



**Spectrum Research  
& Testing Lab., Inc.**

No. 101-10, Ling 8,  
Shan-Tong Li, Chung-Li  
City, Taoyuan, Taiwan

## TEST REPORT

Reference No.: A06032005  
Report No.: FCCA06032005  
Page: 1 of 17  
Date: Jun. 19, 2006

Product Name: SYSTEM 122  
Model Number: ZT2SC, ZT2SCS  
Applicant: ZENTAN TECHNOLOGY CO., LTD.  
NO. 92, HSING-SHENG RD., CHIA-LI CHENG,  
TAINAN HSIEN, TAIWAN, R.O.C.  
Date of Receipt: Mar. 20, 2006  
Finished date of Test: Apr. 25, 2006  
Applicable Standards: 47 CFR Part 15, Subpart C  
ANSI C63.4: 2003

We, **Spectrum Research & Testing Laboratory Inc.**, hereby certify that one sample of the above was tested in our laboratory with positive results according to the above-mentioned standards. The records in the report are an accurate account of the results. Details of the results are given in the subsequent pages of this report.

Checked By :

Nick Hsieh  
(Nick Hsieh)

Date:

2006/6/19

Approved By :

Johnson Ho  
(Johnson Ho, Director)

Date:

6/19/2006

FCC ID: QSW2SCS

**NVLAP**<sup>®</sup>

Lab Code: 200099-0

|                                                                                                                                                                                                               |                      |                                                                                              |
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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|

## Table of Contents

|     |                                              |    |
|-----|----------------------------------------------|----|
| 1.  | DOCUMENT POLICY AND TEST STATEMENT .....     | 3  |
| 1.1 | DOCUMENT POLICY .....                        | 3  |
| 1.2 | TEST STATEMENT .....                         | 3  |
| 2.  | DESCRIPTION OF EUT AND TEST MODE .....       | 4  |
| 2.1 | GENERAL DESCRIPTION OF EUT .....             | 4  |
| 2.2 | DESCRIPTION OF EUT INTERNAL DEVICE .....     | 4  |
| 2.3 | DESCRIPTION OF TEST MODE .....               | 4  |
| 2.4 | DESCRIPTION OF SUPPORT UNIT .....            | 5  |
| 3.  | DESCRIPTION OF APPLIED STANDARDS .....       | 5  |
| 4.  | RADIATED EMISSION TEST .....                 | 6  |
| 4.1 | RADIATED EMISSION LIMIT .....                | 6  |
| 4.2 | TEST EQUIPMENT .....                         | 7  |
| 4.3 | TEST SET-UP .....                            | 8  |
| 4.4 | TEST PROCEDURE .....                         | 9  |
| 4.5 | EUT OPERATING CONDITION .....                | 9  |
| 4.6 | RADIATED EMISSION TEST RESULT .....          | 10 |
| 6   | TIME DOMAIN AND DUTY CYCLE TEST .....        | 12 |
| 6.1 | TEST EQUIPMENT .....                         | 12 |
| 6.2 | TEST SET-UP .....                            | 12 |
| 6.3 | TEST PROCEDURE .....                         | 12 |
| 6.4 | EUT OPERATING CONDITION .....                | 12 |
| 6.5 | TIME DOMAIN AND DUTY CYCLE TEST RESULT ..... | 13 |
| 7.  | PHOTOS OF TESTING .....                      | 15 |
| 7   | TERMS OF ABRIVATION .....                    | 17 |

|                                                                                                                                                                                                                   |                      |                                                                                              |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|
|  <b>Spectrum Research<br/>&amp; Testing Lab., Inc.</b><br>No. 101-10, Ling 8,<br>Shan-Tong Li, Chung-Li<br>City, Taoyuan, Taiwan | <h1>TEST REPORT</h1> | Reference No.: A06032005<br>Report No.: FCCA06032005<br>Page: 3 of 17<br>Date: Jun. 19, 2006 |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|

## 1. DOCUMENT POLICY AND TEST STATEMENT

### 1.1 DOCUMENT POLICY

- The report shall not be reproduced except in full, without the written approval of SRT Lab, Inc.
- The report must not be used by the applicant to claim that the product is endorsed by NVLAP.
- The NVLAP logo applies only to the applicable standards specified in this report.

