Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan	**TEST REPORT**	Reference No.:A08121802 Report No.:FCCA08121802 FCC ID: TFO7702 Page: 1 of 22 Date: Dec. 22, 2008

Product Name:	Bicycle Computer
Model Number:	CAD-TX
Applicant:	Cycle Parts GmbH
	Grosse Ahlmuehle 33, 76865 Rohrbach, Germany
Date of Receipt:	Dec. 18, 2008
Finished date of Test:	Dec. 19, 2008
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.

Tested By : Shun Wang (Shunm Wang), Date: Dec. 22, 2008

Approved By : (Johnson Ho, Director), Date: 1/13/2009

NVLAP®

Lab Code: 200099-0

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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 client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.

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.
- DC power source from battery: DC power source, 3.0 Vdc, was used during the test.

1.3 EUT MODIFICATION

- No modification in SRT Lab.

2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	Bicycle Computer
MODEL NO.	CAD-TX
CABLE	N/A
TYPE	Prototype
POWER SUPPLY	DC 3.0V, 180uA
FREQUENCY BAND	112 ± 1 kHz
NUMBER OF CHANNEL	1
CHANNEL SPACING	1 s
MODULATION TYPE	Amplitude modulation
DUTY CYCLE	0.8~5%
MODE OF OPERATION	simplex
BIT RATE OF TRANSMISSION	1k bit/sec
ANTENNA TYPE	Coil with ferrite bar
OPERATING TEMPERATURE RANGE	-10~55°C

NOTE： For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

2.2 DESCRIPTION OF EUT INTERNAL DEVICE

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

2.3 DESCRIPTION OF TEST MODE

1. TX
2. Link

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	Bicycle Computer	Cycle Parts GmbH	VDO X3DW	DOC	N/A
2	Bicycle Computer	Cycle Parts GmbH	VDO X2DW	DOC	N/A
3	Bicycle Computer	Cycle Parts GmbH	VDO X1DW	DOC	N/A

NOTE : 1. For the actual test configuration, please refer to the photos of testing.
2. For more detailed information, please refer to the EUT's specification or user's manual provided by manufacturer.

3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a Bicycle Computer 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.

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 (μV/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.

4.2 TEST EQUIPMENT

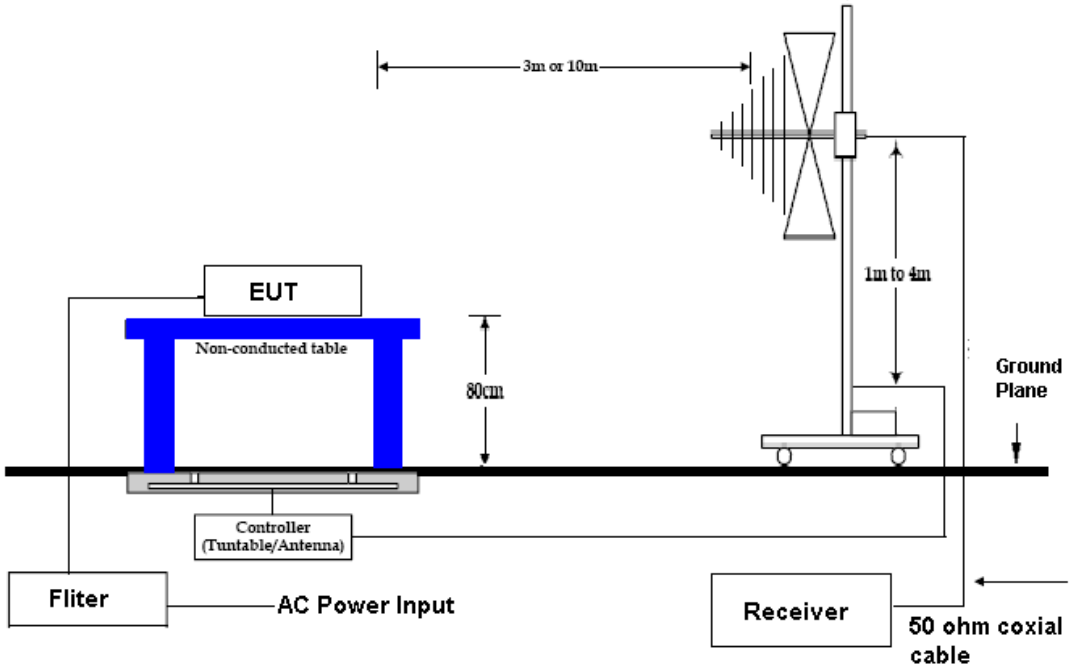
The following test equipment was used during the radiated emission test：

