



**Spectrum Research &
Testing Lab., Inc.**
No. 101-10, Ling 8,
Shan-Tong Li, Chung-Li
City, Taoyuan, Taiwan

TEST REPORT

Reference No.: A07010409
Report No.: FCCA07010409
FCCID: FSUGMZHT
Page: 1 of 26
Date: Jan. 10, 2007

Product Name: Navigator 900G Laser
Model Number: GM-060038/T
Applicant: KYE SYSTEMS CORP.
No.492,Sec.5,Chung Hsin Rd.,San Chung,Taipei
Hsien,241, Taiwan, R.O.C.
Date of Receipt: Jan. 04, 2007
Finished date of Test: Jan. 10, 2007
Applicable Standards: 47 CFR Part 15, Subpart C
ANSI C63.4:2003
FCC Public Notice DA 00-705(March 2000)

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 :

Lily Yang
(Lily Yang)

Date: Jan/10/2007

Approved By :

Johnson Ho
(Johnson Ho, Director)

Date: 1/10/2007

NVLAP[®]

Lab Code: 200099-0



TEST REPORT

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TEST REPORT

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.

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.
- AC power source, 120 VAC/60 Hz, was used during the test.

1.3 EUT MODIFICATION

- No modification in SRT Lab.



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2. DESCRIPTION OF EUT AND TEST MODE

2.1 GENERAL DESCRIPTION OF EUT

Product	Navigator 900G Laser
Model No.	GM-060038/T
Power Supply	DC 3 V
Frequency Band	2402-2480MHz
Number of Channel	16
Channel Spacing	3 MHz
Rated RF Output Power	-6 dBm
Modulation Type	GFSK
Bit Rate of Transmission	2000 kbps
Mode of Operation	Duplex.
Antenna Gain	-3 dBi
Duty Cycle	50 %

NOTE :

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

2.2 DESCRIPTION OF SUPPORT UNIT

The transmitter part of EUT was tested with a PC system and 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	N/A				
2					
3					
4					
5					

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



2.3 DESCRIPTION OF TEST MODE

Sixteen channels are provided by EUT. Three channels of lower, medium and higher were chosen for test.

Channel	Frequency (MHz)
0	2402
8	2448
15	2480

NOTE :

1. Below 1 GHz, the channel 0, 8 and 15 were pre-tested in chamber. The channel 16, worst case one, was chosen for conducted and radiated emission test.
2. Above 1 GHz, the channel 0, 8 and 15 were tested individually.

3. DESCRIPTION OF APPLIED STANDARDS

The EUT is a kind of wireless product and to be connected with a PC system for normal use. 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

Public Notice DA 00-705 (March 2000)

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

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4. TECHNICAL CHARACTERISTICS TEST

4.1 20dB Bandwidth

4.1.1 LIMIT

Frequency Range (MHz)	Limit(kHz)				
	Quantity of Hopping Channel	50	25	15	75
902-928		<250	>250	NA	NA
2400-2483.5		NA	NA	>1000	<1000

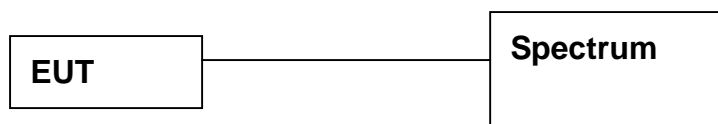
4.1.2 TEST EQUIPMENT

The following test equipment was used during the test:

Equipment/ Facilities	Specifications	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	APR. 2007 R&S

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

4.1.3 TEST SET-UP



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

4.1.4 TEST PROCEDURE

The EUT was operated in hopping mode or any specific channel.
 Printed out the test result from the spectrum by hard copy function.