### 1.2 TEST STATEMENT

- The test results in the report apply only to the unit tested by SRT Lab.
- There was no deviation from the requirements of test standards during the test.
- The heartbeat simulator (see the test photo) was produced signal to EUT during the test.
- DC power source, 3V from Lithium battery, was used during the test.

|                                                                                                                                                                                                               |                      |                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|
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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|

## 2. DESCRIPTION OF EUT AND TEST MODE

### 2.1 GENERAL DESCRIPTION OF EUT

|                                 |                                                             |
|---------------------------------|-------------------------------------------------------------|
| <b>PRODUCT</b>                  | SYSTEM 122                                                  |
| <b>MODEL NO.</b>                | ZT2SC, ZT2SCS                                               |
| <b>POWER SUPPLY</b>             | DC 3V, 0.5mA                                                |
| <b>CABLE</b>                    | N/A                                                         |
| <b>I/O PORT</b>                 | N/A                                                         |
| <b>FREQUENCY BAND</b>           | 127KHz±10%                                                  |
| <b>CARRIER FREQUENCY</b>        | 127KHz±10%                                                  |
| <b>NUMBER OF CHANNEL</b>        | 1                                                           |
| <b>CHANNEL SPACING</b>          | 0                                                           |
| <b>MODULATION TYPE</b>          | PULSE                                                       |
| <b>DUTY CYCLE</b>               | 0.5-5%                                                      |
| <b>MODE OF OPERATION</b>        | SIMPLEX                                                     |
| <b>BIT RATE OF TRANSMISSION</b> | 1000 BIT/SEC                                                |
| <b>ANTENNA TYPE</b>             | Coils would be on ferrite cores and soldered to transmitter |

#### NOTE :

ZT2SC and ZT2SCS are identical in all aspects except for enclosure.

The EUT is the transmitter part. For more detailed features, please refer to the User's Manual of EUT.

### 2.2 DESCRIPTION OF EUT INTERNAL DEVICE

| DEVICE | BRAND / MAKER | MODEL # | FCC ID/DOC | REMARK |
|--------|---------------|---------|------------|--------|
| N/A    |               |         |            |        |
|        |               |         |            |        |
|        |               |         |            |        |
|        |               |         |            |        |
|        |               |         |            |        |
|        |               |         |            |        |
|        |               |         |            |        |

### 2.3 DESCRIPTION OF TEST MODE

N/A (It is only applicable to more than one test mode.)

|                                                                                   |                                                                                                                             |                      |                                                                                              |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|
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|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|

## 2.4 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.4. All interface ports were connected to the appropriate support units via specific cables. The support units and cables are listed below.

| NO | DEVICE            | BRAND  | MODEL # | FCC ID / DOC | CABLE |
|----|-------------------|--------|---------|--------------|-------|
| 1  | HEART RATEMONITOR | ZENTAN | GT3     | N/A          | N/A   |
|    |                   |        |         |              |       |
|    |                   |        |         |              |       |
|    |                   |        |         |              |       |
|    |                   |        |         |              |       |
|    |                   |        |         |              |       |
|    |                   |        |         |              |       |
|    |                   |        |         |              |       |
|    |                   |        |         |              |       |
|    |                   |        |         |              |       |

**NOTE :** For the actual test configuration, please refer to the photos of testing.

## 3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a kind of radio product and according to the specifications provided by the applicant, it must comply with the requirements of the following standards:

47 CFR Part 15, Subpart C

ANSI C63.4: 2003

All tests have been performed and recorded as per the above standards.

|                                                                                                                                                                                                               |                      |                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|
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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|

## 4. RADIATED EMISSION TEST

### 4.1 RADIATED EMISSION LIMIT

All emission from EUT, including any network of conductors and apparatus connected thereto, shall not exceed the level of field strength specified below :

FCC Part 15, Subpart C Section 15.209.

| FREQUENCY (MHz) | DISTANCE (m) | FIELD STRENGTH ( $\mu\text{V/m}$ ) |
|-----------------|--------------|------------------------------------|
| 0.009 - 0.490   | 300          | 2400/F(kHz)                        |
| 0.490-1.705     | 300          | 2400/F(kHz)                        |
| 1.705-30.0      | 30           | 30                                 |
| 30 - 88         | 3            | 100                                |
| 88 - 216        | 3            | 150                                |
| 216 - 960       | 3            | 200                                |
| ABOVE 960       | 3            | 500                                |

**NOTE** : 1. In the emission tables above , the tighter limit applies at the band edges.

2. Distance refers to the distance between measuring instrument , antenna , and the closest point of any part of the device or system.