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	9kHz TO 2.75 GHz	ROHDE & SCHWARZ	ESCS30 / 830245/012	OCT. 2009 ETC
BI-LOG ANTENNA	26 MHz TO 2 GHz	EMCO	3142B / 0005-1534	NOV. 2009 ETC
LOOP ANTENNA	9KHz TO 30MHz	R&S	HFH2-Z2/1162 1/2	MAR.2009 R&S
OATS	3 – 10 M MEASUREMENT	SRT	SRT-1	NOV. 2009 SRT
COAXIAL CABLE	25M	TIMES	J400 / #25M	AUG. 2009 ETC
FILTER	2 LINE, 30A	FIL.COIL	FC-943 / 869	NCR

NOTE:

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

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.

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.

4.6 RADIATED EMISSION TEST RESULT

Temperature:	24 °C	Humidity:	59%RH
Ferquency Range:	9kHz – 30MHz	Measured Distance:	3m
Spectrum Detector:	Q.P.	Tested by	Shunm Wang

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
0.1126(F)	0.03	20.20	37.52	57.75	106.57	-48.82
0.2252	0.03	20.20	12.82	33.05	100.55	-67.50
0.3378	0.01	20.20	14.93	35.14	97.03	-61.89
0.4504	0.00	20.20	*	*	94.53	*
0.563	0.00	20.10	*	*	92.59	*
0.6756	0.00	20.10	*	*	91.01	*
0.7882	0.00	20.10	*	*	89.67	*
0.9008	0.00	20.10	*	*	88.51	*
1.10134	0.00	20.08	*	*	86.77	*

NOTE : 1. Measurement uncertainty is less than +/- 3.7dB

2. "*": Measurement does not apply for this frequency.

3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss

4. Limit(dBuV/m)=20log{2400/F(kHz)}(The measurement distance at 300m)+40log(300/3)(The measurement distance at 3m)-20log(377)

5. The field strength of other emission frequencies were very low against the limit.

6. (F) : Fundamental frequency of transmitter.

Temperature:	24 °C	Humidity:	59%RH
Ferquency Range:	30 – 1000 MHz	Measured Distance:	3m
		Test Mode:	TX
Spectrum Detector:	Q.P.	Tested by	Shunm Wang

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
118.5400	1.98	8.34	6.2	16.5	43.5	-27.0
339.1200	3.73	15.10	7.3	26.1	46.0	-19.9
576.8400	5.26	19.98	4.8	30.0	46.0	-16.0
681.4300	5.85	21.42	6.4	33.7	46.0	-12.3
904.3400	7.02	23.64	5.5	36.2	46.0	-9.8
945.1200	7.18	23.75	4.7	35.6	46.0	-10.4

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
138.2200	2.18	8.36	7.3	17.8	43.5	-25.7
159.3600	2.37	9.15	5.2	16.7	43.5	-26.8
183.8400	2.56	9.92	6.9	19.4	43.5	-24.1
208.1100	2.76	10.82	4.6	18.2	43.5	-25.3
343.6700	3.76	15.18	5.3	24.2	46.0	-21.8
848.2300	6.69	22.72	4.5	33.9	46.0	-12.1

NOTE : 1. Measurement uncertainty is less than +/- 3.7dB
2. "*": Measurement does not apply for this frequency.
3. Emissiom 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.

Temperature:	24 °C	Humidity:	59%RH
Ferquency Range:	30 – 1000 MHz	Measured Distance:	3m
		Test Mode:	Link
Spectrum Detector:	Q.P.	Tested by	Shunm Wang

Antenna Polarization：Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
118.5430	1.98	8.34	6.1	16.4	43.5	-27.1
339.1240	3.73	15.10	7.4	26.2	46.0	-19.8
576.8400	5.26	19.98	4.9	30.1	46.0	-15.9
681.4390	5.85	21.42	6.3	33.6	46.0	-12.4
904.3450	7.02	23.64	5.6	36.3	46.0	-9.7
945.1240	7.18	23.75	4.6	35.5	46.0	-10.5

Antenna Polarization：Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
138.2220	2.18	8.36	7.2	17.7	43.5	-25.8
159.3540	2.37	9.15	5.3	16.8	43.5	-26.7
183.8460	2.56	9.92	7.0	19.5	43.5	-24.0
208.1080	2.76	10.82	4.5	18.1	43.5	-25.4
343.6660	3.76	15.18	5.4	24.3	46.0	-21.7
848.2320	6.69	22.72	4.4	33.8	46.0	-12.2

NOTE : 1. Measurement uncertainty is less than +/- 3.7dB
2. "*": Measurement does not apply for this frequency.
3. Emissiom 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.

