Product Name:	SYSTEM 122
Model No.:	ZT1CSC
Applicant:	ZENTAN TECHNOLOGY CO., LTD. NO. 92, HSING-SHENG RD., CHIA-LI CHENG, TAINAN HSIEN, TAIWAN, R.O.C.
Date of Receipt:	May 25, 2004
Finished date of Test:	Jul. 29, 2004
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 : Ken Su for , Date: 07/30/2004
(Sunyou Chen)

Approved By : Johnson Ho For , Date: 7/30/2004
(Johnson Ho, Director)

NVLAP®
Lab Code: 200099-0

Table of Contents

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, TÜV, NEMKO and SRT.
- 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.

1.3 EUT MODIFICATION

- No modification in SRT Lab.

2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

PRODUCT	SYSTEM 122
MODEL NO.	ZT1CSC
POWER SUPPLY	DC 3.0V from Lithium battery
CABLE	N/A
I/O PORT	N/A
FREQUENCY BAND	9kHz - 490kHz
EMITTED FREQUENCY	122kHz
NUMBER OF CHANNEL	1
CHANNEL SPACING	0
RF OUTPUT POWER	31nW
MODULATION TYPE	Pulse
ANTENNA TYPE	Coils wound on ferrite cores and soldered to transmitter
ANTENNA GAIN	0dBi
RANGE	Up to 80cm (31.5 inches) to monitor
BATTERY LIFE	Approximately 2 years when used 60 min/day

NOTE: The EUT is the transmitter part of a chest transmitter which can detect heartbeat automatically when on the body. 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.)

2.4 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.4:2003. 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
	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.

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

FREQUENCY (MHz)	DISTANCE (m)	FIELD STRENGTH (dBμV/m)
30 - 88	3	40.0
88 - 216	3	43.5
216 - 960	3	46.0
Above 960	3	54.0

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

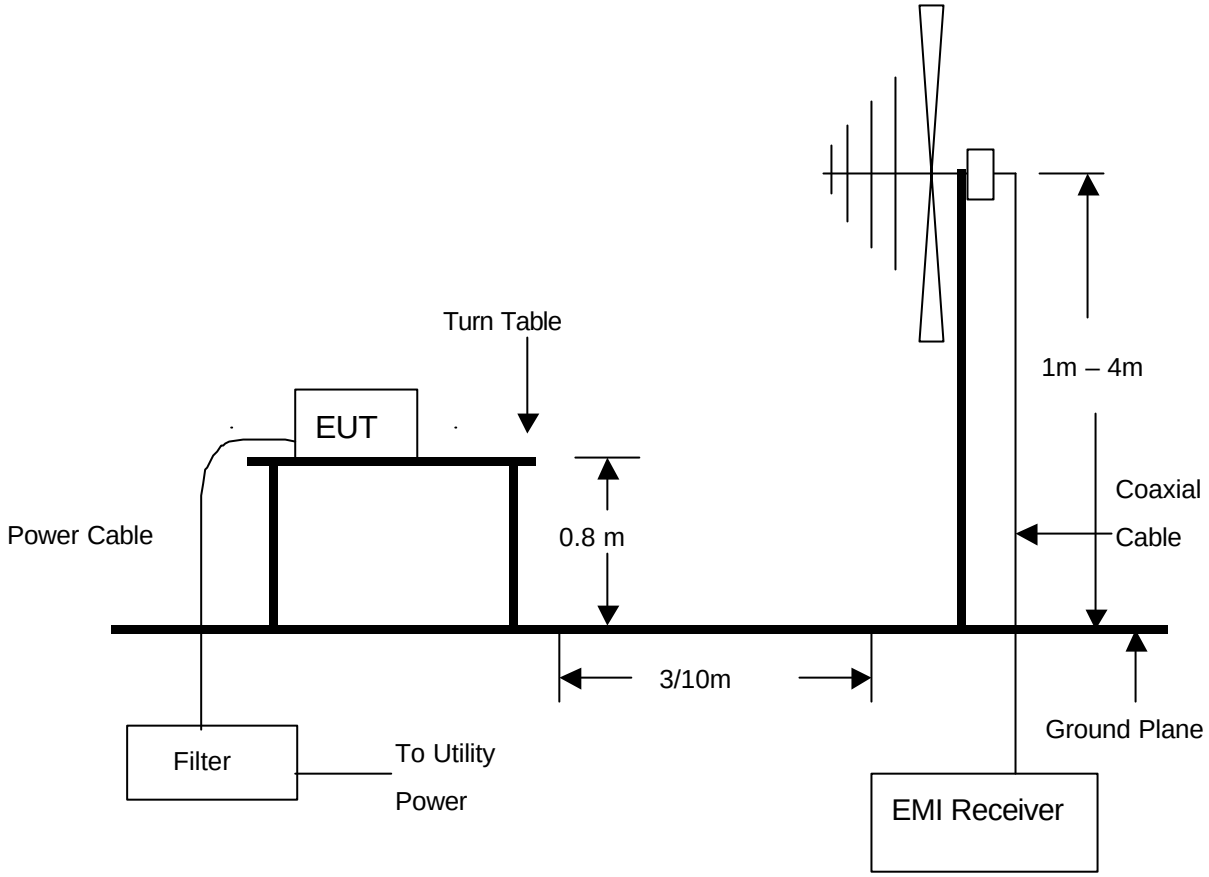
The following test equipment was used during the radiated emission test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	20 MHz TO 1 GHz	ROHDE & SCHWARZ	ESVS30/ 841977/003	AUG. 2004 ETC
BI-LOG ANTENNA	25 MHz TO 2 GHz	EMCO	3142/ 9701-1124	APR. 2005 SRT
OATS	3 – 10 M MEASUREMENT	SRT	SRT-1	APR. 2005 SRT
COAXIAL CABLE	25M	SUNCITY	J400/ 25M	AUG. 2004 SRT
FILTER	2 LINE, 30A	FIL.COIL	FC-943/ 869	N/A
FREQUENCY CONVERTER	N/A	APC	AFC-2KBB/ F100030031	AUG. 2004 SRT

