

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

TEST REPORT

Reference No.: A08010303 Report No.: FCCA08010303 FCC ID:FSUGMZIA Page:1 of 22 Date: Jan. 11, 2008

Product Name:	Navigator 620 Laser
Model No.:	GM-070023/T
Applicant:	KYE SYSTEMS CORP.(Genius)
	No. 492, Sec. 5, Chung Hsin Rd., San Chung, Taipei Hsien, 241, Taiwan, R.O.C.
Date of Receipt:	Jan. 3, 2008
Finished date of Test:	Jan. 9, 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 :

<u>(Jeff Yu)</u>, Date: <u>Jan/</u>[]

1208

Approved By :

(Johnson Ho, Director), Date: Jan. 11, 2008.



Lab Code: 200099-0 FMNG-059.10 REPORT Spectrum Research & Testing Lab., Inc. No. 101-10, Ling 8, Shan-Tong Li, Chung-Li City, Taoyuan, Taiwan, R.O.C.

TEST REPORT

Reference No.: A08010303 Report No.: FCCA08010303 FCC ID: FSUGMZIA Page: 2 of 22 Date: Jan. 11, 2008

Table of Contents

1.	DOCUMENT POLICY AND TEST STATEMENT	. 3
1.1	DOCUMENT POLICY	. 3
1.2	TEST STATEMENT	. 3
1.3	EUT MODIFICATION	
2.	DESCRIPTION OF EUT AND TEST MODE	. 4
2.1	GENERAL DESCRIPTION OF EUT	. 4
2.2	DESCRIPTION OF EUT INTERNAL DEVICE	
2.3	DESCRIPTION OF TEST MODE	. 4
2.4	DESCRIPTION OF SUPPORT UNIT	
3.	DESCRIPTION OF APPLIED STANDARDS	. 5
4.	CONDUCTED EMISSION TEST	. 6
4.1	CONDUCTED EMISSION LIMIT	. 6
4.2	TEST EQUIPMENT	. 6
4.3	TEST SETUP	
4.4	TEST PROCEDURE	
4.5	EUT OPERATING CONDITION	
4.6	TEST RESULT	
5.	RADIATED EMISSION TEST	
5.1	RADIATED EMISSION LIMIT	
5.2	TEST EQUIPMENT	
5.3	TEST SET-UP	
5.4	TEST PROCEDURE	
5.5	EUT OPERATING CONDITION	
5.6	RADIATED EMISSION TEST RESULT	
6.	BAND EDGE	
6.1	BAND EDGE LIMIT	
6.2	TEST EQUIPMENT	
6.3	TEST SET-UP	
6.4	TEST PROCEDURE	
6.5	EUT OPERATING CONDITION	
6.6	BAND EDGE TEST RESULT	
7.	PHOTOS OF TESTING	
8.	TERMS OF ABBREVIATION	22

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.
- Each test or calibration report bearing the term and/or symbol shall include a statement that 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.
- Power source, 3 Vdc(for EUT) and 120 Vac/60 Hz(for support units), 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 620 Laser
Moedl No.	GM-070023/T
Power Supply	DC 3.0 V
Cable	N/A
Carrier Frequency	27.045 MHz
Number of channel	1
Rated RF Output power	56dBuV
Modulation type	FSK
Duty Cycle	50%
Mode of operation	Simplex
Channel bandwidth	10KHz
Antenna type	Loop antenna
NOTE ·	

NOTE :

For more detailed features, please refer to the manufacturer's specification or User's Manual.

