

FCC TEST REPORT

CATEGORY: Portable End Product
PRODUCT NAME: RF27MHZ MOUSE
FCC ID.: H4IMS27RF001
FILING TYPE: Certification
MODEL NAME: SM-2055

APPLICANT: **LITE-ON TECHNOLOGY CORP.**
No. 90, Chien 1 Road, Chung Ho, Taipei Hsien 235, Taiwan, R.O.C.
MANUFACTURER: Same as Applicant

ISSUED BY: **SPORTON INTERNATIONAL INC.**
6F, No. 106, Sec. 1, Hsin Tai Wu Rd., His Chih, Taipei Hsien,
Taiwan, R.O.C.

Statements:

The test result in this report refers exclusively to the presented test model / sample.

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Certificate or Test Report could not be used by the applicant to claim the product endorsement by CNLA, NVLAP or any agency of U.S. government.

The test equipment used to perform the test are calibrated and traceable to NML/ROC or NIST/USA.



Dr. Alan Lane
Vice General Manager
Sporton International Inc.



Lab Code: 200079-0

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History of this test report

☒ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

1. General Description of Equipment Under Test

1.1. Applicant

LITE-ON TECHNOLOGY CORP.

90, Chung Ho, Taipei Hsien 235, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1

1.3. Basic Description of Equipment under Test

This product is a RF 27 MHz mouse and receiver. The technical data has been listed on section "Features of Equipment under Test".

1.4. Features of Equipment under Test

ITEMS	DESCRIPTION
Type of Modulation	FSK
Number of Channel	1
Carrier Frequency	27.045MHz
Type of Antenna	Printed Loop Antenna
Function Type	Transmitter
Power Rating (DC/AC, Voltage)	3 VDC from battery for mouse 5 VDC from PS2 port of host PC

2. Test Configuration of the Equipment Under Test

2.1. Description of the Test

- a) The used peripherals as well as the configuration fulfill the requirements of ANSI C63.4:2001. The configuration is operated in a manner which tends to maximize its emission characteristics in a typical application.
- b) 3 meters measurement distance was used in this test.

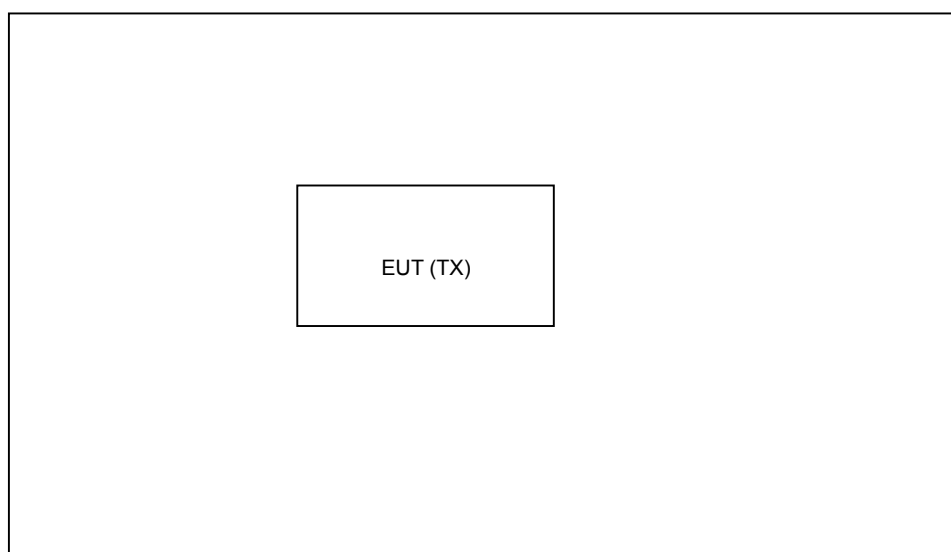
2.2. Frequency Range Investigated

- a) Radiated emission test: from 30 MHz to 1000MHz.

2.3. Details of the Supporting Units

The EUT was tested alone. No supporting device is needed for testing.

2.4. Connection Diagram of Test System





3. Test Software

No test software is required for this testing.

4. Test Location and Standards

4.1. Test Location

Test Location : Sporton Hwa Ya Testing Building

Address : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan
Hsien, Taiwan, R.O.C.
Tel: +886 3 327 3456 Fax: +886 3 318 0055

Test Site No. : CO04-HY, 03CH03-HY

4.2. Test Standards

Here is the list of the standards followed in this test report.