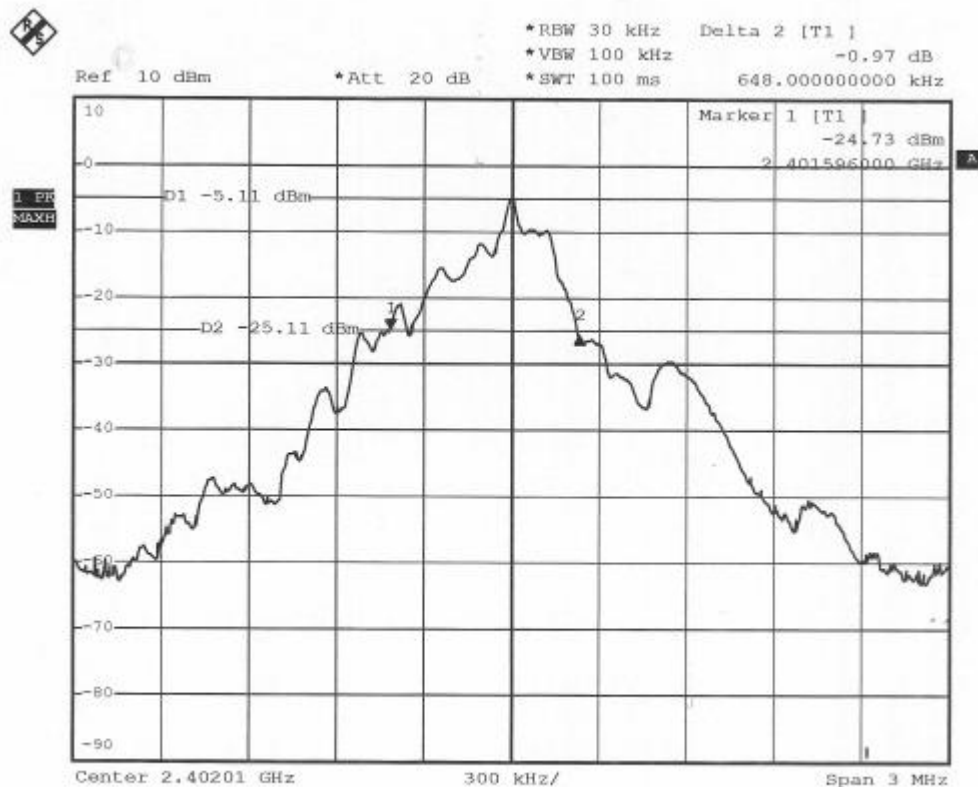


4.1.5 TEST RESULT

Temperature:	25°C	Humidity:	60%RH
Spectrum Detector:	PK	Tested by:	Lily Yang
Test Result:	PASS	Tested Date:	Jan. 08, 2007

Channel Number	Channel Frequency (MHz)	20dB Down Bandwidth (MHz)
0	2402	648
8	2448	690
15	2480	690

CH0:

