

## ELECTROMAGNETIC EMISSIONS COMPLIANCE REPORT

### INTENTIONAL RADIATOR CERTIFICATION TO FCC PART 15 SUBPART C REQUIREMENT

OF

**Product Name:** Transmitter: 122K-TX15

**Brand Name:** Pulsetronic

**Model Name:** TX15

**Model Difference:** N/A

**FCC ID:** TM6DTC-TX15

**Report No.:** ER/2005/80016

**Issue Date:** Oct. 12, 2005

**FCC Rule Part:** §15.209

**Prepared for** Direction Technology Co., Ltd.  
1F, No. 88-7, Sec.1, Kwang Fu Rd., Sec.1, San  
Chung, Taipei, Taiwan.

**Prepared by** SGS Taiwan Ltd.  
No. 134, Wu Kung Rd., Wuku Industrial  
Zone, Taipei County, Taiwan.

*Note: This report shall not be reproduced except in full, without the written approval of SGS Taiwan Ltd. This document may be altered or revised by SGS Taiwan Ltd. personnel only, and shall be noted in the revision section of the document.*

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

### VERIFICATION OF COMPLIANCE

**Applicant:** Direction Technology Co., Ltd.  
1F, No. 88-7, Sec.1, Kwang Fu Rd., Sec.1, San Chung, Taipei, Taiwan.

**Product Description:** 122KHz Heart rate transmitter

**FCC ID Number:** TM6DTC-TX15

**Brand Name:** Pulsetronic

**Model No.:** TX15

**Model Difference:** N/A

**File Number:** ER/2005/80016

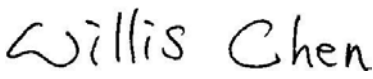


**Date of test:** Aug. 16, 2005 – Aug. 17, 2005

**Date of EUT Received:** Aug. 16, 2005

**We hereby certify that:**

The above equipment was tested by SGS Taiwan Ltd. The test data, data evaluation, test procedures, and equipment configurations shown in this report were made in accordance with the procedures given in ANSI C63.4 (2003) and the energy emitted by the sample EUT tested as described in this report is in compliance with conducted and radiated emission limits of FCC Rules Part 15.209.

The test results of this report relate only to the tested sample identified in this report.

<i>Test By:</i>	 <hr/> <i>Willis Chen</i>	<i>Date</i>	Oct. 12, 2005 <hr/>
<i>Prepared By:</i>	 <hr/> <i>Eva Kao</i>	<i>Date</i>	Oct. 12, 2005 <hr/>
<i>Approved By</i>	 <hr/> <i>Vincent Su</i>	<i>Date</i>	Oct. 12, 2005 <hr/>

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

## Version

Version No.	Date
00	Oct. 12, 2005

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

## Table of Contents

<b>1.</b>	<b>GENERAL INFORMATION .....</b>	<b>5</b>
1.1	PRODUCT DESCRIPTION .....	5
1.2	RELATED SUBMITTAL(S) / GRANT (S) .....	5
1.3	TEST METHODOLOGY .....	5
1.4	TEST FACILITY .....	5
1.5	SPECIAL ACCESSORIES .....	5
1.6	EQUIPMENT MODIFICATIONS .....	5
<b>2.</b>	<b>SYSTEM TEST CONFIGURATION .....</b>	<b>6</b>
2.1	EUT CONFIGURATION .....	6
2.2	EUT EXERCISE .....	6
2.3	TEST PROCEDURE .....	6
2.4	LIMITATION .....	6
2.5	CONFIGURATION OF TESTED SYSTEM .....	9
<b>3.</b>	<b>SUMMARY OF TEST RESULTS .....</b>	<b>10</b>
<b>4.</b>	<b>DESCRIPTION OF TEST MODES .....</b>	<b>10</b>
<b>5.</b>	<b>CONDUCTED EMISSIONS TEST (NOT APPLICABLE IN THIS REPORT).....</b>	<b>11</b>
5.1	MEASUREMENT PROCEDURE: .....	11
5.2	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....	11
5.3	MEASUREMENT EQUIPMENT USED: .....	11
5.4	MEASUREMENT RESULT: .....	11
<b>6.</b>	<b>RADIATED EMISSION TEST .....</b>	<b>12</b>
6.1	MEASUREMENT PROCEDURE .....	12
6.2	TEST SET-UP (BLOCK DIAGRAM OF CONFIGURATION) .....	12
6.3	MEASUREMENT EQUIPMENT USED: .....	13
6.4	FIELD STRENGTH CALCULATION .....	13
6.5	MEASUREMENT RESULT .....	14
6.6	MEASUREMENT RESULT .....	15
6.7	MEASUREMENT RESULT .....	16

