

APPLICATION FOR CERTIFICATION  
On Behalf of

Sense Technology Co., Ltd.

UHF RFID Scanner

Model Number: Sense1820

Prepared for : Sense Technology Co., Ltd.  
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Shen Zhen, China

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Report Number : ACS-F04274  
Date of Test : Aug.12~17, 2004  
Date of Report : Sep.08, 2004

## TABLE OF CONTENTS

Description	Page
FCC Test Report for Declaration of Conformity	
<b>1. GENERAL INFORMATION .....</b>	<b>1-1</b>
1.1. Description of Device (EUT) .....	1-1
1.2. Test Facility .....	1-2
1.3. Measurement Uncertainty.....	1-2
<b>2. POWER LINE CONDUCTED EMISSION TEST .....</b>	<b>2-1</b>
2.1. Test Equipments .....	2-1
2.2. Block Diagram of Test Setup .....	2-1
2.3. Power Line Conducted Emission Test Limits .....	2-2
2.4. Configuration of EUT on Test.....	2-2
2.5. Operating Condition of EUT .....	2-2
2.6. Test Procedure .....	2-2
2.7. Power Line Conducted Emission Test Results.....	2-3
<b>3. RADIATED EMISSION TEST .....</b>	<b>3-1</b>
3.1. Test Equipment.....	3-1
3.2. Block Diagram of Test Setup .....	3-1
3.3. Radiated Emission Limit .....	3-2
3.4. EUT Configuration on Test.....	3-3
3.5. Operating Condition of EUT .....	3-3
3.6. Test Procedure .....	3-3
3.7. Radiated Emission Test Result.....	3-4
<b>4. 20dB BANDWIDTH MEASUREMENT .....</b>	<b>4-1</b>
4.1. Test Equipment.....	4-1
4.2. Block Diagram of Test Setup .....	4-1
4.3. Operating Condition of EUT .....	4-1
4.4. Test Procedure .....	4-2
4.5. Test Results .....	4-2
<b>5. THE MAXIMUM PEAK OUTPUT POWER MEASUREMENT .....</b>	<b>5-1</b>
5.1. Test Equipment.....	5-1
5.2. Block Diagram of Test Setup .....	5-1
5.3. Specification Limits (§15.247(b)-(3)) .....	5-1
5.4. Operating Condition of EUT .....	5-1
5.5. Test Procedure .....	5-2
5.6. Test Results .....	5-2
<b>6. CHANNEL CARRIER FREQUENCIES SEPARATED MEASUREMENT .....</b>	<b>6-1</b>
6.1. Test Equipment.....	6-1
6.2. Block Diagram of Test Setup .....	6-1
6.3. Specification Limits (§15.247(a)) .....	6-1
6.4. Operating Condition of EUT .....	6-1
6.5. Test Procedure .....	6-2
6.6. Test Results .....	6-2
<b>7. FREQUENCY HOPPING SYSTEM CHANNEL NUMBER MEASUREMENT .....</b>	<b>7-1</b>
7.1. Test Equipment.....	7-1
7.2. Block Diagram of Test Setup .....	7-1
7.3. Specification Limits (§15.247(a)) .....	7-1
7.4. Operating Condition of EUT .....	7-1

7.5. Test Procedure .....	7-2
7.6. Test Results .....	7-2
<b>8. THE AVERAGE TIME OF OCCUPANCY MEASUREMENT.....</b>	<b>8-1</b>
8.1. Test Equipment.....	8-1
8.2. Block Diagram of Test Setup .....	8-1
8.3. Specification Limits (§15.247(a)) .....	8-1
8.4. Operating Condition of EUT .....	8-1
8.5. Test Procedure .....	8-2
8.6. Test Results .....	8-2
<b>9. DEVIATION TO TEST SPECIFICATIONS.....</b>	<b>9-1</b>
<b>10. PHOTOGRAPH.....</b>	<b>10-1</b>
10.1. Photos of Power Line Conducted Emission Test .....	10-1
10.2. Photos of Radiated Emission Test.....	10-2
10.3. Photo of 20dB Bandwidth Measurement.....	10-4
10.4. Photo of The Maximum Peak Output Power Measurement.....	10-4
10.5. Photo of Channel Carrier Frequencies Separated Measurement.....	10-5
10.6. Photo of Frequency Hopping System Channel Number Measurement.....	10-5
10.7. Photo of The Average Time Of Occupancy Measurement .....	10-6

APPENDIX I (7 pages)  
 APPENDIX II (13 pages)

## TEST REPORT DECLARATION

Applicant : Sense Technology Co., Ltd.  
 Manufacturer : Sense Technology Co., Ltd.  
 EUT Description : UHF RFID Scanner  
 (A) MODEL NO. : Sense1820  
 (B) SERIAL NO. : F2004090801  
 (C) POWER SUPPLY : DC 5V

## Test Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Apr 2004.

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.

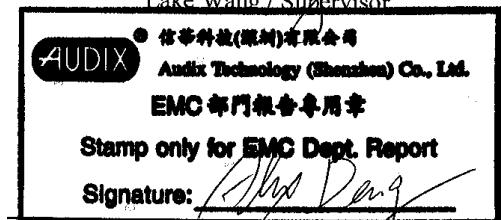
This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

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 : Aug.12~17, 2004

Prepared by : Jane Dai  
Jane Dai / Assistant

Reviewer : Lake Wang  
Lake Wang / Supervisor



Approved & Authorized Signer :

Name of the Representative of the Responsible Party : \_\_\_\_\_

Signature : \_\_\_\_\_

## 1. GENERAL INFORMATION

### 1.1. Description of Device (EUT)

Description : UHF RFID Scanner

Model Number : Sense1820

Applicant : Sense Technology Co., Ltd.  
Room 716-723, You Se Building, Shen Nan Zhong  
Road, Shen Zhen, China

Manufacturer : Sense Technology Co., Ltd.  
Room 716-723, You Se Building, Shen Nan Zhong  
Road, Shen Zhen, China

Power Adapter : Manufacture: Shenzhen Zhong Yuan Tong  
M/N: DSA-0421S-05-1-25  
Cable: Unshielded, Detachable 0.8m

Date of Test : Aug.12~17, 2004

## 1.2. Test Facility

### Site Description

3m Anechoic Chamber	:	Certificated by FCC, USA Registration Number : 90454 Aug. 15, 2003
3m & 10m Anechoic Chamber	:	Certificated by FCC, USA Registration Number : 794232 Mar. 15, 2004
EMC Lab.	:	Certificated by DATech, German Registration Number : DAT-P-091/99-01 Feb. 02, 2004
		Certificated by NVLAP, USA NVLAP Code: 200372-0 Mar. 31, 2004
		Certificated by Nemko, Norway Aut. No.: ELA135 April. 22, 2004
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. Measurement Uncertainty

Conducted Emission Uncertainty =  $\pm$  2.66dB

Radiated Emission Uncertainty =  $\pm$  4.26dB

## 2. POWER LINE CONDUCTED EMISSION TEST

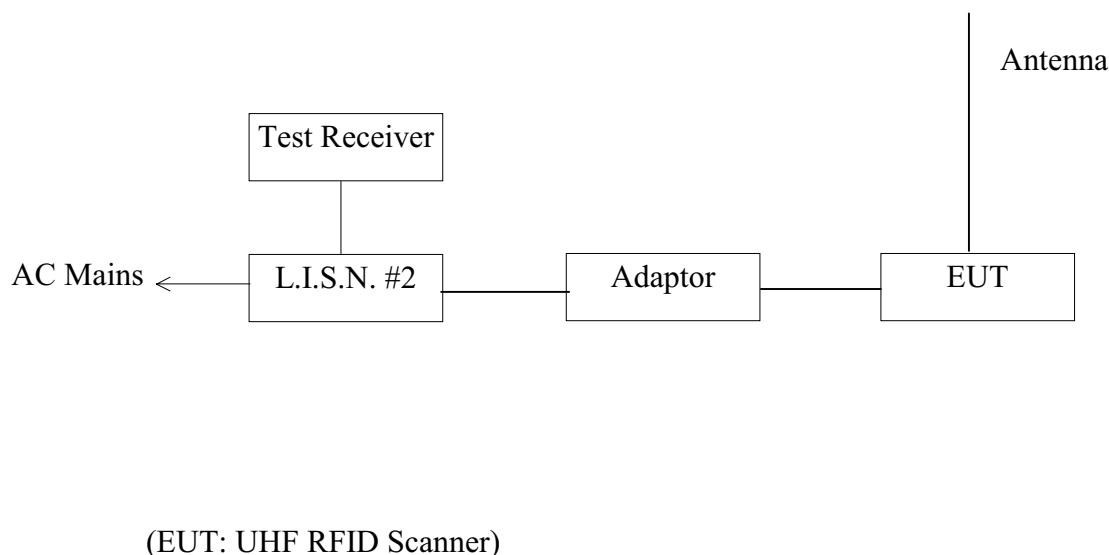
### 2.1. Test Equipments

The following test equipments are used during the power line conducted emission test:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESHS10	838693/001	May 24, 04	1 Year
2.	L.I.S.N.#1	Rohde & Schwarz	ESH2-Z5	834066/011	May 24, 04	1 Year
3.	L.I.S.N.#2	Kyoritsu	KNW-407	8-541-4	May 24, 04	1 Year
4.	L.I.S.N.#3	EMCO	3825/2	9006-1660	May 24, 04	1 Year
5.	Terminator	Hubersuhner	50Ω	No. 1	May 24, 04	1 Year
6.	Terminator	Hubersuhner	50Ω	No. 2	May 24, 04	1 Year
7.	RF Cable	MIYAZAKI	5D-2W	LISN Cable 1#	Aug. 19, 04	1/2 Year
8.	Passive Probe	Rohde & Schwarz	ESH2-Z3	299.7810.52	May 24, 04	1 Year
9.	Coaxial Switch	Anritsu	MP59B	M55367	May 29, 04	1/2 Year
10.	Pulse Limiter	Rohde & Schwarz	ESH3-Z2	100340	NCR	NCR
11.	PC	N/A	586ATXS	N/A	N/A	N/A
12.	Printer	HP	Laserjet2100	SGGJ092351	N/A	N/A

### 2.2. Block Diagram of Test Setup

#### 2.2.1. Block diagram of connection between the EUT and simulators



### 2.3.Power Line Conducted Emission Test Limits

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150KHz ~ 500KHz	66 ~ 56*	56 ~ 46*
500KHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. \* Decreasing linearly with logarithm of frequency.

2. The lower limit shall apply at the transition frequencies.

### 2.4.Configuration of EUT on Test

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

#### 2.4.1.UHF RFID Scanner (EUT)

Model Number : Sense1820

Serial Number : F2004090801

Manufacturer : Sense Technology Co., Ltd.

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

### 2.5.Operating Condition of EUT

2.5.1.Setup the EUT and simulator as shown as Section 2.2.

2.5.2.Turn on the power of all equipment.

2.5.3.Let the EUT work in test mode (Tx Low/Tx Middle/Tx High) and measure it.

### 2.6.Test Procedure

The EUT is connected to the power mains through a line impedance stabilization network (L.I.S.N.#2). This provides a 50 ohm coupling impedance for the EUT.

Please refer the block diagram of the test setup and photographs. Power on the PC and let it work normally, we use a keyboard test soft ware, let EUT working in test mode, then test it. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.4-2001 on Conducted Emission Test.

The bandwidth of test receiver (R & S ESHS20) is set at 10KHz.

The frequency range from 150KHz to 30MHz is checked.

The test result are reported on Section 2.7., all the scanning waveforms for Conducted Emission Test are attached in Appendix I.

## 2.7.Power Line Conducted Emission Test Results

**PASS.**

The frequency range from 150KHz to 30 MHz is investigated.

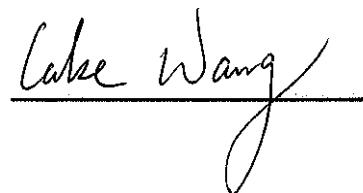
All emissions not reported below are too low against the prescribed limits.

Date of Test :	Aug.15, 2004	Temperature :	23°C
EUT :	UHF RFID Scanner	Humidity :	54%
Model No. :	Sense1820	Test Mode :	Tx (High)
Test Engineer :	Richzhy		

Frequency (MHz)	Reading (dB $\mu$ V)				Limit (dB $\mu$ V)	
	VA		VB			
	Quasi-Peak	Average	Quasi-Peak	Average	Quasi-Peak	Average
0.185	26.87	18.99	*	*	64.24	54.24
0.189	*	*	26.45	19.31	64.06	54.06
0.251	17.47	10.58	23.31	16.49	61.73	51.73
0.312	*	*	20.65	13.91	59.93	49.93
0.377	13.63	7.06	*	*	58.34	48.34
0.435	*	*	18.82	12.05	57.15	47.15
0.437	10.68	3.49	*	*	57.11	47.11
1.560	9.33	1.55	13.67	7.14	56.00	46.00
11.139	*	*	15.59	9.10	60.00	50.00
12.188	15.91	8.29	*	*	60.00	50.00

"\*" As the QP value is too low against AV limit, So AV Value had been omitted.

Reviewer:



### 3. RADIATED EMISSION TEST

#### 3.1. Test Equipment

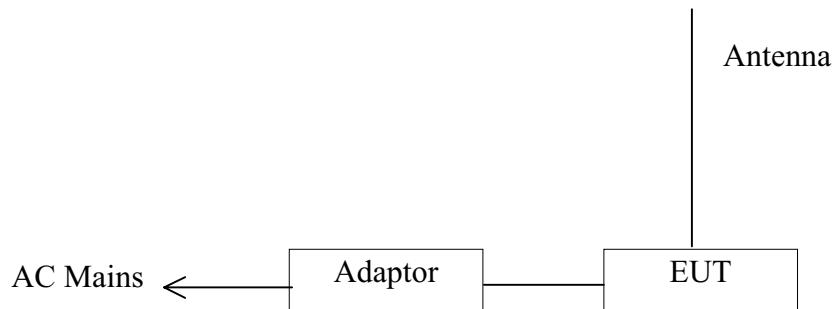
The following test equipments are used during the radiated emission test:

##### 3.1.1. For Anechoic Chamber

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Analyzer	HP	8591EM	3628A00914	May 24,04	1 Year
2.	Test Receiver	Rohde & Schwarz	ESVS20	830350/005	May 24,04	1 Year
3.	Amplifier	HP	8447D	2944A07794	Mar.17, 04	1/2 Year
4.	Bilog Antenna	Schaffner	CBL6111C	2598	Jan. 13, 04	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	July 31, 04	1/2 Year
8.	RF Cable	MIYAZAKI	5D-2W	3# Chamber No.2	July 31, 04	1/2 Year
9.	RF Cable	FUJIKURA	RG-55/U	3# Chamber No.3	July 31, 04	1/2 Year
10.	RF Cable	FUJIKURA	RG-55/U	3# Chamber No.4	July 31, 04	1/2 Year
11.	Coaxial Switch	Anritsu	MP59B	M73989	May.27, 04	1/2 Year

#### 3.2. Block Diagram of Test Setup

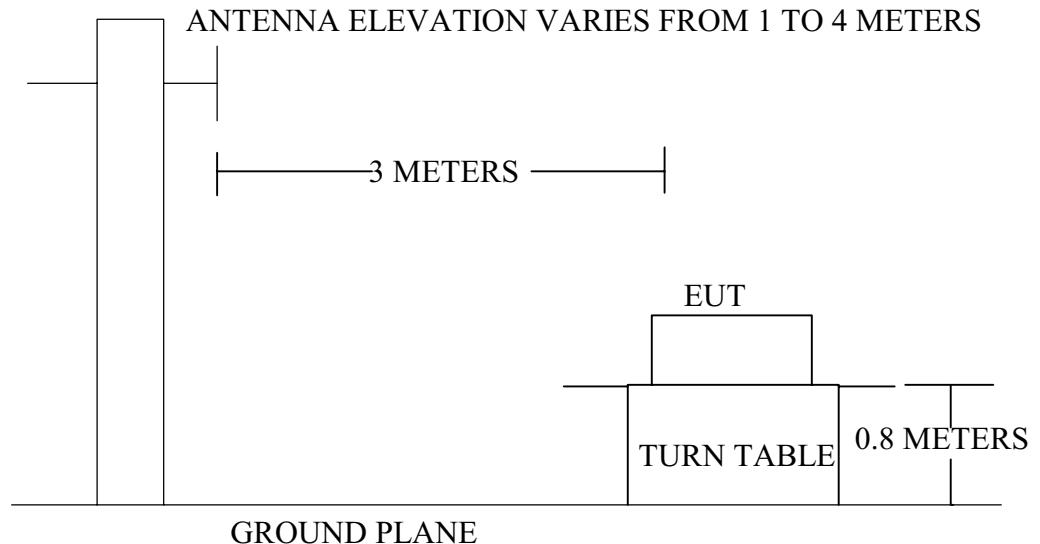
##### 3.2.1. Block diagram of connection between the EUT and simulators



(EUT: UHF RFID Scanner)

## 3.2.2.In Anechoic Chamber

## ANTENNA TOWER



## 3.3.Radiated Emission Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Above 1000	3	Local Oscillator: 114.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 94.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average) Other: 74.0 $\text{dB}(\mu\text{V})/\text{m}$ (Peak) 54.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

Remark :

- (1) Emission level  $\text{dB}\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$
- (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.UHF RFID Scanner (EUT)

Model Number	:	Sense1820
Serial Number	:	F2004090801
Manufacturer	:	Sense Technology Co., Ltd.

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

### 3.5.Operating Condition of EUT

3.5.1.Setup the EUT as shown in Section 3.2..

3.5.2.Let the EUT work in test mode (Tx Low/Tx Middle/Tx High) 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 24.44GHz is checked.

The test mode (Tx Low/Tx Middle/Tx High) is tested in Anechoic Chamber, and all the scanning waveforms are attached in Appendix II.

### 3.7.Radiated Emission Test Result

**PASS.**

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

Please see the following pages.

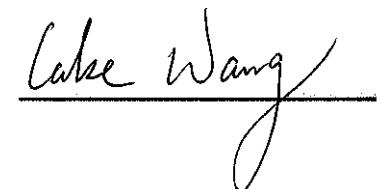
Date of Test :	Aug.15, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (Low)
Test Engineer:	Richzhy		

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading dB $\mu$ V	Emission Level dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m
444.190	16.73	4.99	17.75	39.46	-6.54	46.00
555.740	19.48	6.10	13.45	39.03	-6.97	46.00
599.390	18.77	6.15	13.45	38.38	-7.62	46.00
<b>664.380</b>	<b>19.65</b>	<b>6.30</b>	<b>14.45</b>	<b>40.39</b>	<b>-5.61</b>	<b>46.00</b>
708.030	20.60	6.61	11.86	39.07	-6.93	46.00
902.300	22.39	7.82	55.19	85.40	-8.60	94.00

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

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading
3. The worst emission was detected at 664.380MHz with corrected signal level of 40.39dB $\mu$ V/m (Limit is 46.00dB $\mu$ V/m) when the antenna was at horizontal polarization and at 1.2m high and the turn table was at 180 ° .
4. 0 ° was the table front facing the antenna. Degree is calculated from 0 ° clockwise facing the antenna.