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.

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 C63.4:2003. 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 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 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. The EUT was tesed in 3 orthogonal positions (X, Y and Z).

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:	52%RH
Ferquency Range:	9kHz – 30MHz	Measured Distance:	3m
Spectrum Detector:	PK.	Tested Mode:	N/A
Tested Date:	Jul. 16, 2004	Tested By:	Kevin Liao

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)
0.128(F)	0.03	20.20	8.28	28.51	105.46	-76.95
0.255	0.03	20.20	-8.09	12.14	99.47	-87.33
0.383	0.01	20.20	*	*	95.94	*
0.512	0.00	20.20	*	*	113.42	*
0.639	0.00	20.10	*	*	111.49	*
0.766	0.00	20.10	*	*	109.92	*
0.886	0.00	20.10	*	*	108.66	*
1.017	0.00	20.10	*	*	107.46	*
1.269	0.00	20.08	*	*	105.53	*

NOTE :

1. Measurement uncertainty is less than +/- 2dB
2. "*": Measurement does not apply for this frequency.
3. Emissiom Level = Reading Value + Ant. Factor + Cable Loss
4. Limit(dBuA/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.
7. The emission level at Y position was better than at other positions(see radiation test figure).

Temperature:	24 °C	Humidity:	52%RH
Ferquency Range:	30 – 1000MHz	Measured Distance:	3m
Spectrum Detector:	Q.P.	Tested Mode:	N/A
Tested Date:	Jul. 28, 2004	Tested By:	Kevin Liao

Antenna Polarization:Horizontal

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
44.2870	0.71	10.94	16.3	27.9	40.0	-12.1	48.3	3.81
174.2560	1.44	9.24	13.8	24.5	43.5	-19.0	248.4	3.16
252.0710	1.77	12.32	16.7	30.8	46.0	-15.2	197.5	3.52
355.1430	2.14	15.89	8.4	26.4	46.0	-19.6	491.4	3.28
500.7280	2.67	21.30	4.3	28.3	46.0	-17.7	186.2	2.99
549.1740	2.86	19.34	3.9	26.1	46.0	-19.9	308.6	2.83