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

## 1. GENERAL INFORMATION

### 1.1 Product Description

The Direction Technology Co., Ltd. Model: TX15 (referred to as the EUT in this report) The EUT is an short range, lower power heart rate transmitter..

A major technical descriptions of EUT is described as following:

- A). Operation Frequency: 122KHz, one channel.
- B). Antenna Designation: Non-User Replaceable (Fixed)
- C). Power Supply: 3 Vdc by battery.

### 1.2 Related Submittal(s) / Grant (s)

This submittal(s) (test report) is intended for FCC ID: TM6DTC-TX15 filing to comply with Section 15.209 of the FCC Part 15, Subpart C Rules. The composite system (receiver) is compliance with Subpart B is authorized under a Verification procedure.

### 1.3 Test Methodology

Both conducted and radiated testing were performed according to the procedures in ANSI C63.4 (2003). Radiated testing was performed at an antenna to EUT distance 3 meters.

### 1.4 Test Facility

The open area test site and conducted measurement facility used to collect the radiated data is located on the address of SGS Taiwan Ltd. No. 134, Wu Kung Rd., Wuku Industrial Zone, Taipei Country, Taiwan. The Open Area Test Sites and the Line Conducted labs are constructed and calibrated to meet the FCC requirements in documents ANSI C63.4: 2003 and CISPR 22/EN 55022 requirements. Site No. 1(3 &10 meters) Registration Number: 94644, Anechoic chamber (3 meters) Registration Number: 573967

### 1.5 Special Accessories

Not available for this EUT intended for grant.

### 1.6 Equipment Modifications

Not available for this EUT intended for grant.

## 2. System Test Configuration

### 2.1 EUT Configuration

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

### 2.2 EUT Exercise

The Transmitter was operated in the normal operating mode. the Tx frequency was fixed and continuous which was for the purpose of the measurements.

### 2.3 Test Procedure

#### 2.3.1 Conducted Emissions (Not apply in the report)

The EUT is a placed on as turn table which is 0.8 m above ground plane. According to the requirements in Section 7 and 13 of ANSI C63.4-2003. Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode.

#### 2.3.2 Radiated Emissions

The EUT is a placed on as turn table which is 0.8 m above ground plane. The turn table shall rotate 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna which varied from 1m to 4m to find out the highest emission. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical. In order to find out the max. emission, the relative positions of this hand-held transmitter(EUT) was rotated through three orthogonal axes according to the requirements in Section 8 and 13 of ANSI C63.4-2003.

### 2.4 Limitation

#### (1) Conducted Emission (Not applicable in this report)

According to section 15.207(a) Conducted Emission Limits is as following.

Frequency range MHz	Limits dB (uV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Note

- 1.The lower limit shall apply at the transition frequencies
- 2.The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

**(2) Radiated Emission**

- (a) Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:
- (b) In the emission table above, the tighter limit applies at the band edges.
- (c) The level of any unwanted emissions from an intentional radiator operating under these general provisions shall not exceed the level of the fundamental emission. For intentional radiators which operate under the provisions of other Sections within this Part and which are required to reduce their unwanted emissions to the limits specified in this table, the limits in this table are based on the frequency of the unwanted emission and not the fundamental frequency. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Frequency (MHz)	Field strength $\mu\text{V}/\text{m}$	Distance (m)	Field strength at 3m $\text{dB}\mu\text{V}/\text{m}$
0.009-0.490	2400/F(KHz)	300	
0.490-1.705	24000/F(KHz)	30	
1.705-30	30	30	69.54
30-88	100	3	40
88-216	150	3	43.5
216-960	200	3	46
Above 960	500	3	54

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

Limit Table:

Unmber of Harmonic	Frequency (KHz)	Limit at 300m (uV/m)	Limit at 30m (uV/m)	Limit at 1m (uV/m)
1	122	19.67	--	124.96
2	244	9.84	--	118.94
3	366	6.56	--	115.42
4	488	4.92	--	112.92
5	610	--	39.34	90.98
6	732	--	32.79	89.40
7	854	--	28.10	88.06
8	976	--	24.59	86.90
9	1098	--	21.86	85.88
10	1220	--	19.67	84.96

**Limit Calculation and transfer to 1m test distance:**

If the frequency between 9 – 490KHz,  
 Limit =  $20\log(2400/f(\text{KHz})) + 40\log(300/1)$

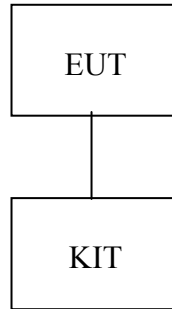
If the frequency between 490 KHz – 1.705MHz  
 Limit =  $20\log(24000/f(\text{KHz})) + 40\log(30/1)$

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.



## 2.5 Configuration of Tested System

**Fig. 2-1 Configuration of Tested System**



**Table 2-1 Equipment Used in Tested System**

Item	Equipment	Mfr/Brand	Model/ Type No.	FCC ID	Series No.	Data Cable	Power Cord
1.	KIT	N/A	N/A	N/A	N/A	20cm	N/A

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

### 3. Summary Of Test Results

FCC Rules	Description Of Test	Result
§ 15.207	Conducted Emission	N/A
§ 15.209	Radiated Emission	Compliant

### 4. Description of test modes

The EUT has been tested under continuous operating condition with a Test Kit. The Frequency 122KHz was chosen for testing.

The field strength of radiation emission was measured as EUT stand-up position (H mode) and lie down position (E1,E2 mode) three axis modes.

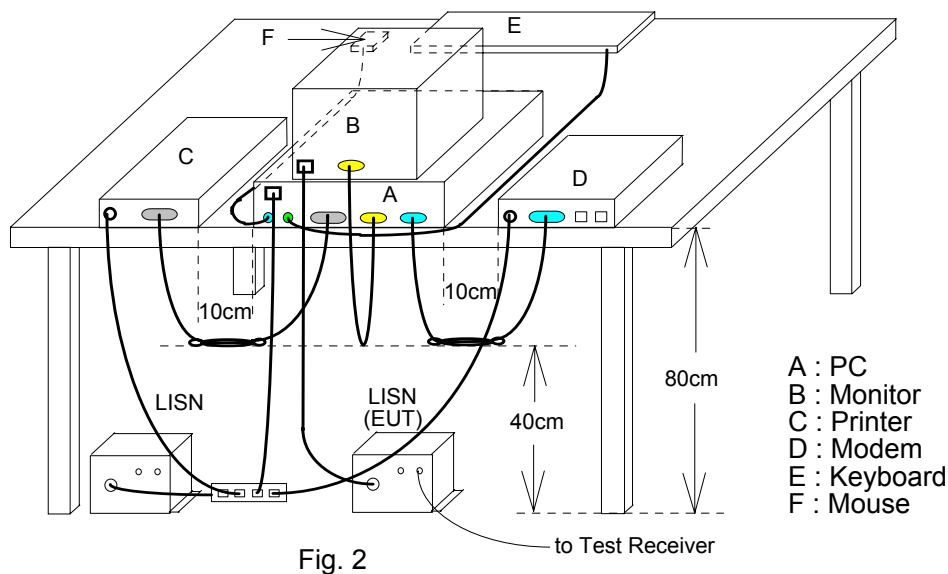
The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

## 5. Conducted Emissions Test (Not applicable in this report)

### 5.1 Measurement Procedure:

1. The EUT was placed on a table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

### 5.2 Test SET-UP (Block Diagram of Configuration)



### 5.3 Measurement Equipment Used:

Conducted Emission Test Site					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
EMC Analyzer	HP	8594EM	3624A00203	09/02/2005	09/03/2006
EMI Test Receiver	R&S	ESCS30	828985/004	06/09/2005	06/10/2006
Transient Limiter	HP	11947A	3107A02062	09/02/2005	09/03/2006
LISN	Rolf-Heine	NNB-2/16Z	99012	12/31/2004	12/30/2005
LISN	Rolf-Heine	NNB-2/16Z	99013	12/24/2004	12/23/2005
Coaxial Cables	N/A	No. 3, 4	N/A	12/24/2004	12/23/2005