According to the FCC Part 15, Subpart A Section 15.31(f)(2), the extrapolation factor of 40 dB/decade is used for measurement distances different then specified in with limits for frequencies below 30 MHz.

|                                                                                                                                                                                                               |                      |                                                                                              |
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|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|

## 4.2 TEST EQUIPMENT

The following test equipment was used during the radiated emission test :

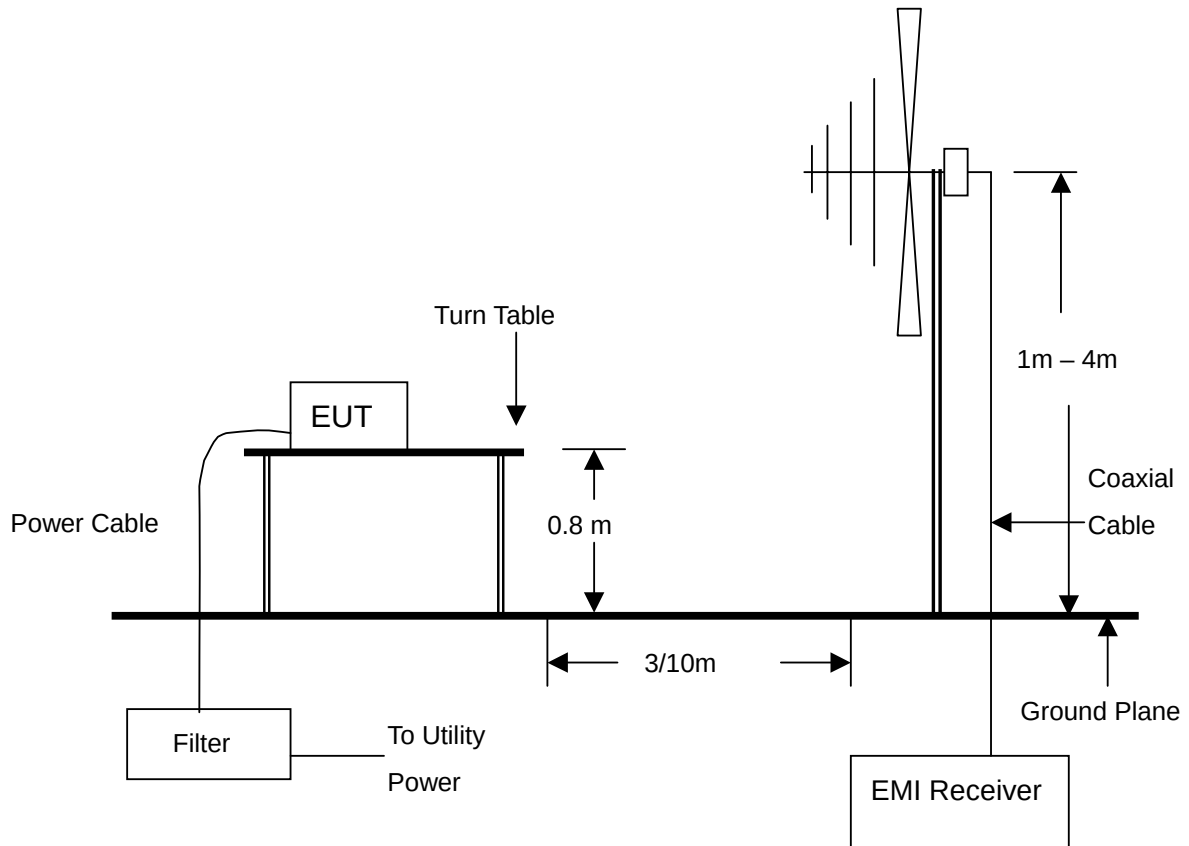
| EQUIPMENT/<br>FACILITIES | SPECIFICATIONS       | MANUFACTURER    | MODEL#/<br>SERIAL# | DUE DATE OF CAL. &<br>CAL. CENTER |
|--------------------------|----------------------|-----------------|--------------------|-----------------------------------|
| SPECTRUM ANALYZER        | 9 kHz TO 7GHz        | ROHDE & SCHWARZ | FSP7 10289         | JUN. 2006 ETC                     |
| BI-LOG ANTENNA           | 25 MHz TO 2 GHz      | EMCO            | 3142/ 9701-1124    | APR. 2007 SRT                     |
| OATS                     | 3 – 10 M MEASUREMENT | SRT             | SRT-1              | APR. 2007 SRT                     |
| COAXIAL CABLE            | 25M                  | SUNCITY         | J400/ 25M          | AUG. 2006 SRT                     |
| FILTER                   | 2 LINE, 30A          | FIL.COIL        | FC-943/ 869        | N/A                               |
| FREQUENCY CONVERTER      | N/A                  | APC             | AFC-1KW/ 860612    | AUG. 2004 SRT                     |
| LOOP ANTENNA             | 9 kHz TO 30 MHz      | R&S             | FHF2-Z2/ 1162 1/2  | OCT. 2006 R&S                     |
| EMITEST RECEIVER         | 9kHz~2.75GHz         | R&S             | ESCS30/830245/ 012 | OCT. 2006 ETC                     |