Reviewer:



Date of Test :	Aug.15, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (Low)
Test Engineer:	Richzhy		

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dB $\mu$ V	Emission Level Vertical dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m
443.220	16.32	4.86	18.00	39.18	-6.82	46.00
509.180	17.86	5.75	15.73	39.34	-6.66	46.00
555.740	19.66	6.10	13.27	39.03	-6.97	46.00
599.390	18.93	6.15	13.29	38.38	-7.62	46.00
<b>664.380</b>	<b>19.22</b>	<b>6.30</b>	<b>13.88</b>	<b>39.39</b>	<b>-6.61</b>	<b>46.00</b>
902.300	22.71	7.82	55.07	85.60	-8.40	94.00

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

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading
3. The worst emission was detected at 664.380MHz with corrected signal level of 39.39dB $\mu$ V/m (Limit is 46.00dB $\mu$ V/m) when the antenna was at vertical polarization and at 1.1m high and the turn table was at 0°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Reviewer:

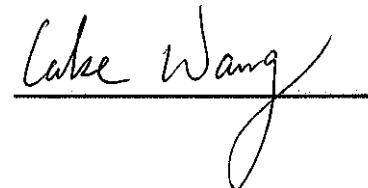
Caike Wang

Date of Test :	Aug.15, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (Middle)
Test Engineer:	Richzhy		

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dB $\mu$ V	Emission Level Horizontal dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m
443.220	16.76	4.86	15.85	37.47	-8.53	46.00
554.770	19.38	6.08	12.65	38.11	-7.89	46.00
643.040	20.32	6.37	11.63	38.32	-7.68	46.00
664.380	19.65	6.30	13.24	39.18	-6.82	46.00
<b>708.030</b>	<b>20.60</b>	<b>6.61</b>	<b>12.12</b>	<b>39.33</b>	<b>-6.67</b>	<b>46.00</b>
915.400	22.46	7.74	56.00	86.20	-7.80	94.00

Remark: 1. All readings are Quasi-Peak values.  
 2. Emission Level = Antenna Factor + Cable Loss + Meter Reading  
 3. The worst emission was detected at 708.030MHz with corrected signal level of 39.33dB $\mu$ V/m (Limit is 46.00dB $\mu$ V/m) when the antenna was at horizontal polarization and at 1.15m high and the turn table was at 180°.  
 4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Reviewer:



Date of Test :	Aug.15, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (Middle)
Test Engineer:	Richzhy		

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dB $\mu$ V	Emission Level Vertical dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m
444.190	16.25	4.99	16.40	37.63	-8.37	46.00
<b>555.740</b>	<b>19.66</b>	<b>6.10</b>	<b>13.82</b>	<b>39.58</b>	<b>-6.42</b>	<b>46.00</b>
599.390	18.93	6.15	13.32	38.41	-7.59	46.00
664.380	19.22	6.30	13.67	39.18	-6.82	46.00
708.030	21.08	6.61	11.65	39.33	-6.67	46.00
915.400	23.01	7.74	55.25	86.00	-8.00	94.00

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

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading
3. The worst emission was detected at 555.740MHz with corrected signal level of 39.58dB $\mu$ V/m (Limit is 46.00dB $\mu$ V/m) when the antenna was at vertical polarization and at 1.05m high and the turn table was at 0°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Reviewer:

Calke Wang

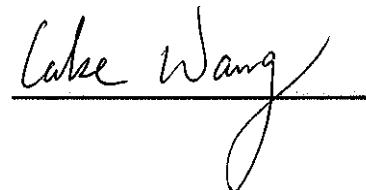
Date of Test :	Aug.15, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (High)
Test Engineer:	Richzhy		

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dB $\mu$ V	Emission Level Horizontal dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m
443.220	16.76	4.86	15.85	37.47	-8.53	46.00
555.740	19.48	6.10	13.00	38.58	-7.42	46.00
599.390	18.77	6.15	10.48	35.41	-10.59	46.00
664.380	19.65	6.30	13.24	39.18	-6.82	46.00
<b>708.030</b>	<b>20.60</b>	<b>6.61</b>	<b>12.12</b>	<b>39.33</b>	<b>-6.67</b>	<b>46.00</b>
927.900	22.46	7.74	55.40	85.60	-8.40	94.00

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

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading
3. The worst emission was detected at 708.030MHz with corrected signal level of 39.33dB $\mu$ V/m (Limit is 46.00dB $\mu$ V/m) when the antenna was at horizontal polarization and at 1.15m high and the turn table was at 180°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Reviewer:



Date of Test :	Aug.15, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (High)
Test Engineer:	Richzhy		

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dB $\mu$ V	Emission Level Vertical dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m
444.190	16.25	4.99	16.40	37.63	-8.37	46.00
510.150	18.00	5.80	8.76	32.57	-13.44	46.00
555.740	19.66	6.10	12.82	38.58	-7.42	46.00
<b>664.380</b>	<b>19.22</b>	<b>6.30</b>	<b>13.67</b>	<b>39.18</b>	<b>-6.82</b>	<b>46.00</b>
709.000	21.08	6.61	8.61	36.30	-9.70	46.00
927.900	22.89	7.74	55.07	85.70	-8.30	94.00

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

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading
3. The worst emission was detected at 664.380MHz with corrected signal level of 39.18dB $\mu$ V/m (Limit is 46.00dB $\mu$ V/m) when the antenna was at vertical polarization and at 1.0m high and the turn table was at 0°.
4. 0° was the table front facing the antenna. Degree is calculated from 0° clockwise facing the antenna.

Reviewer:

Calke Wang

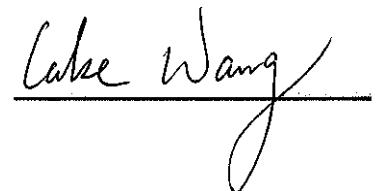
Date of Test :	Aug. 17, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (Low)
Test Engineer:	Richzhy		

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Horizontal dB $\mu$ V	Emission Level Horizontal dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m	Remark
4978.000	33.18	4.75	5.32	43.25	-10.75	54.00	Average

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Horizontal dB $\mu$ V	Emission Level Horizontal dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m	Remark
4978.000	33.18	4.75	8.32	46.25	-27.72	74.00	Peak
17847.000	44.67	9.76	8.41	62.84	-11.16	74.00	Peak

Remark: 1. All readings are Peak and Average values.  
 2. Emission Level = Antenna Factor + Cable Loss + Meter Reading  
 3. The bandwidth of the RBW is set at 1MHz and VBW is set at 1MHz.

Reviewer:



Date of Test :	Aug. 17, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (Low)
Test Engineer:	Richzhy		

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Vertical dB $\mu$ V	Emission Level Vertical dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m	Remark
4604.000	32.81	4.48	5.94	43.23	-10.77	54.00	Average

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Vertical dB $\mu$ V	Emission Level Vertical dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m	Remark
4604.000	32.81	4.48	6.94	44.23	-29.77	74.00	Peak
17915.000	44.95	9.72	7.79	62.46	-11.54	74.00	Peak

Remark: 1. All readings are Peak and Average values.

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

3. The bandwidth of the RBW is set at 1MHz and VBW is set at 1MHz.

Reviewer:

Caike Wang

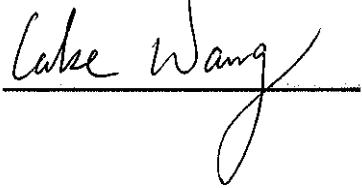
Date of Test :	Aug. 17, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (Middle)
Test Engineer:	Richzhy		

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Horizontal dB $\mu$ V	Emission Level Horizontal dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m	Remark
4978.000	33.18	4.75	5.32	43.25	-10.75	54.00	Average

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Horizontal dB $\mu$ V	Emission Level Horizontal dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m	Remark
4978.000	33.18	4.75	8.32	46.25	-27.75	74.00	Peak
17932.000	45.02	9.71	8.59	63.32	-10.68	74.00	Peak

Remark: 1. All readings are Peak and Average values.  
 2. Emission Level = Antenna Factor + Cable Loss + Meter Reading  
 3. The bandwidth of the RBW is set at 1MHz and VBW is set at 1MHz.

Reviewer:



Date of Test :	Aug. 17, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (Middle)
Test Engineer:	Richzhy		

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Vertical dB $\mu$ V	Emission Level Vertical dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m	Remark
4604.000	32.81	4.48	5.94	43.23	-10.77	54.00	Average

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Vertical dB $\mu$ V	Emission Level Vertical dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m	Remark
4604.000	32.81	4.48	6.94	44.23	-29.77	74.00	Peak
17881.000	44.81	9.74	8.25	62.80	-11.20	74.00	Peak

Remark: 1. All readings are Peak and Average values.

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

3. The bandwidth of the RBW is set at 1MHz and VBW is set at 1MHz.

Reviewer:

Caike Wang

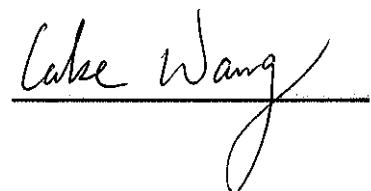
Date of Test :	Aug. 17, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (High)
Test Engineer:	Richzhy		

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Horizontal dB $\mu$ V	Emission Level Horizontal dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m	Remark
4978.000	33.18	4.75	5.32	43.25	-10.75	54.00	Average

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Horizontal dB $\mu$ V	Emission Level Horizontal dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m	Remark
4978.000	33.18	4.75	8.32	46.25	-27.75	74.00	Peak
17932.000	45.02	9.71	8.59	63.32	-10.68	74.00	Peak

Remark: 1. All readings are Peak and Average values.  
 2. Emission Level = Antenna Factor + Cable Loss + Meter Reading  
 3. The bandwidth of the RBW is set at 1MHz and VBW is set at 1MHz.

Reviewer:



Date of Test :	Aug. 17, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (High)
Test Engineer:	Richzhy		

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Vertical dB $\mu$ V	Emission Level Vertical dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m	Remark
5097.000	33.19	4.82	5.41	43.42	-10.58	54.00	Average

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Vertical dB $\mu$ V	Emission Level Vertical dB $\mu$ V/m	Over Limits dB	Limits dB $\mu$ V/m	Remark
5097.000	33.19	4.82	6.41	44.42	-26.58	74.00	Peak
17881.000	44.81	9.74	8.25	62.80	-11.20	74.00	Peak

Remark: 1. All readings are Peak and Average values.

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

3. The bandwidth of the RBW is set at 1MHz and VBW is set at 1MHz.

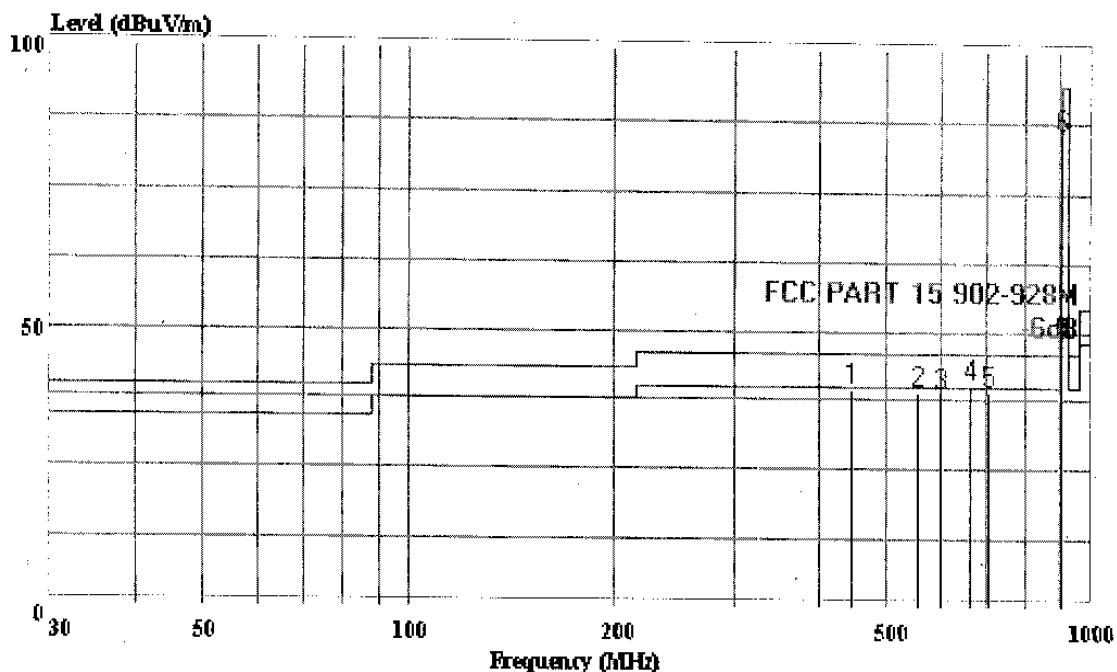
Reviewer:

Caike Wang



Shenzhen Science & Ind. Park  
Tel: 0755-26639495~7  
Fax: 0755-26632877

Data#: 18 File#: Sense.EMI Date: 2004-08-15 Time: 19:00:57



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

Trace:

Ref Trace:

Condition: FCC PART 15 902-928M 3m 2598FACTOR HORIZONTAL

FUT : UHF RFTD Scanner

M/N : Sense1820

Power : DC 5V Adaptor Input:120V/60Hz

Engineer : Richzhv

Test Comment: Temp:24°C Humi:56%

Memo : Tx (Low)

: 120cm 180deg

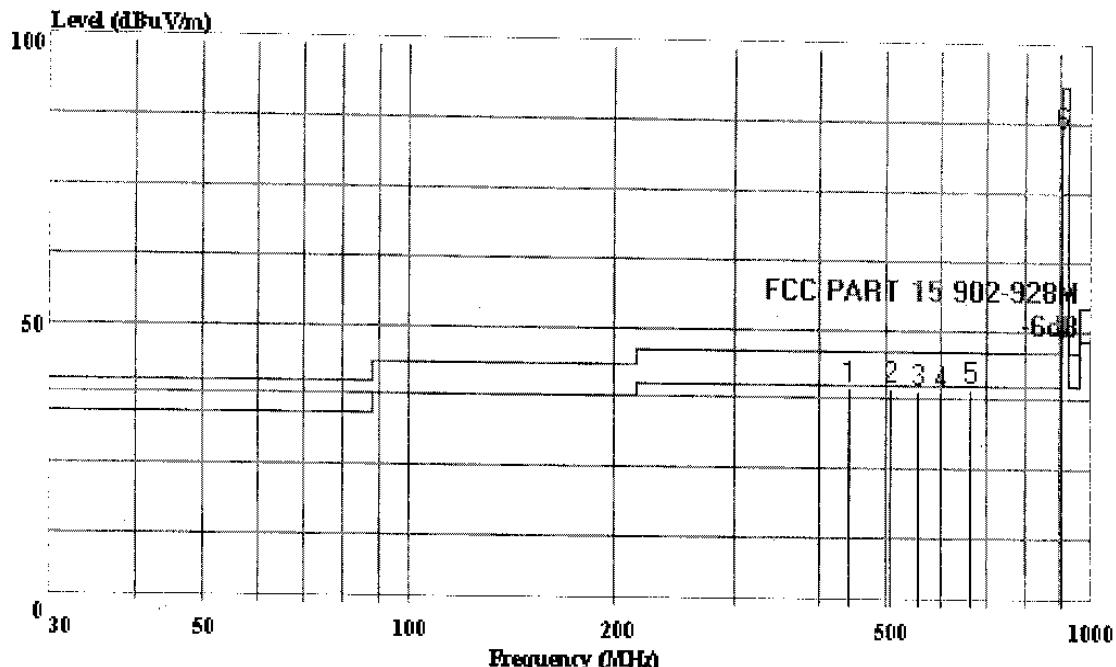
Page: 1

Freq	Level	Over	Limit	Read	Probe	Cable
		Limit	Line	Level	Factor	Loss
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB
1	444.190	39.46	-6.54	46.00	17.75	16.73
2	555.740	39.03	-6.97	46.00	13.45	19.48
3	599.390	38.38	-7.62	46.00	13.45	18.77
4	664.380	40.39	-5.61	46.00	14.45	19.65
5	708.030	39.07	-6.93	46.00	11.86	20.60
6	902.300	85.40	-8.60	94.00	55.19	22.39



Shenzhen Science & Ind. Park  
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Fax: 0755-26632877

Data#: 12 File#: Sense.EMI Date: 2004-08-15 Time: 19:00:23



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

Trace:

Ref Trace:

Condition: FCC PART 15 902-928M 3m 2598FACTOR VERTICAL  
 EUT : UHF RTD Scanner  
 M/N : Sense1820  
 Power : DC 5V Adaptor Input:120V/60Hz  
 Engineer : Richzhv  
 Test Comment: Temp:24°C Humi:56%  
 Memo : Tx (Low)  
       : 110cm 0deg

Page: 1

Freq	Level	Over	Limit	Read	Probe	Cable
		Limit	Line	Level	Factor	Loss
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB
1	443.220	39.18	-6.82	46.00	18.00	16.32
2	509.180	39.34	-6.66	46.00	15.73	17.86
3	555.740	39.03	-6.97	46.00	13.27	19.66
4	599.390	38.38	-7.62	46.00	13.29	18.93
5	664.380	39.39	-6.61	46.00	13.88	19.22
6	902.300	85.60	-8.40	94.00	55.07	22.71

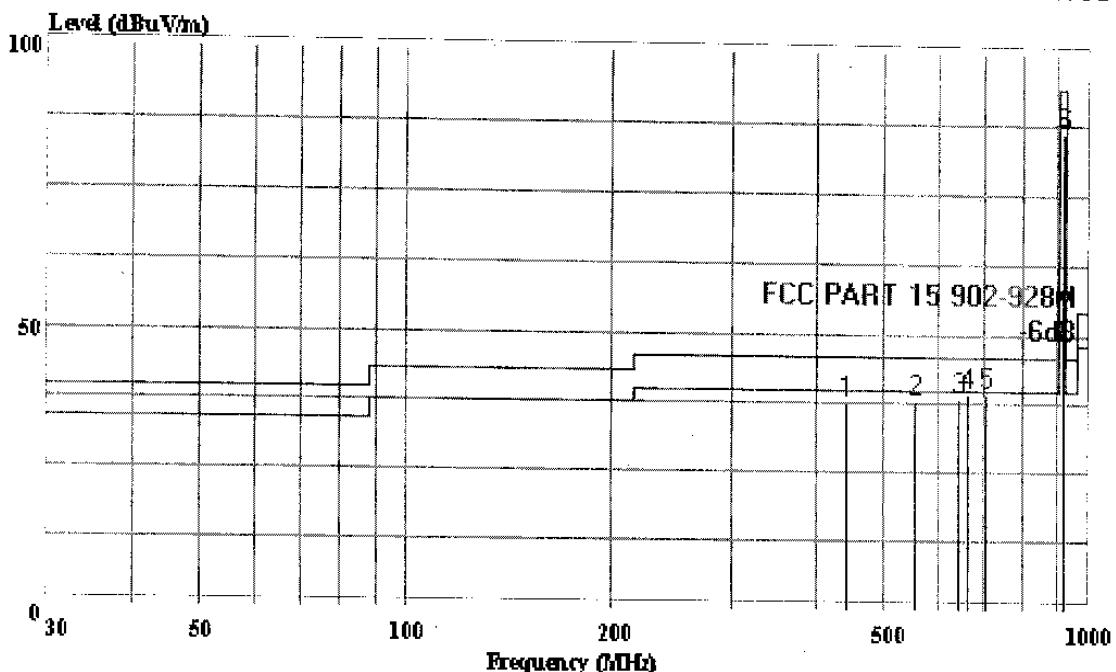


AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

Shenzhen Science & Ind. Park  
 Tel: 0755-26639495~7  
 Fax: 0755-26632877

Data#: 20 File#: Sense.EMI

Date: 2004-08-15 Time: 19:01:31



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

Trace:

Ref Trace:

Condition: FCC PART 15 902-928M 3m 2598FACTOR HORIZONTAL

FUT : UHF RTD Scanner

M/N : Sense1820

Power : DC 5V Adaptor Input:120V/60Hz

Engineer : Richzhv

Test Comment: Temp:24°C Humi:56%

Memo : Tx(Middle)