Antenna Polarization:Vertical

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBμV)	Emission Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	AZ(°)	EL(m)
31.8860	0.62	16.82	16.3	33.7	40.0	-6.3	143.9	1.00
56.4020	0.81	7.40	16.3	24.5	40.0	-15.5	116.5	1.28
227.7300	1.66	10.44	18.7	30.8	46.0	-15.2	42.0	1.17
250.6880	1.76	12.20	17.1	31.1	46.0	-14.9	333.2	1.67
334.6980	2.05	15.36	11.8	29.2	46.0	-16.8	284.1	1.36
492.5330	2.64	20.56	8.3	31.5	46.0	-14.5	219.7	1.82

NOTE :

1. Measurement uncertainty is +/-2dB.
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. The emission level at Y position was better than at other positions(see radiation test figure).

5. OCCUPIED BANDWIDTH TEST

5.1 TEST EQUIPMENT

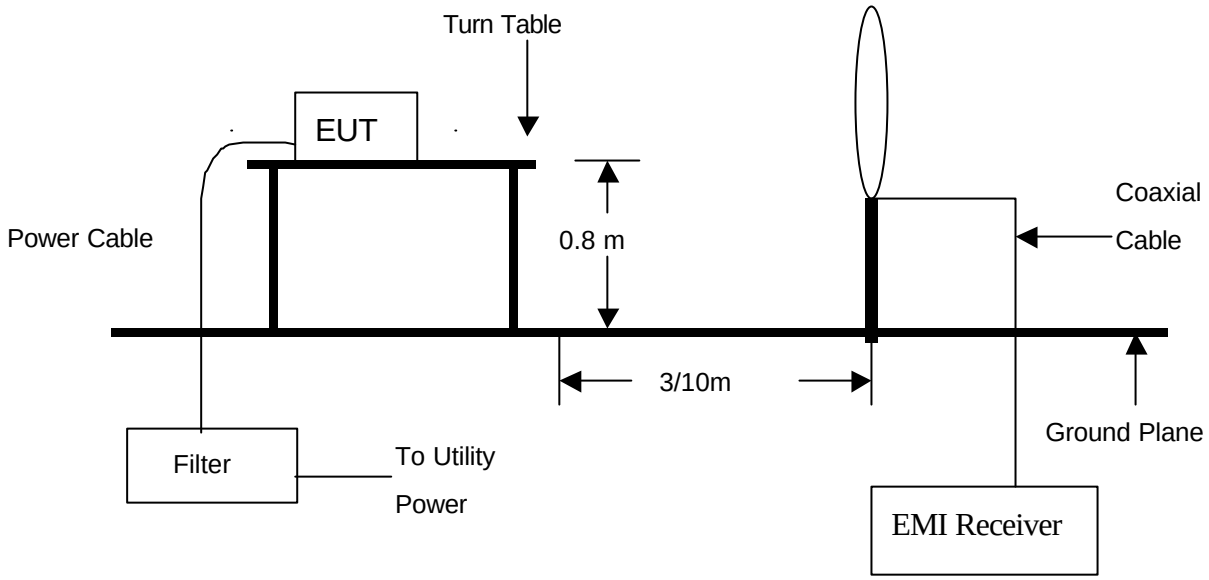
The following test equipment was used during the radiated emission test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST RECEIVER	20 MHz TO 1 GHz	ROHDE & SCHWARZ	ESVS30/ 841977/003	AUG. 2004 ETC
LOOP ANTENNA	9 kHz TO 30 MHz	R&S	FHF2-Z2/ 1162 1/2	OCT. 2004 R&S
OATS	3 – 10 M MEASUREMENT	SRT	SRT-1	APR. 2005 SRT

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.

5.2 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.

5.3 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:2003. The measurements were made at an open area test site with 3 meter measurement distance.The test receiver captured the test result plot and delta mark to 26dBc. Then printed out the plot on screen of the test receiver.