ANSI C63.4-2001

47 CFR Part 15 Subpart C (Section 15.227)

5. Band Edge

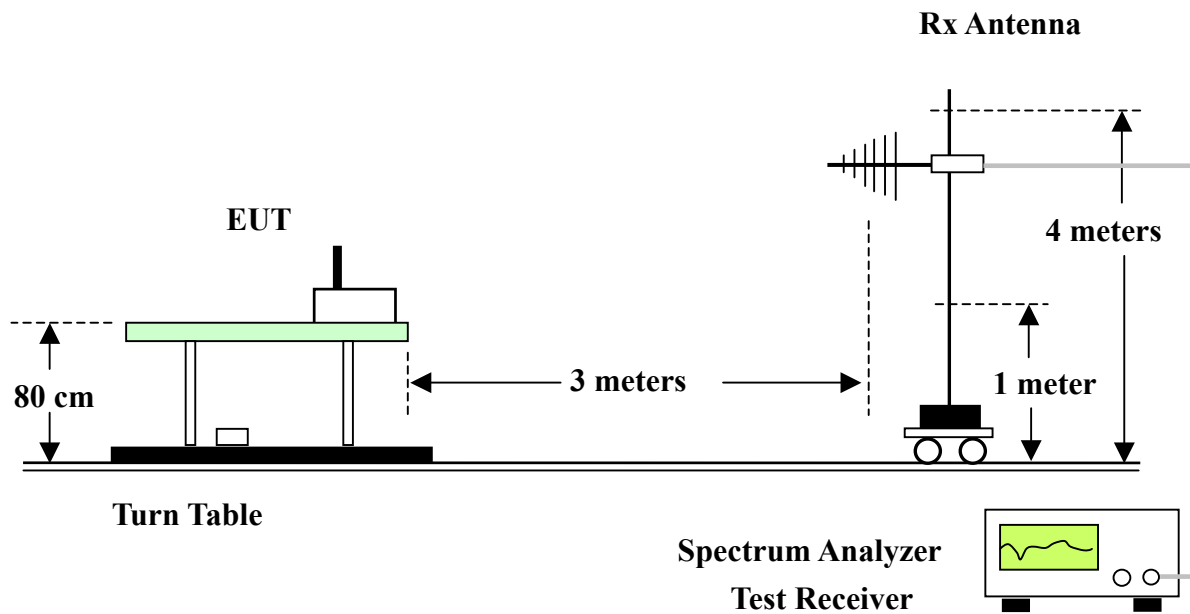
5.1. Measuring Instruments

Please reference item 1~8 in chapter 7 for the instruments used for testing.