2.2 DESCRIPTION OF EUT INTERNAL DEVICE

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

NOTE :

1. Frequency range to be measured. Radiated emission is 30MHz to 1GHz.

2.3 DESCRIPTION OF TEST MODE

Mode 1: Link

Mode 2: TX



TEST REPORT

2.4 DESCRIPTION OF SUPPORT UNIT

The EUT was configured by the requirement of ANSI C63.4:2003 and CISPR22:2003. 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
1	Printer	HP	deskjet 3420	N/A	1.5m unshielded power cord 1.5m shielded data cable
2	Keyboard	Acer	KU-0355	N/A	1.5m shielded data cable
3	NoteBook	Dell	N521071	N/A	1.8m unshielded power cord
4	Monitor	SANGSUNG	700IFT	N/A	1.6m unshielded power cord 1.5m shielded data cable
5	Speaker	HI-FI	JB-599	N/A	2.0m unshielded power cord

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

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

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



4. CONDUCTED EMISSION TEST

4.1 CONDUCTED EMISSION LIMIT

FREQUENCY (MHz)	Class A	Class A (dBμV)		(dBµV)
FREQUENCT (MHZ)	Quasi-peak	Average	Quasi-peak	Average
0.15 - 0.5	79	66	66 - 56	56 - 46
0.5 - 5.0	73	60	56	46
5.0 - 30.0	73	60	60	50

NOTE:

1. The lower limit shall apply at the transition frequencies.

2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50 MHz.

4.2 TEST EQUIPMENT

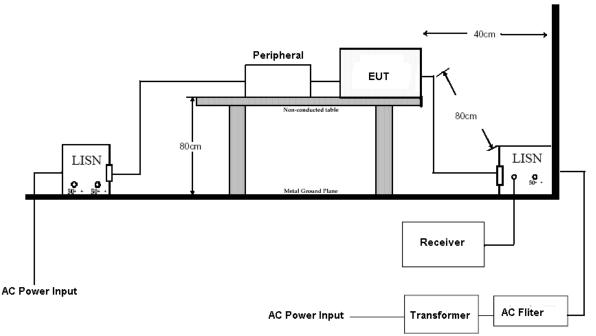
The following test equipment was used for the test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
EMI TEST	9 kHz TO	ROHDE &	ESHS30 /	SEP. 2008
RECEIVER	30 MHz	SCHWARZ	826003/008	ETC
LISN	50 µH, 50 ohm	FCC	FCC-LISN-50-25-2 / 01017	OCT. 2008 ETC
LISN	50µH, 50 ohm	SOLAR ELECTRONICS	9252-50-R24-BNC / 951315	JUN. 2008 ETC
50 OHM TERMINATOR	50 ohm	HP	11593A / #2	OCT. 2008 ETC
COAXIAL CABLE	5M	TIMES	EQM-0159 / #5-5m	AUG. 2008 SRT
FILTER	2 LINE, 30A	FIL.COIL	FC-943 / 771	NCR
GROUND PLANE	2.3M (H) x 2.4M (W)	SRT	N/A	NCR
GROUND PLANE	2.4M (H) x 2.4M (W)	SRT	N/A	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 SETUP



NOTE:

1. The EUT was put on a wooden table with 0.8m heights above ground plane, and 0.4m away from reference ground plane (> 2mx2m).

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

- 3. The serial no. of the LISN connected to EUT is 951318.
- 4. The serial no. of the LISN connected to support units is 924839.

4.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:2003 and CISPR22:2003. The frequency spectrum from 0.15 MHz to 30 MHz was investigated. The LISN used was 50 ohm/50µH as specified. All readings were quasi-peak and average values with 10 kHz resolution bandwidth of the test receiver. The EUT system was operated in all typical methods by users. Both lines of the power mains of EUT were measured and the cables connected to EUT and support units were moved to find the maximum emission levels for each frequency. First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.

TEST REPORT

Reference No.: A08010303 Report No.:FCCA08010303 FCC ID:FSUGMZIA Page:8 of 22 Date: Jan. 11, 2008

4.5 EUT OPERATING CONDITION

1. Set the EUT under transmission condition continuously according to the test progress provided by the applicant.

2. Under Windows XP run "EMI TEST", "WIN FCC" programs and PC sent "H" pattern or accessed the following peripherals directly or via EUT:

- Monitor
- Printer
- Keyboard
- Speaker



TEST REPORT

Reference No.: A08010303 Report No.:FCCA08010303 FCC ID:FSUGMZIA Page:9 of 22 Date: Jan. 11, 2008

