FCC TEST REPORT

CATEGORY	:	Mobile End Product
PRODUCT NAME	:	Car Kit
FCC ID.	:	I4L-MS5519
FILING TYPE	:	Certification
BRAND NAME	:	MSI
MODEL NAME	:	MS-5519
APPLICANT	:	**Micro-Star Int'l Co., Ltd.** No. 69, Li-De St., Jung-He City, Taipei Hsien, Taiwan
MANUFACTURER	:	**Micro-Star Int'l Co., Ltd.** No. 488, Ban-Nan Rd., Jung-He City, Taipei Hsien, Taiwan
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

Lab Code: 200079-0

Table of Contents

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

Micro-Star Int'l Co., Ltd.
No. 69, Li-De St., Jung-He City, Taipei Hsien, Taiwan

1.2. Manufacturer

Micro-Star Int'l Co., Ltd.
No. 488, Ban-Nan Rd., Jung-He City, Taipei Hsien, Taiwan

1.3. Basic Description of Equipment under Test

This EUT is a wireless music adaptor that can connect to an audio source and broadcast that audio signal to any radio or stereo within 3~10 meters. This EUT can be charged via the USB port by a charger used in the car.

1.4. Features of Equipment under Test

ITEMS	DESCRIPTION
Type of Modulation	FM
Number of Channel	4
Carrier Frequencies	88.1~88.9 MHz
Channel Bandwidth	200 kHz
Function Type	Transmitter
Antenna	Wire Antenna
Power Rating (DC/AC, Voltage)	12 VDC
Duty Cycle	1.0
Temperature Range (Operating)	0 ~ 40 ℃

2. Test Configuration of the Equipment under Test

2.1. Description of the Test

a. During testing, the equipment was placed on a non-conducting support.
b. The EUT has been programmed to continuously transmit or receive during testing. The used peripherals as well as the configuration fulfill the requirements of ANSI C63.4:2001.
c. The configuration is operated in a manner which tends to maximize its emission characteristics in a typical application.
d. 3 meters measurement distance in semi-anechoic chamber was used in this test.

2.2. Frequency Range Investigated

a. Conducted power line test: from 150 kHz to 30 MHz
b. Radiated emission test: from 30 MHz to 1000 MHz

2.3. Description of Test Supporting Units

Support Unit 1. -- Notebook (DELL)

FCC ID	: N/A
Model No.	: PP01L
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP031
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- Printer (EPSON)

FCC ID	: N/A
Model No.	: Stylus Color 680
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0017
Data Cable	: Shielded, 360 degree via metal backshells, 1.35m