### 5.4 Measurement Result:

N/A, The EUT is powered by 3Bdc battery.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

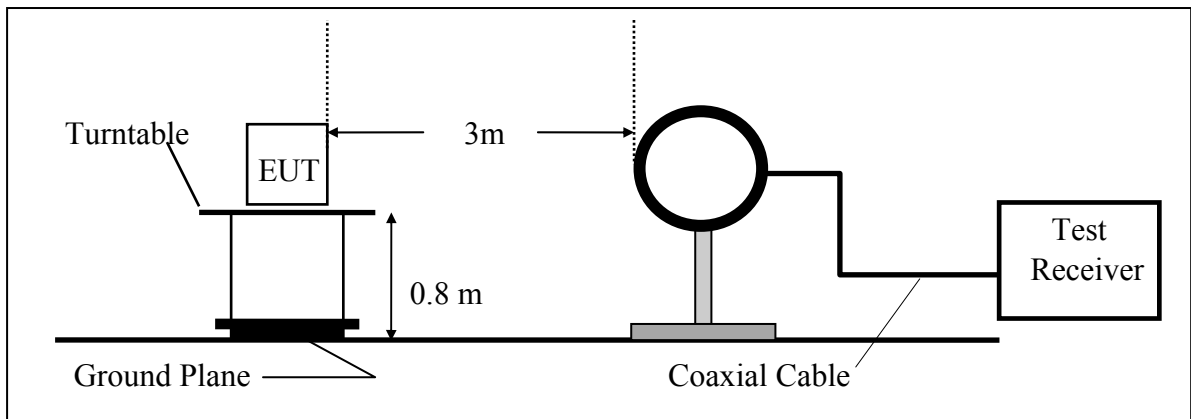
## 6. Radiated Emission Test

### 6.1 Measurement Procedure

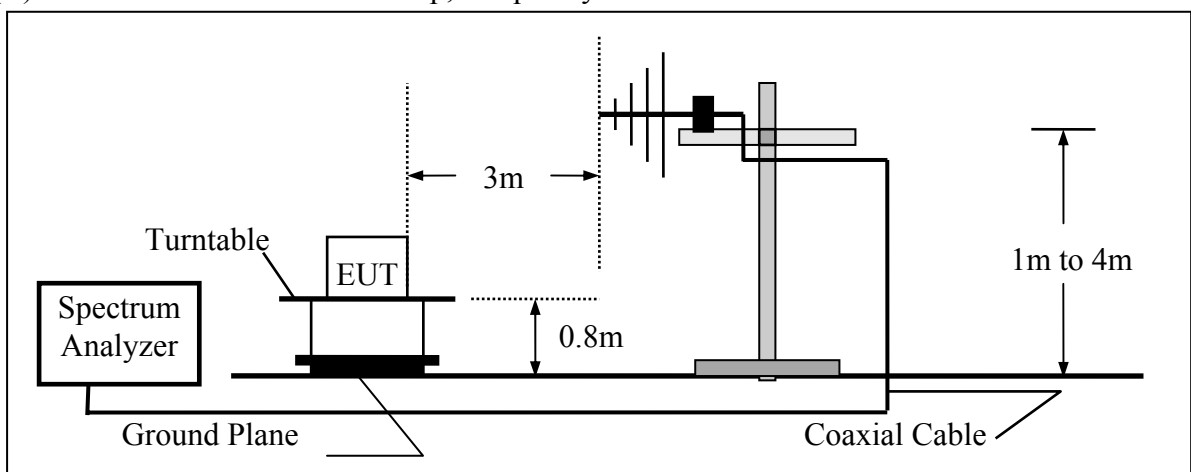
1. The EUT was placed on a turn table which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
4. Repeat above procedures until all frequency measured were complete.