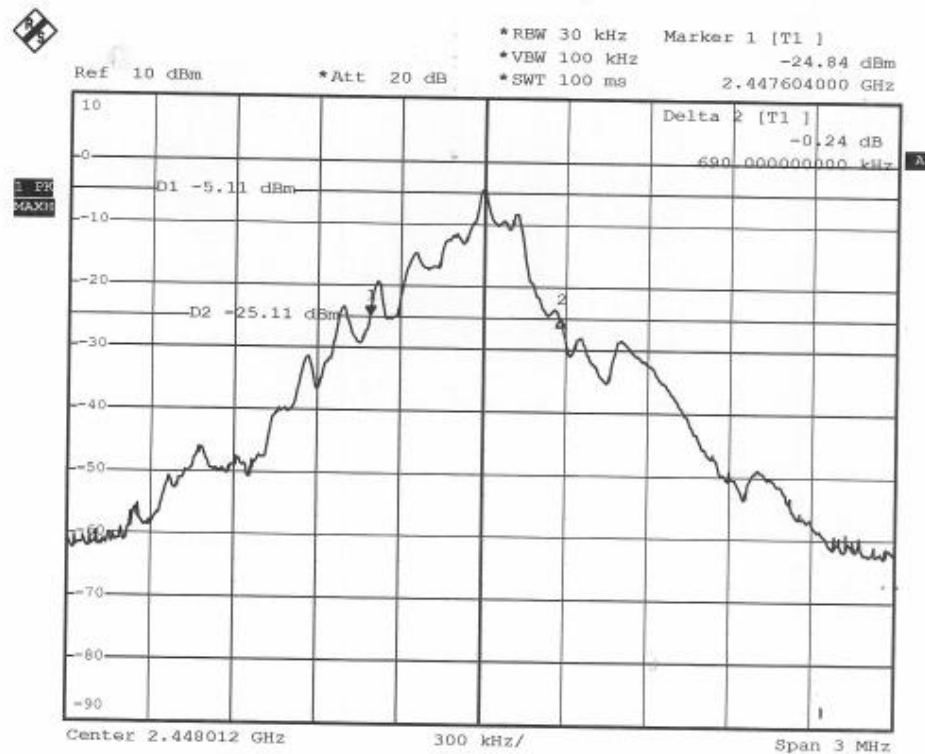


Date: 8.JAN.2007 12:02:01



TEST REPORT

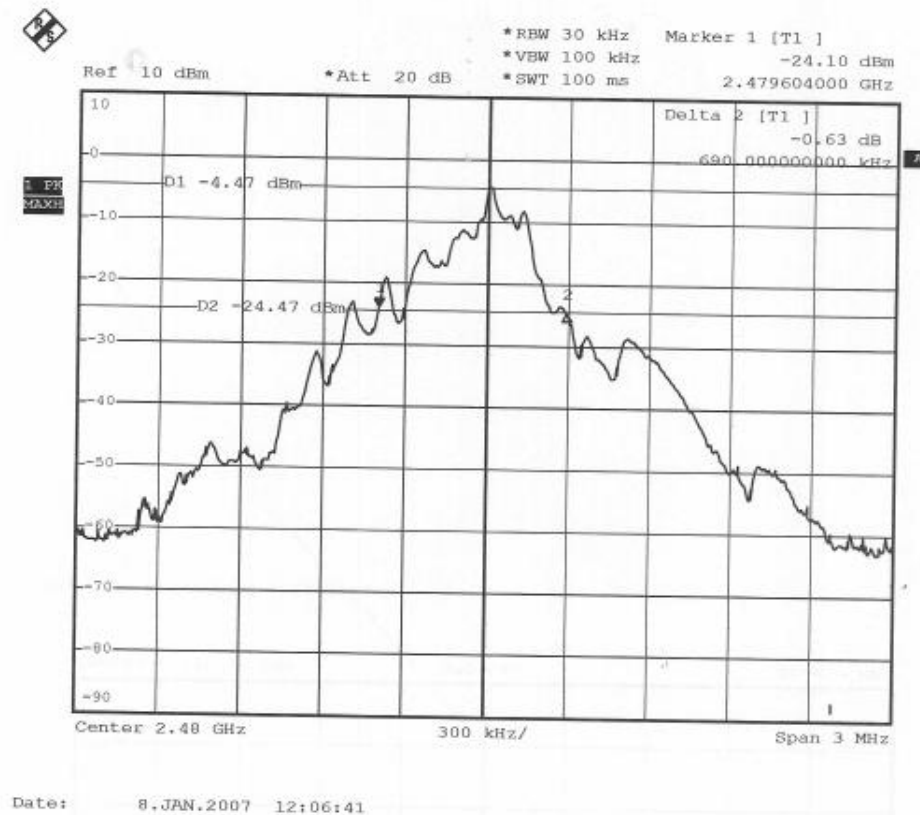
CH8:



Date: 8.JAN.2007 12:04:20



CH15:



4.2 BAND EDGE TEST

4.2.1 LIMIT

FCC Part15, Subpart C Section 15.249 (c), Emission radiated outside of the specified frequency bands, except for harmonics, shall attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in Section 15.209, whichever is the lesser attenuation.

Operating Frequency Range (MHz)	Limit (dBμV/m)	
	Peak	Average
902-928	74	54
2400-2483.5		
5725-5850		

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4.2.2 TEST EQUIPMENT

The following test equipment was used during the test :

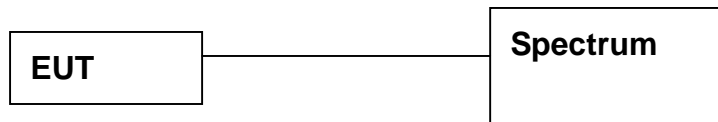
Equipment/ Facilities	Specification	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
SPECTRUM	9kHz-7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	APR. 2007 R&S
EMI TEST RECEIVER	9 kHz TO 2750 MHz	ROHDE & SCHWARZ	ESCS30/ 830245/012	OCT. 2007 ETC
SPECTRUM	9KHz-26.5GHz	HP	8953E/ 3710A03220	MAY 2007 ETC
PRE-AMPLIFIER	1GHz-26.5GHz Gain:30dB	HP	8449B/ 3008A01019	NOV. 2007 ETC
BI-LOG ANTENNA	25 MHz TO 2 GHz	EMCO	3142/ 9701-1124	FEB. 2007 SRT
HORN ANTENNA	1GHz to 18GHz	EMCO	3115/ 9602-4681	DEC. 2007 ETC
OATS	3 - 10 M measurement	SRT	SRT-1	APR. 2007 SRT