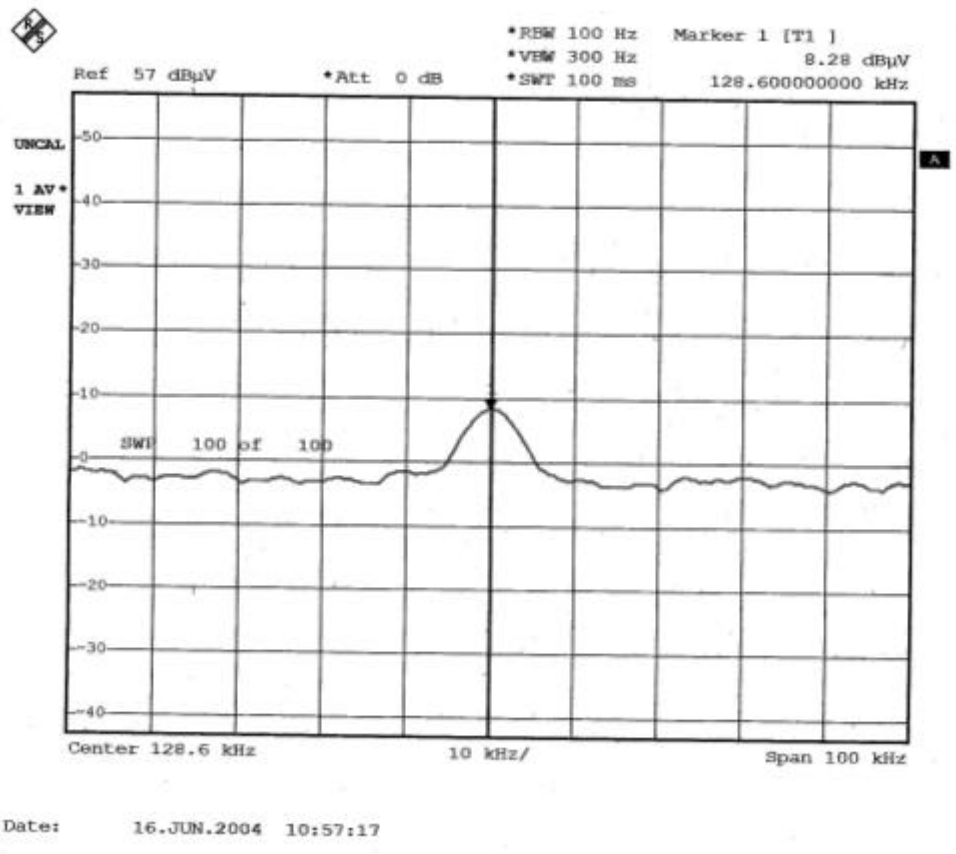
5.4 EUT OPERATING CONDITION

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

5.5 OCCUPIED BANDWIDTH TEST RESULT

Temperature:	24 °C	Humidity:	52%RH
Spectrum Detector:	PK.	Measured Distance:	3m
Tested Date:	Jul. 16, 2004	Tested By:	Kevin Liao

Channel Number	Channel Frequency (kHz)	26 dB Down Bandwidth (kHz)	Pass/Fail
1	128.6	8.28	Pass



6 TIME DOMAIN AND DUTY CYCLE TEST

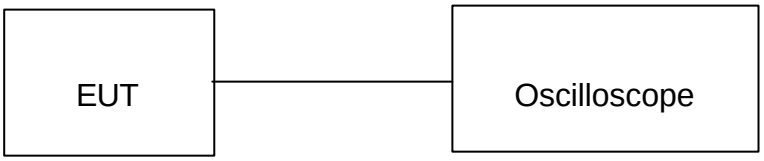
6.1 TEST EQUIPMENT

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

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
Oscilloscope	100MHz 200Ms a/s	HP	54645A/ US39151317	APR. 2005 HP, ITRI

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 oscilloscope 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