### 6.2 Test SET-UP (Block Diagram of Configuration)

(A) Radiated Emission Test Set-Up, Frequency Below 30MHz



(B) Radiated Emission Test Set-Up, Frequency Below 1000MHz



The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

**6.3 Measurement Equipment Used:**

966 Chamber					
EQUIPMENT TYPE	MFR	MODEL NUMBER	SERIAL NUMBER	LAST CAL.	CAL DUE.
Spectrum Analyzer	R&S	FSP 40	100034	11/09/2004	11/10/2005
Spectrum Analyzer	Agilent	E4446A	MY43360126	03/29/2005	03/28/2006
Spectrum Analyzer	Agilent	E7405A	US40240202	06/28/2005	06/29/2006
Loop Antenna	MESSTEC	FLA30	03/10086	11/25/2004	11/26/2006
Bilog Antenna	SCHWAZBECK	VULB9163	152	10/10/2004	10/10/2005
Horn antenna	Schwarzbeck	BBHA 9120D	309/320	11/10/2004	11/11/2005
Horn antenna	Schwarzbeck	BBHA 9170	184/185	11/02/2004	11/02/2005
Pre-Amplifier	HP	8447D	2944A09469	07/24/2005	07/23/2006
Pre-Amplifier	HP	8494B	3008A00578	02/26/2005	02/25/2006
Turn Table	HD	DT420	N/A	N.C.R	N.C.R
Antenna Tower	HD	MA240-N	240/657	N.C.R	N.C.R
Controller	HD	HD100	N/A	N.C.R	N.C.R
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-10 M	10m	10/09/2004	10/08/2005
Low Loss Cable	HUBER+SUHNER	SUCOFLEX 104PEA-3M	3m	10/09/2004	10/08/2005
Site NSA	SGS	966 chamber	N/A	11/17/2004	11/16/2005

**6.4 Field Strength Calculation**

The field strength is calculated by adding the Antenna Factor and Cable Factor and subtracting the Amplifier Gain and Duty Cycle Correction Factor (if any) from the measured reading. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CL - AG$$

Where FS = Field Strength	CL = Cable Attenuation Factor (Cable Loss)
RA = Reading Amplitude	AG = Amplifier Gain
AF = Antenna Factor	

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

### 6.5 Measurement Result

Operation Mode: Transmitting Mode H Position  
 Fundamental Frequency: 122 KHz  
 Temperature : 25 °C  
 Humidity : 58 %

Test Date : Aug. 17,2005  
 Test By: Willis  
 Ant. Pol: Vertical/ Horizontal

Freq. (KHz)	Ant.Pol. H/V	Detector Mode (PK/AV/QP)	Reading (dBUV)	Factor (dB)	Actual FS (dBUV/m)	Limit at 1m (dBUV/m)	Safe Margin (dB)	Note
122.00	V	Peak	56.64	-7.30	49.34	124.96	-75.62	F
244.00	V	Peak	30.13	-6.50	23.63	118.94	-95.31	H
366.00	V	Peak	29.92	-6.40	23.52	115.42	-91.90	H
488.00	V	Peak	--		0.00	112.92		H
610.00	V	Peak	--		0.00	90.98		H
732.00	V	Peak	--		0.00	89.40		H
854.00	V	Peak	--		0.00	88.06		H
976.00	V	Peak	--		0.00	86.90		H
1098.00	V	Peak	--		0.00	85.88		H
1220.00	V	Peak	--		0.00	84.96		H
122.00	H	Peak	40.21	-7.30	32.91	124.96	-92.05	F
244.00	H	Peak	29.93	-6.50	23.43	118.94	-95.51	H
366.00	H	Peak	29.88	-6.40	23.48	115.42	-91.94	H
488.00	H	Peak	--		0.00	112.92		H
610.00	H	Peak	--		0.00	90.98		H
732.00	H	Peak	--		0.00	89.40		H
854.00	H	Peak	--		0.00	88.06		H
976.00	H	Peak	--		0.00	86.90		H
1098.00	H	Peak	--		0.00	85.88		H
1220.00	H	Peak	--		0.00	84.96		H

Remark :

- (1) Measuring frequencies from foundation frequency to 10<sup>th</sup> Harmonic. °
- (2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 9KHz to 150KHz was 300Hz, 150KHz to 30MHz was 10KHz; 30MHz to 1GHz was 100KHz.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

### 6.6 Measurement Result

Operation Mode: Transmitting Mode E1 Position  
 Fundamental Frequency: 122 KHz  
 Temperature : 25 °C  
 Humidity : 58 %