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



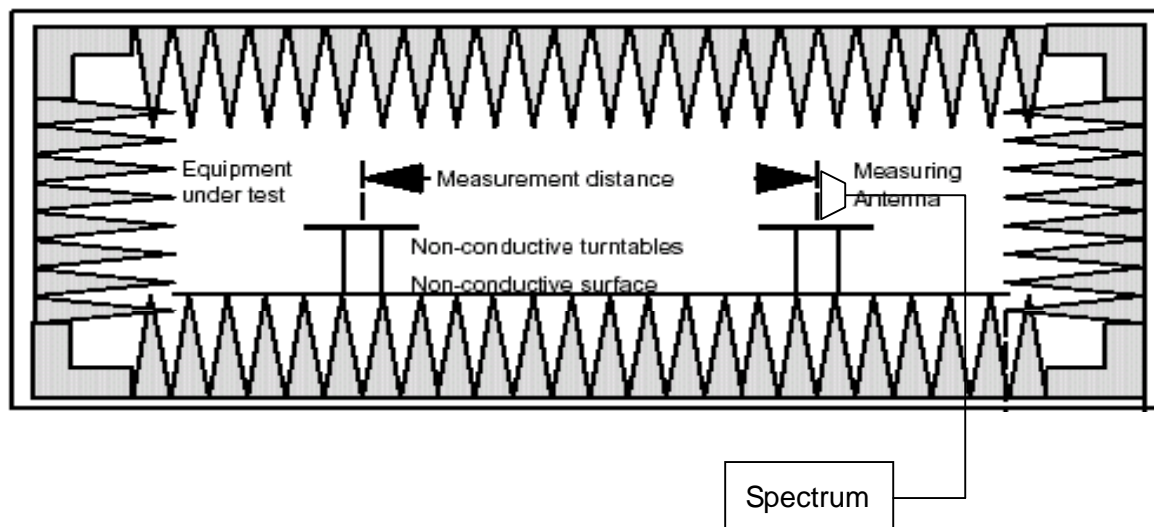
4.2.3 TEST SET-UP

FOR RF CONDUCTED TEST (dBc)



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

FOR RADIATED EMISSION TEST



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.



4.2.4 TEST PROCEDURE

1. The EUT was operating in hopping mode or could be controlled its channel.
Printed out the test result from the spectrum by hard copy function.
2. The EUT was tested according to the requirement of ANSI C63.4 and CISPR 22. The measurements were made at an open area test site with 10 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz. All readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak and average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

4.2.5 EUT OPERATING CONDITION

Same as section 4.1.5 of this report.