4.6 TEST RESULT

Temperature:	22°C	Humidity:	63 %RH
Ferquency Range:	0.15 – 30 MHz	Tested Mode:	Link
Receiver Detector:	Q.P. and AV.	Tested By:	Jeff Yu
		Tested Date:	Jan. 04, 2008

Power Line Measured : Line

Freq. (MHz)	Correct. Factor	Reading Value (dBµV)			on Level μV)		nit µV)		·gin B)
(,	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.150	0.30	55.50	33.19	55.80	33.49	58.54	48.54	-2.74	-15.05
0.159	0.30	58.54	40.98	58.84	41.28	57.94	47.94	0.90	-6.66
0.514	0.24	30.50	20.92	30.74	21.16	56.00	46.00	-25.26	-24.84
3.744	0.19	32.54	20.45	32.73	20.64	56.00	46.00	-23.27	-25.36
5.731	0.22	20.50	13.28	20.72	13.50	60.00	50.00	-39.28	-36.50
6.299	0.22	19.46	11.27	19.68	11.49	60.00	50.00	-40.32	-38.51

Power Line Measured : Neutral

Freq. (MHz)	Correct. Factor	Reading Value (dBµV)		Emissic (dB	on Level μV)		nit µV)		rgin B)
(,	(dB)	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.	Q.P.	AV.
0.156	0.30	57.76	40.24	58.06	40.54	58.29	48.29	-0.23	-7.75
0.159	0.30	57.10	40.90	57.40	41.20	56.06	46.06	1.34	-4.86
0.509	0.24	32.40	22.26	32.64	22.50	56.00	46.00	-23.36	-23.50
3.616	0.19	29.30	18.23	29.49	18.42	56.00	46.00	-26.51	-27.58
9.344	0.23	20.16	13.20	20.39	13.43	60.00	50.00	-39.61	-36.57
9.517	0.23	19.56	12.50	19.79	12.73	60.00	50.00	-40.21	-37.27

NOTE :

1. Measurement uncertainty is +/-1.32dB

2. Emission level = Reading value + Correction factor

3. Correction Factor = Cable loss + Insertion loss of LISN

4. Margin value = Emission level - Limit

5. The emission of other frequencies was very low against the limit.

6. "-": The Quasi-peak reading value also meets average limit and measurement with the average detector is unnecessary.

5. RADIATED EMISSION TEST

5.1 RADIATED EMISSION LIMIT

FCC Part 15, Subpart C Section 15.227.

FREQUENCY (MHz)	DISTANCE (m)	FIELD STREN	GTH (dBμV/m)
		PEAK	AVERAGE
26.96 - 27.28	3	100.0	80.0

FCC Part 15, Subpart B Section 15.209.

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, antemma, and the closest point of any part of the device or system.

5.2 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		ROHDE & SCHWARZ	ESCS30 / 830245/012	OCT. 2008 ETC
BI-LOG ANTENNA	26 MHz TO 2 GHz	EMCO	3142B / 0005-1534	NOV. 2008 ETC
OATS	3 – 10 M MEASUREMENT	SRT	SRT-1	NOV. 2008 SRT
COAXIAL CABLE	25M	TIMES	J400 / #25M	AUG. 2008 ETC
FILTER	2 LINE, 30A	FIL.COIL	FC-943 / 869	NCR

NOTE:

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

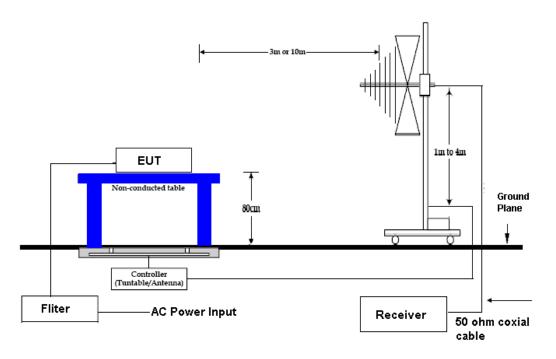
2. The Open Area Test Site (SRT-1) is registered by FCC with No. 90957 and VCCI with No. R-1081.