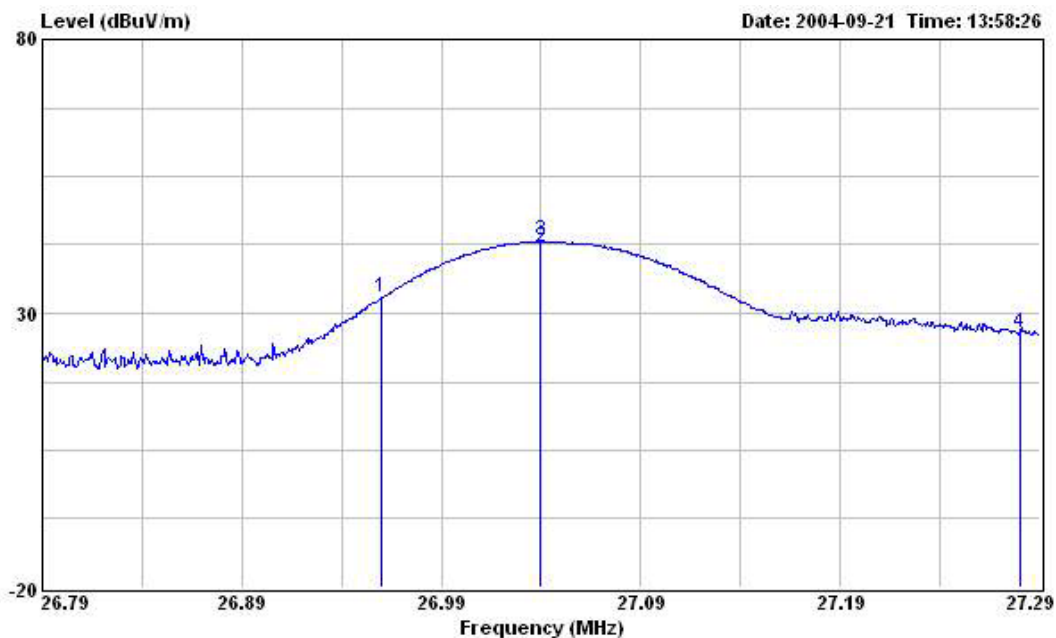
5.2. Test Procedures

1. Configure the EUT according to ANSI C63.4.
2. The EUT was placed on the top of the turn table 0.8 meter above ground.
3. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turn table.
4. Power on the EUT and all the supporting units.
5. The turn table was rotated 360 degrees to determine the position of the highest radiation.
6. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
7. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.
8. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
9. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

5.3. Test Setup Layout



5.4. Test Results



RBW:120KHz,VBW:300KHz

Conformation of the fundamental frequency

Frequency	Level	Over	Limit	Read	Probe	Cable	Preamp
(MHz)	(dBuV/m)	Limit	Line	Level	Factor	Loss	Factor
(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV)	(dB)	(dB)	(dB)
26.960	32.82	-32.72	69.54	44.90	15.09	0.89	28.06
27.280	26.56	-42.98	69.54	38.80	14.93	0.89	28.06

6. Carrier Field Strength

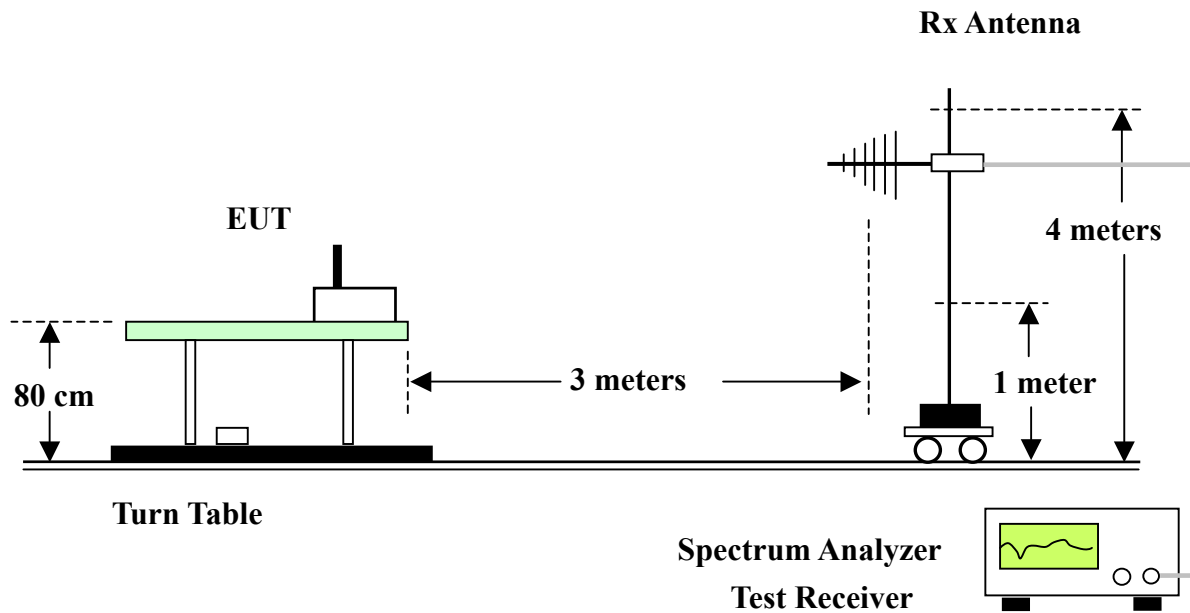
6.1. Measuring Instruments

Please reference item 1~8 in chapter 7 for the instruments used for testing.