### NOTE:

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.
2. The Open Area Test Site (SRT-1) is registered by FCC with No. 90957 and VCCI with No. R-1081.
3. The Open Area Test Site (SRT-2) is registered by FCC with No. 98458 and VCCI with No. R-1168.

|                                                                                                                                                                                                               |                      |                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|
|  <b>Spectrum Research &amp; Testing Lab., Inc.</b><br>No. 101-10, Ling 8,<br>Shan-Tong Li, Chung-Li<br>City, Taoyuan, Taiwan | <h1>TEST REPORT</h1> | Reference No.: A06032005<br>Report No.: FCCA06032005<br>Page: 8 of 17<br>Date: Jun. 19, 2006 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|

## 4.3 TEST SET-UP



### NOTE :

1. The EUT system was put on a wooden table with 0.8m heights above a ground plane.
2. For the actual test configuration, please refer to the photos of testing.

|                                                                                                                                                                                                               |                      |                                                                                              |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|
|  <b>Spectrum Research &amp; Testing Lab., Inc.</b><br>No. 101-10, Ling 8,<br>Shan-Tong Li, Chung-Li<br>City, Taoyuan, Taiwan | <h1>TEST REPORT</h1> | Reference No.: A06032005<br>Report No.: FCCA06032005<br>Page: 9 of 17<br>Date: Jun. 19, 2006 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|----------------------------------------------------------------------------------------------|

## 4.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4. The measurements were made at an open area test site with 3 meter measurement distance. The frequency spectrum measured started from 9 kHz. All readings were quasi-peak value with 200Hz resolution bandwidth at frequency below 150kHz, and with 9kHz resolution bandwidth between 150 kHz and 30MHz . Under 30MHz to 1 GHz, all readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, all readings were peak or average values with 1 MHz resolution bandwidth of the test receiver.

## 4.5 EUT OPERATING CONDITION

Set the EUT under transmission condition continuously at specific channel frequency.

|                                                                                                                                                                                                               |                      |                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------|
|  <b>Spectrum Research &amp; Testing Lab., Inc.</b><br>No. 101-10, Ling 8,<br>Shan-Tong Li, Chung-Li<br>City, Taoyuan, Taiwan | <h1>TEST REPORT</h1> | Reference No.: A06032005<br>Report No.: FCCA06032005<br>Page: 10 of 17<br>Date: Jun. 19, 2006 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------|