5. CONDUCTED EMISSION TEST FOR POWER PORT

The test item was not performed, because the EUT uses 3Vdc battery as power source.

6 TIME DOMAIN AND DUTY CYCLE TEST

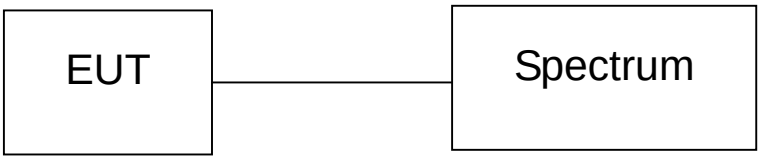
6.1 TEST EQUIPMENT

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

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	9kHz-40GHz	ROHDE & SCHWARZ	FSP40/ 100093	SEP. 2009 ETC

NOTE: 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 spectrum recorded signal values.The simulator’s signal was imitated for normal use mode.The number of hearbeat 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.

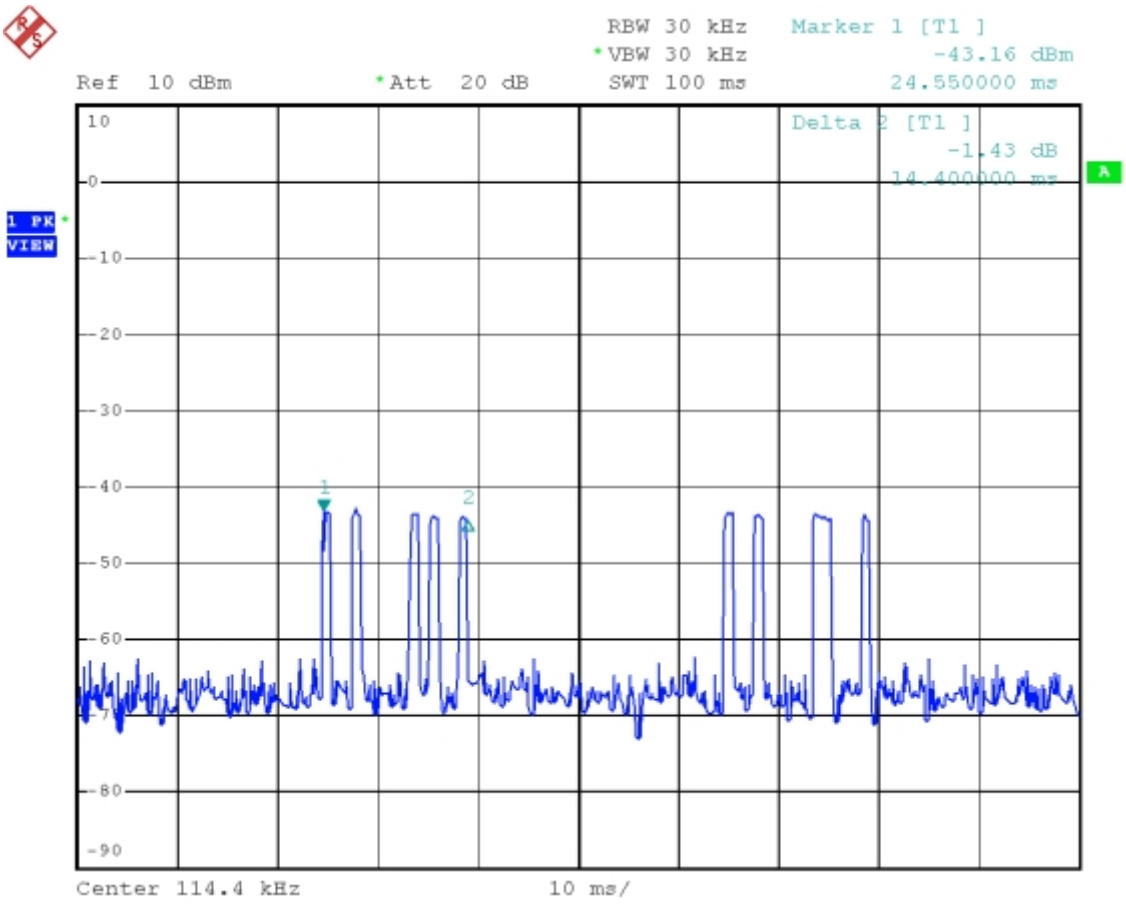
6.5 TIME DOMAIN AND DUTY CYCLE TEST RESULT

Temperature:	24 °C	Humidity:	58%RH
Tested by	Shunm Wang	Tested Date:	Dec. 18, 2008