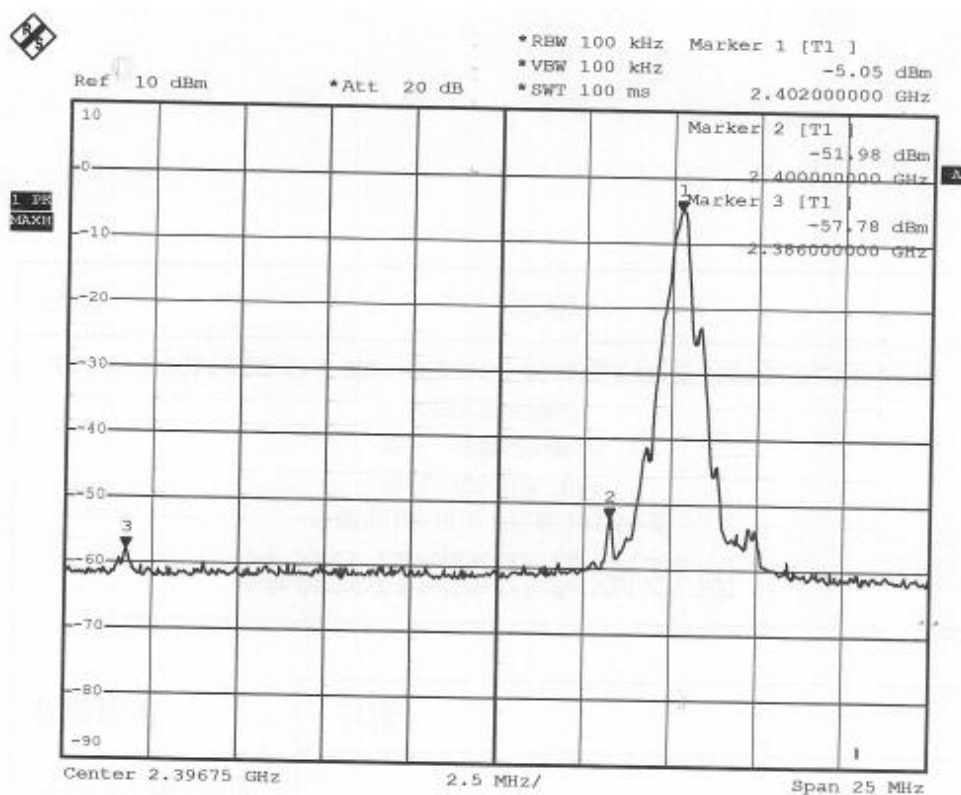
4.2.6 TEST RESULT

Temperature:	<u>26°C</u>	Humidity:	<u>61%RH</u>
Spectrum Detector:	<u>PK & AV</u>	Tested by:	<u>Lily Yang</u>
Test Result:	<u>PASS</u>	Tested Date:	<u>Jan. 08, 2007</u>



TEST REPORT

Ch0:

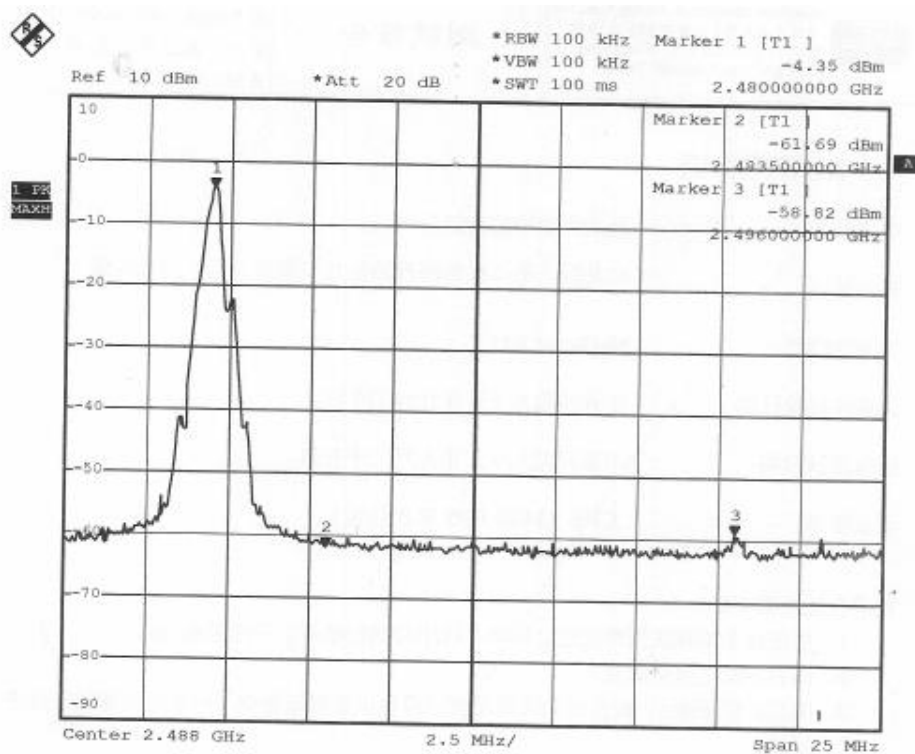


Date: 8.JAN.2007 12:18:23



TEST REPORT

Ch15:



Date: 8.JAN.2007 12:11:08

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4.3 FUNDAMENTAL & SPURIOUS RADIATED EMISSION TEST

4.3.1 LIMIT

FCC Part15, Subpart C Section 15.209 limit of radiated emission for frequency below1000MHz. The emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Distance (m)	Field Strength (dB μ V/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.