## 4.6 RADIATED EMISSION TEST RESULT

|                    |              |                    |             |
|--------------------|--------------|--------------------|-------------|
| Temperature:       | 24 °C        | Humidity:          | 52%RH       |
| Ferquency Range:   | 9kHz – 30MHz | Measured Distance: | 3m          |
| Spectrum Detector: | Q.P.         | Tested by          | Roger Horng |

| Frequency (MHz) | Cable Loss (dB) | Antenna Factor (dB/m) | Reading Data (dBμV) | Emission Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) |
|-----------------|-----------------|-----------------------|---------------------|-------------------------|----------------|-------------|
| 0.126           | 0.03            | 20.20                 | 35.00               | 55.23                   | 105.60         | -50.37      |
| 0.241           | 0.03            | 20.20                 | 12.60               | 32.83                   | 99.96          | -67.13      |
| 0.356           | 0.01            | 20.20                 | 11.60               | 31.81                   | 96.58          | -64.77      |
| 0.507           | 0.00            | 20.20                 | *                   | *                       | 93.50          | *           |
| 0.634           | 0.00            | 20.10                 | *                   | *                       | 91.56          | *           |
| 0.761           | 0.00            | 20.10                 | *                   | *                       | 89.98          | *           |
| 0.888           | 0.00            | 20.10                 | *                   | *                       | 88.64          | *           |
| 1.015           | 0.00            | 20.10                 | *                   | *                       | 87.47          | *           |
| 1.269           | 0.00            | 20.08                 | *                   | *                       | 85.53          | *           |

- NOTE :**
1. Measurement uncertainty is less than +/- 4dB
  2. "\*": Measurement does not apply for this frequency.
  3. Emission Level = Reading Value + Ant. Factor + Cable Loss
  4.  $\text{Limit(dBuV/m)} = 20\log\{2400/F(\text{kHz})\} + (\text{The measurement distance at 300m}) + 40\log(300/3) - (\text{The measurement distance at 3m}) - 20\log(377)$
  5. The field strength of other emission frequencies were very low against the limit.
  6. (F) : Fundamental frequency of transmitter.

|                                                                                                                                                                                                               |                      |                          |
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|                                                                                                                                                                                                               |                      | Report No.: FCCA06032005 |
|                                                                                                                                                                                                               |                      | Page: 11 of 17           |
|                                                                                                                                                                                                               |                      | Date: Jun. 19, 2006      |

|                    |               |                    |             |
|--------------------|---------------|--------------------|-------------|
| Temperature:       | 24 °C         | Humidity:          | 57 %RH      |
| Ferquency Range:   | 30 – 1000 MHz | Measured Distance: | 3m          |
| Spectrum Detector: | Q.P.          | Tested by          | Roger Horng |

Antenna Polarization : Horizontal

| Frequency (MHz) | Cable Loss (dB) | Antenna Factor (dB/m) | Reading Data (dBμV) | Emission Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | EL(m) | AZ(°) |
|-----------------|-----------------|-----------------------|---------------------|-------------------------|----------------|-------------|-------|-------|
| 217.5900        | 2.60            | 10.28                 | 15.6                | 28.5                    | 46.0           | -17.5       | 75.6  | 2.0   |
| 270.6900        | 2.98            | 12.38                 | 6.5                 | 21.9                    | 46.0           | -24.1       | 45.6  | 4.0   |
| 306.3400        | 3.05            | 13.83                 | 3.2                 | 20.1                    | 46.0           | -25.9       | 55.9  | 2.2   |
| 491.9200        | 4.08            | 16.08                 | 4.5                 | 24.7                    | 46.0           | -21.3       | 69.8  | 1.6   |
| 599.9000        | 4.60            | 17.39                 | 5.8                 | 27.8                    | 46.0           | -18.2       | 36.9  | 2.0   |
| 711.1200        | 5.07            | 21.10                 | 6.3                 | 32.5                    | 46.0           | -13.5       | 44.1  | 1.7   |