6.2. Test Procedures

1. Configure the EUT according to ANSI C63.4.
2. The EUT was placed on the top of the turn table 0.8 meter above ground.
3. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turn table.
4. Power on the EUT and all the supporting units.
5. The turn table was rotated 360 degrees to determine the position of the highest radiation.
6. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
7. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.
8. Set the test-receiver system to Peak and CISPR Average Detect Function with specified bandwidth under Maximum Hold Mode.
9. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

6.3. Test Setup Layout



6.4. Test Results and Limit

Frequency	Level	Over	Limit	Read	Probe	Cable	Preamp	Remark
(MHz)	(dBuV/m)	Limit	Line	Level	Factor	Loss	Factor	
(MHz)	(dBuV/m)	(dB)	(dBuV/m)	(dBuV)	(dB)	(dB)	(dB)	
27.040	43.16	-36.84	80.00	55.30	15.03	0.89	28.06	Peak
27.040	42.13	-37.87	80.00	54.27	15.03	0.89	28.06	A.V.



7. Conducted Emission Measurement

This device is battery powered. So the conducted power line test is not applicable to this EUT.

8. Test of Radiated Emission

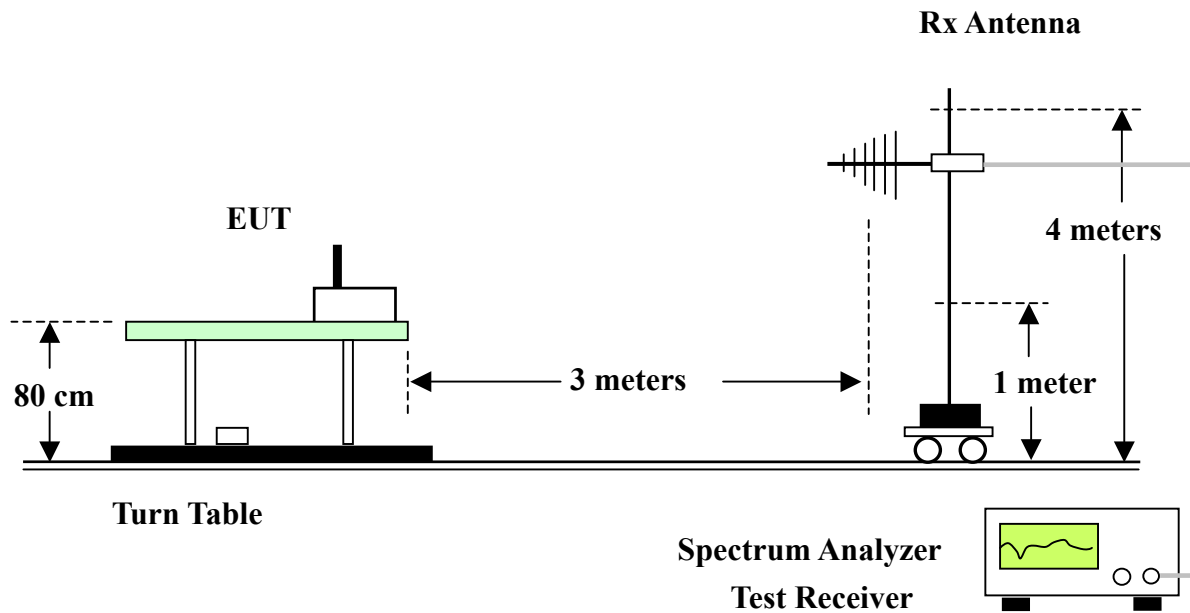
8.1. Measuring Instruments

Please reference item 1~8 in chapter 7 for the instruments used for testing.

8.2. Test Procedures

1. Configure the EUT according to ANSI C63.4.
2. The EUT was placed on the top of the turn table 0.8 meter above ground.
3. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turn table.
4. Power on the EUT and all the supporting units.
5. The turn table was rotated 360 degrees to determine the position of the highest radiation.
6. The height of the broadband receiving antenna was varied between one meter and four meters above ground to find the maximum emission field strength of both horizontal and vertical polarization.
7. For each suspected emission, the antenna tower was scan (from 1 M to 4 M) and then the turn table was rotated (from 0 degree to 360 degrees) to find the maximum reading.
8. Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
9. If the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions which do not have 3 dB margin will be repeated one by one using the quasi-peak method and reported.