FCC Part 15, Section15.35(b) limit of radiated emission for frequency above 1000 MHz

Frequency (MHz)	Class A (dBuV/m) (at 3m)		Class B (dBuV/m) (at 3m)	
	Peak	Average	Peak	Average
Above 1000	80.0	60.0	74.0	54.0

FCC Part 15, Subpart C Section 15.249. The field strength of emissions from intentional radiators operated within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Filed Strength of Fundamental (dBuV/m) (at 3m)		Field Strength of Harmonics (dBuV/m) (at 3m)	
	Peak	Average	Peak	Average
902-928	114	94	74.0	54.0
2400-2483.5	114	94	74.0	54.0
5725-5875	114	94	74.0	54.0
24000-24250	128	108	88.0	68.0

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4.3.2 TEST EQUIPMENT

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

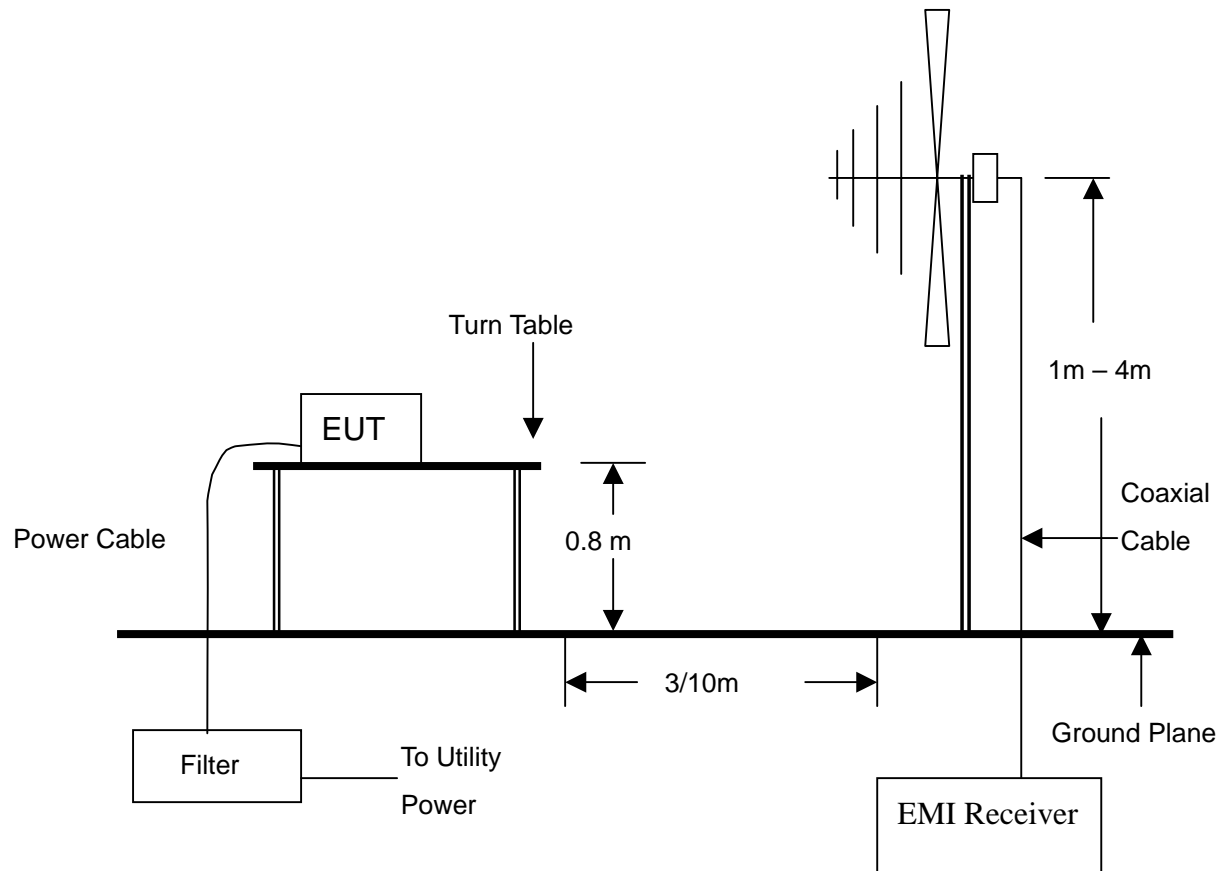
Equipment/ Facilities	Specification	Manufacturer	Model#/ Serial#	Due Date of Cal. & Cal. Center
EMI TEST RECEIVER	20 kHz TO 1 GHz	ROHDE & SCHWARZ	ESCS30/ 830245/012	OCT. 2007 ETC
BI-LOG ANTENNA	25 MHz TO 2 GHz	EMCO	3142/ 9701-1124	FEB. 2007 SRT
OATS	3 – 10 M MEASUREMENT	SRT	SRT-1	DEC. 2007 SRT
COAXIAL CABLE	25M	SUNCITY	J400/ 25M	AUG. 2007 SRT
FILTER	2 LINE, 30A	FIL.COIL	FC-943/ 869	N/A
FREQUENCY CONVERTER	N/A	APC	AFC-2KBB/ F100030031	AUG. 2007 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.