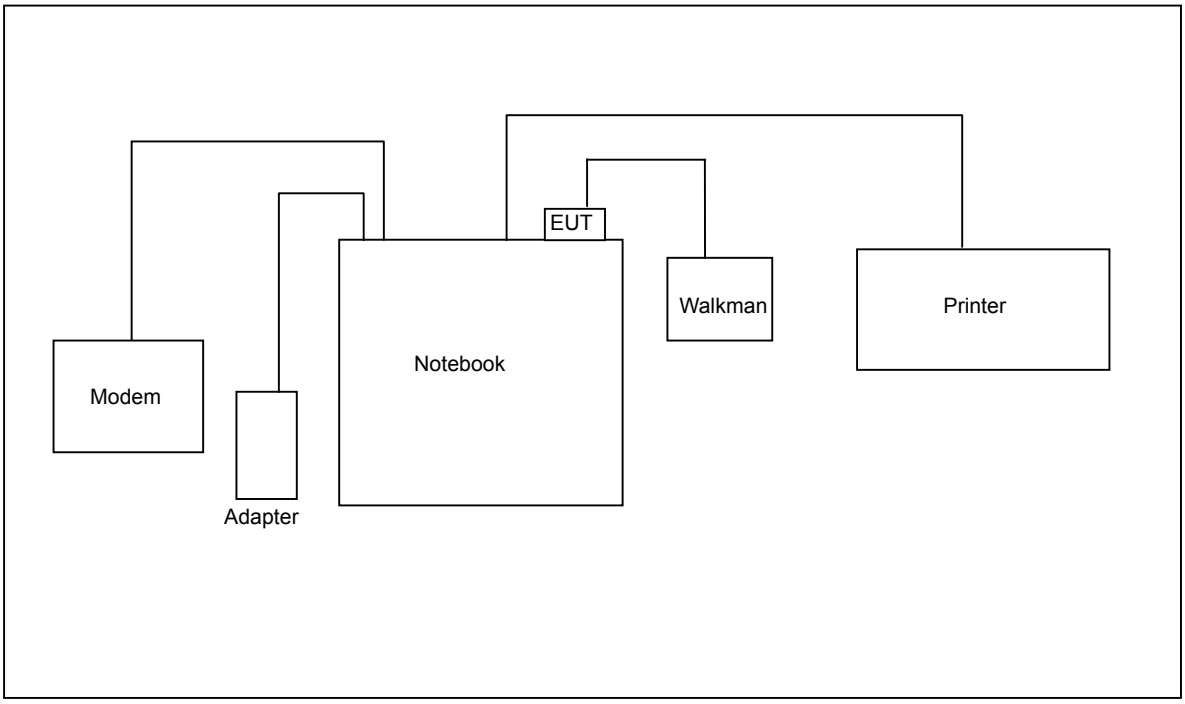
Support Unit 3. – Walk Man (KOKA)

FCC ID	: N/A
Model No.	: KW-235
Serial No.	: SP020

Support Unit 4. -- Modem (ACEEX) – for local workstation

FCC ID	: IFAXDM141
Model No.	: DM141
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0049
Data Cable	: Shielded, 1.15m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

2.4. Connection Diagram of Test System



2.5. Test Software

There is no software required in this test. The channel can be changed from the EUT.

3. Test Location and Standards

3.1. 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

3.2. Test Conditions

Normal Voltage : 12VDC

Normal Temperature : 20 ℃

3.3. Standards for Methods of Measurement

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

ANSI C63.4-2001

47 CFR Part 15 Subpart C (Section 15.239)

3.4. DoC Statement

This EUT is also classified as a device of computer peripheral Class B which DoC has to be followed. It has been verified according to the rule of 47 CFR part 15 Subpart B, and found that all the requirements has been fulfilled.

4. List of Measurements

4.1. Summary of the Test Results

Applied Standard: 47 CFR Part 15 and Part 2			
Paragraph	**FCC Rule**	**Carrier Field Strength**	**Result**
4.2	15.107/15.207	AC Power Line Conducted Emission	Pass
4.3	15.247(a)(2)	Bandwidth	Pass
4.4	15.239(b)	Field Strength of Carrier Frequency	Pass
4.5	15.239(c)	Test of Spurious Radiated Emission	Pass
4.6	15.203	Antenna Requirement	Pass

4.2. Test of Conducted Emission

Conducted Emissions were measured from 150 kHz to 30 MHz with a bandwidth of 9 kHz and return leads of the EUT according to the methods defined in European Standard EN 55022 Clause 9. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane as shown in section 5.3. The interface cables and equipment positioning were varied within limits of reasonable applications to determine the position producing maximum conducted emissions.