8.3. Test Setup Layout



8.4. Test Results and Limit

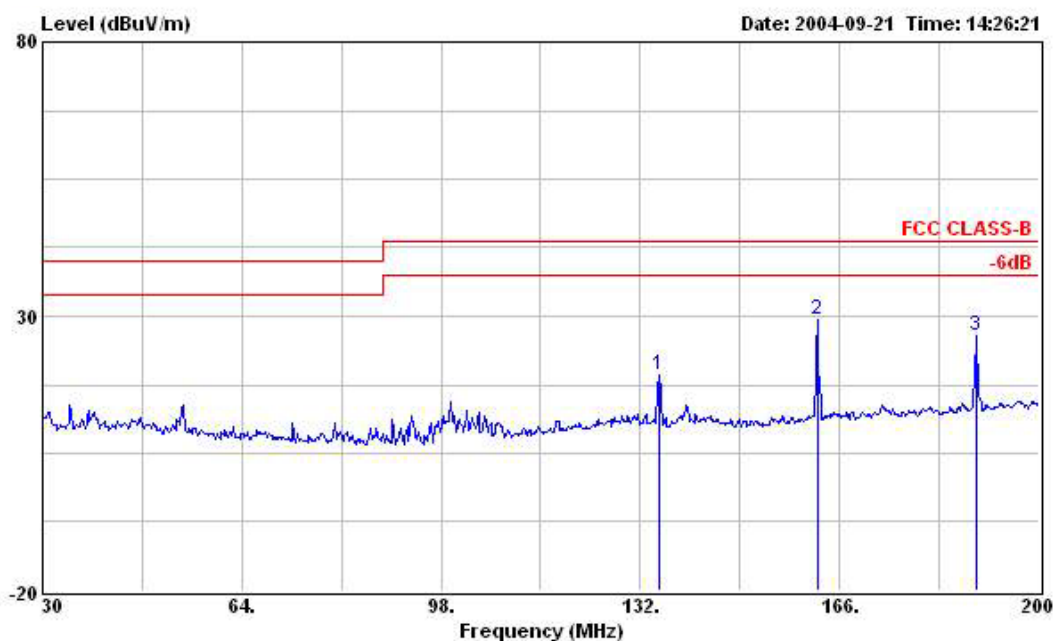
Note:

Emission level (dBuV/m) = 20 log Emission level (uV/m)

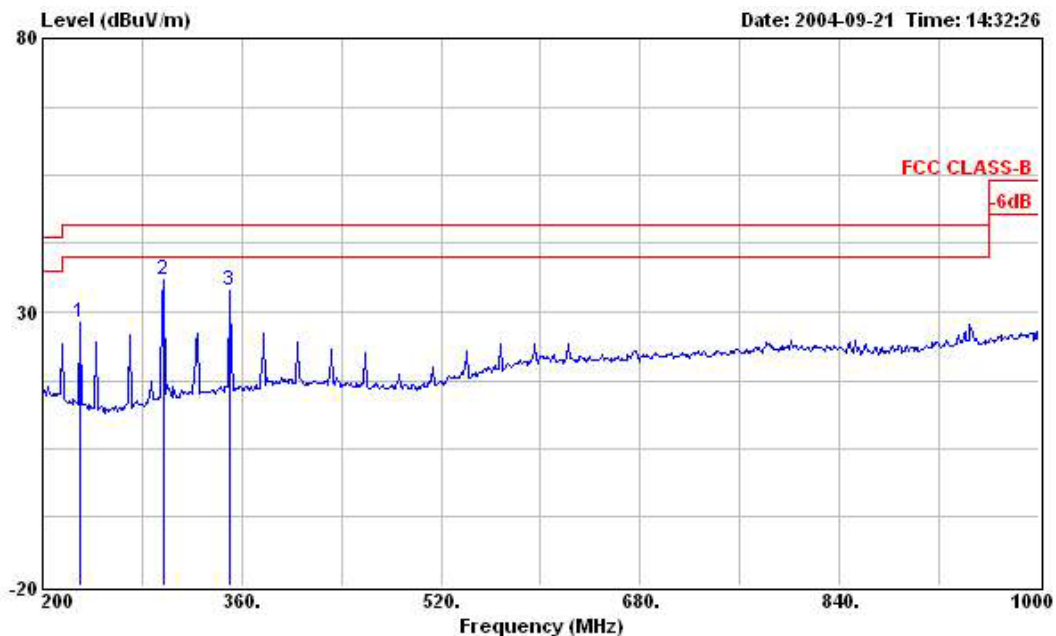
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Test Mode	TX	Temperature	26deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	67 %		