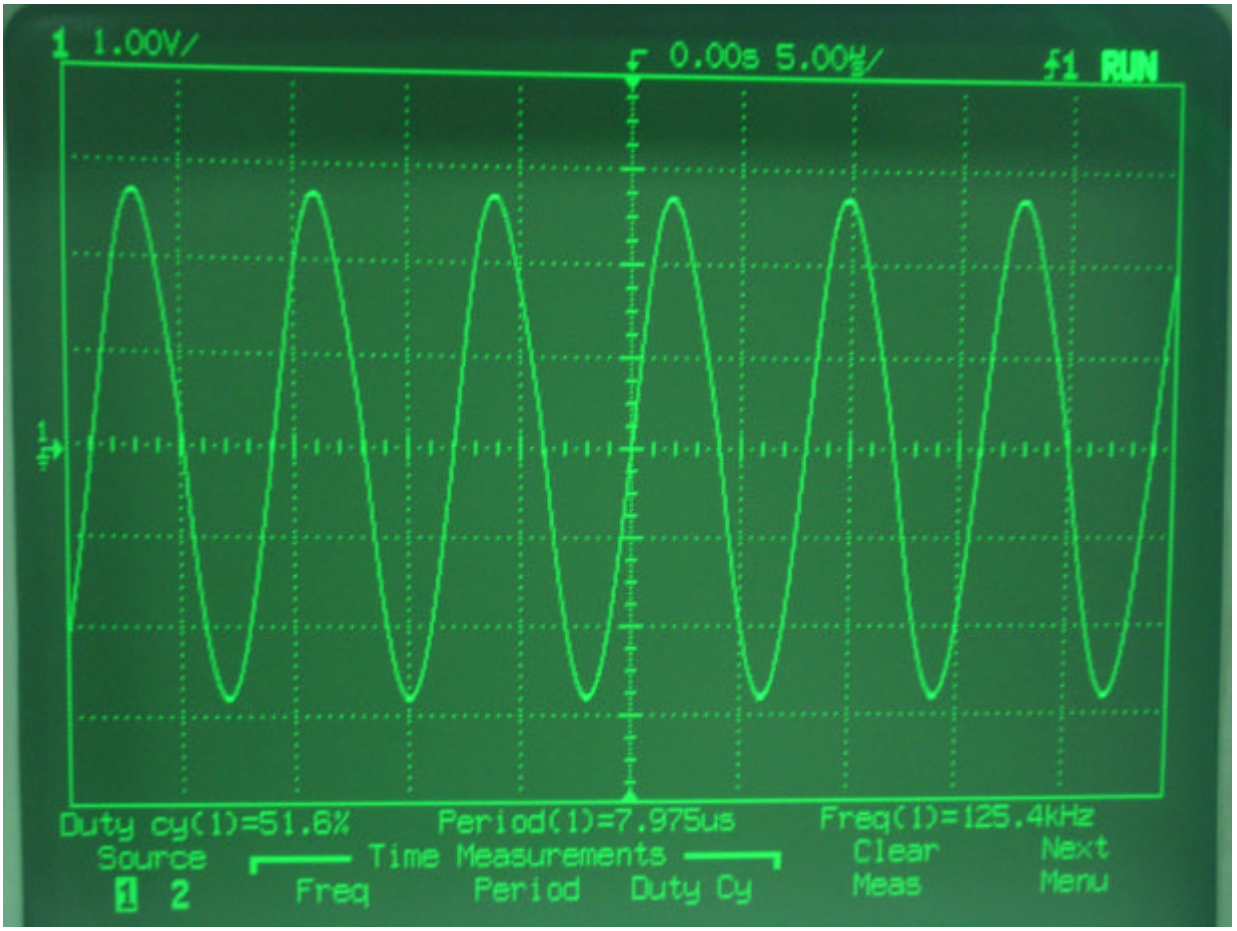
Set the EUT under transmission condition continuously at specific channel frequency.

6.5 TIME DOMAIN AND DUTY CYCLE TEST RESULT

Temperature:	25 °C	Humidity:	55%RH
Tested Date:	Jul. 16, 2004	Tested By:	Kevin Liao

Time Domain:

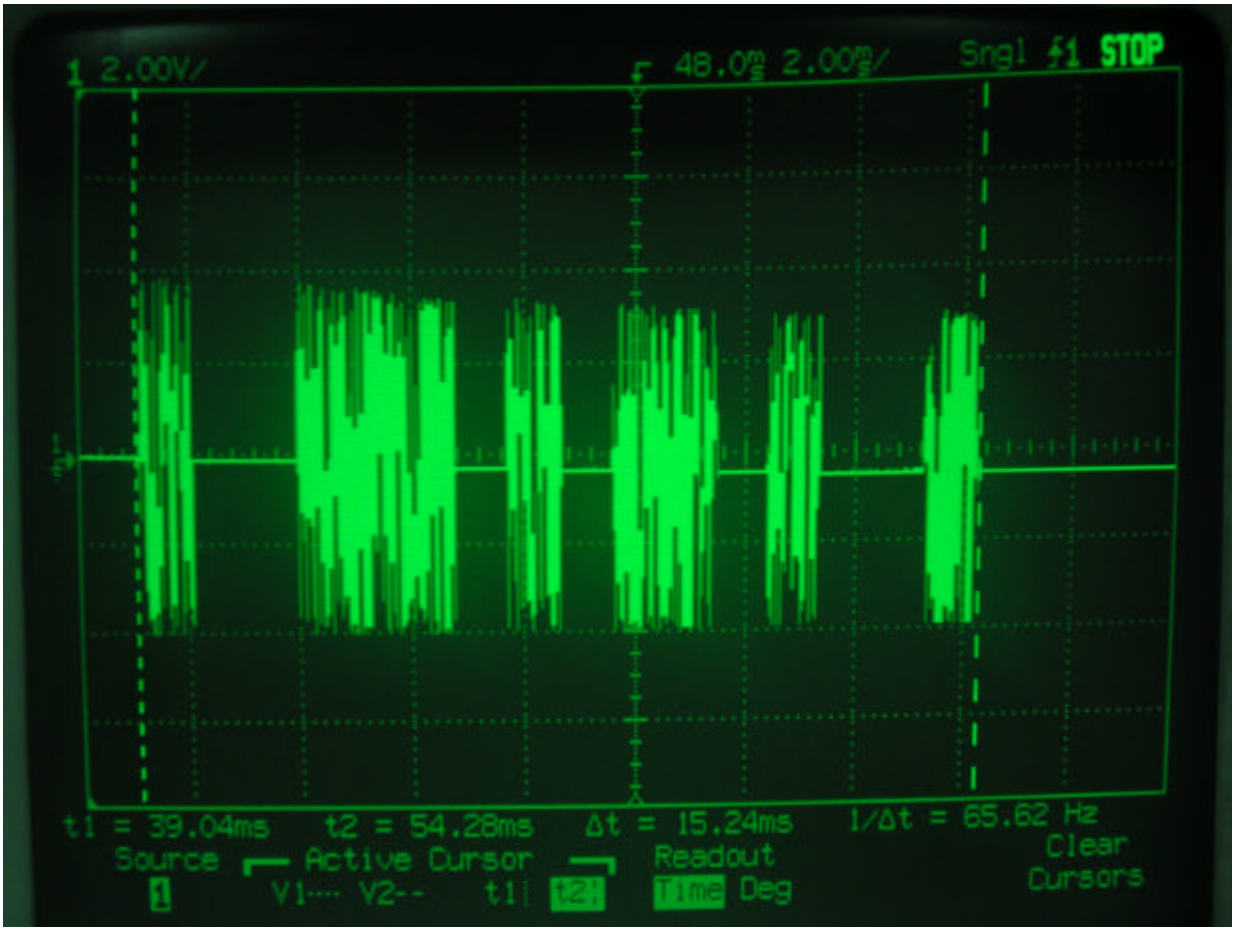
Frequency (kHz)	Period (us)	Duty cycle (%)	Pass/Fail
125.4	7.975	51.8	Pass



