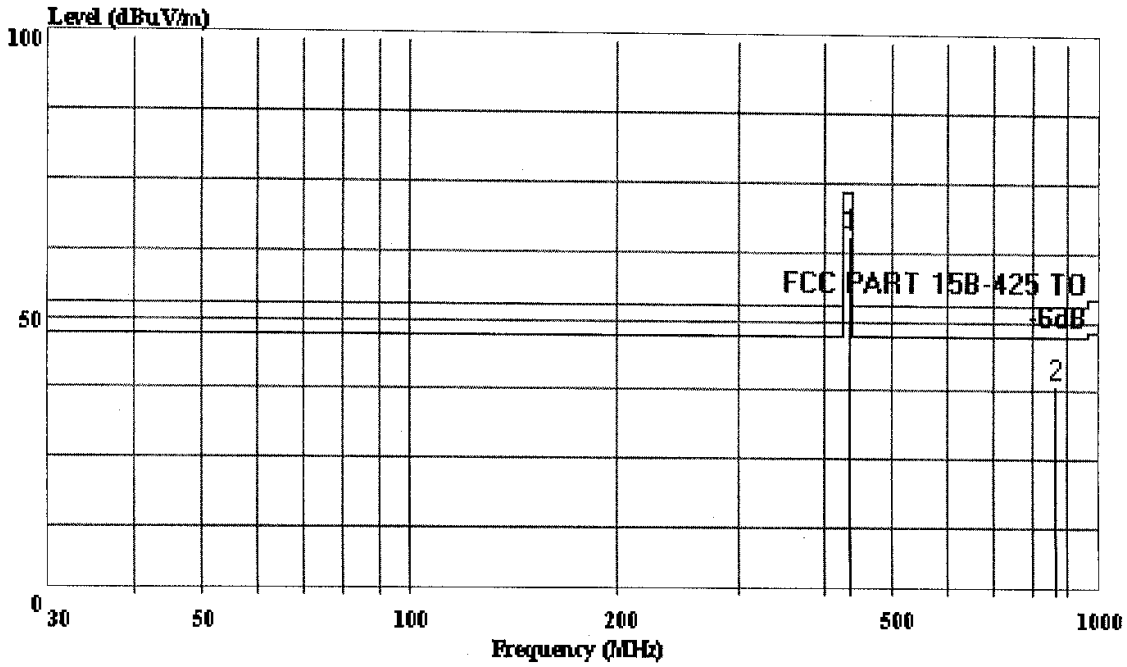


AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (3# Chamber)

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 Line	Over Limit	Read Level	Probe Factor	Cable 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

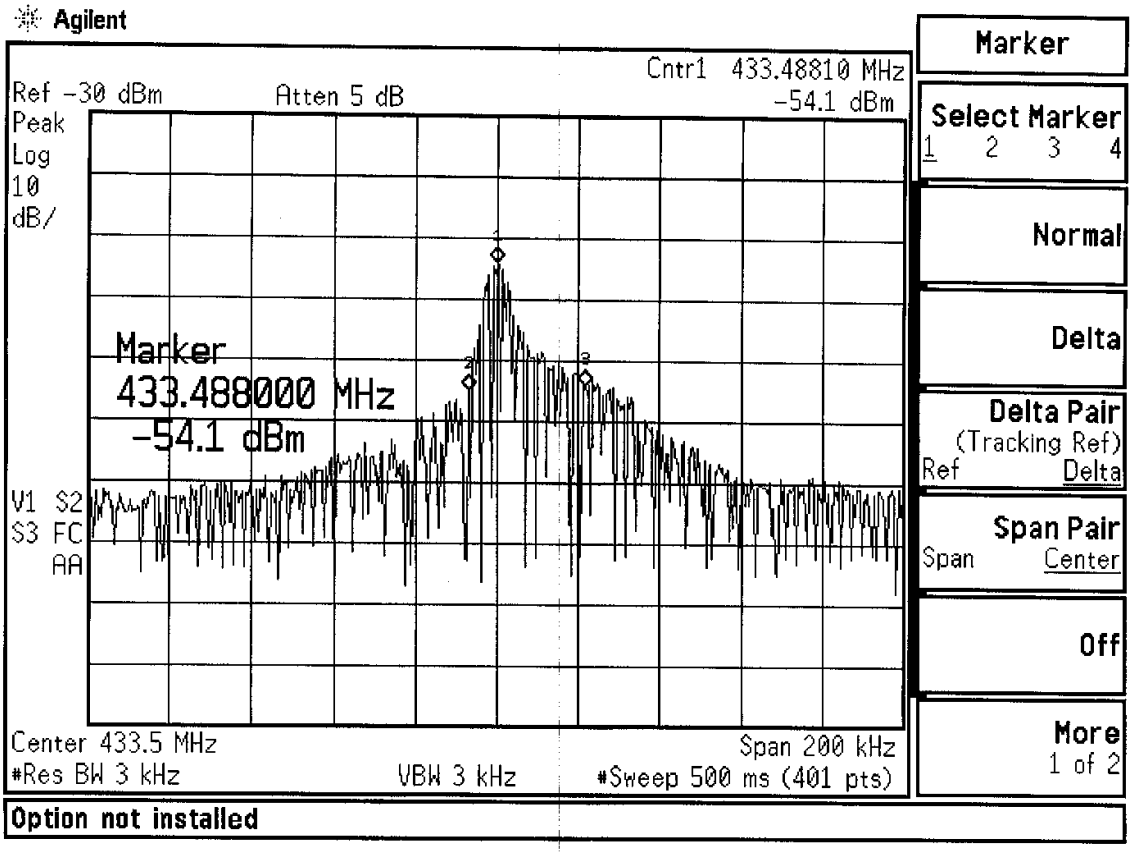
Bandwidth is determined at the points 20dB down from the modulated:

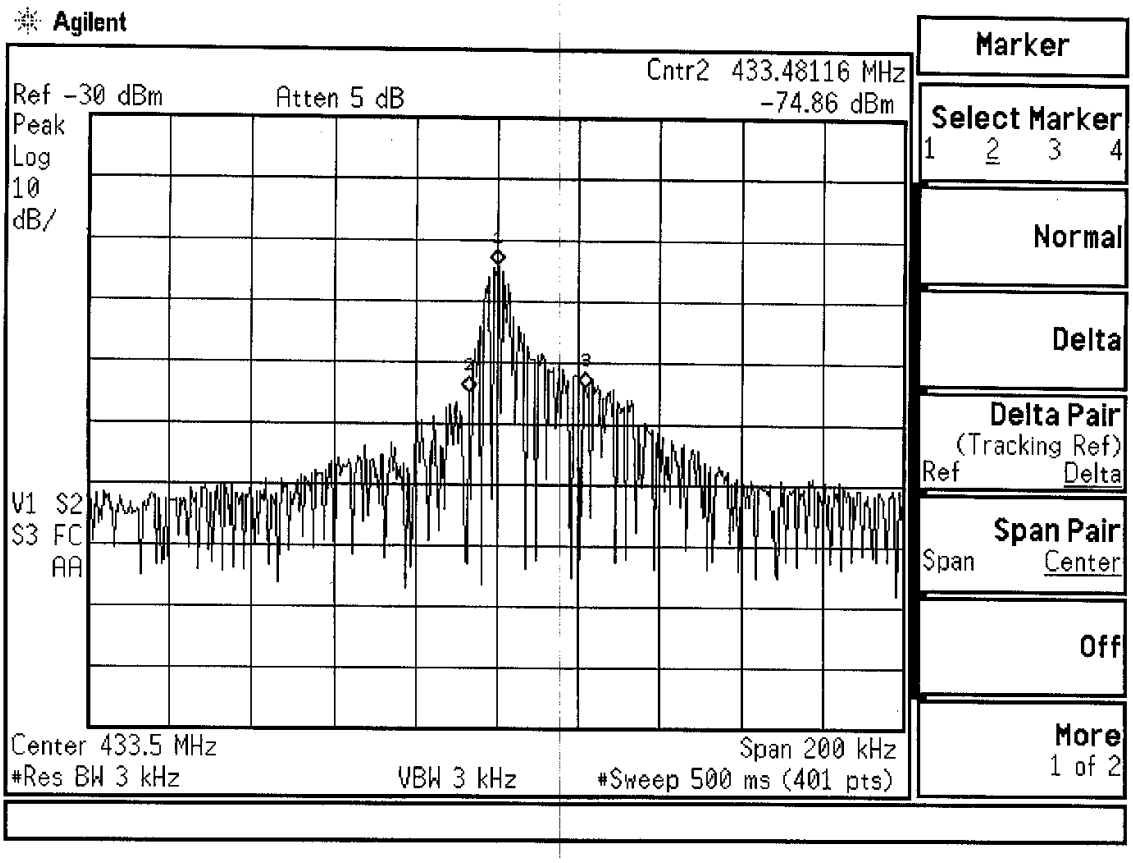
433.4881*0.25%=1.0837MHz

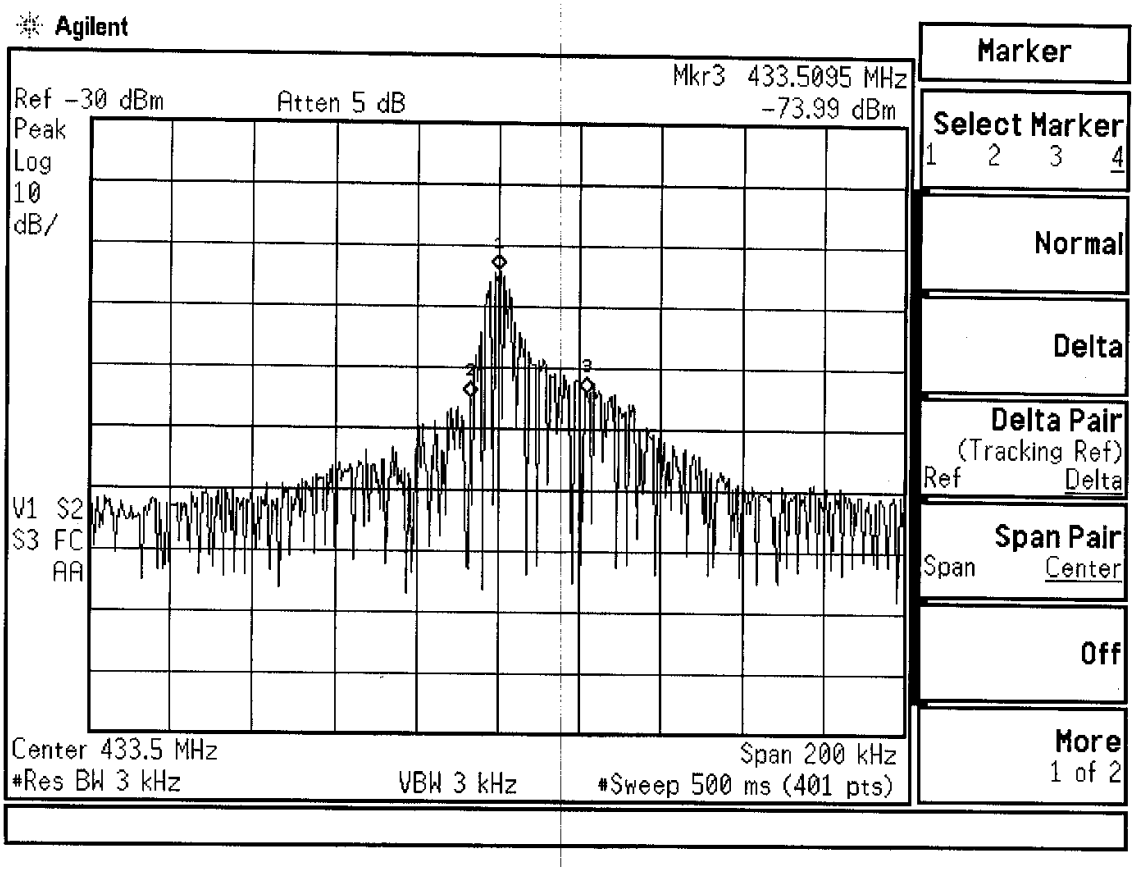
433.50950-433.48116=0.02834

4.4.Test Result

PASS.


Agilent
Cntr1 433.48810 MHz
Ref -30 dBm
Atten 5 dB
-54.1 dBm
Peak
Log
10
dB/
Marker
433.488000 MHz
-54.1 dBm
V1 S2
S3 FC
AA
Center 433.5 MHz
#Res BW 3 kHz
VBW 3 kHz
Span 200 kHz
#Sweep 500 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2
Option not installed


Agilent
Ref -30 dBm
Atten 5 dB
Cntr2 433.48116 MHz
-74.86 dBm
Peak
Log
10
dB/
V1 S2
S3 FC
AA
Center 433.5 MHz
#Res BW 3 kHz
VBW 3 kHz
Span 200 kHz
#Sweep 500 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2


Agilent
Ref -30 dBm
Atten 5 dB
Mkr3 433.5095 MHz
-73.99 dBm
Peak
Log
10
dB/
V1 S2
S3 FC
AA
Center 433.5 MHz
#Res BW 3 kHz
VBW 3 kHz
Span 200 kHz
#Sweep 500 ms (401 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Delta
Span Pair
Span Center
Off
More
1 of 2

5. DEVIATION TO TEST SPECIFICATIONS

(None.)