Antenna Polarization : Vertical

| Frequency (MHz) | Cable Loss (dB) | Antenna Factor (dB/m) | Reading Data (dBμV) | Emission Level (dBμV/m) | Limit (dBμV/m) | Margin (dB) | EL(m) | AZ(°) |
|-----------------|-----------------|-----------------------|---------------------|-------------------------|----------------|-------------|-------|-------|
| 167.7600        | 2.28            | 10.12                 | 18.0                | 30.4                    | 43.5           | -13.1       | 63.9  | 4.0   |
| 264.0500        | 2.90            | 12.12                 | 18.2                | 33.2                    | 46.0           | -12.8       | 51.6  | 1.9   |
| 401.4450        | 3.61            | 15.90                 | 2.9                 | 22.4                    | 46.0           | -23.6       | 63.4  | 2.1   |
| 542.6000        | 4.33            | 16.65                 | 2.8                 | 23.8                    | 46.0           | -22.2       | 64.9  | 4.0   |
| 646.9400        | 4.75            | 19.06                 | 1.9                 | 25.7                    | 46.0           | -20.3       | 70.9  | 3.3   |
| 730.0820        | 5.13            | 21.27                 | 8.9                 | 35.3                    | 46.0           | -10.7       | 39.8  | 2.2   |

- NOTE :**
1. Measurement uncertainty is less than +/- 4dB
  2. "": Measurement does not apply for this frequency.
  3. Emission Level = Reading Value + Ant. Factor + Cable Loss
  4. The field strength of other emission frequencies were very low against the limit.
  5. (F) : Fundamental frequency of transmitter.
  6. (\*):The emission always below noise.

|                                                                                   |                                                                                                                             |                      |                                                                                               |
|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------|
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|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------|

## 6 TIME DOMAIN AND DUTY CYCLE TEST

### 6.1 TEST EQUIPMENT

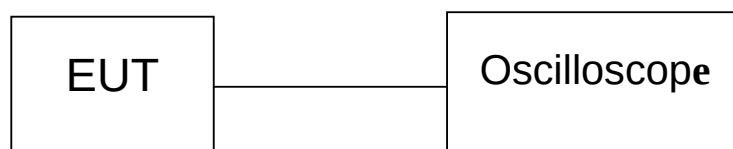
The following test equipment was used during the radiated emission test :

| EQUIPMENT/<br>FACILITIES | SPECIFICATIONS      | MANUFACTURER | MODEL#/<br>SERIAL#    | DUE DATE OF CAL. &<br>CAL. CENTER |
|--------------------------|---------------------|--------------|-----------------------|-----------------------------------|
| Oscilloscope             | 100MHz<br>200Ms a/s | HP           | 54645A/<br>US39151317 | APR. 2007<br>HP, ITRI             |

#### NOTE:

1. The calibration interval of the above test equipment is one year and the calibrations are traceable to NML/ROC and NIST/USA.

### 6.2 TEST SET-UP



### 6.3 TEST PROCEDURE

The EUT was transmitting continuously. The oscilloscope recorded signal values. The simulator's signal was imitated for normal use mode. The number of heartbeat is 130 times at one minute during the test.

### 6.4 EUT OPERATING CONDITION

Set the EUT under transmission condition continuously at specific channel frequency.

|                                                                                                                                                                                                                  |                      |                                                                                               |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------|
| <b>Spectrum Research &amp; Testing Lab., Inc.</b><br><br>No. 101-10, Ling 8,<br>Shan-Tong Li, Chung-Li<br>City, Taoyuan, Taiwan | <h1>TEST REPORT</h1> | Reference No.: A06032005<br>Report No.: FCCA06032005<br>Page: 13 of 17<br>Date: Jun. 19, 2006 |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------|