4.3.3 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.

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4.3.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4 and CISPR 22. The measurements were made at an open area test site with 10 meter measurement distance under 1 GHz and with 3m distance above 1GHz. The frequency spectrum measured started from 30 MHz. Under 1 GHz. All readings were quasi-peak values with 120 kHz resolution bandwidth of the test receiver. Above 1 GHz, the measurements were made at an open area test site with 3 meter measurement distance and all readings were peak and average values with 1 MHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. The cables connected to EUT and support units were moved to find the maximum emission levels for each frequency.

4.3.5 EUT OPERATING CONDITION

Same as section 4.1.5 of this report.



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4.3.6 TEST RESULT

Temperature:	18°C	Humidity:	68 %RH
Frequency Range:	30 – 1000 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Tested Mode:	TX
Tested By:	Lily Yang	Tested Date:	Jan. 08, 2007

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)
150.2800	2.50	9.30	4.8	16.7	43.5	-26.9	355	2.8
326.8900	3.99	14.27	3.9	22.2	46.0	-23.8	350	2.7
425.9400	5.22	15.95	6.5	27.7	46.0	-18.3	0	2.5
501.8900	6.36	16.11	3.7	26.2	46.0	-19.8	340	2.2
627.8900	7.31	18.34	3.4	29.1	46.0	-16.9	10	2.4
696.0000	8.08	20.86	3.3	32.2	46.0	-13.8	350	2.5

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)
36.7900	0.74	12.18	18.0	30.9	40.0	-9.1	0	2.5
192.0000	2.55	10.72	4.5	17.8	43.5	-25.7	5	2.4
330.5900	4.15	14.36	4.1	22.6	46.0	-23.4	0	2.2
536.2300	6.08	16.57	3.6	26.3	46.0	-19.8	350	2.0
600.3600	7.03	17.40	3.8	28.2	46.0	-17.8	355	2.0
643.9000	6.96	18.95	3.5	29.4	46.0	-16.6	30	2.3

NOTE :

1. Measurement uncertainty is +/-2dB.
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.



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Temperature:	18 °C	Humidity:	68 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	TX-Ch0
Tested By:	Lily Yang	Tested Date:	Jan. 08, 2007

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00	-32.16	28.54	88.3	87.6	84.7	84.0	114.0	94	-29.3	-10.0	15	1.4
4804.00	-30.47	33.64	52.2	46.7	55.4	49.8	74.0	54.0	-18.6	-4.2	20	1.2
7206.00	-28.90	36.26	45.6	*	53.0	*	74.0	54.0	-21.0	*	18	1.1
9608.00	-28.55	37.84	37.3	*	46.6	*	74.0	54.0	-27.4	*	22	1.3
1577.00	-32.99	25.59	39.0	*	31.6	*	74.0	54.0	-42.4	*	350	1.1
3329.00	-31.60	31.99	37.5	*	37.9	*	74.0	54.0	-36.1	*	10	1.2

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2402.00	-32.16	28.00	81.8	81.5	77.6	77.3	114.0	94	-36.4	-16.7	17	1.4
4804.00	-30.47	33.64	50.6	*	53.8	*	74.0	54.0	-20.2	*	19	1.3
7206.00	-28.90	36.26	36.7	*	44.1	*	74.0	54.0	-29.9	*	25	1.2
9608.00	-28.55	37.84	37.0	*	46.3	*	74.0	54.0	-27.7	*	19	1.3
1569.00	-33.00	25.56	38.4	*	31.0	*	74.0	54.0	-43.0	*	2	1.2
3329.00	-31.60	31.99	37.6	*	38.0	*	74.0	54.0	-36.0	*	25	1.4

NOTE :

1. Measurement uncertainty is +/-2dB.
2. "**": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



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Temperature:	18 °C	Humidity:	68 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	TX-Ch8
Tested By:	Lily Yang	Tested Date:	Jan. 08, 2007