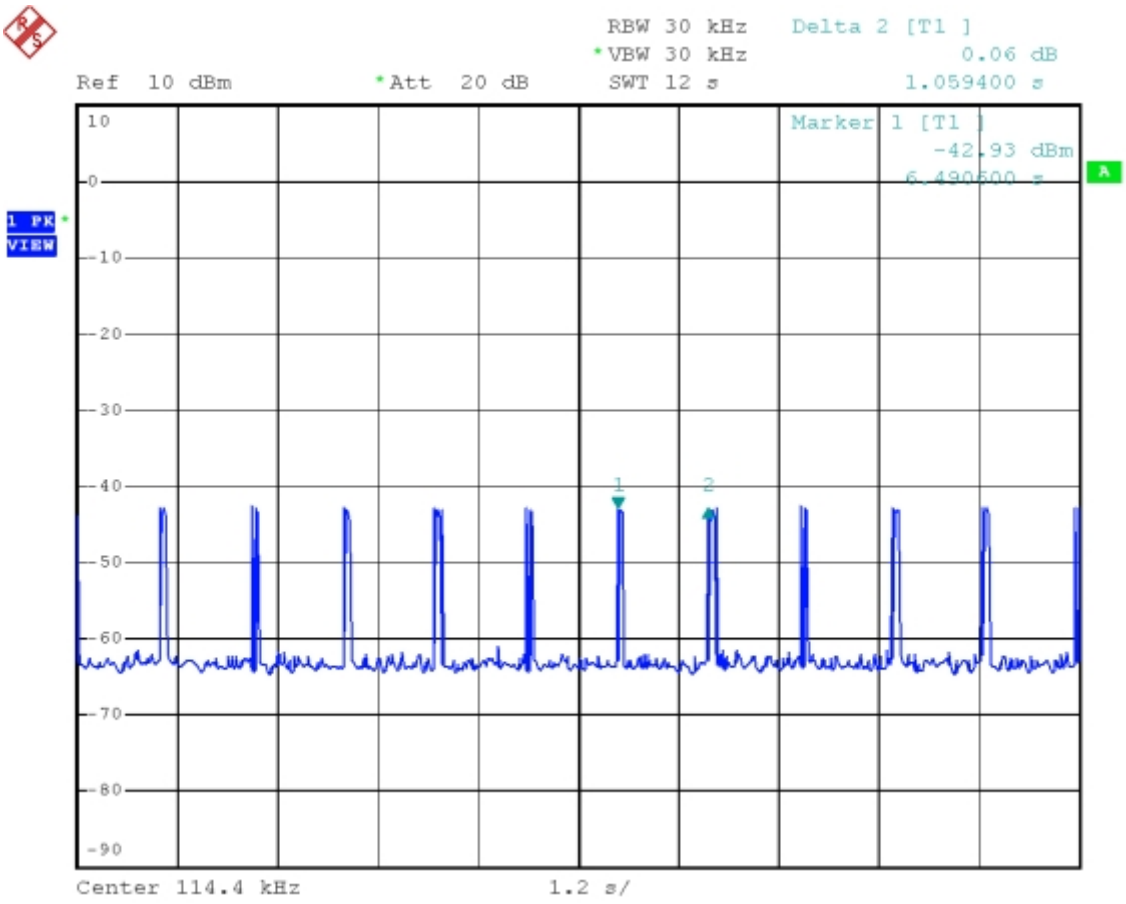
TIME DOMAIN:

Time on (ms)	Period (ms)	Duty cycle (%)	PASS/FAIL
14.4	1059.4	1.35	PASS

Time on:



Total time:


RBW 30 kHz
VBW 30 kHz
SWT 12 s
Delta 2 [T1]
0.06 dB
1.059400 s
Ref 10 dBm
Att 20 dB
Marker 1 [T1]
-42.93 dBm
6.490600 s
1 PK
VIEW
10
0
-10
-20
-30
-40
-50
-60
-70
-80
-90
Center 114.4 kHz
1.2 s/

7. BAND EDGE TEST

7.1 LIMIT

FCC Part15, Subpart C Section 15.209 (c), the level of any unwanted emissions shall not exceed the level of the fundamental frequency.