(A) Polarization: Horizontal

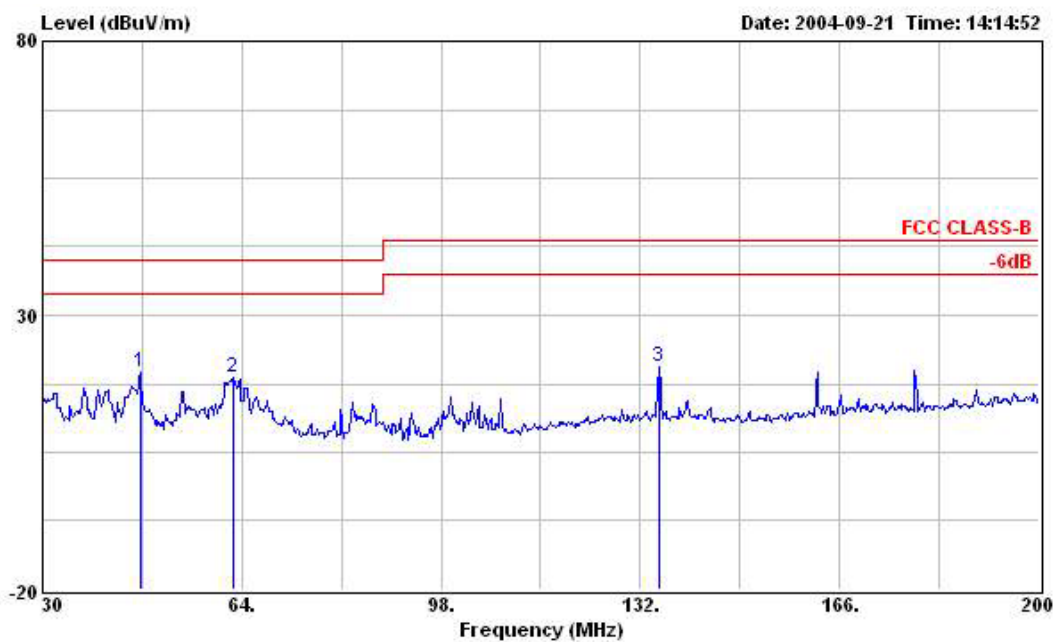


	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	135.230	19.23	-24.27	43.50	32.60	12.47	1.99	27.83	Peak	---	---
2	162.260	29.39	-14.11	43.50	42.00	12.84	2.32	27.77	Peak	---	---
3	189.460	26.46	-17.04	43.50	36.75	14.96	2.47	27.72	Peak	---	---