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2448.00	-32.24	28.64	87.2	84.9	83.6	81.3	114.0	94.0	-30.4	-12.7	80	1.1
4896.00	-30.23	33.72	52.9	48.8	56.4	52.2	74.0	54.0	-17.6	-1.8	90	1.1
7344.00	-28.99	36.38	38.5	*	45.9	*	74.0	54.0	-28.1	*	105	1.1
9702.00	-28.59	37.88	37.0	*	46.3	*	74.0	54.0	-27.7	*	180	1.2
1403.00	-31.58	25.09	48.8	*	42.3	*	74.0	54.0	-31.7	*	190	1.4
1407.50	-31.42	25.10	41.4	*	35.1	*	74.0	54.0	-38.9	*	320	1.3

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2448.00	-32.24	28.10	80.9	77.2	76.8	73.1	114.0	94.0	-37.2	-20.9	278	1.3
4896.00	-30.23	33.72	50.1	*	53.6	*	74.0	54.0	-20.4	*	316	1.2
7344.00	-28.99	36.38	36.7	*	44.1	*	74.0	54.0	-29.9	*	223	1.2
9702.00	-28.59	37.88	37.2	*	46.5	*	74.0	54.0	-27.5	*	87	1.0
1445.00	-29.89	25.18	45.7	*	41.0	*	74.0	54.0	-33.0	*	97	1.0
3413.00	-31.45	32.24	39.6	*	40.4	*	74.0	54.0	-33.6	*	39	1.0

NOTE :

1. Measurement uncertainty is +/-2dB.
2. "**": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



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Testing Lab., Inc.**
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Temperature:	18 °C	Humidity:	68 %RH
Frequency Range:	1 – 25 GHz	Measured Distance:	3m
Receiver Detector:	PK. or AV.	Tested Mode:	TX-Ch15
Tested By:	Lily Yang	Tested Date:	Jan. 08, 2007

Antenna Polarization : Horizontal

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00	-32.19	28.73	88.7	86.5	85.2	83.0	114.0	94.0	-28.8	-11.0	78	1.1
4959.99	-30.26	33.77	51.5	48.7	55.0	52.3	74.0	54.0	-19.0	-1.8	89	1.0
7441.04	-28.95	36.45	37.3	*	44.8	*	74.0	54.0	-29.2	*	103	1.0
9919.96	-28.65	37.97	37.1	*	46.4	*	74.0	54.0	-27.6	*	182	1.2
1403.04	-31.58	25.09	49.1	*	42.6	*	74.0	54.0	-31.4	*	193	1.2
1407.50	-31.42	25.10	41.0	*	34.7	*	74.0	54.0	-39.3	*	321	1.3

Antenna Polarization : Vertical

Frequency (MHz)	Correct Factor (dB)	Ant. Factor (dB/m)	Reading Data (dBμV)		Emission Level (dBμV/m)		Limit (dBμV/m)		Margin (dB)		AZ (°)	EL (m)
			PK.	AV.	PK.	AV.	PK.	AV.	PK.	AV.		
2480.00	-32.19	28.16	83.0	80.7	79.0	76.7	114.0	94.0	-35.0	-17.3	278	2.0
4959.99	-30.26	33.77	52.4	50.2	55.9	53.7	74.0	54.0	-18.1	-0.3	316	1.4
7441.04	-28.95	36.45	36.8	*	44.3	*	74.0	54.0	-29.7	*	223	1.4
9919.96	-28.65	37.97	37.6	*	46.9	*	74.0	54.0	-27.1	*	87	1.3
1423.80	-30.78	25.13	47.0	*	41.3	*	74.0	54.0	-32.7	*	97	1.3
1446.60	-29.85	25.18	44.2	*	39.5	*	74.0	54.0	-34.5	*	39	1.2

NOTE :

1. Measurement uncertainty is +/-2dB.
2. "**": The Peak reading value also meets average limit and measurement with the average detector is unnecessary.
3. Emission Level = Reading Value + Ant. Factor + Correct Factor (incl.:Cable Loss and Pre-Amplifier Gain)
4. The field strength of other emission frequencies were very low against the limit.
5. (F):The field strength of fundamental frequency.



**Spectrum Research &
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No. 101-10, Ling 8,
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5. Antenna application

5.1 Antenna requirement

The EUT's antenna is met the requirement of FCC part15C section15.203 and 15.204.

5.2 Result

The EUT's antenna used a chip antenna and integrated on PCB. The antenna's gain is -3 dBi and meets the requirement.



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7. TERMS OF ABBREVIATION

AV.	Average detection
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