7.2 TEST EQUIPMENT

Equipment/ Facilities	Specification	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
SPECTRUM	9kHz-40GHz	ROHDE & SCHWARZ	FSP40/ 100093	SEP. 2009 ETC

7.3 TEST SET-UP

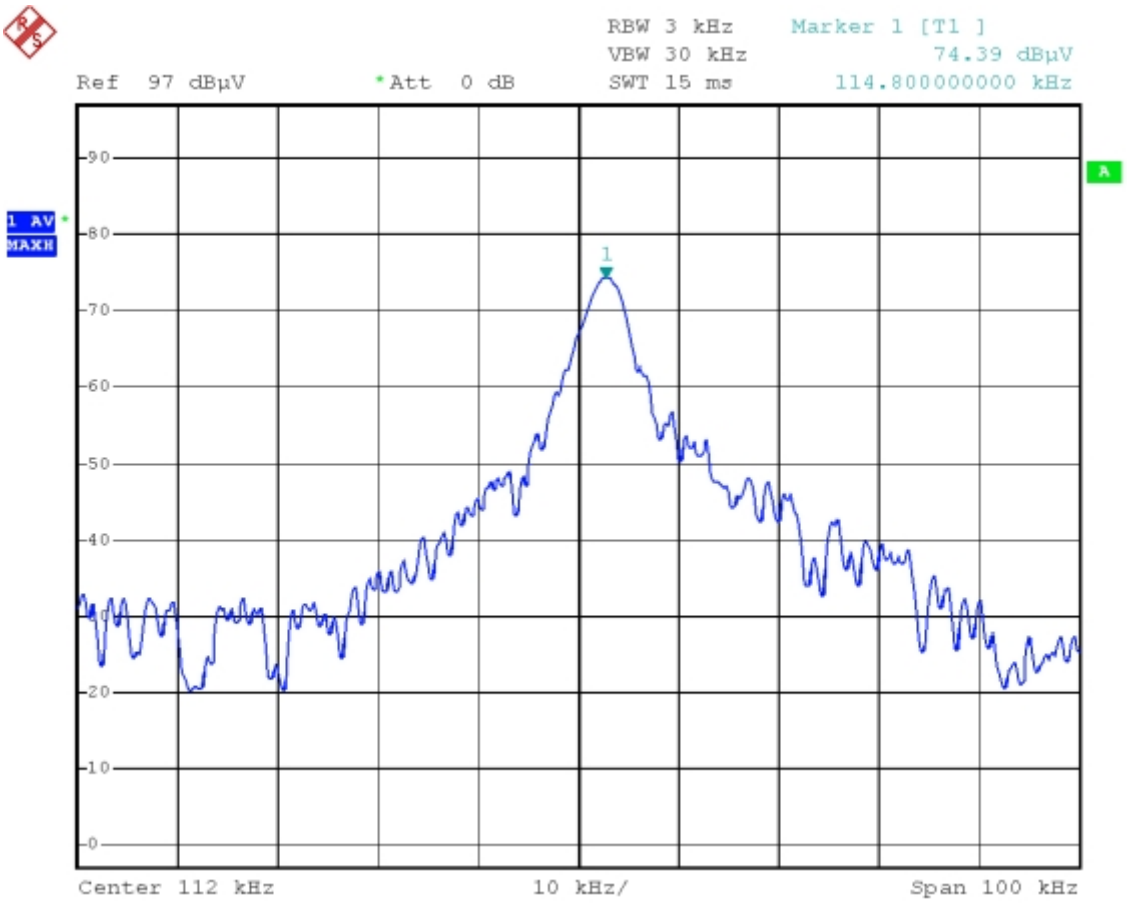
The EUT was connected to the spectrum through a 50Ω RF cable.

7.4 TEST PROCEDURE

The EUT was operating in controlled channel.
Printed out the test result from the spectrum by hard copy function.

7.5 TEST RESULT

Temperature:	24°C	Humidity:	58%RH
Tested by:	Shunm Wang	Tested Date:	Dec. 18, 2008
Test Result:	PASS		



9. 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