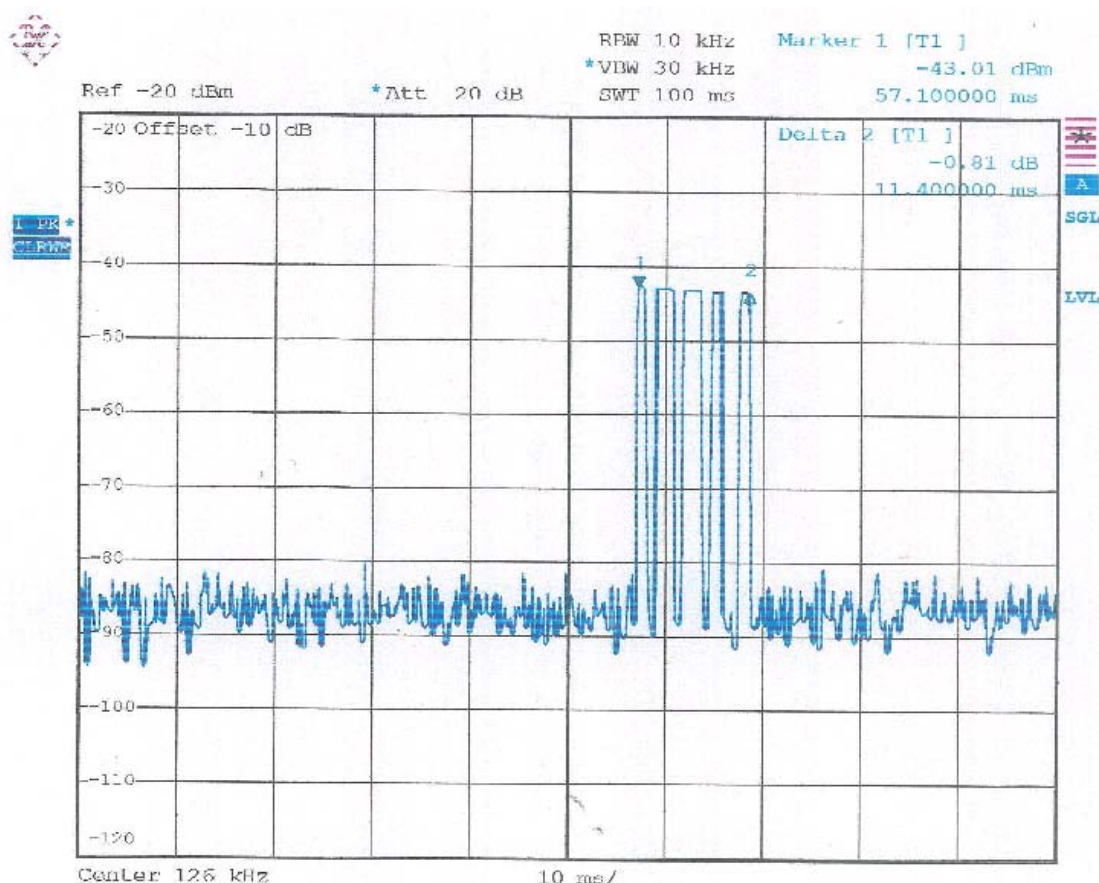
## 6.5 TIME DOMAIN AND DUTY CYCLE TEST RESULT

Temperature: 25 °C      Humidity: 55%RH  
 Tested by Roger Horng      Tested Date: Apr. 06, 2006

TIME DOMAIN:

| Frequency (kHz) | Period (ms) | Duty cycle (%) | PASS/FAIL   |
|-----------------|-------------|----------------|-------------|
| 126.0           | 1986.6      | 0.56           | <b>PASS</b> |

Time on:





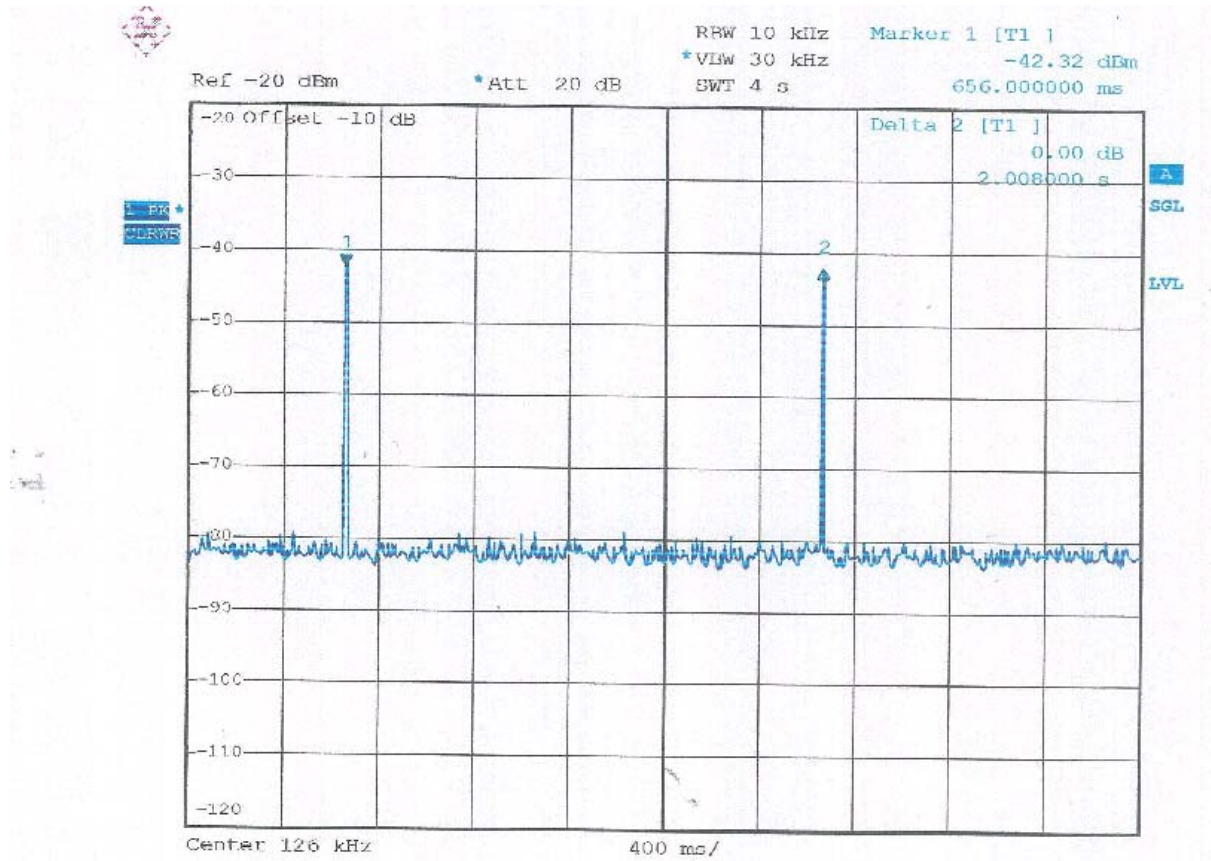
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# TEST REPORT

Reference No.: A06032005  
Report No.: FCCA06032005  
Page: 14 of 17  
Date: Jun. 19, 2006

Total time:



FCC ID: QSW2SCS



**Spectrum Research  
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## TEST REPORT

Reference No.: A06032005  
Report No.: FCCA06032005  
Page: 15 of 17  
Date: Jun. 19, 2006

### 7. PHOTOS OF TESTING

- Radiated test -Below 30MHz (Loop Antenna)



FCC ID: QSW2SCS



**Spectrum Research  
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City, Taoyuan, Taiwan

## TEST REPORT

Reference No.: A06032005  
Report No.: FCCA06032005  
Page: 16 of 17  
Date: Jun. 19, 2006

-Raditated test-30~1000MHz (Bi-log Antenna)



FCC ID: QSW2SCS

|                                                                                                                                                                                                               |                      |                                                                                               |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------|
|  <b>Spectrum Research &amp; Testing Lab., Inc.</b><br>No. 101-10, Ling 8,<br>Shan-Tong Li, Chung-Li<br>City, Taoyuan, Taiwan | <h1>TEST REPORT</h1> | Reference No.: A06032005<br>Report No.: FCCA06032005<br>Page: 17 of 17<br>Date: Jun. 19, 2006 |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------|-----------------------------------------------------------------------------------------------|

## 7 TERMS OF ABRIVATION

|          |                                              |
|----------|----------------------------------------------|
| AZ(°)    | Turn table azimuth                           |
| Correct. | Correction                                   |
| EL(m)    | Antenna height (meter)                       |
| EUT      | Equipment Under Test                         |
| Horiz.   | Horizontal direction                         |
| LISN     | Line Impedance Stabilization Network         |
| NSA      | Normalized Site Attenuation                  |
| Q.P.     | Quasi-peak detection                         |
| SRT Lab  | Spectrum Research & Testing Laboratory, Inc. |
| Vert.    | Vertical direction                           |