: 115cm 180deg

Page: 1

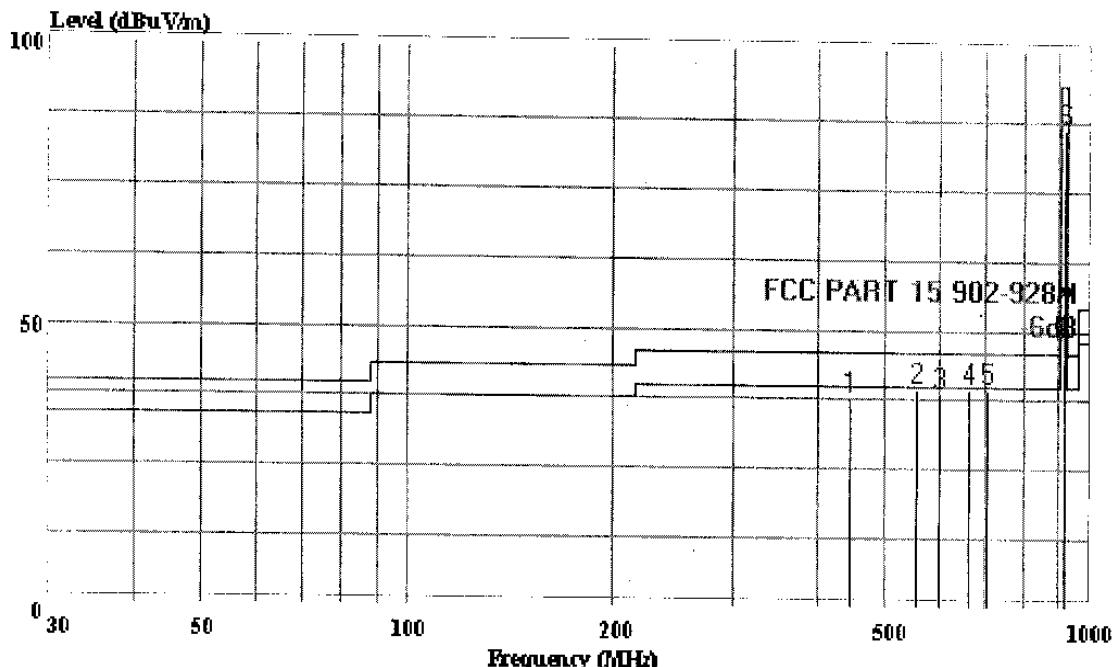
Freq	Level	Over	Limit	Read	Probe	Cable
		Limit	Line	Level	Factor	Loss

	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB
1	443.220	37.47	-8.53	46.00	15.85	16.76	4.86
2	554.770	38.11	-7.89	46.00	12.65	19.38	6.08
3	643.040	38.32	-7.68	46.00	11.63	20.32	6.37
4	664.380	39.18	-6.82	46.00	13.24	19.65	6.30
5	708.030	39.33	-6.67	46.00	12.12	20.60	6.61
6	915.400	86.20	-7.80	94.00	56.00	22.46	7.74



Shenzhen Science & Ind. Park  
Tel: 0755-26639495~7  
Fax: 0755-26632877

Data#: 21 File#: Sense.EMI Date: 2004-08-15 Time: 19:02:00



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

Trace:

Ref Trace:

Condition: FCC PART 15 902-928M 3m 2598FACTOR VERTICAL  
 EUT : UHF RFTD Scanner  
 M/N : Sense1820  
 Power : DC 5V Adaptor Input:120V/60Hz  
 Engineer : Richzhv  
 Test Comment: Temp:24°C Humi:56%  
 Memo : Tx(Middle)  
 : 105cm 0deg

Page: 1

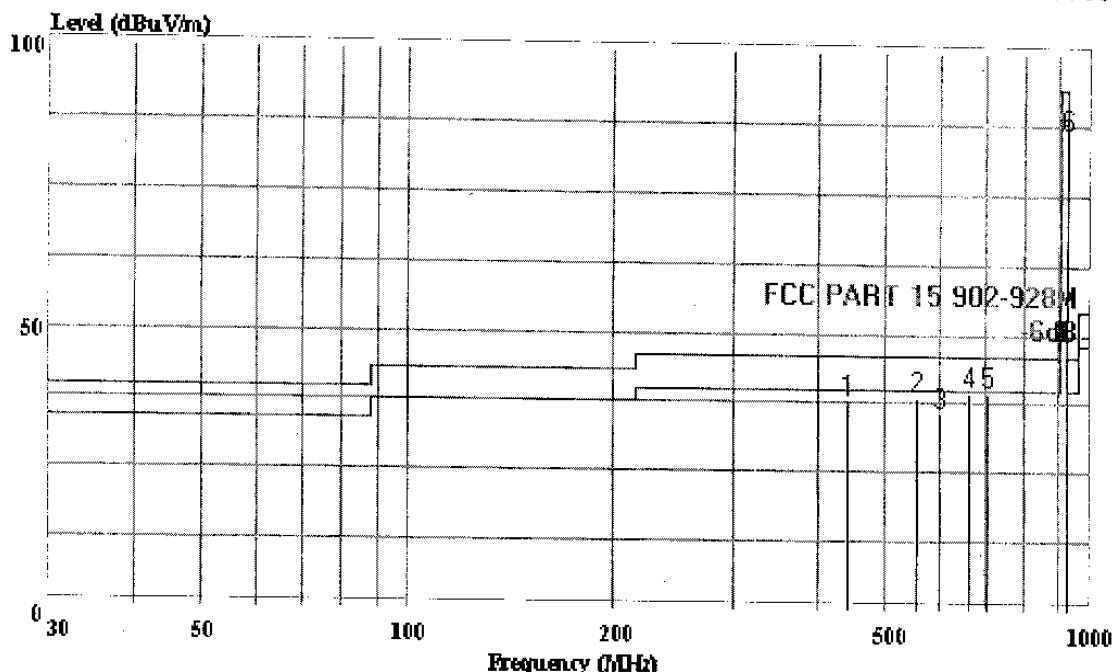
Freq	Over	Limit	Read	Probe	Cable
Level	Limit	Line	Level	Factor	Loss

	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB
1	444.190	37.63	-8.37	46.00	16.40	16.25	4.99
2	555.740	39.58	-6.42	46.00	13.82	19.66	6.10
3	599.390	38.41	-7.59	46.00	13.32	18.93	6.15
4	664.380	39.18	-6.82	46.00	13.67	19.22	6.30
5	708.030	39.33	-6.67	46.00	11.65	21.08	6.61
6	915.400	86.00	-8.00	94.00	55.25	23.01	7.74



Shenzhen Science & Ind. Park  
Tel: 0755-26639495~7  
Fax: 0755-26632877

Data #: 23 File #: Sense.EMI Date: 2004-08-15 Time: 19:03:03



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

Trace:

Ref Trace:

Condition: FCC PART 15 902-928M 3m 2598FACTOR HORIZONTAL  
 EUT : UHF RTFD Scanner  
 M/N : Sense1820  
 Power : DC 5V Adaptor Input:120V/60Hz  
 Engineer : Richzhv  
 Test Comment: Temp:24°C Humi:56%  
 Memo : Tx(High)  
 : 115cm 180deg

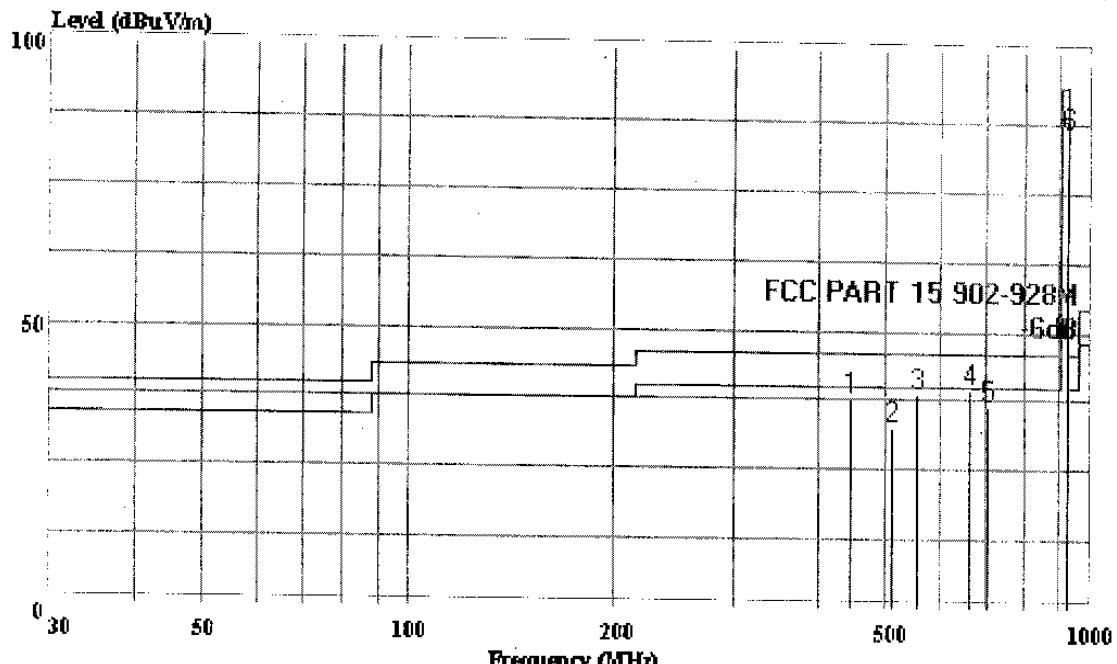
Page: 1

Freq	Level	Over	Limit	Read	Probe	Cable
		Line	Line	Level	Factor	Loss
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB
1	443.220	37.47	-8.53	46.00	15.85	16.76
2	555.740	38.58	-7.42	46.00	13.00	19.48
3	599.390	35.41	-10.59	46.00	10.48	18.77
4	664.380	39.18	-6.82	46.00	13.24	19.65
5	708.030	39.33	-6.67	46.00	12.12	20.60
6	927.900	85.60	-8.40	94.00	55.40	22.46



Shenzhen Science & Ind. Park  
Tel: 0755-26639495~7  
Fax: 0755-26632877

Data#: 00 File#: Sense.EMI Date: 2004-08-15 Time: 19:02:33



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

Trace:

Ref Trace:

Condition: FCC PART 15 902-928M 3m 2598FACTOR VERTICAL  
 FUT : UHF RFTD Scanner  
 M/N : Sense1820  
 Power : DC 5V Adaptor Input:120V/60Hz  
 Engineer : Richzhv  
 Test Comment: Temp:24°C Humi:56%  
 Memo : Tx(High)  
 : 100cm 0deg

Page: 1

Freq	Level	Over Limit		Read Line	Probe Level	Cable Factor	Loss
		MHz	dBuV/m	dB	dBuV/m		
1	444.190	37.63	-8.37	46.00	16.40	16.25	4.99
2	510.150	32.57	-13.44	46.00	8.76	18.00	5.80
3	555.740	38.58	-7.42	46.00	12.82	19.66	6.10
4	664.380	39.18	-6.82	46.00	13.67	19.22	6.30
5	709.000	36.30	-9.70	46.00	8.61	21.08	6.61
6	927.900	85.70	-8.30	94.00	55.07	22.89	7.74

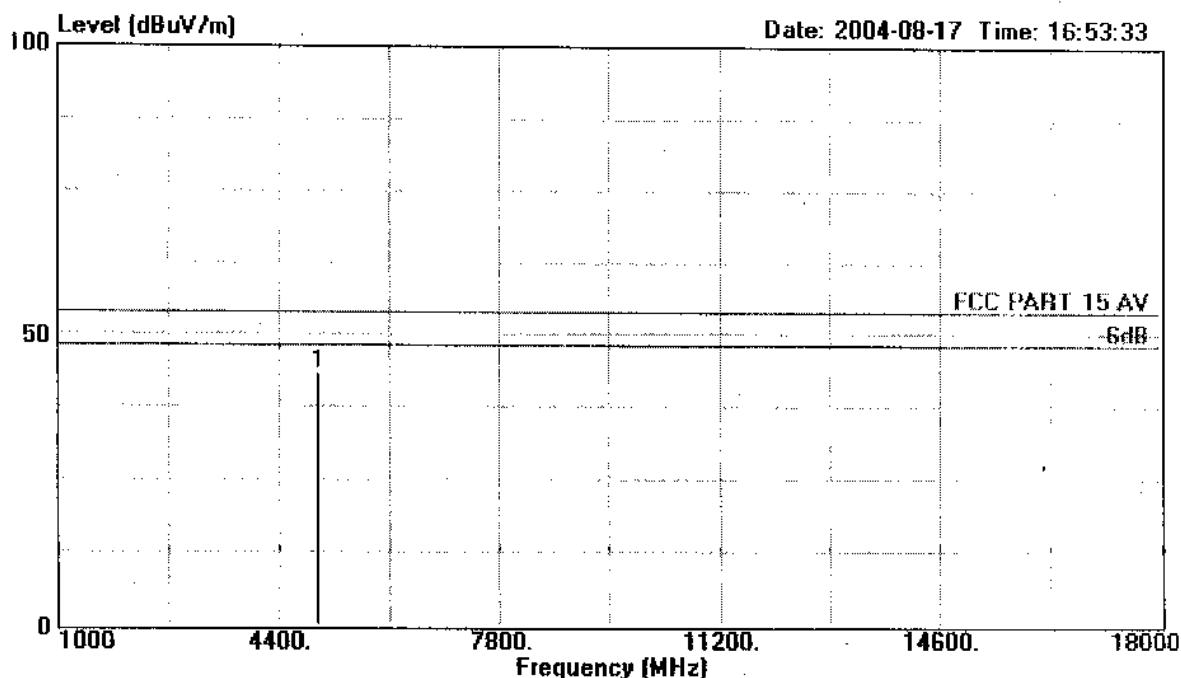


信華科技(深圳)有限公司

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Tel: +86-755-26639496 Fax: +86-755-26632677

Data#: 115 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
Condition : FCC PART 15 AV 3m 3115 FACTOR HORIZONTAL  
EUT : UHF RFID Scanner  
M/N : Sense1820  
Power : DC5V Adaptor Input:120V/60Hz  
Test Engineer : Richzhzy  
Test Comment : Temp:24°C Humi:56%  
Memo : Tx (Low)  
:

Freq	Level	Over Limit		Read Line	Probe Factor	Cable Loss		Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB	
1	4978.000	43.25	-10.75	54.00	5.32	33.18	4.75	Average

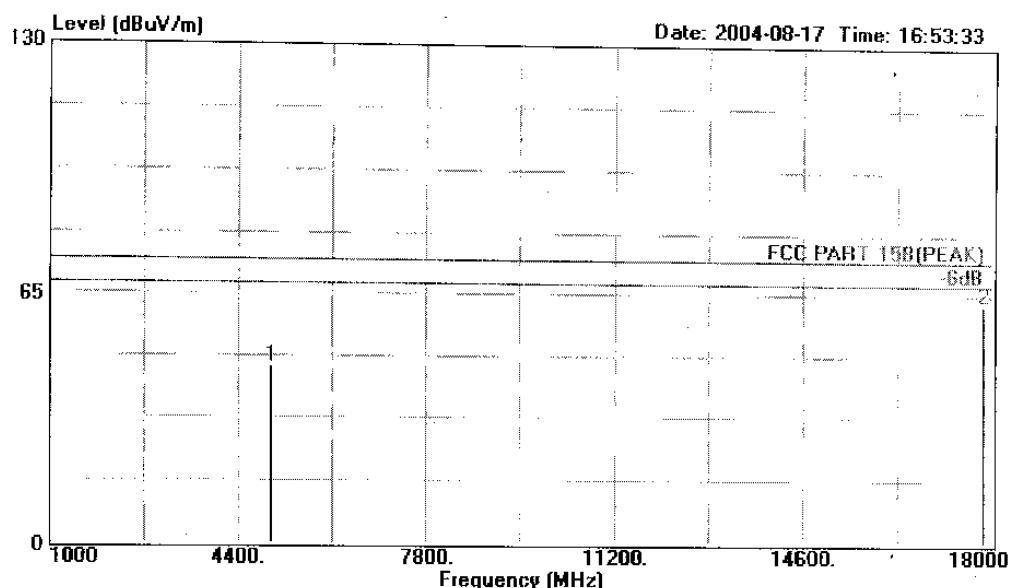


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Data#: 112 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15B(PeAK) 3m 3115 FACTOR HORIZONTAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DCSV Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx(Low)  
 :

Freq	Level	Over Limit		Read Line	Probe Level	Cable Factor	Loss	Remark
		MHz	dBuV/m	dB	dBuV/m			
1	4978.000	46.25	-27.75	74.00	8.32	33.18	4.75	Peak
2	17647.000	62.84	-11.16	74.00	8.41	44.67	9.76	Peak

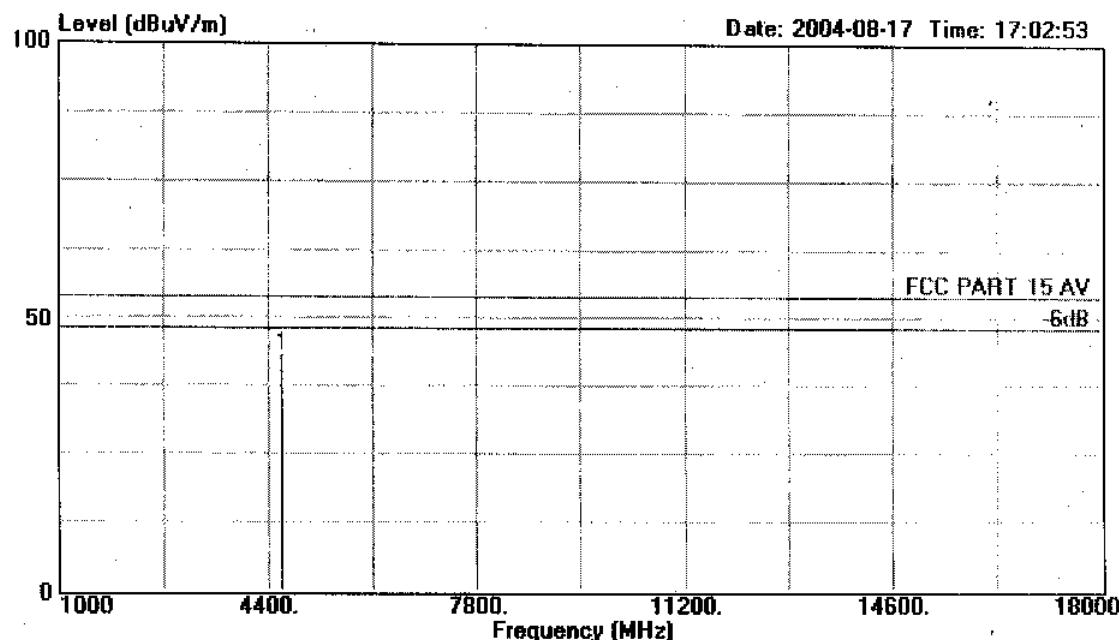


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 Nantou, Shenzhen, Guangdong, China  
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Data#: 119 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15 AV 3m 3115 FACTOR VERTICAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DC5V Adaptor Input:120V/60Hz  
 Test Engineer : Richzhzy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx(Low)  
 :

Freq	MHz	Over Limit		Read	Probe	Cable	Remark
		Level	Limit	Line	Level	Factor	
	dBuV/m	dB	dBuV/m	dBuV	dB	dB	
1	4604.000	43.23	-10.77	54.00	5.94	32.81	4.48 Average

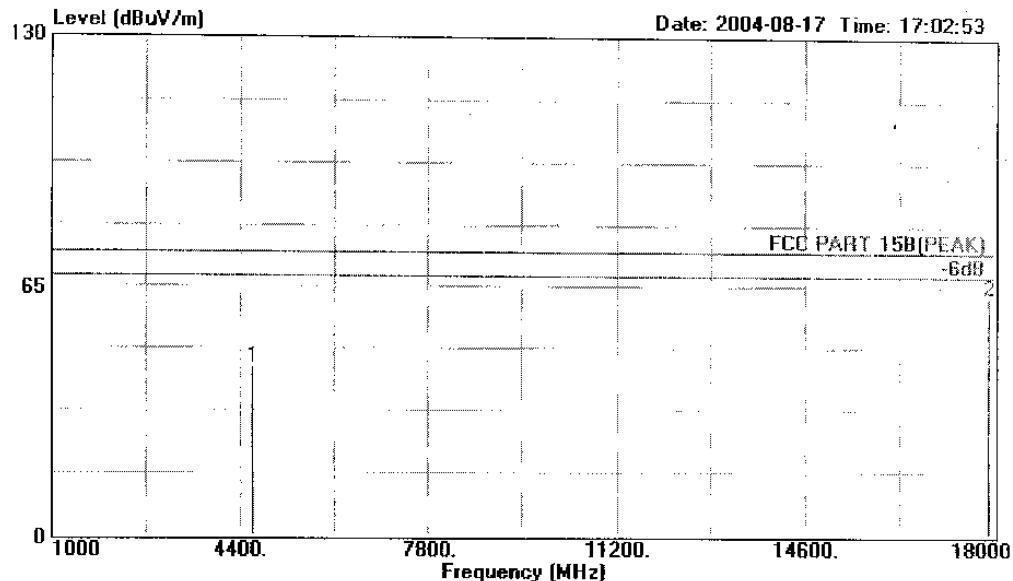


信华科技(深圳)有限公司

AUDIX Technology (Shenzhen) Co.,Ltd.