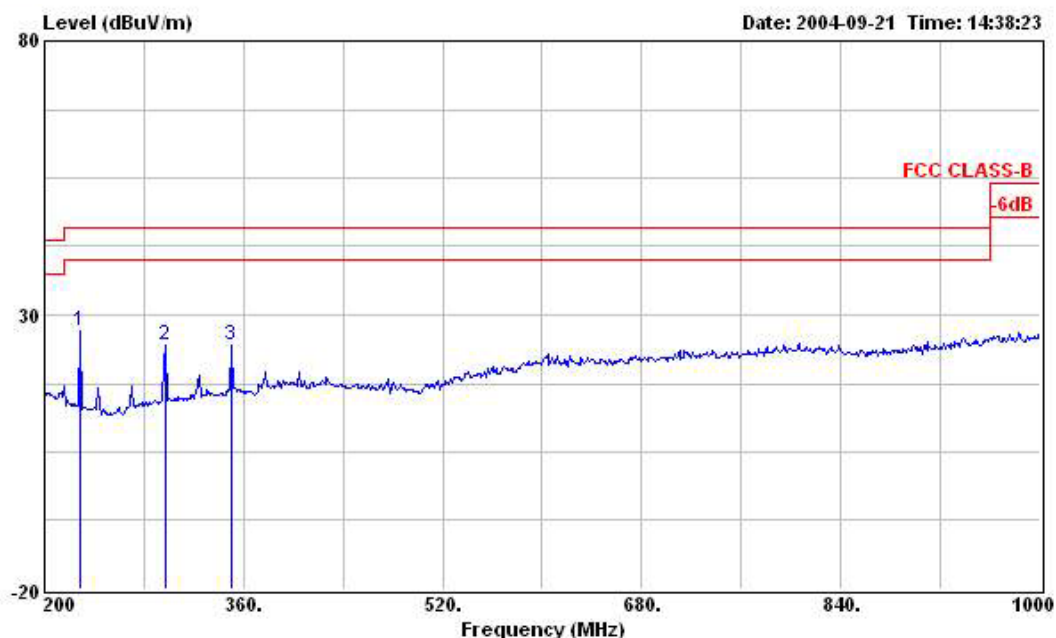


	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	230.400	28.12	-17.88	46.00	39.12	13.83	2.75	27.58	Peak	---	---
2	297.600	35.77	-10.23	46.00	46.28	13.73	3.07	27.31	Peak	145	167
3	349.600	33.90	-12.10	46.00	42.90	15.30	3.25	27.55	Peak	---	---

(B) Polarization: Vertical



	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant.	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	46.660	19.59	-20.41	40.00	34.38	12.06	1.16	28.01	Peak	---	---
2	62.470	18.78	-21.22	40.00	35.10	10.33	1.32	27.97	Peak	---	---
3	135.230	20.57	-22.93	43.50	33.94	12.47	1.99	27.83	Peak	---	---



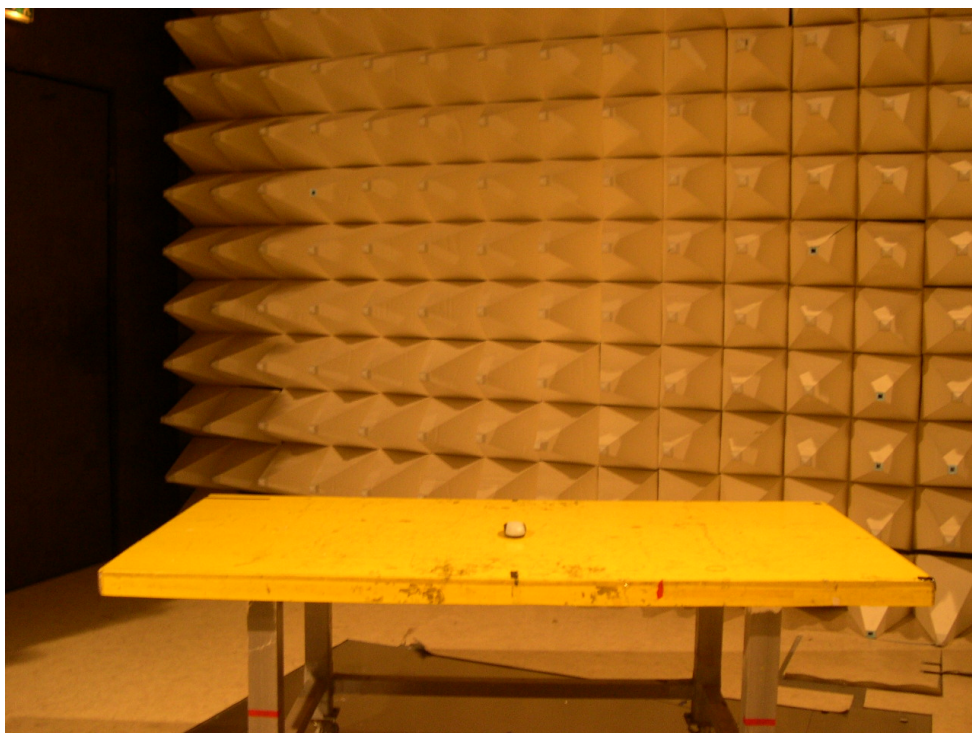
	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	228.000	27.16	-18.84	46.00	38.07	13.96	2.72	27.59	Peak	---	---
2	297.600	24.63	-21.37	46.00	35.14	13.73	3.07	27.31	Peak	---	---
3	349.600	24.59	-21.41	46.00	33.59	15.30	3.25	27.55	Peak	---	---

Remark: Spurious emission emitted by the EUT, except listed above, is too low to be measured.