Test Date : Aug. 17,2005  
 Test By: Willis  
 Pol: Vertical/ Horizontal

Freq. (KHz)	Ant.Pol. H/V	Detector Mode (PK/AV/QP)	Reading (dBUV)	Factor (dB)	Actual FS (dBUV/m)	Limit at 1m (dBUV/m)	Safe Margin (dB)	Note
122.00	V	Peak	55.63	-7.30	48.33	124.96	-76.63	F
244.00	V	Peak	29.70	-6.50	23.20	118.94	-95.74	H
366.00	V	Peak	29.60	-6.40	23.20	115.42	-92.22	H
488.00	V	Peak	--		0.00	112.92		H
610.00	V	Peak	--		0.00	90.98		H
732.00	V	Peak	--		0.00	89.40		H
854.00	V	Peak	--		0.00	88.06		H
976.00	V	Peak	--		0.00	86.90		H
1098.00	V	Peak	--		0.00	85.88		H
1220.00	V	Peak	--		0.00	84.96		H
122.00	H	Peak	39.24	-7.30	31.94	124.96	-93.02	F
244.00	H	Peak	29.90	-6.50	23.40	118.94	-95.54	H
366.00	H	Peak	29.83	-6.40	23.43	115.42	-91.99	H
488.00	H	Peak	--		0.00	112.92		H
610.00	H	Peak	--		0.00	90.98		H
732.00	H	Peak	--		0.00	89.40		H
854.00	H	Peak	--		0.00	88.06		H
976.00	H	Peak	--		0.00	86.90		H
1098.00	H	Peak	--		0.00	85.88		H
1220.00	H	Peak	--		0.00	84.96		H

Remark :

- (1) Measuring frequencies from foundation frequency to 10<sup>th</sup> Harmonic. °
- (2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 9KHz to 150KHz was 300Hz, 150KHz to 30MHz was 10KHz; 30MHz to 1GHz was 100KHz.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.

### 6.7 Measurement Result

Operation Mode: Transmitting Mode E2 Position  
 Fundamental Frequency: 122 KHz  
 Temperature : 25 °C  
 Humidity : 58 %

Test Date : Aug. 17,2005  
 Test By: Willis  
 Pol: Vertical/ Horizontal

Freq. (KHz)	Ant.Pol. H/V	Detector Mode (PK/AV/QP)	Reading (dBuV)	Factor (dB)	Actual FS (dBuV/m)	Limit at 1m (dBuV/m)	Safe Margin (dB)	Note
122.00	V	Peak	50.66	-7.30	43.36	124.96	-81.60	F
244.00	V	Peak	28.18	-6.50	21.68	118.94	-97.26	H
366.00	V	Peak	27.86	-6.40	21.46	115.42	-93.96	H
488.00	V	Peak	--		0.00	112.92		H
610.00	V	Peak	--		0.00	90.98		H
732.00	V	Peak	--		0.00	89.40		H
854.00	V	Peak	--		0.00	88.06		H
976.00	V	Peak	--		0.00	86.90		H
1098.00	V	Peak	--		0.00	85.88		H
1220.00	V	Peak	--		0.00	84.96		H
122.00	H	Peak	37.51	-7.30	30.21	124.96	-94.75	F
244.00	H	Peak	28.17	-6.50	21.67	118.94	-97.27	H
366.00	H	Peak	27.58	-6.40	21.18	115.42	-94.24	H
488.00	H	Peak	--		0.00	112.92		H
610.00	H	Peak	--		0.00	90.98		H
732.00	H	Peak	--		0.00	89.40		H
854.00	H	Peak	--		0.00	88.06		H
976.00	H	Peak	--		0.00	86.90		H
1098.00	H	Peak	--		0.00	85.88		H
1220.00	H	Peak	--		0.00	84.96		H

Remark :

- (1) Measuring frequencies from foundation frequency to 10<sup>th</sup> Harmonic. °
- (2) “F” denotes fundamental frequency; “H” denotes spurious frequency. “E” denotes band edge frequency.
- (3) Data of measurement within this frequency range shown “ - ” in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
- (4) The IF bandwidth of SPA between 9KHz to 150KHz was 300Hz, 150KHz to 30MHz was 10KHz; 30MHz to 1GHz was 100KHz.

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This test report cannot be reproduced, except in full, without prior written permission of the Company.