APPENDIX I

AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.
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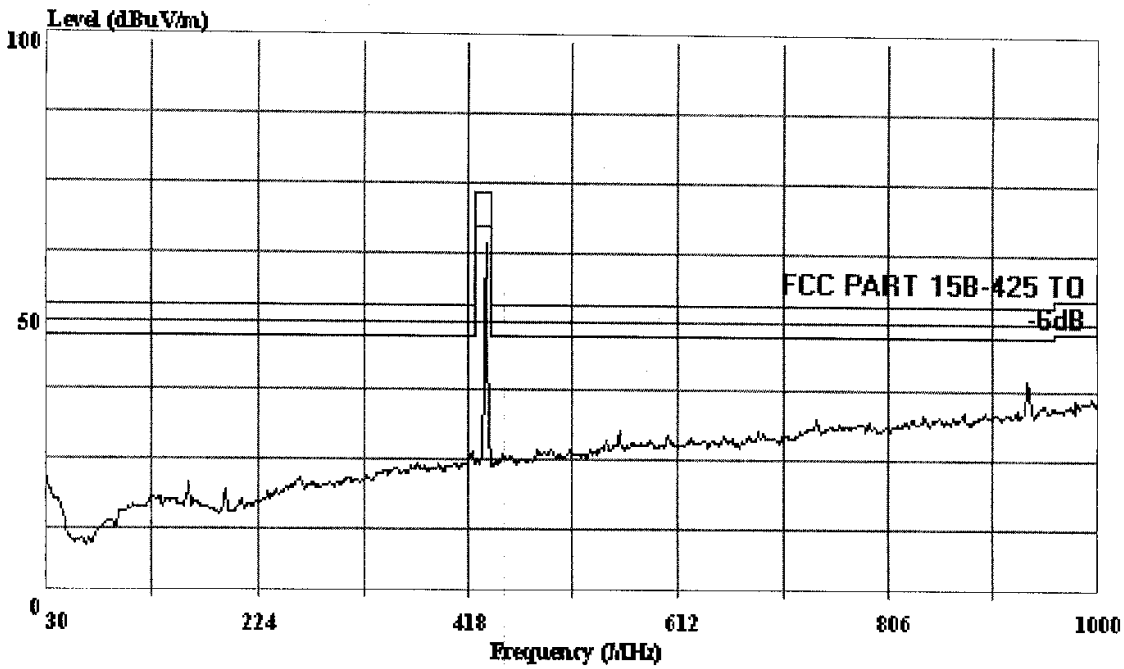

AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (3# Chamber)

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

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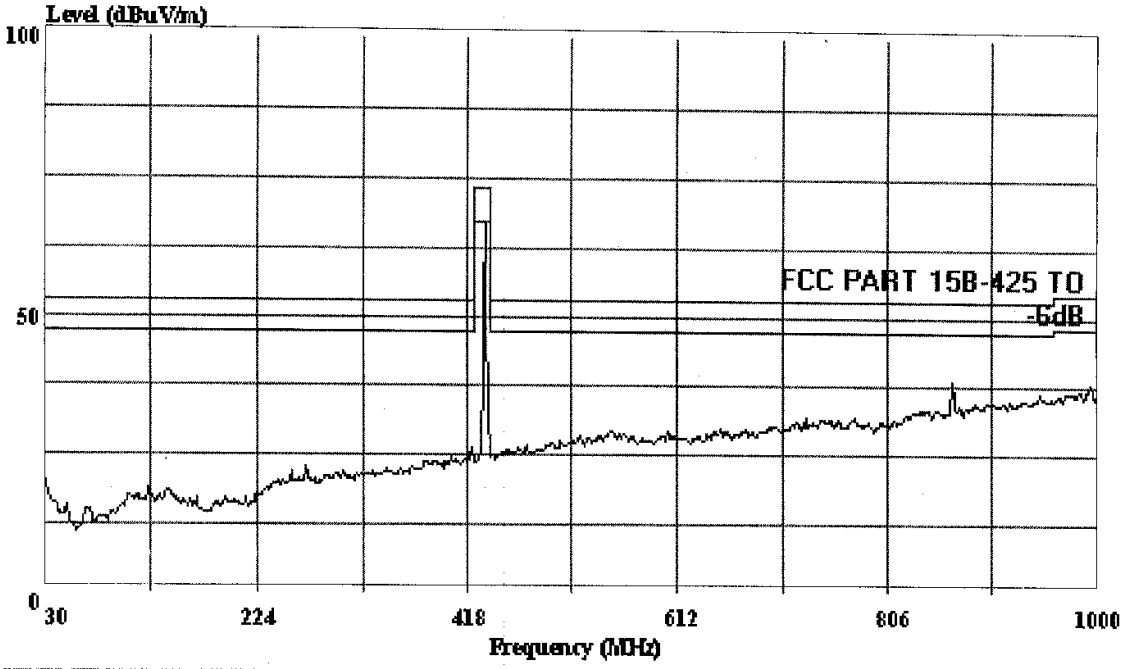