3. The Open Area Test Site (SRT-2) is registered by FCC with No. 98458 and VCCI with No. R-1168.



Reference No.: A08010303 Report No.:FCCA08010303 FCC ID:FSUGMZIA Page:11 of 22 Date: Jan. 11, 2008

5.3 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.



TEST REPORT

Reference No.: A08010303 Report No.:FCCA08010303 FCC ID:FSUGMZIA Page:12 of 22 Date: Jan. 11, 2008

5.4 TEST PROCEDURE

The EUT was tested according to the requirement of ANSI C63.4:2003 and CISPR 22:2003. 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 or 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.

First, find the margin or higher points at least 6 points by software, then use manual to find the maximum data. The procedure is referred on the test procedure of SRT LAB.

5.5 EUT OPERATING CONDITION

Same as section 4.5 of this report.



5.6 RADIATED EMISSION TEST RESULT

Temperature:	23°C	Humidity:	66 %RH
Ferquency Range:	9K - 1000 MHz	Measured Distance:	3m
Receiver Detector:	PK & AV.	Tested Mode:	TX (Fundamental
Tested Date:	Jan. 09, 2008		Frequency)
Tested By:	Jeff Yu		

Fundamental frequency of transmitter

Frequency (MHz)	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)		Margin (dB)
27.045	0.03	20.20	30.85(PK)	51.05	100.0	-48.95

Receiver Detector: Q.P. Tested Mode: TX (Harmonic)

Frequency (MHz)	Antenna Polarization	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
54.090	Н	0.87	4.98	26.58	32.43	40.0	-7.57
81.135	Н	1.26	8.18	27.63	35.81	40.0	-4.19



TEST REPORT

Reference No.: A08010303 Report No.:FCCA08010303 FCC ID:FSUGMZIA Page:14 of 22 Date: Jan. 11, 2008

Tested Mode:

TX (Spurious)

Frequency (MHz)	Antenna Polarization	Cable Loss (dB)	Antenna Factor (dB/m)	Reading Data (dBµV)	Emission Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)
81.1100	Н	1.26	8.18	12.8	22.2	40.0	-17.8
160.8400	Н	2.10	9.00	4.8	15.9	43.5	-27.6
219.6300	Н	2.85	10.36	4.2	17.4	46.0	-28.6
296.7500	Н	3.91	13.52	3.8	21.2	46.0	-24.8
349.0000	Н	4.70	14.78	4.3	23.8	46.0	-22.2
418.0000	Н	5.49	15.94	4.2	25.6	46.0	-20.4
113.4200	V	1.71	7.24	17	25.9	43.5	-17.6
160.9500	V	2.10	9.00	8	19.1	43.5	-24.4
188.4100	V	2.49	11.26	7.2	21.0	43.5	-22.5
250.0200	V	3.77	11.50	9.5	24.8	46.0	-21.2
319.6000	V	3.82	14.12	5.2	23.1	46.0	-22.9
399.9000	V	4.70	15.88	4.5	25.1	46.0	-20.9

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

5. (F) : Fundamental frequency of transmitter.



Temperature:	23°C	Humidity:	66 %RH
Ferquency Range:	30 – 1000 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Tested Mode:	Link
Tested Date:	Jan. 09, 2008	Tested By:	Jeff Yu

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)
81.6990	1.61	7.45	12.0	21.1	30.0	-8.9	270	3.3
108.6968	1.88	6.18	11.2	19.3	30.0	-10.7	45	3.2
192.3698	2.64	9.72	8.5	20.9	30.0	-9.1	45	2.8
352.9963	3.82	15.66	8.2	27.7	37.0	-9.3	60	2.5
652.8569	5.62	20.97	5.1	31.7	37.0	-5.3	90	1.5
871.2263	6.83	23.48	2.5	32.8	37.0	-4.2	270	1

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)
81.7595	1.61	7.45	11.5	20.6	30.0	-9.4	270	1.2
108.7340	1.88	6.18	10.2	18.3	30.0	-11.7	180	1.6
193.0056	2.64	9.75	9.0	21.4	30.0	-8.6	90	2.8
353.2075	3.82	15.64	7.5	27.0	37.0	-10.0	160	2.8
652.5432	5.62	20.97	5.0	31.6	37.0	-5.4	270	3.2
871.7598	6.83	23.48	2.0	32.3	37.0	-4.7	300	3.3

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.