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Data#: 113 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
Condition : FCC PART 15B(Peak) 3m 3115 FACTOR VERTICAL  
EUT : UHF RFID Scanner  
M/N : Sense1820  
Power : DC5V Adaptor Input:120V/60Hz  
Test Engineer : Richzhy  
Test Comment : Temp:24°C Humi:56%  
Memo : Tx(Low)

Freq	Level	Over Limit		Read Line	Probe Factor	Cable Loss		Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB	
1	4604.000	44.23	-29.77	74.00	6.94	32.81	4.48	Peak
2	17915.000	62.46	-11.54	74.00	7.79	44.95	9.72	Peak

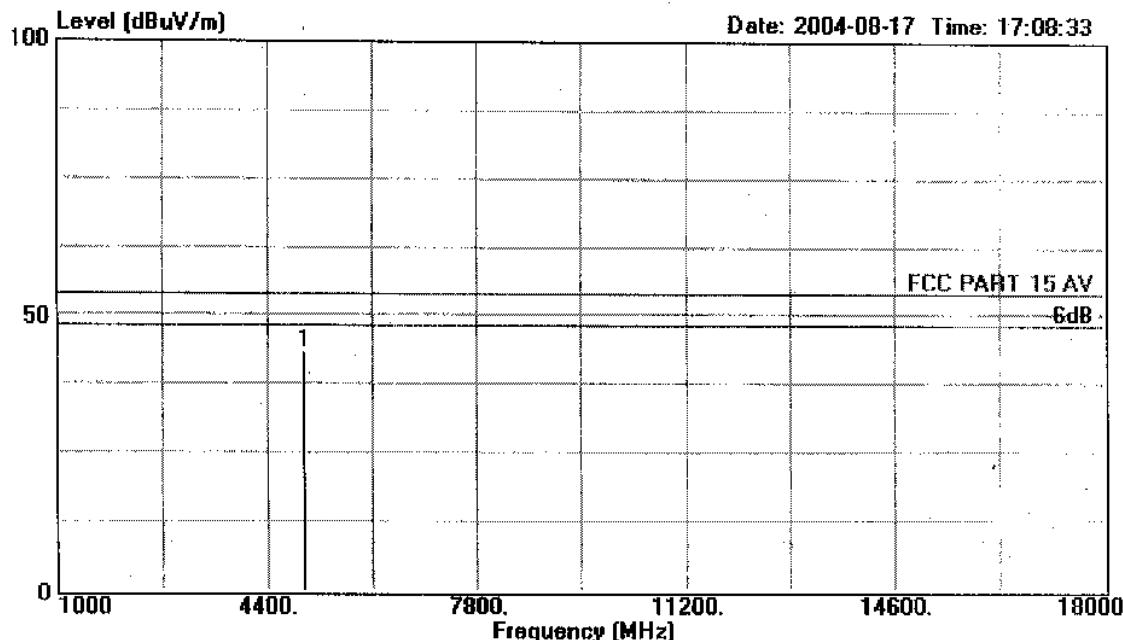


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Data#: 120 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15 AV 3m 3115 FACTOR HORIZONTAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DCSV Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx (Middle)  
 :

	Over	Limit	Read	Probe	Cable		
Freq	Level	Limit	Line	Level	Factor	Loss	Remark
MHz	dB <sub>UV</sub> /m	dB	dB <sub>UV</sub> /m	dB <sub>UV</sub>	dB	dB	
1	4978.000	43.25	-10.75	54.00	5.32	33.18	4.75 Average

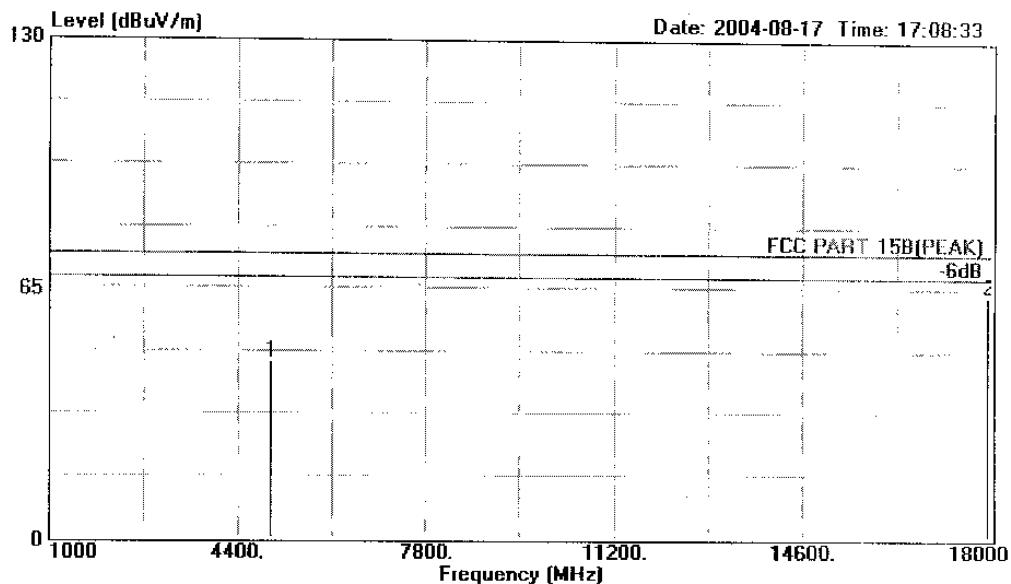


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Data#: 114 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15B(PeAK) 3m 3115 FACTOR HORIZONTAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DCSV Adaptor Input:120V/ 60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx(Middle)

Freq	Level	Over Limit	Read Line	Probe Factor	Cable	
					MHz	dBuV/m
					dB	dBuV/m
1	4978.000	46.25	-27.75	74.00	8.32	33.18
2	17932.000	63.32	-10.68	74.00	8.59	45.02

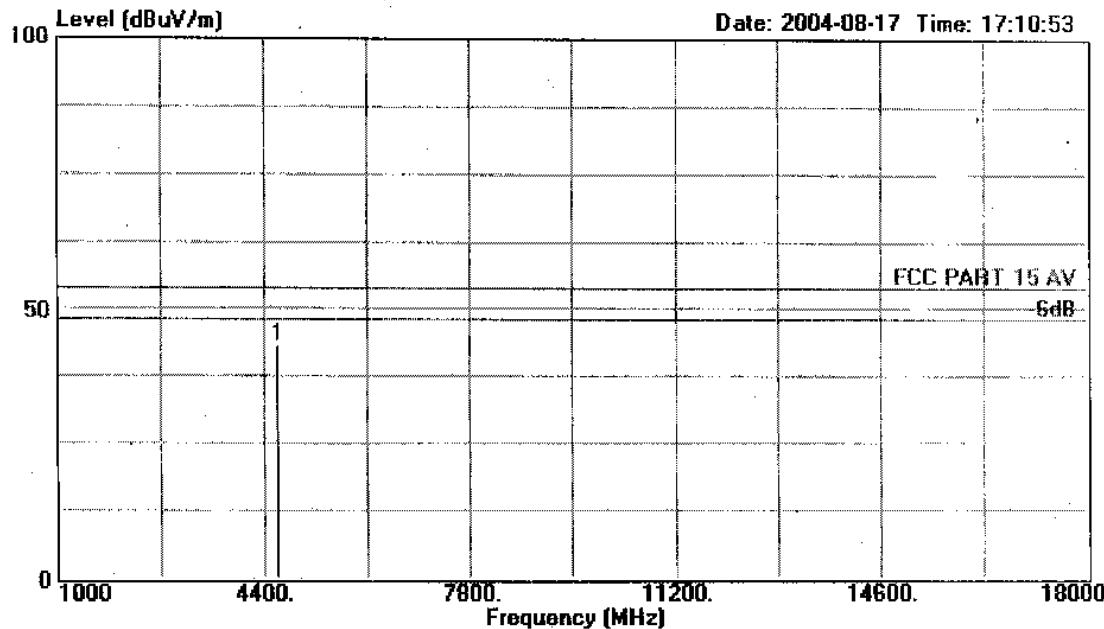


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Data#: 121 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
Condition : FCC PART 15 AV 3m 3115 FACTOR VERTICAL  
EUT : UHF RFID Scanner  
M/N : Sense1620  
Power : DC5V Adaptor Input:120V/60Hz  
Test Engineer : Richzhzy  
Test Comment : Temp:24°C Humi:56%  
Memo : Tx(Middle)

Freq	Level	Over	Limit	Read	Probe	Cable
		Line	dBuV/m	Level	Factor	dB
1 4604.000	43.23	-10.77	54.00	5.94	32.81	4.46 Average

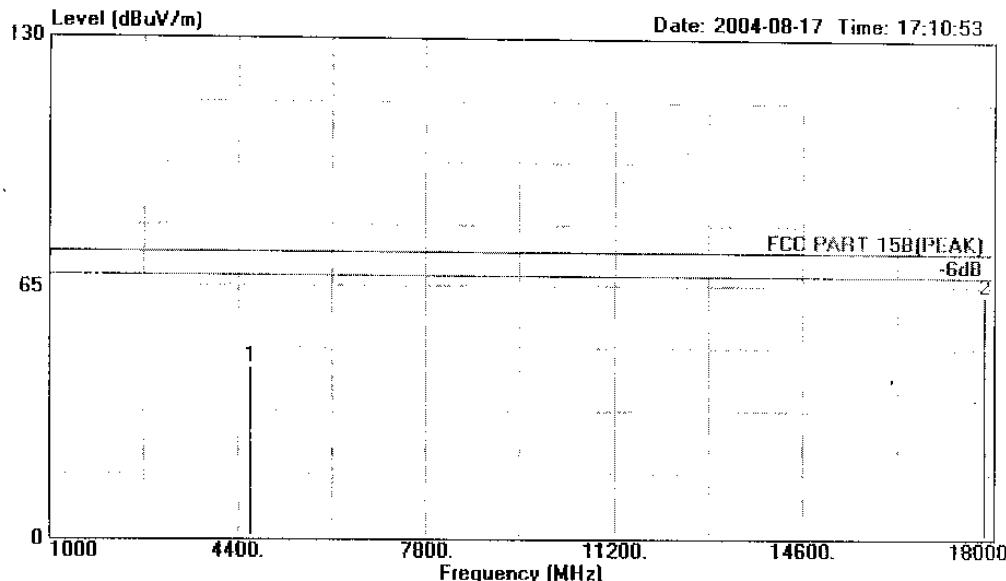


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Data#: 115 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15B(PeAK) 3m 3115 FACTOR VERTICAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DC5V Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx(Middle)

Freq	Level	Over Limit		Read Line	Probe Factor	Cable Loss		Remark
		MHz	dBuV/m	dB	dBuV/m	dB	dB	
1	4604.000	44.23	-29.77	74.00	6.94	32.81	4.48	Peak
2	17881.000	62.80	-11.20	74.00	8.25	44.81	9.74	Peak

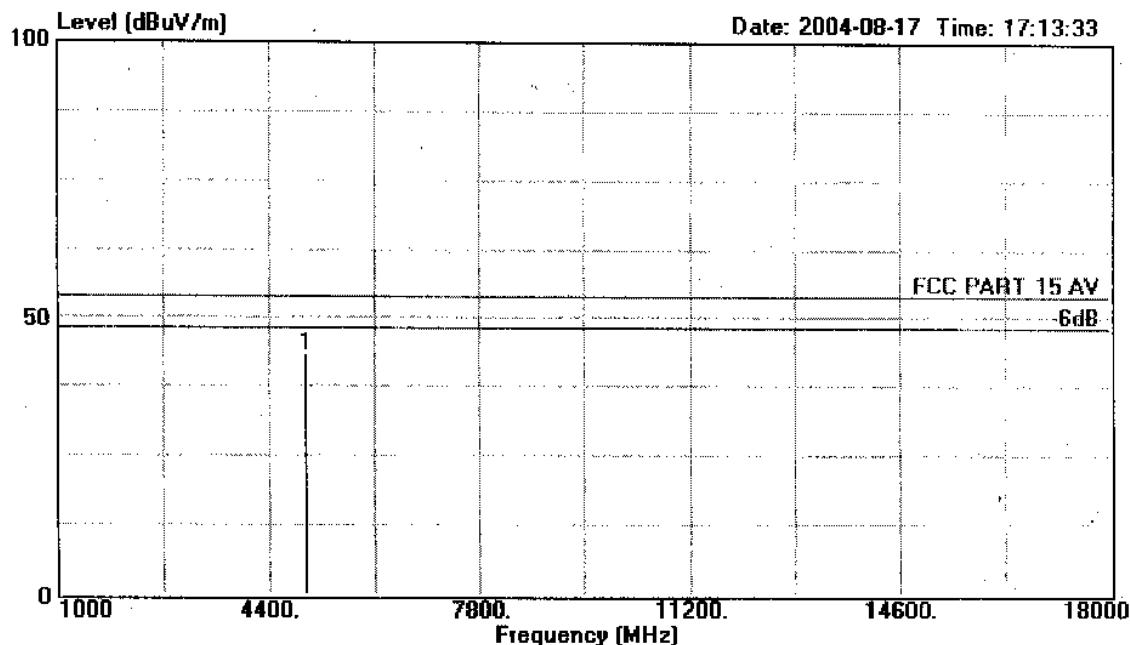


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Data#: 122 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15 AV 3m 3115 FACTOR HORIZONTAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DC5V Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx(High)

Freq	Level	Over	Limit	Read	Probe	Cable	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	
1 4978.000	43.25	-10.75	54.00	5.32	33.18	4.75	Average

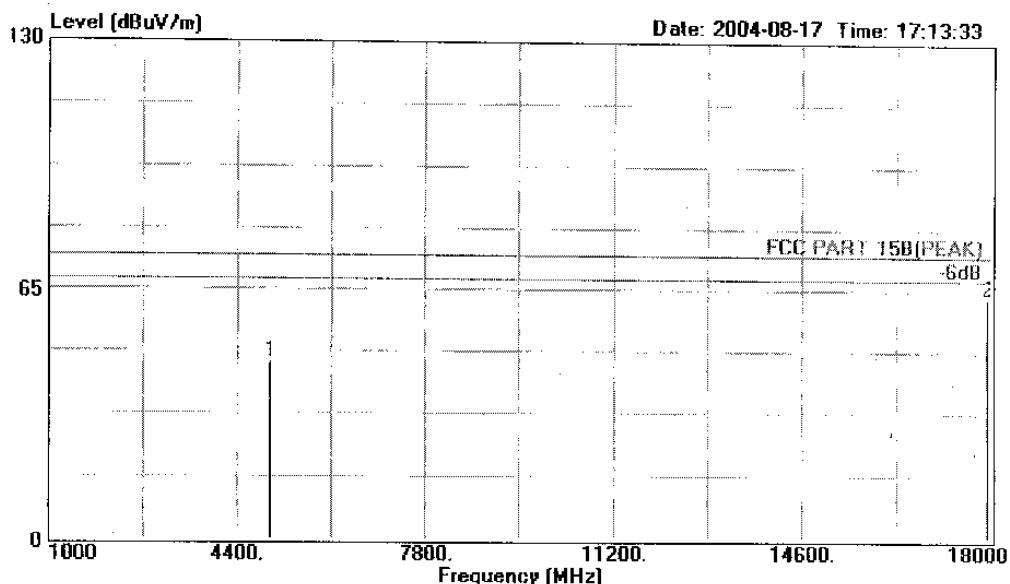


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Data#: 116 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15B(Peak) 3m 3115 FACTOR HORIZONTAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DCSV Adaptor Input:120V/ 60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx(High)

Freq	Level	Over Limit		Read Line	Probe Factor	Cable	
		MHz	dBuV/m	dB	dBuV/m	dB	dB
1	4978.000	46.25	-27.75	74.00	8.32	33.18	4.75 Peak
2	17932.000	63.32	-10.68	74.00	8.59	45.02	9.71 Peak

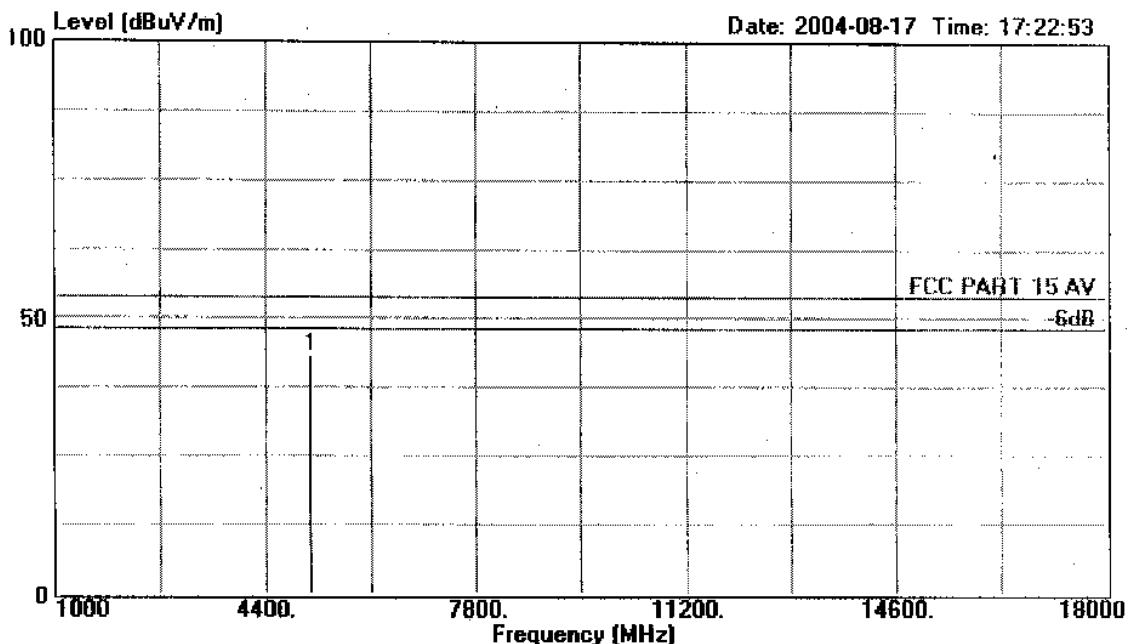


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Data#: 123 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15 AV 3m 3115 FACTOR VERTICAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1620  
 Power : DC5V Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx(High)  
 :