Trace: Ref Trace:

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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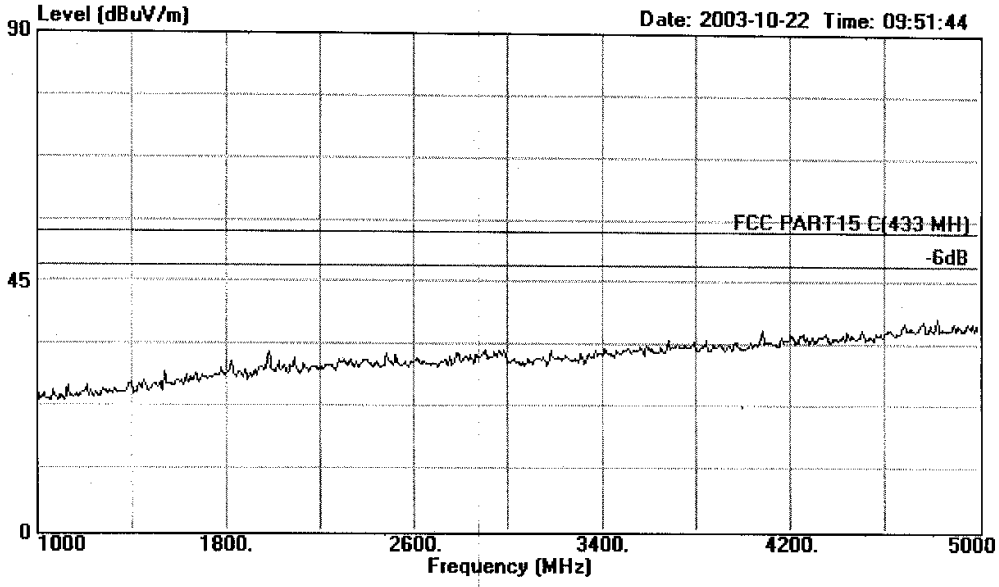

Site : 1# Chamber
Condition : FCC PART15 C(433 MH) 3m 3115FACTOR HORIZONTAL
EUT : RFT 100 thermometer
M/N : X142
Power : DC 3V
Test Engineer : Tomy
Memo : ON

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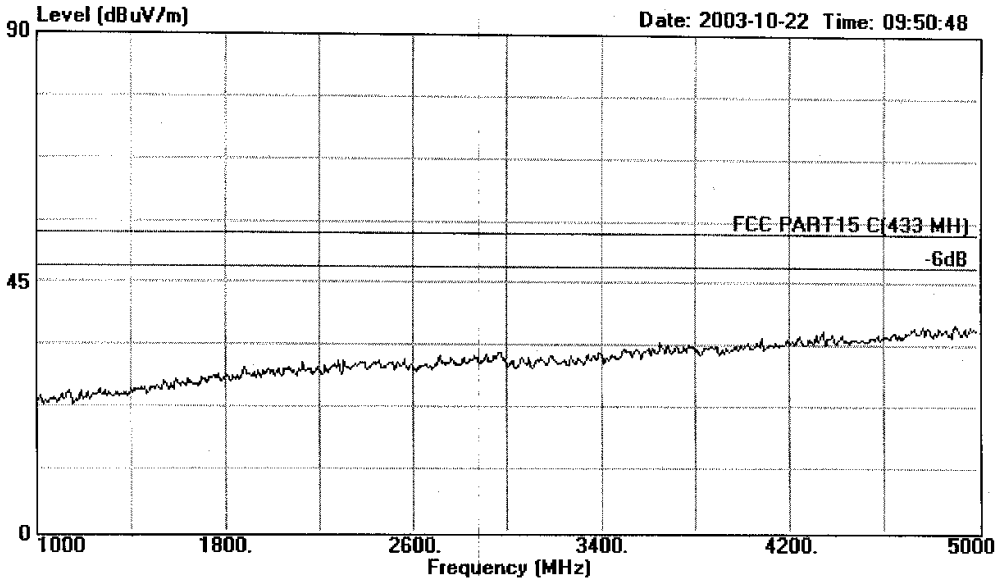

Site : 1# Chamber
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EUT : RFT 100 thermometer
M/N : X142
Power : DC 3V
Test Engineer : Tomy
Memo : ON