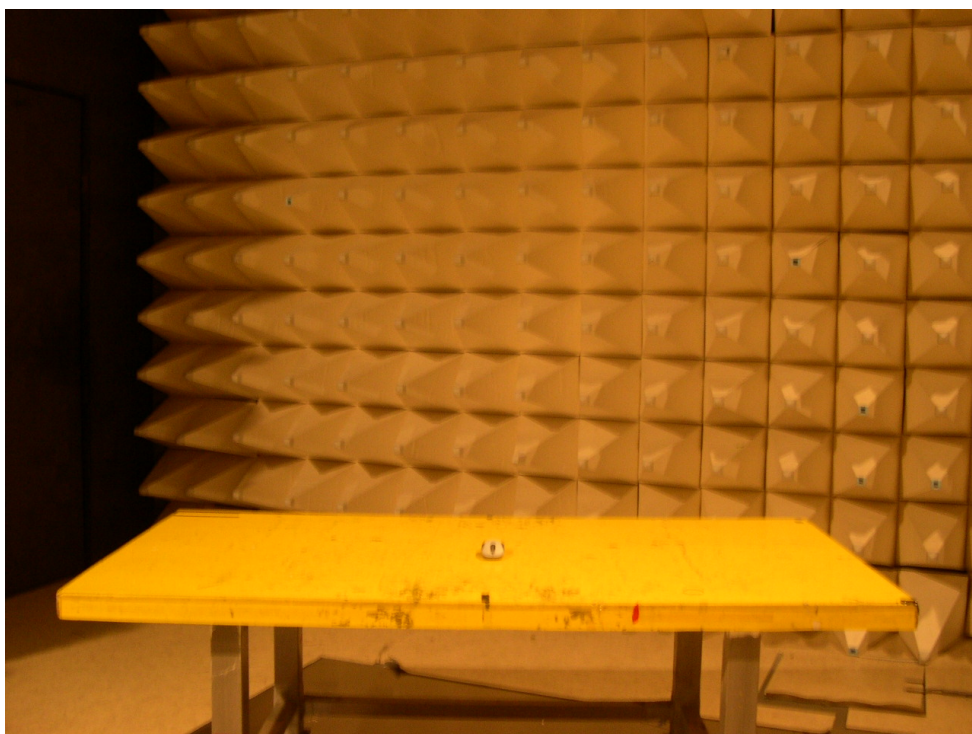
8.5. Photographs of Radiated Emission Test Configuration

- The photographs show the configuration that generates the maximum emission.

FRONT VIEW



REAR VIEW



9. List of Measuring Equipments Used

Items	Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
1	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2004	Radiation (03CH03-HY)
2	Spectrum analyzer	R&S	FSP40	100004	9KHZ~40GHz	Aug. 31, 2004	Radiation (03CH03-HY)
3	Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Nov. 05, 2003	Radiation (03CH03-HY)
4	Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz –200MHz	Jul. 28, 2004	Radiation (03CH03-HY)
5	Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 28, 2004	Radiation (03CH03-HY)
6	RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 03, 2003	Radiation (03CH03-HY)
7	Amplifier	MITEQ	AFS44	849984	100MHz~26.5GHz	Mar. 26, 2004	Radiation (03CH03-HY)
8	Horn Antenna	EMCO	3115	6821	1GHz – 18GHz	Sep. 11, 2004	Radiation (03CH03-HY)
9	Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
10	Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
11	Horn Antenna	Schwarzbeck	BBHA9170	154	18GHz~40GHz	Jun. 09, 2004	Radiation (03CH03-HY)
12	RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Dec. 05, 2003	Radiation (03CH03-HY)
13	Spectrum analyzer	R&S	FSP7	838858/014	9KHZ~7GHZ	Sep. 02, 2004	Conducted (TH01-HY)
14	Power meter	R&S	NRVS	100444	DC~40GHz	Jun. 15, 2004	Conducted (TH01-HY)
15	Power sensor	R&S	NRV-Z55	100049	DC~40GHz	Jun. 15, 2004	Conducted (TH01-HY)
16	Power Sensor	R&S	NRV-Z32	100057	30MHz-6GHz	Jun. 15, 2004	Conducted (TH01-HY)
17	AC power source	HPC	HPA-500W	HPA-9100024	AC 0~300V	Jun. 16, 2004	Conducted (TH01-HY)
18	AC power source	G.W.	GPC-6030D	C671845	DC 1V~60V	Nov. 06, 2003	Conducted (TH01-HY)
19	Temp. and Humidity Chamber	KSON	THS-C3L	612	N/A	Oct. 01, 2003	Conducted (TH01-HY)
20	RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz~7GHz	Jan. 01, 2004	Conducted (TH01-HY)
21	RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz~1GHz	Jan. 01, 2004	Conducted (TH01-HY)

※ Calibration Interval of instruments listed above is one year.