Freq	Level	Over Limit	Read Line	Probe Cable			
				Limit	Factor	Loss	Remark
1	5097.000	43.42	-10.58	54.00	5.41	33.19	4.82 Average

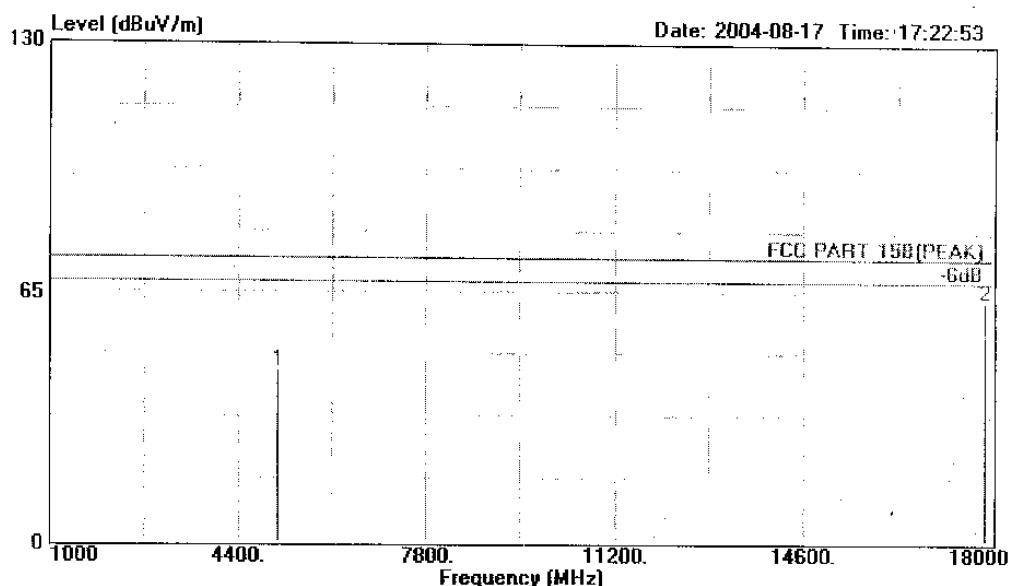


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Data#: 117 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15B(Peak) 3m 3115 FACTOR VERTICAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DC5V Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx(High)

Freq	Level	Over Limit		Read Line	Probe Level	Cable Factor		Loss	Remark
		MHz	dBuV/m	dB	dBuV/m	dBuV	dB		
1	5097.000	44.42	-29.58	74.00	6.41	33.19	4.82	Peak	
2	17881.000	62.80	-11.20	74.00	8.25	44.81	9.74	Peak	

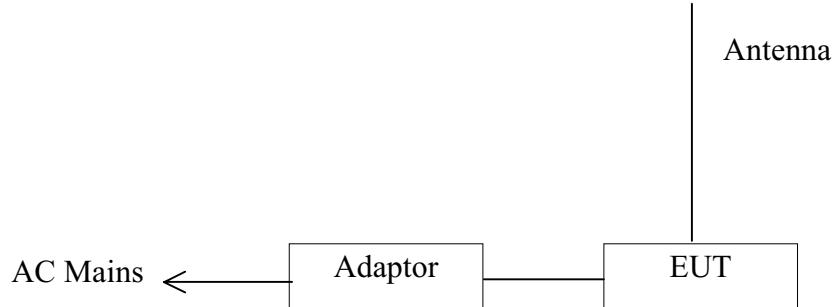
## 4. 20dB BANDWIDTH MEASUREMENT

### 4.1. Test Equipment

The following test equipment were used during the Emission Bandwidth Test :

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4407B	MY41440292	May 24,04	1 Year
2.	Amp	HP	8449B	3008A00863	May 24,04	1 Year
3.	Antenna	EMCO	3115	9607-4877	Jun.15, 04	1.5 Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May 24,04	1 Year

### 4.2. Block Diagram of Test Setup



(EUT: UHF RFID Scanner)

### 4.3. Operating Condition of EUT

4.3.1. Setup the EUT as shown in Section 4.2..

4.3.2. Let the EUT work in test mode (Tx Low/Tx Middle/Tx High) and test it.

#### 4.4. Test Procedure

EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. Power on the EUT and let it work normally, we use a keyboard test software, 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. Horn antenna is used as receiving antenna.

The bandwidth of the fundamental frequency was measure by spectrum analyzer with 100kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

#### 4.5. Test Results

**PASSED.**

The testing data was attached in the next pages.

Date of Test :	Aug.17, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (Low)
Test Engineer:	Richzhy		

Frequency	20dB Bandwidth
902.3MHz	350KHz

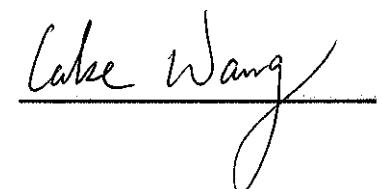
Date of Test :	Aug.17, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (Middle)
Test Engineer:	Richzhy		

Frequency	20dB Bandwidth
915.4MHz	350KHz

Date of Test :	Aug.17, 2004	Temperature :	24°C
EUT :	UHF RFID Scanner	Humidity :	56%
Model No. :	Sense1820	Test Mode :	Tx (High)
Test Engineer:	Richzhy		

Frequency	20dB Bandwidth
927.9MHz	340KHz

Reviewer:



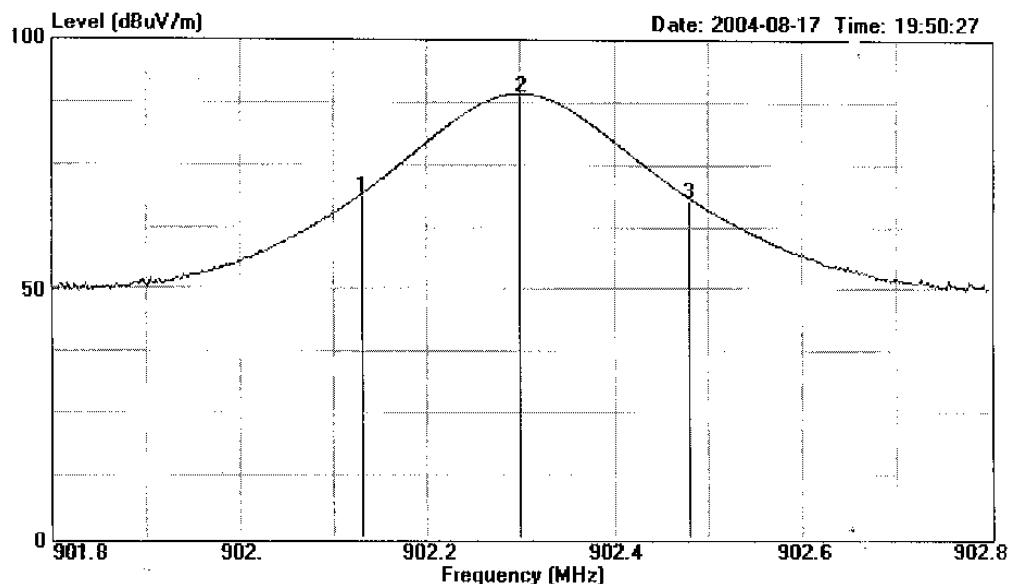


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Data#: 107 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : 3m 2597 FACTOR HORIZONTAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DC5V Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx (Low)

Freq	Level	Over Limit		Read Line	Probe Factor	Cable Loss		Remark
		MHz	dBuV/m	dB	dBuV/m	dB	dB	
1	902.130	68.72	-----	-----	41.32	22.70	4.70	Peak
2	902.300	88.93	-----	-----	61.52	22.71	4.70	Peak
3	902.480	67.88	-----	-----	40.45	22.72	4.71	Peak

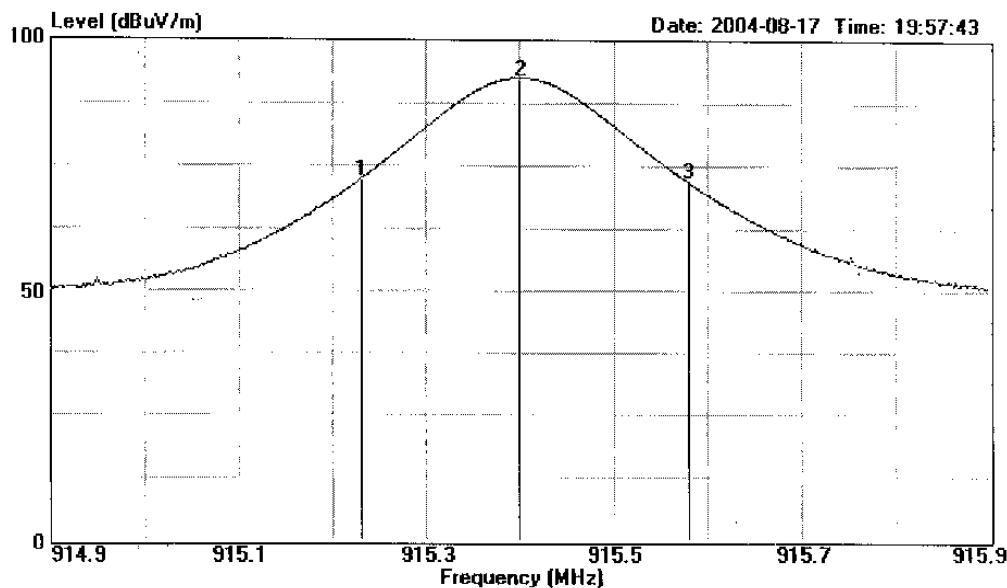


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Data#: 106 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : 3m 2597 FACTOR HORIZONTAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DCSV Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx (Middle)

Freq	Level	Over Limit		Read Line	Probe Factor	Cable Loss	
		MHz	dBuV/m	dB	dBuV/m	dB	dB
1	915.230	72.06	-----	-----	44.17	23.27	4.62 Peak
2	915.400	92.12	-----	-----	64.23	23.27	4.62 Peak
3	915.580	72.01	-----	-----	44.12	23.27	4.62 Peak

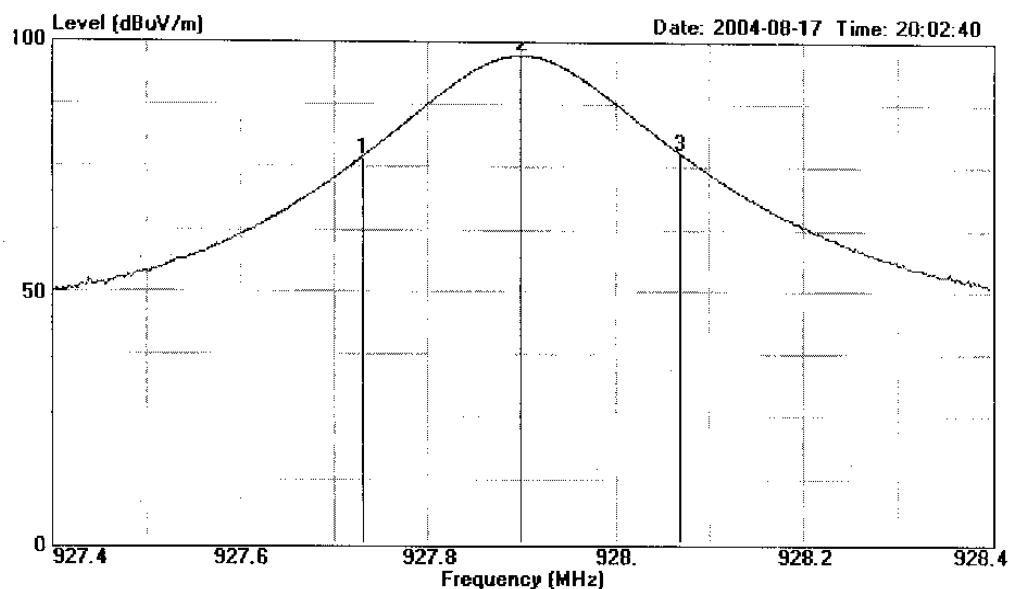


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Data#: 109 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : 3m 2597 FACTOR HORIZONTAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DCSV Adaptor Input:120W/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx (High)  
 :

Freq	MHz	Over Limit		Read	Probe	Cable	Remark
		Level	Limit	Line	Level	Factor	
1	927.730	76.69	-----	-----	48.93	23.28	4.48 Peak
2	927.900	97.73	-----	-----	69.97	23.28	4.48 Peak
3	928.070	77.64	-----	-----	49.68	23.28	4.48 Peak

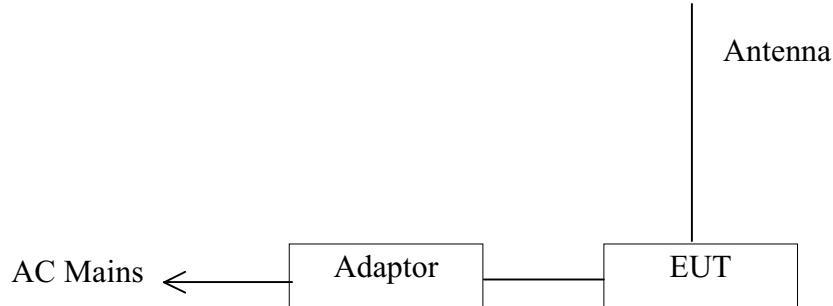
## 5. THE MAXIMUM PEAK OUTPUT POWER MEASUREMENT

### 5.1. Test Equipment

The following test equipment were used during the Emission Bandwidth Test :

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4407B	MY41440292	May 24,04	1 Year
2.	Amp	HP	8449B	3008A00863	May 24,04	1 Year
3.	Antenna	EMCO	3115	9607-4877	Jun. 15, 04	1.5 Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May 24,04	1 Year
5.	Power meter	HP	436A	2016A07891	NCR	
6.	Power Sensor	Agilent	8482B	My41090514	May 24,04	1 Year

### 5.2. Block Diagram of Test Setup



(EUT: UHF RFID Scanner)

### 5.3. Specification Limits (§15.247(b)-(3))

The Limits of maximum Peak Output Power for digital modulation in 902-928MHz is : 1Watt. (30dBm)

### 5.4. Operating Condition of EUT

5.4.1. Setup the EUT as shown in Section 5.2..

5.4.2. Let the EUT work in test mode (Tx Low/Tx Middle/Tx High) and test it.

## 5.5. Test Procedure

Setup the EUT as shown in Section 5.2. Turn on the play station 2 and let the EUT working . The EUT is via the power sensor link to power meter. The test value reading is from power meter.

## 5.6. Test Results

**PASSED.**

The testing data was attached in the next pages.

Date of Test :	Aug.17, 2004	Temperature :	23°C
EUT :	UHF RFID Scanner	Humidity :	58%
Model No. :	Sense1820	Test Mode :	Tx (Low)
Test Engineer:	Richzhy		

Frequency	Reading dBm	Cable Loss dB	Peak Power dBm	Limit dBm
902.3MHz	-9.11	0.2	-8.91	30.00

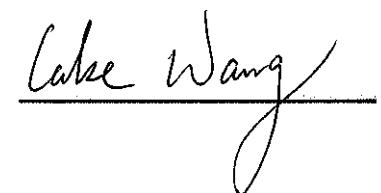
Date of Test :	Aug.17, 2004	Temperature :	23°C
EUT :	UHF RFID Scanner	Humidity :	58%
Model No. :	Sense1820	Test Mode :	Tx (Middle)
Test Engineer:	Richzhy		

Frequency	Reading dBm	Cable Loss dB	Peak Power dBm	Limit dBm
915.4MHz	-9.01	0.2	-8.81	30.00

Date of Test :	Aug.17, 2004	Temperature :	23°C
EUT :	UHF RFID Scanner	Humidity :	58%
Model No. :	Sense1820	Test Mode :	Tx (High)
Test Engineer:	Richzhy		

Frequency	Reading dBm	Cable Loss dB	Peak Power dBm	Limit dBm
927.9MHz	-9.21	0.2	-9.01	30.00

Reviewer:



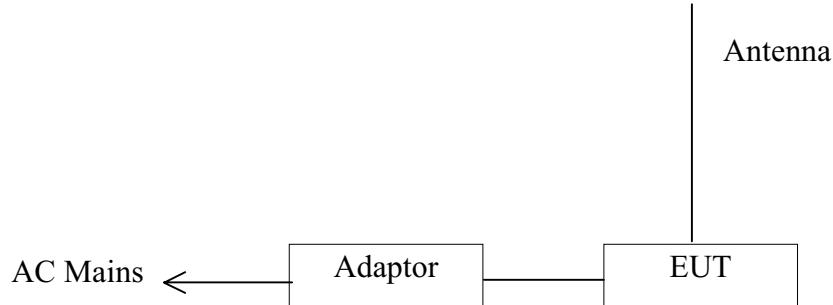
## 6. CHANNEL CARRIER FREQUENCIES SEPARATED MEASUREMENT

### 6.1. Test Equipment

The following test equipment were used during the Emission Bandwidth Test :

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4407B	MY41440292	May 24,04	1 Year
2.	Amp	HP	8449B	3008A00863	May 24,04	1 Year
3.	Antenna	EMCO	3115	9607-4877	Jun.15, 04	1.5 Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May 24,04	1 Year

### 6.2. Block Diagram of Test Setup



(EUT: UHF RFID Scanner)

### 6.3. Specification Limits (§15.247(a))

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 KHz or 20dB bandwidth of the hopping channel, whichever is greater.

The maximum allowed 20dB bandwidth of the hopping channel is 500KHz.

### 6.4. Operating Condition of EUT

6.4.1. Setup the EUT as shown in Section 6.2..

6.4.2. Let the EUT work in test mode (Tx) and test it.

## 6.5. Test Procedure

EUT and its simulators are placed on a turn table, the EUT and let it work normally, we use a keyboard test soft ware, let EUT working in test mode, then test it.

The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 30kHz RBW and 100kHz VBW, set sweep time : 50ms.

## 6.6. Test Results

**PASSED.**

The testing data was attached in the next pages.