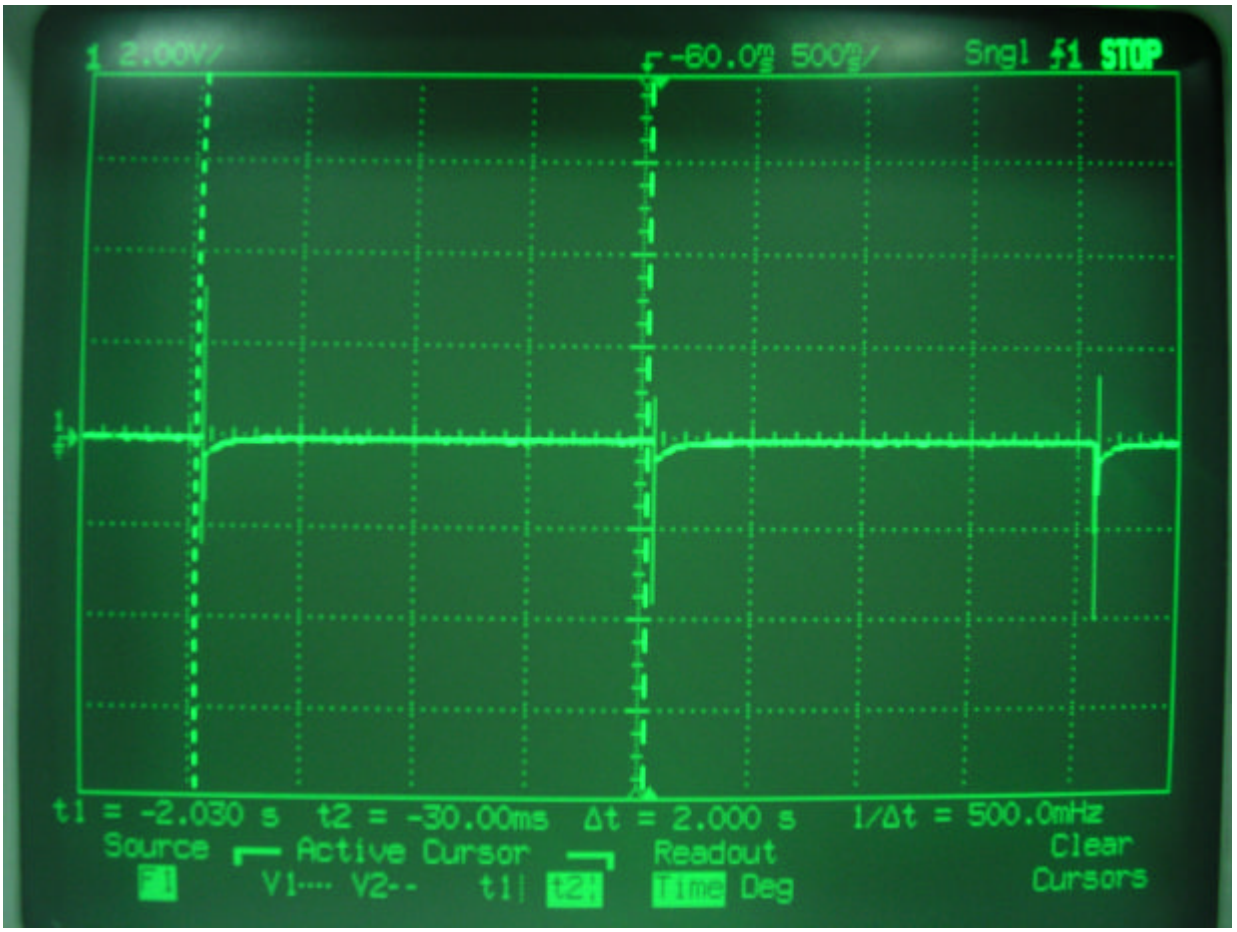
Duty Cycle:

Time on (ms)	Total Time (s)	Duty Cycle (%)	Pass/Fail
15.24	2	0.76	Pass

Time on:

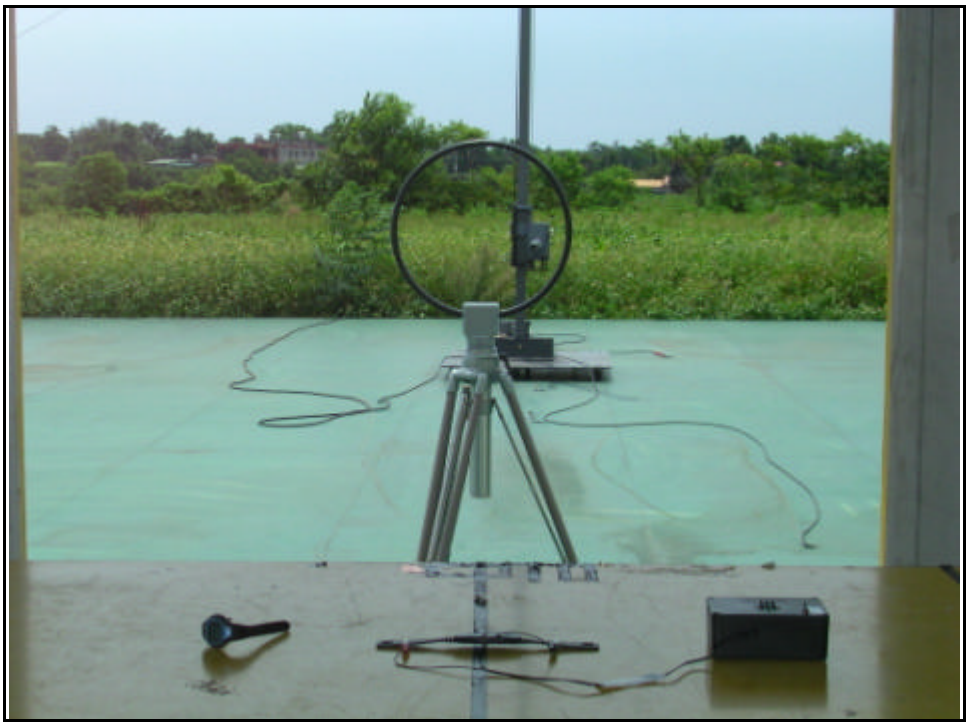


Total Time:

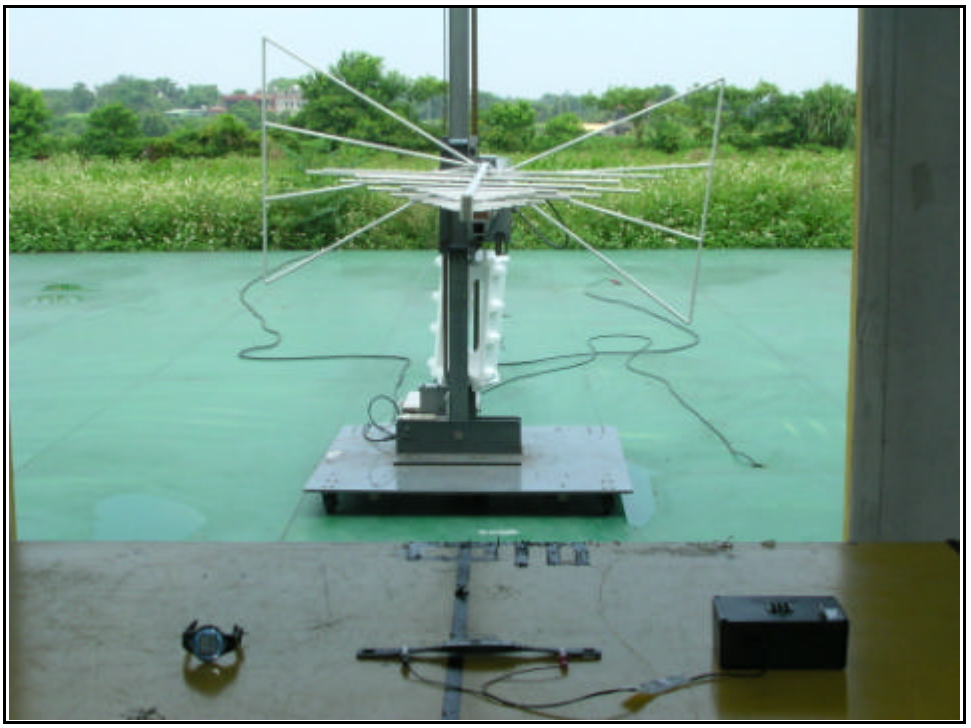

1 2.00V/
-60.0ms 500ms/
Sngl
STOP
t1 = -2.030 s
t2 = -30.00ms
Δt = 2.000 s
1/Δt = 500.0mHz
Source
Active Cursor
Readout
Clear
Cursors
V1---- V2--
t1
t2
Time
Deg

7. PHOTOS OF TESTING

- Raditated test (Below 30MHz)



- Raditated test (30 – 1000MHz)



8 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