Temperature:	23°C	Humidity:	66 %RH
Ferquency Range:	30 – 1000 MHz	Measured Distance:	3m
Receiver Detector:	Q.P.	Tested Mode:	ТХ
Tested Date:	Jan. 09, 2008	Tested By:	Jeff Yu

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)
81.6389	1.61	7.45	17.5	26.6	40.0	-13.4	180	3.5
108.2668	1.88	6.18	17.5	25.6	43.5	-17.9	60	3.5
192.8698	2.64	9.72	14.2	26.6	43.5	-16.9	45	2.8
436.8896	4.42	17.67	12.5	34.6	46.0	-11.4	70	2.2
652.8509	5.62	20.97	10.0	36.6	46.0	-9.4	90	1.5
871.0863	6.83	23.48	8.5	38.8	46.0	-7.2	270	1.2

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)
81.1895	1.61	7.45	18.0	27.1	40.0	-12.9	160	1
108.2734	1.88	6.18	16.8	24.9	43.5	-18.6	180	1.2
193.3156	2.64	9.75	15.0	27.4	43.5	-16.1	270	2.8
435.2059	4.41	17.68	12.5	34.6	46.0	-11.4	45	3
654.0690	5.63	21.07	10.5	37.2	46.0	-8.8	45	3.5
871.3598	6.83	23.48	9.5	39.8	46.0	-6.2	300	3.5

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.



6. BAND EDGE

6.1 BAND EDGE LIMIT

The field strength of any emissions, which appear outside of this band, shall not exceed the general radiated emission limits in Section 15.209.

6.2 TEST EQUIPMENT

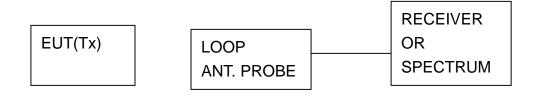
The following test equipment was used during the radiated emission test:

EQUIPMENT/ FACILITIES	SPECIFICATIONS	MANUFACTURER	MODEL#/ SERIAL#	DUE DATE OF CAL. & CAL. CENTER
SPECTRUM	9 kHz TO 7GHz	ROHDE & SCHWARZ	FSP7/ 839511/010	MAY 2008 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.

6.3 TEST SET-UP



6.4 TEST PROCEDURE

A specific loop antenna was connected to receiver to detect the EUT's power level. The Receiver displayed the EUT's power level and printed out the plot of measurement.

6.5 EUT OPERATING CONDITION

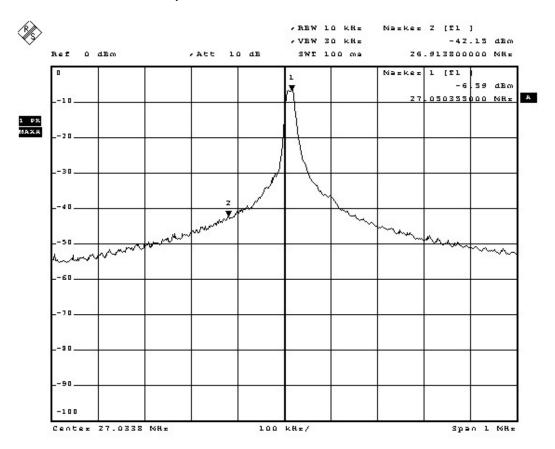
Set the EUT under transmission condition continuously according to the test progress provided by the applicant.



6.6 BAND EDGE TEST RESULT

Temperature:	21 °C	Humidity:	57 %RH
Receiver Detector:	Peak	Tested By:	Jeff Yu
Test Result:	Pass	Tested Date:	Jan. 04, 2008

1. Measurement uncertainty is +/-0.6dB.





TEST REPORT

Reference No.: A08010303 Report No.:FCCA08010303 FCC ID:FSUGMZIA Page:22 of 22 Date: Jan. 11, 2008

8. 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		