Channel Carrier Frequency Separated = 915.8 MHz – 915.4 MHz  
= 0.4 MHz (400KHz)

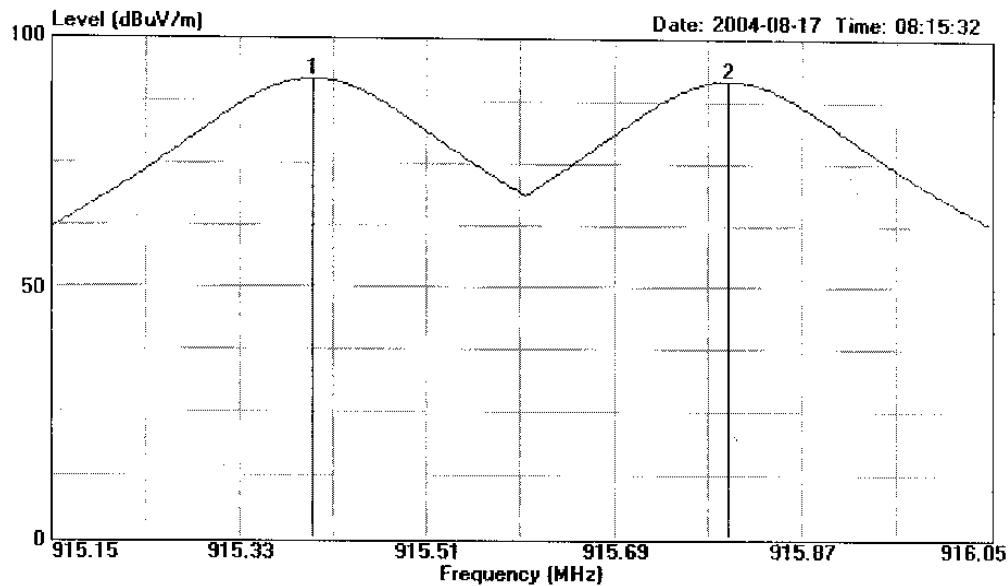


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Data#: 110 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : 3m 2597 FACTOR HORIZONTAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DC5V Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx (hopping mode)

Freq	Over Limit		Read Line	Probe Level	Cable Factor	Loss	Remark
	Level	Limit					
1	915.400	91.87	-----	-----	63.98	23.27	4.62 Peak
2	915.800	91.58	-----	-----	63.69	23.27	4.62 Peak

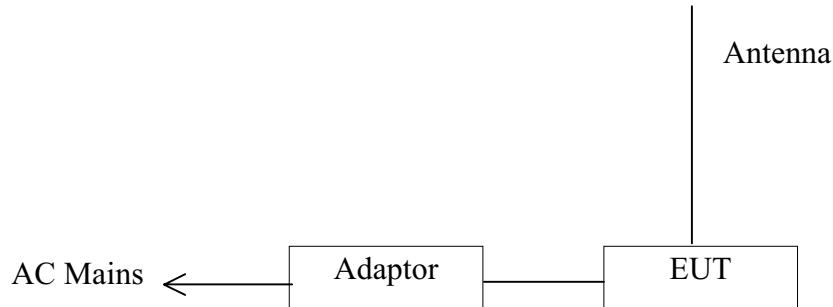
## 7. FREQUENCY HOPPING SYSTEM CHANNEL NUMBER MEASUREMENT

### 7.1. Test Equipment

The following test equipment were used during the Emission Bandwidth Test :

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4407B	MY41440292	May 24,04	1 Year
2.	Amp	HP	8449B	3008A00863	May 24,04	1 Year
3.	Antenna	EMCO	3115	9607-4877	Jun.15, 04	1.5 Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May 24,04	1 Year

### 7.2. Block Diagram of Test Setup



(EUT: UHF RFID Scanner)

### 7.3. Specification Limits (§15.247(a))

For frequency hopping systems operating in the 902-928MHz band employing at least 25 hopping channels.

### 7.4. Operating Condition of EUT

7.4.1. Setup the EUT as shown in Section 7.2..

7.4.2. Let the EUT work in test mode (Tx) and test it.

## 7.5. Test Procedure

EUT and its simulators are placed on a turn table, the EUT and let it work normally, we use a keyboard test soft ware, let EUT working in test mode, then test it.

The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 100kHz RBW and 100kHz VBW, set sweep time : 50ms.

## 7.6. Test Results

**PASSED.**

The testing data was attached in the next pages.

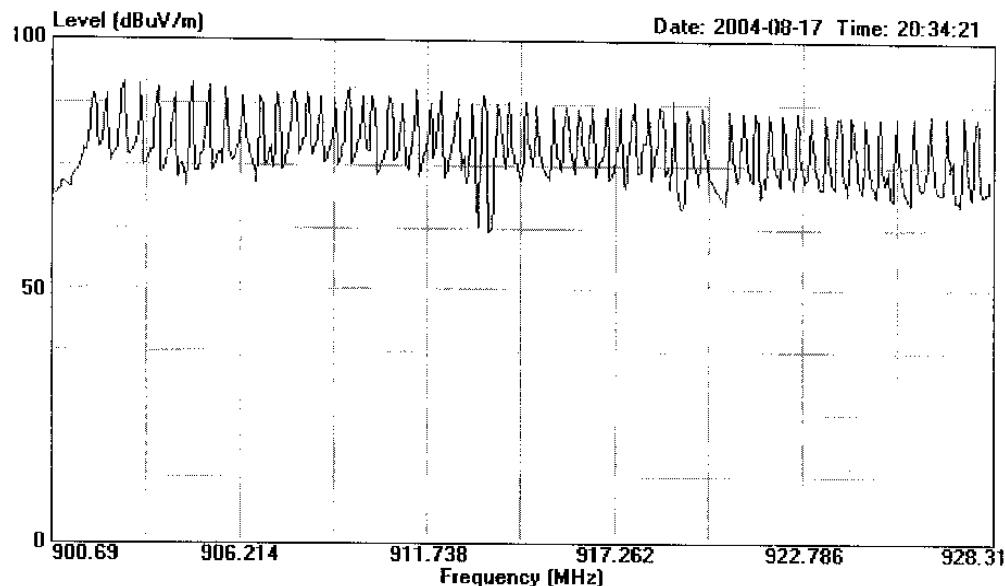


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Tel:+86-755-26639496 Fax:+86-755-26632877

Data#: 111 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
Condition : 3m 2597 FACTOR HORIZONTAL  
EUT : UHF RFID Scanner  
M/N : Sense1820  
Power : DCSV Adaptor Input:120V/60Hz  
Test Engineer : Richzhy  
Test Comment : Temp:24°C Humi:56%  
Memo : Tx (hopping mode)  
: Numbers of Hopping Channels : 61

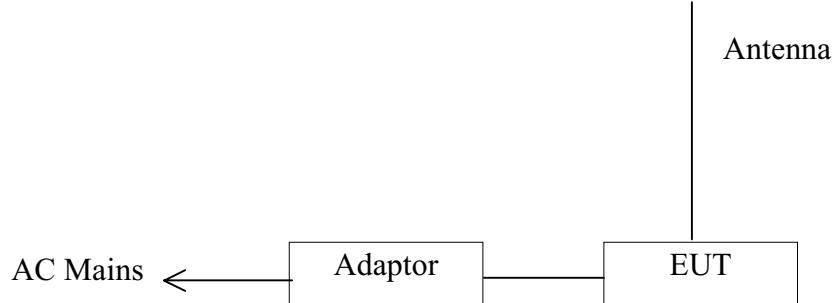
## 8. THE AVERAGE TIME OF OCCUPANCY MEASUREMENT

### 8.1. Test Equipment

The following test equipment were used during the Emission Bandwidth Test :

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4407B	MY41440292	May 24,04	1 Year
2.	Amp	HP	8449B	3008A00863	May 24,04	1 Year
3.	Antenna	EMCO	3115	9607-4877	Jun.15, 04	1.5 Year
4.	HF Cable	Hubersuhne	Sucoflex104	-	May 24,04	1 Year

### 8.2. Block Diagram of Test Setup



(EUT: UHF RFID Scanner)

### 8.3. Specification Limits (§15.247(a))

Frequency hopping systems in the 902-928 MHz band shall use at least 15 non-overlapping channels. The average time of occupancy on any channel shall not greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed.

### 8.4. Operating Condition of EUT

8.4.1. Setup the EUT as shown in Section 8.2..

8.4.2. Let the EUT work in test mode (Tx) and test it.

## 8.5. Test Procedure

EUT and its simulators are placed on a turn table, the EUT and let it work normally, we use a keyboard test soft ware, let EUT working in test mode, then test it.

The bandwidth of the fundamental frequency was measured with the spectrum analyzer using 1MHz RBW and 1MHz VBW, set sweep time : 5ms. Span : 0Hz.

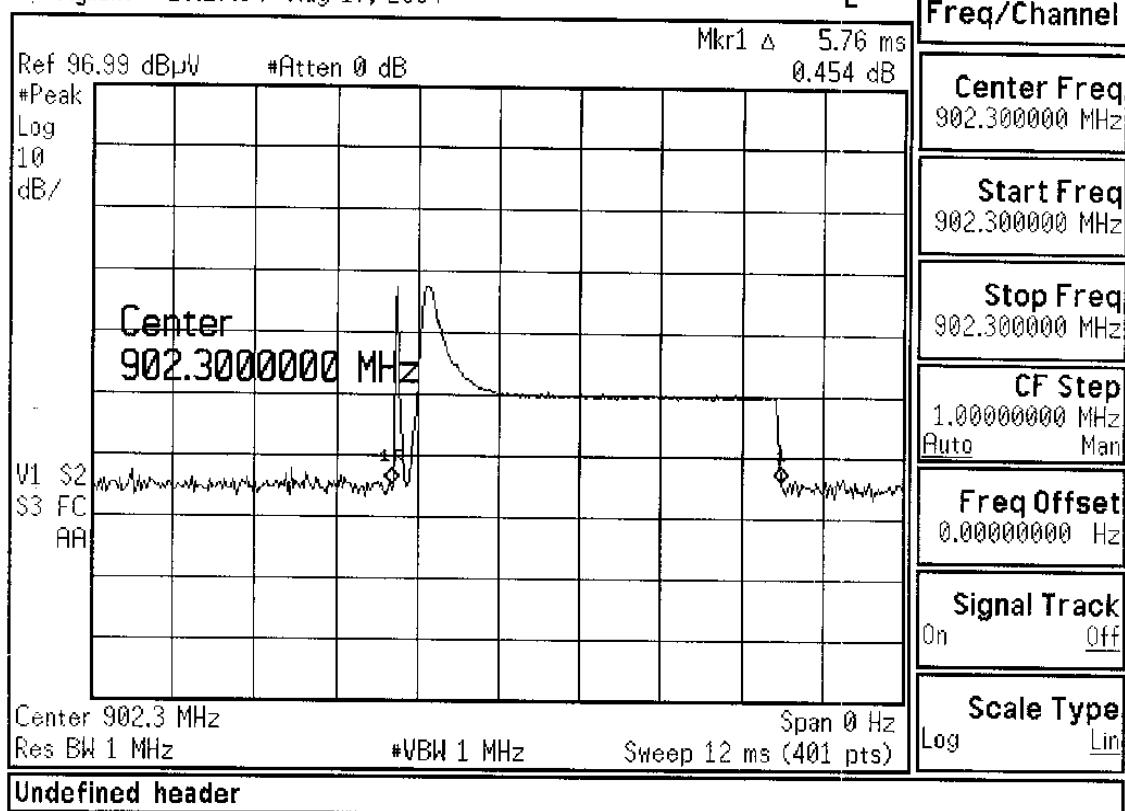
## 8.6. Test Results

**PASSED.**

The testing data was attached in the next pages.

1. This system hop 2.7322 times/second, every hopping include 1 time sending data and 1 time receiving data. So send times in every second to all 61 channels:  
 $2.7322/2=1.3661$  times/second
2. Sent times for average every second and every channel.  
 $1.3661/61=0.02239$  times/channel\*s
3. Cycle time:  $61*0.4=24.4$ second
4. The average time of occupancy on any channel within a period :  
 $0.02239*24.4*5.76=3.1467$ ms <400ms

Agilent 20:27:34 Aug 17, 2004



## 9. DEVIATION TO TEST SPECIFICATIONS

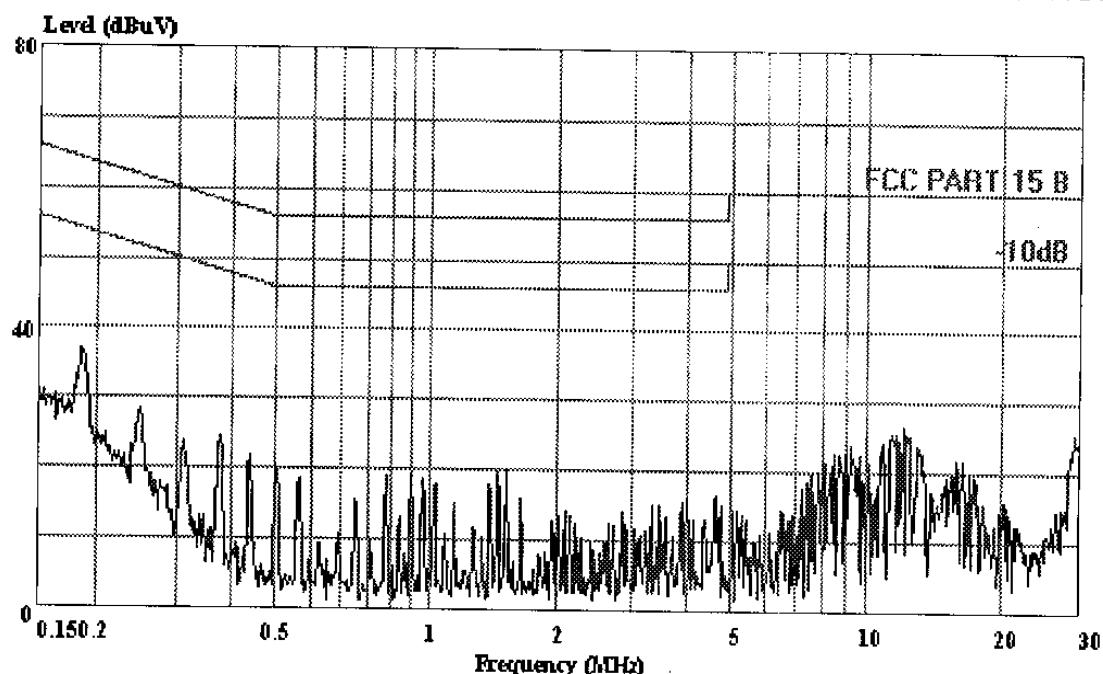
(None.)

## APPENDIX I



Shenzhen Science & Ind Park  
Tel:0755-26639496  
Fax:26632877

Data#: 1 File#: Sense.EMI Date: 2004-08-15 Time: 20:50:16



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (Audix ATC)

Trace:

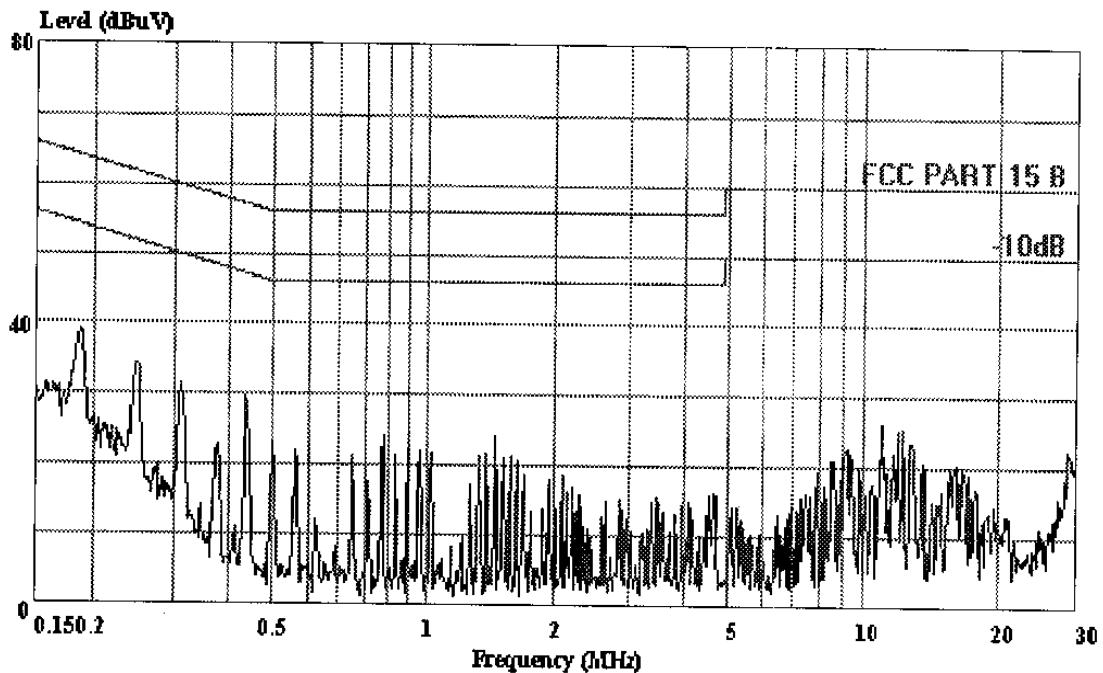
Ref Trace:

Condition: FCC PART 15 B VA KNW-407  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 OP Condition : Tx(Low)  
 Test Spec : DC5V Adaptor Input:120V/60Hz  
 Test Engineer: Richzhy  
 Comment : Temp:23°C Humi:54%



Shenzhen Science & Ind Park  
Tel:0755-26639496  
Fax:26632877

Data#: 2 File#: Sense.EMI Date: 2004-08-15 Time: 20:56:56



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (Audix ATC)

Trace:

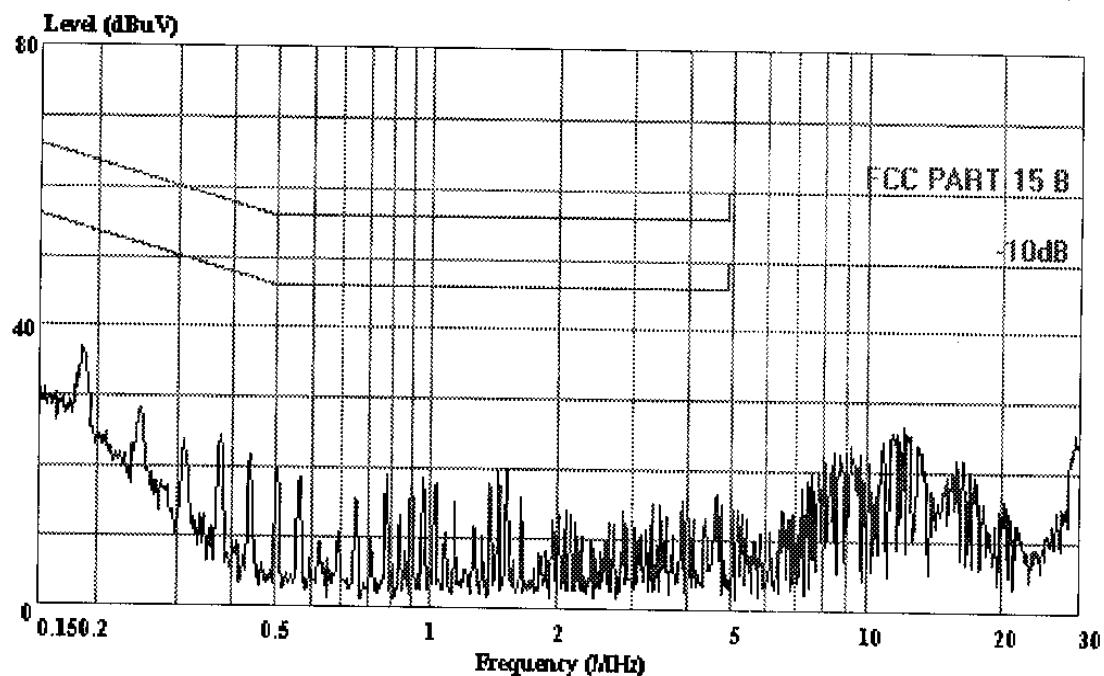
Ref Trace:

Condition: FCC PART 15 B VB KNW-407  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 OP Condition : Tx(Low)  
 Test Spec : DC5V Adaptor Input:120V/60Hz  
 Test Engineer: Richzhy  
 Comment : Temp:23°C Humi:54%



Shenzhen Science & Ind Park  
Tel:0755-26639496  
Fax:26632877

Data#: 3 File#: Sense.EMI Date: 2004-08-15 Time: 21:02:16



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (Audix ATC)

Trace:

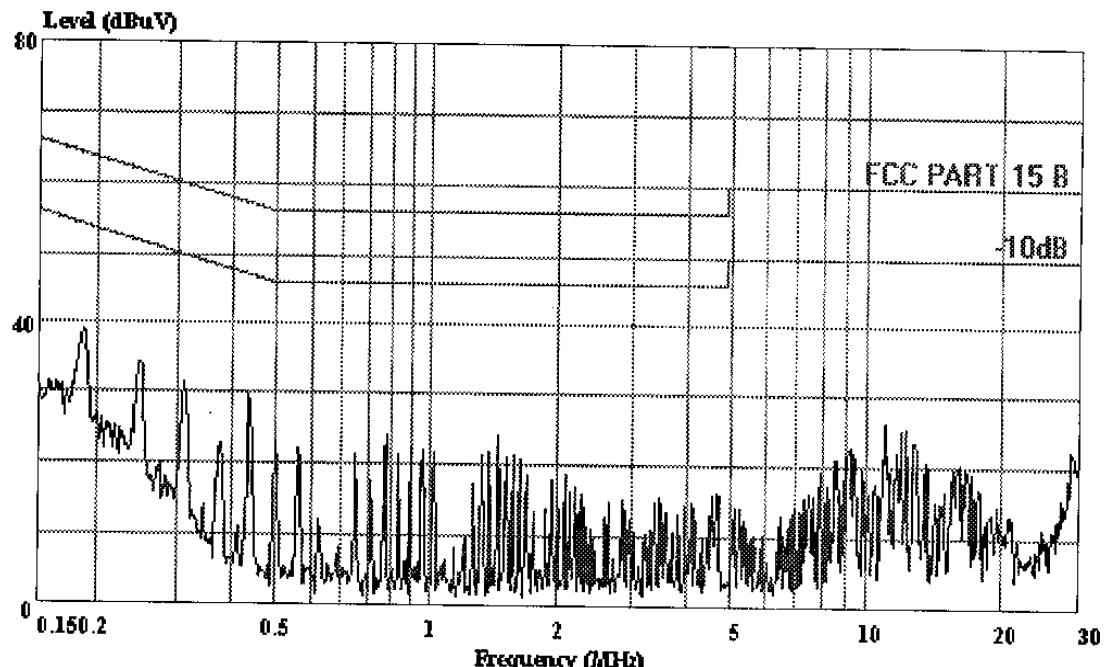
Ref Trace:

Condition: FCC PART 15 B VA KNW-407  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 OP Condition : Tx(Middle)  
 Test Spec : DC5V Adaptor Input:120V/60Hz  
 Test Engineer: Richzhy  
 Comment : Temp:23°C Humi:54%



Shenzhen Science & Ind Park  
Tel:0755-26639496  
Fax:26632877

Data#: 4 File#: Sense.EMI Date: 2004-08-15 Time: 21:11:56



**AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (Audix ATC)**

Trace:

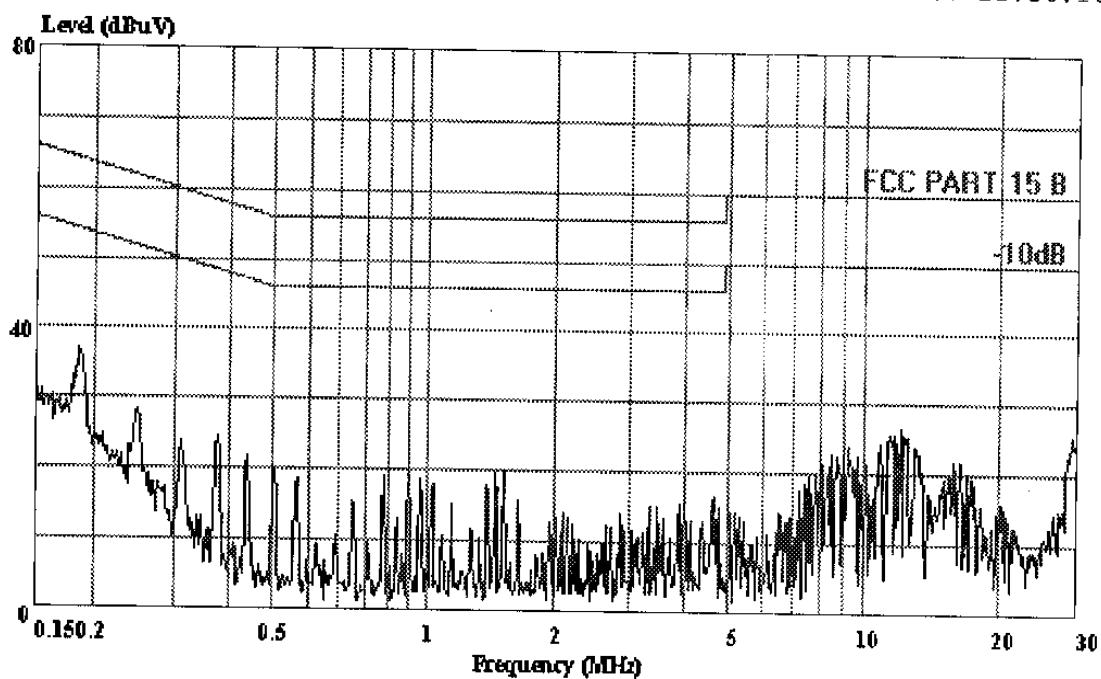
Ref Trace:

Condition: FCC PART 15 B VB KNW-407  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 OP Condition : Tx(Middle)  
 Test Spec : DC5V Adaptor Input:120V/60Hz  
 Test Engineer: Richzhy  
 Comment : Temp:23°C Humi:54%



Shenzhen Science & Ind Park  
Tel:0755-26639496  
Fax:26632877

Data#: 5 File#: Sense.EMI Date: 2004-08-15 Time: 21:16:16



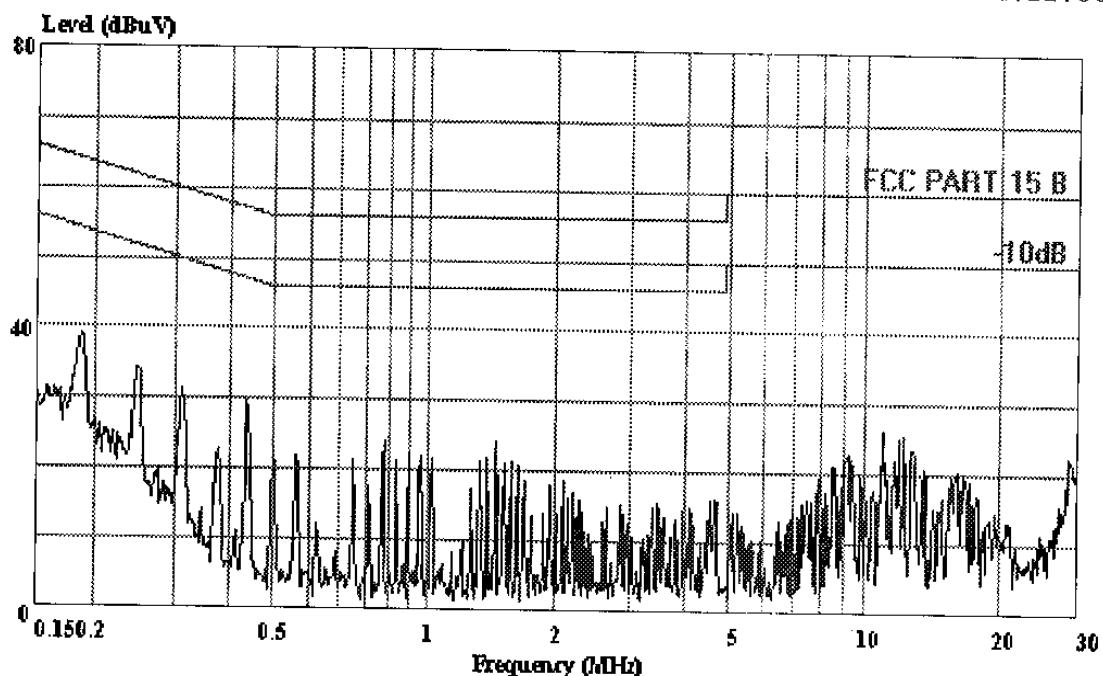
**AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (Audix ATC)**  
Trace: Ref Trace:

Condition: FCC PART 15 B VA KNW-407  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 OP Condition : Tx(High)  
 Test Spec : DC5V Adaptor Input:120V/60Hz  
 Test Engineer: Richzhy  
 Comment : Temp:23°C Humi:54%



Shenzhen Science & Ind Park  
Tel:0755-26639496  
Fax:26632877

Data#: 6 File#: Sense.EMI Date: 2004-08-15 Time: 21:22:56



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (Audix ATC)

Trace:

Ref Trace:

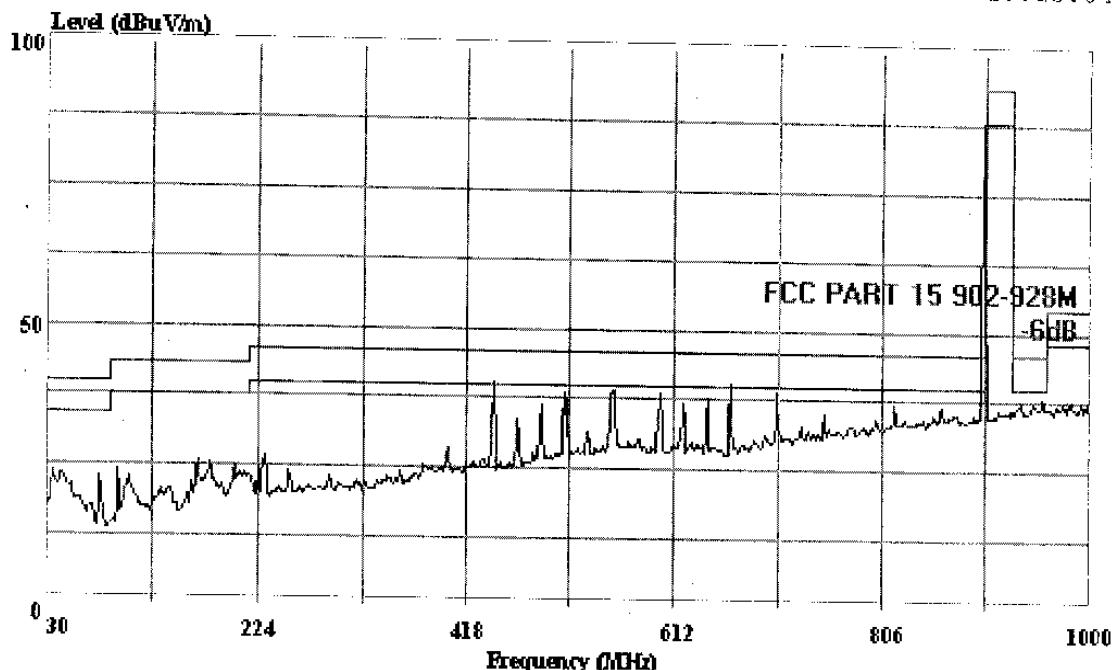
Condition: FCC PART 15 B VB KNW-407  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 OP Condition : Tx(High)  
 Test Spec : DC5V Adaptor Input:120V/60Hz  
 Test Engineer: Richzhy  
 Comment : Temp:23°C Humi:54%

## APPENDIX II



Shenzhen Science & Ind. Park  
Tel: 0755-26639495~7  
Fax: 0755-26632877

Data#: 13 File#: Sense.EMI Date: 2004-08-12 Time: 18:13:04



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

Trace:

Ref Trace:

Condition: FCC PART 15 902-928M 3m 2598FACTOR HORIZONTAL

EUT : UHF RFTD Scanner

M/N : Sense1820

Power : DC 5V Adaptor Input:120V/60Hz

Engineer : Richzhv

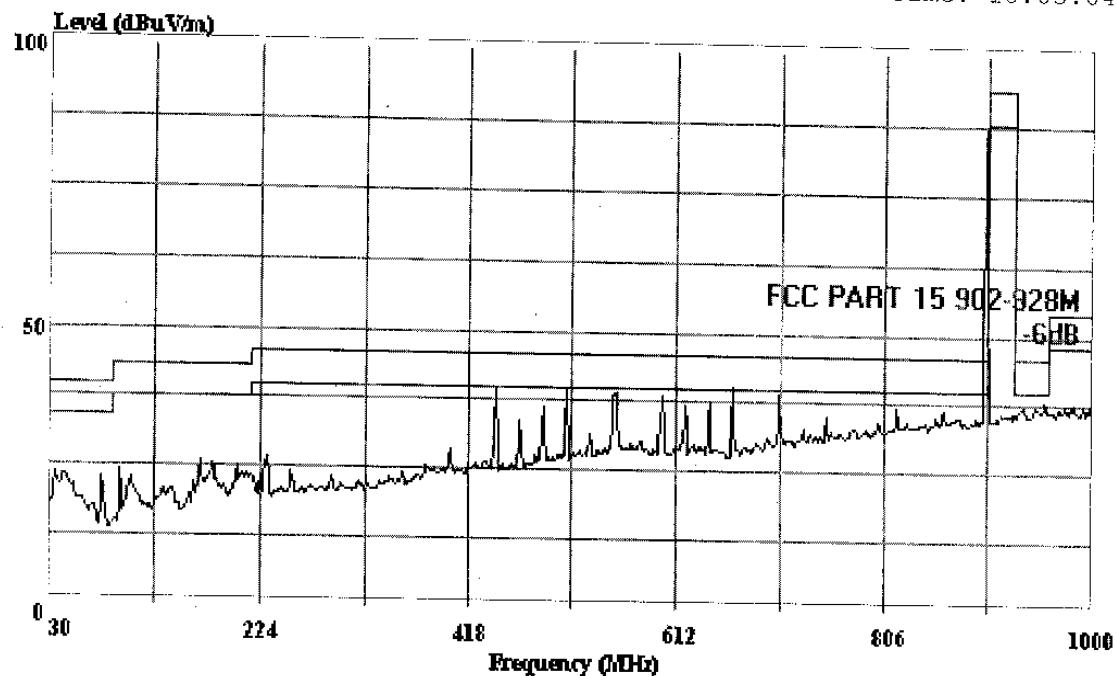
Test Comment: Temp:24°C Humi:56%

Memo : Tx (Low)



Shenzhen Science & Ind. Park  
Tel: 0755-26639495~7  
Fax: 0755-26632877

Data#: 12 File#: Sense.EMI Date: 2004-08-12 Time: 18:03:04



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

Trace:

Ref Trace:

Condition: FCC PART 15 902-928M 3m 2598FACTOR VERTICAL

EUT : UHF RFID Scanner

M/N : Sense1820

Power : DC 5V Adaptor Input:120V/60Hz

Engineer : Richzhv

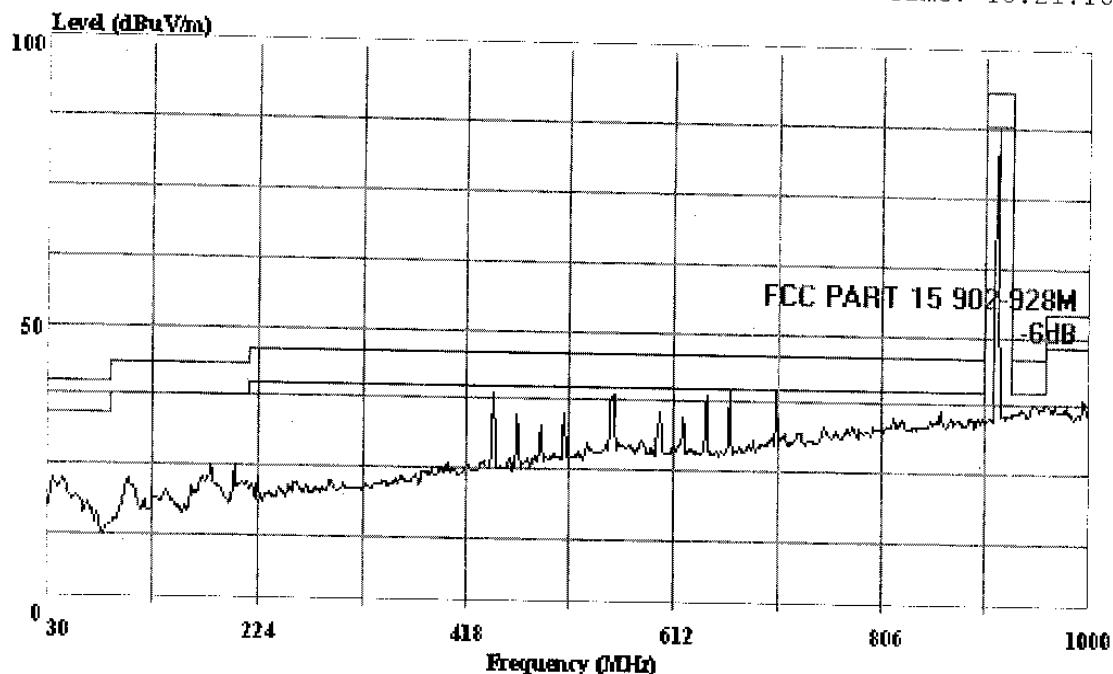
Test Comment: Temp:24°C Humi:56%

Memo : Tx (Low)



Shenzhen Science & Ind. Park  
Tel: 0755-26639495~7  
Fax: 0755-26632877

Data#: 14 File#: Sense.EMI Date: 2004-08-12 Time: 18:21:16



Trace:

Ref Trace:

Condition: FCC PART 15 902-928M 3m 2598FACTOR HORIZONTAL

EUT : UHF RFID Scanner

M/N : Sense1820

Power : DC 5V Adaptor Input:120V/60Hz

Engineer : Richzhv

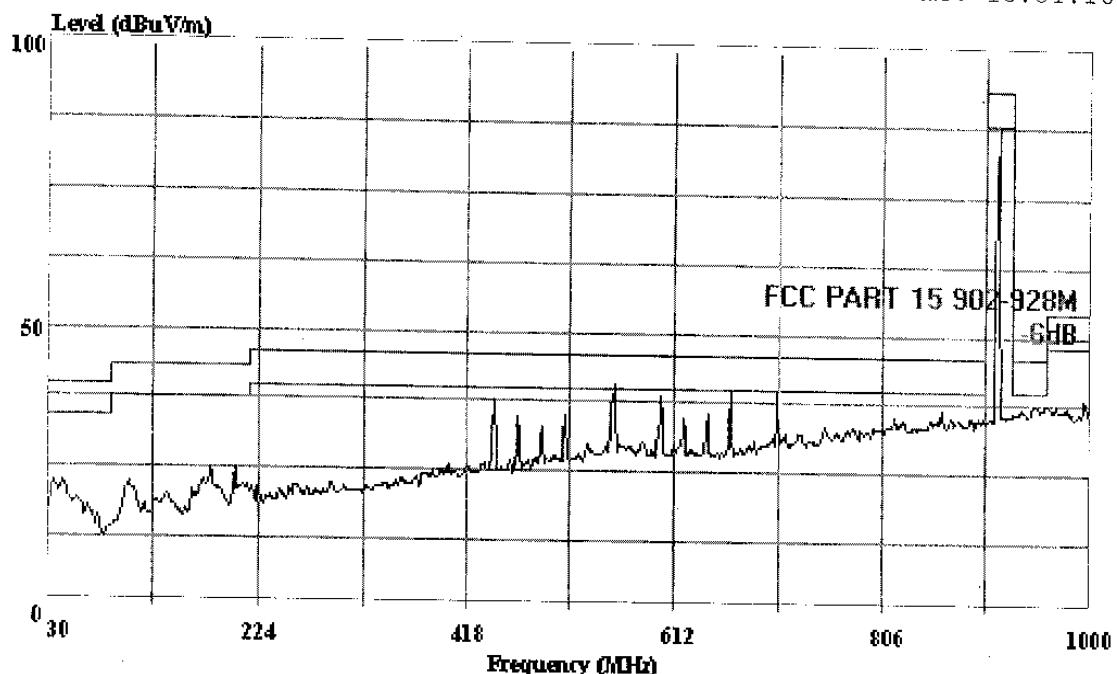
Test Comment: Temp:24°C Humi:56%

Memo : Tx(Middle)



Shenzhen Science & Ind. Park  
Tel: 0755-26639495~7  
Fax: 0755-26632877

Data#: 15 File#: Sense.EMI Date: 2004-08-12 Time: 18:31:16



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

Trace:

Ref Trace:

Condition: FCC PART 15 902-928M 3m 2598FACTOR VERTICAL

EUT : UHF RFTD Scanner

M/N : Sense1820

Power : DC 5V Adaptor Input:120V/60Hz

Engineer : Richzhv

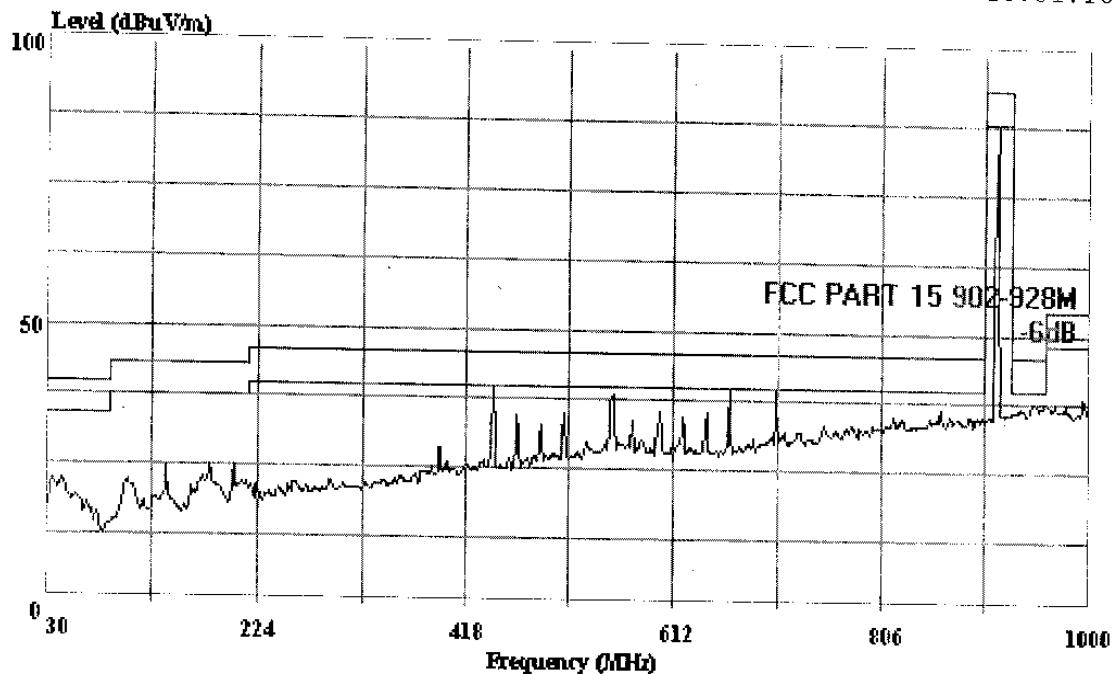
Test Comment: Temp:24°C Humi:56%

Memo : Tx (Middle)



Shenzhen Science & Ind. Park  
Tel: 0755-26639495~7  
Fax: 0755-26632877

Data#: 1 / File#: Sense.EMI Date: 2004-08-12 Time: 18:51:16



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

Trace:

Ref Trace:

Condition: FCC PART 15 902-928M 3m 2598FACTOR HORIZONTAL

EUT : UHF RFID Scanner

M/N : Sense1820

Power : DC 5V Adaptor Input:120V/60Hz

Engineer : Richzhv

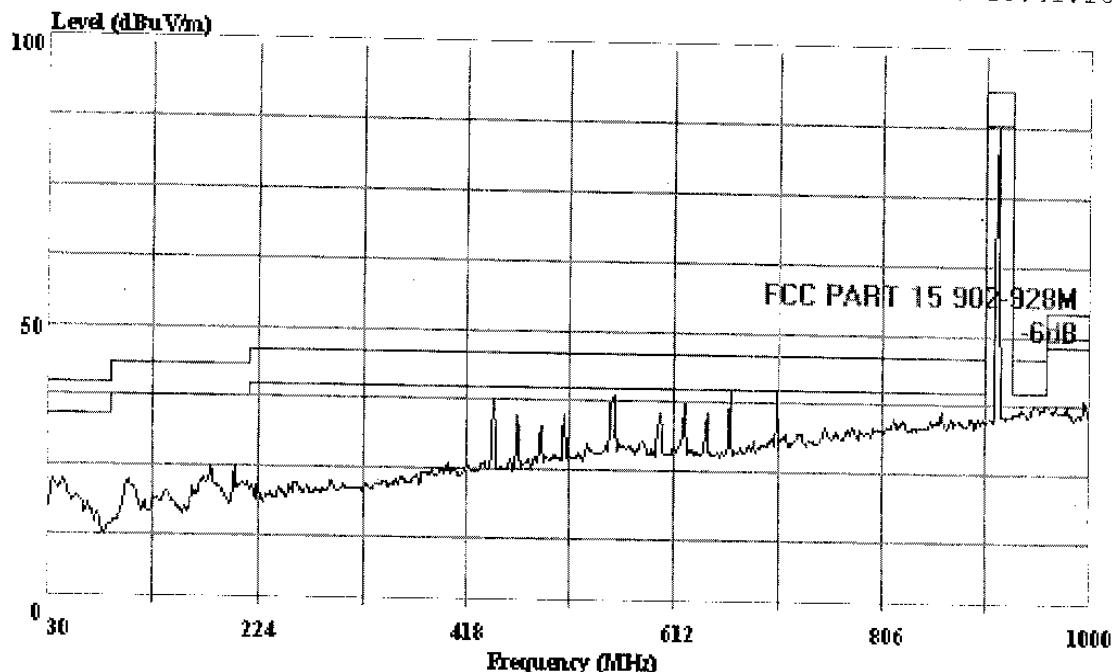
Test Comment: Temp:24°C Humi:56%

Memo : Tx(High)



Shenzhen Science & Ind. Park  
Tel: 0755-26639495~7  
Fax: 0755-26632877

Data #: 1.6 File #: Sense.EMI Date: 2004-08-12 Time: 18:41:16



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

Trace:

Ref Trace:

Condition: FCC PART 15 902-928M 3m 2598FACTOR VERTICAL

EUT : UHF RFTD Scanner

M/N : Sense1820

Power : DC 5V Adaptor Input:120V/60Hz

Engineer : Richzhv

Test Comment: Temp:24°C Humi:56%

Memo : Tx(High)

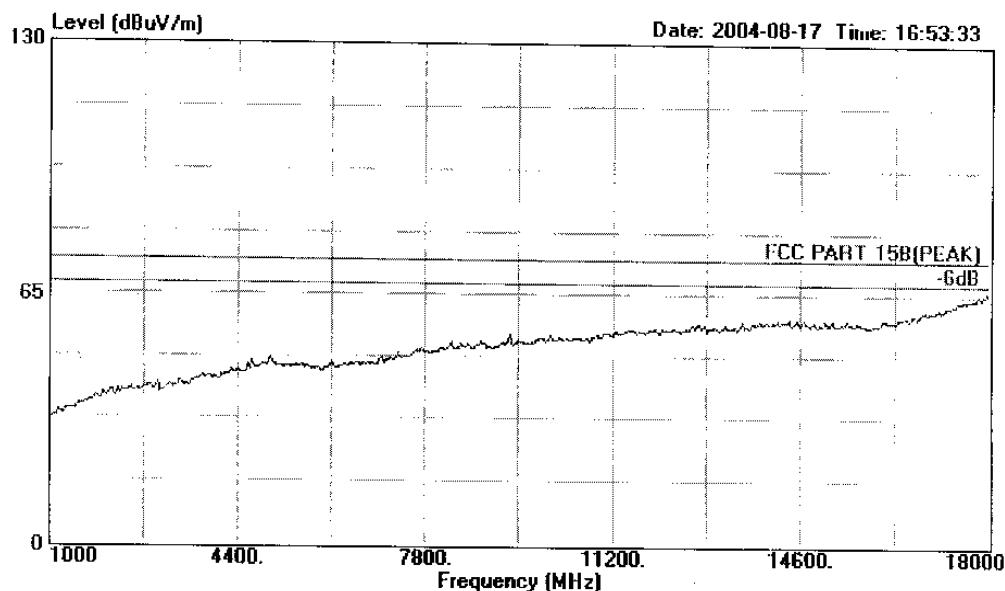


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 Shenzhen Science & Industry Park  
 Nantou, Shenzhen, Guangdong, China  
 Tel:+86-755-26639496 Fax:+86-755-26632877

Data#: 101 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15B(Peak) 3m 3115 FACTOR HORIZONTAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DCSV Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx(Low)  
 :

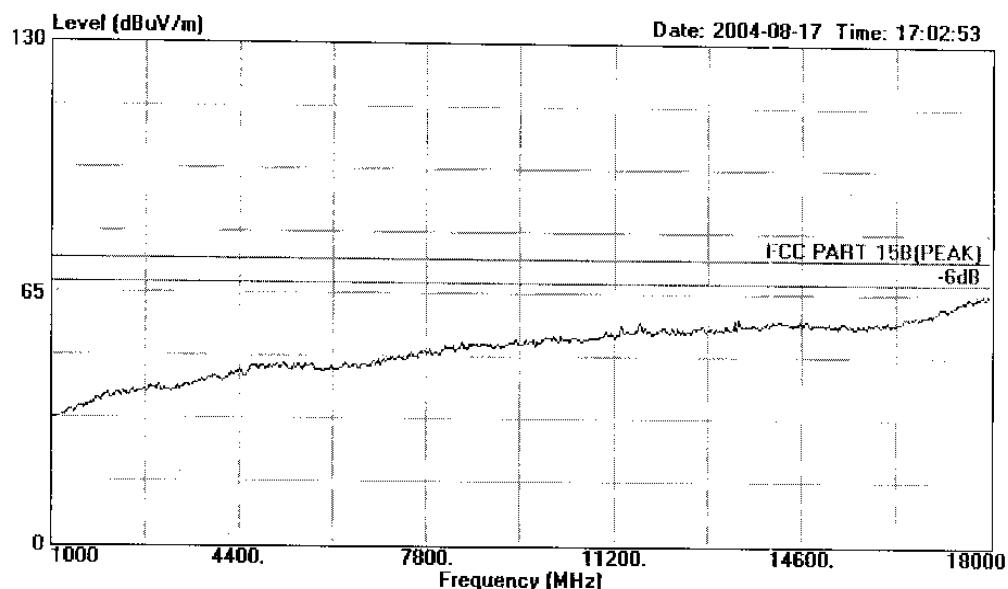


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 Tel:+86-755-26639496 Fax:+86-755-26632877

Data#: 102 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15B(Peak) 3m 3115 FACTOR VERTICAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DCSV Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx (Low)  
 :

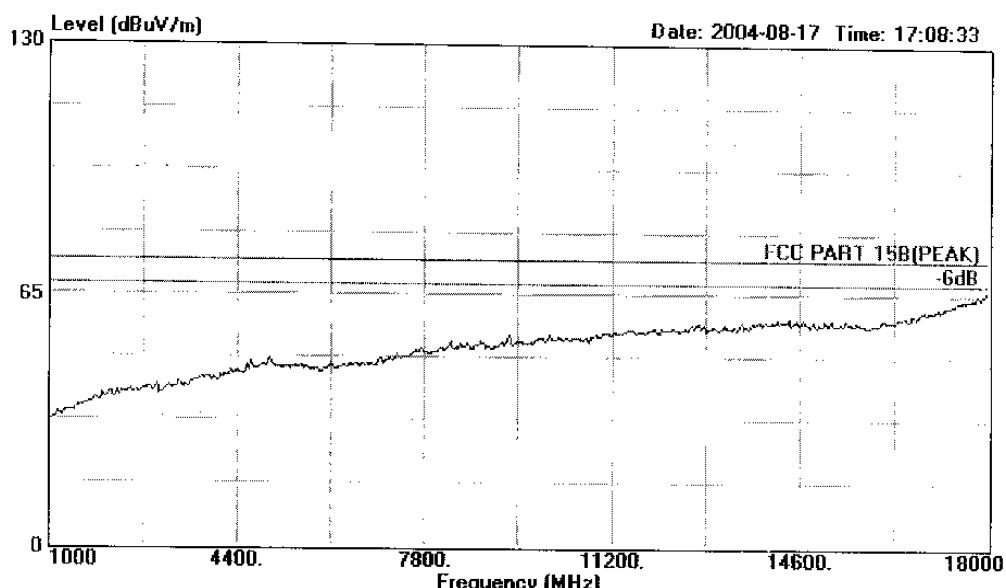


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 Tel: +86-755-26639496 Fax: +86-755-26632877

Data#: 103 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15B(PeAK) 3m 3115 FACTOR HORIZONTAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DCSV Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx(Middle)  
 :

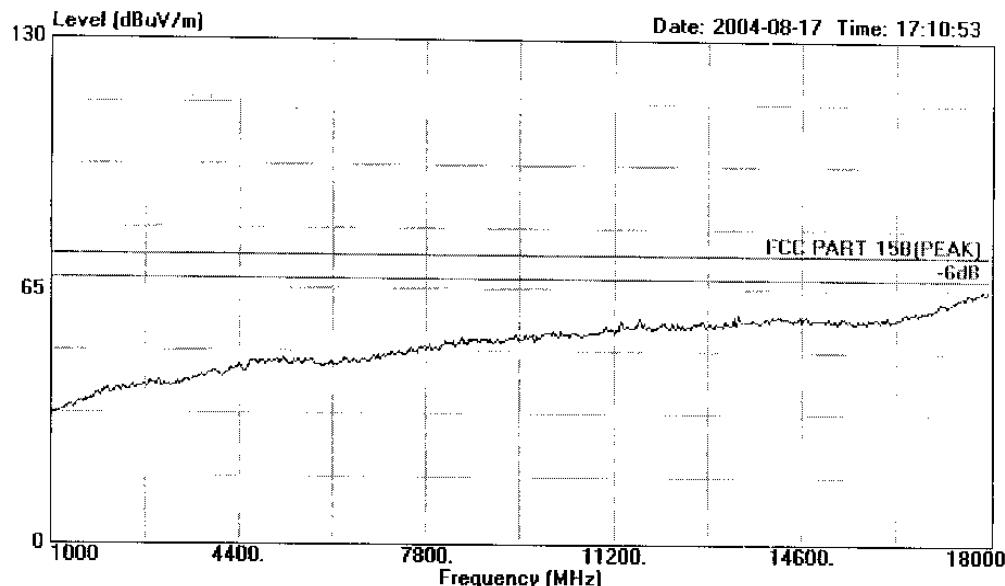


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 Shenzhen Science & Industry Park  
 Nantou, Shenzhen, Guangdong, China  
 Tel:+86-755-26639496 Fax:+86-755-26632677

Data#: 104 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15B(Peak) 3m 3115 FACTOR VERTICAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DCSV Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx(Middle)  
 :

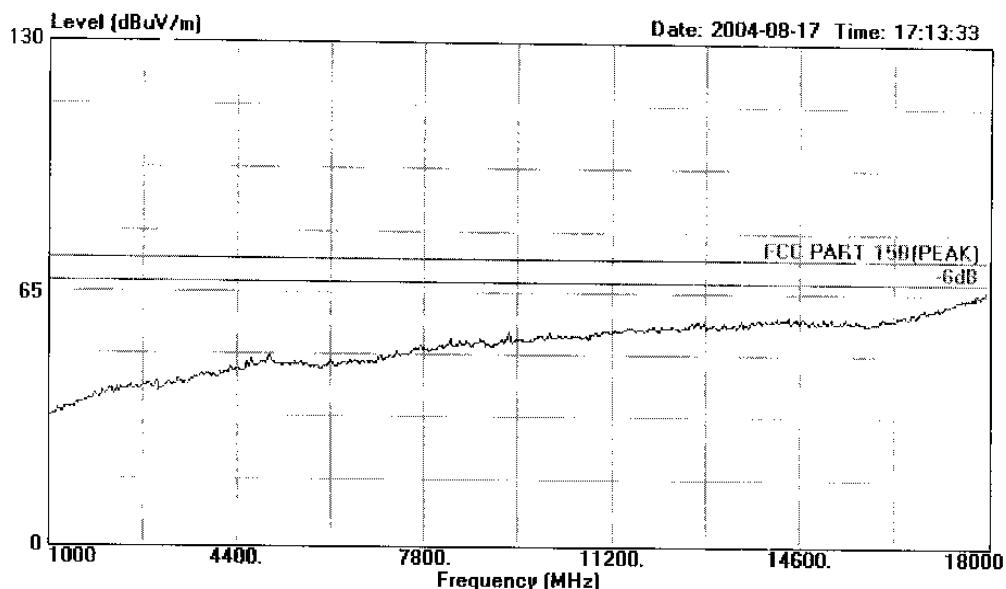


信华科技(深圳)有限公司

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No. 6, Ke Feng Road, Block 52,  
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 Nantou, Shenzhen, Guangdong, China  
 Tel: +86-755-26639496 Fax: +86-755-26632877

Data#: 105 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15B(PEAK) 3m 3115 FACTOR HORIZONTAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DCSV Adaptor Input:120V/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx(High)  
 :

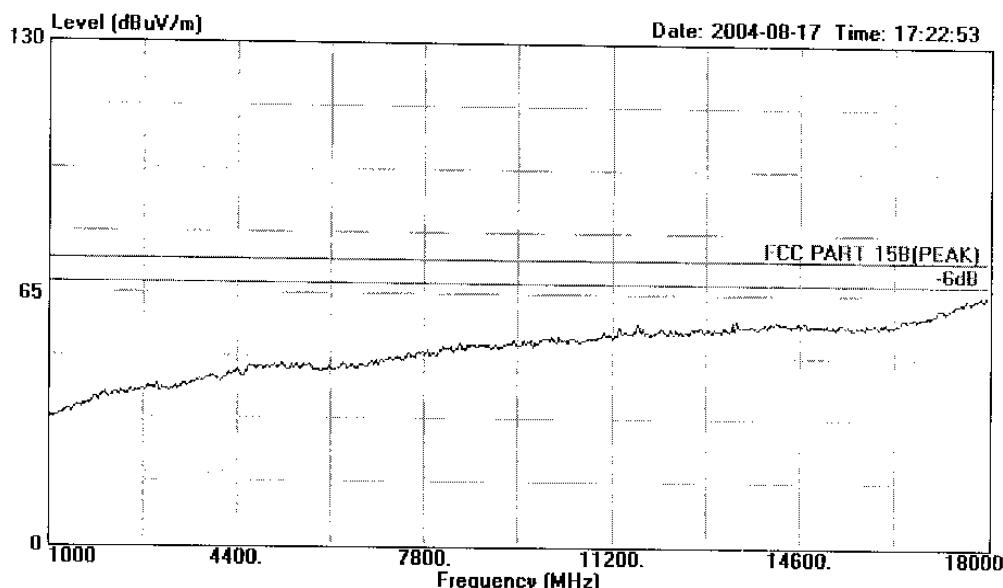


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No. 6, Ke Feng Road, Block 52,  
 Shenzhen Science & Industry Park  
 Nantou, Shenzhen, Guangdong, China  
 Tel:+86-755-26639496 Fax:+86-755-26632877

Data#: 106 File#: C:\EMI TEST DATA\S\Sense.EMI



Site : 1# Chamber  
 Condition : FCC PART 15B(PeAK) 3m 3115 FACTOR VERTICAL  
 EUT : UHF RFID Scanner  
 M/N : Sense1820  
 Power : DCSV Adaptor Input:12DV/60Hz  
 Test Engineer : Richzhy  
 Test Comment : Temp:24°C Humi:56%  
 Memo : Tx(High)  
 :