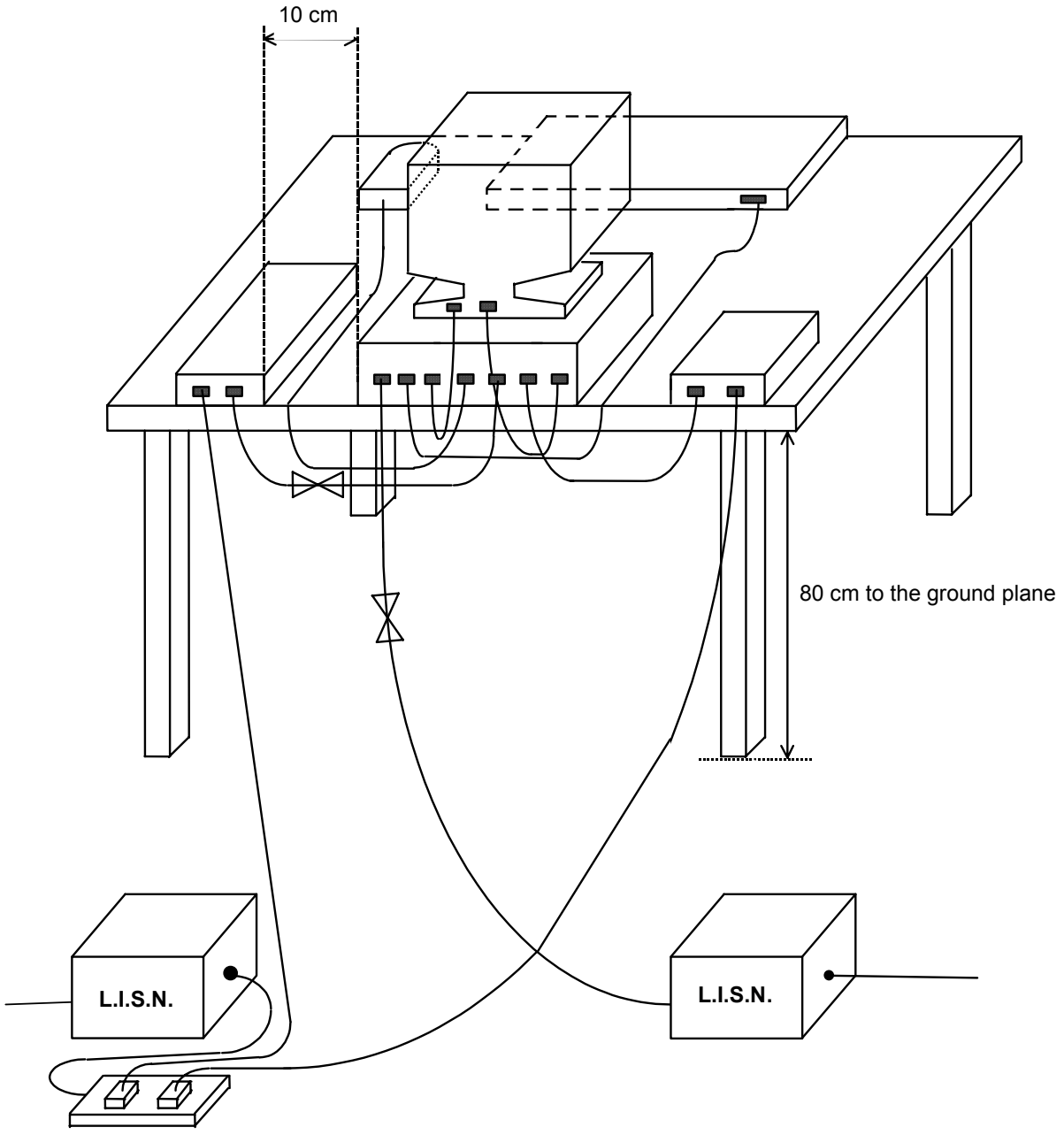
4.2.1 Description of Major Test Instruments

● Test Receiver	(R&S ESCS 30)
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 KHz

4.2.2 Test Procedures

a. The EUT was placed on a desk 0.8 meters height from the metal ground plane and 0.4 meter from the conducting wall of the shielding room and it was kept at least 0.8 meters from any other grounded conducting surface.
b. Connect EUT to the power mains through a line impedance stabilization network (LISN).
c. All the support units are connect to the other LISN.
d. The LISN provides 50 ohm coupling impedance for the measuring instrument.
e. The CISPR states that a 50 ohm , 50 microhenry LISN should be used.
f. Both sides of AC line were checked for maximum conducted interference.
g. The frequency range from 150 kHz to 30 MHz was searched.
h. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

4.2.3 Typical Test Setup Layout of Conducted Powerline

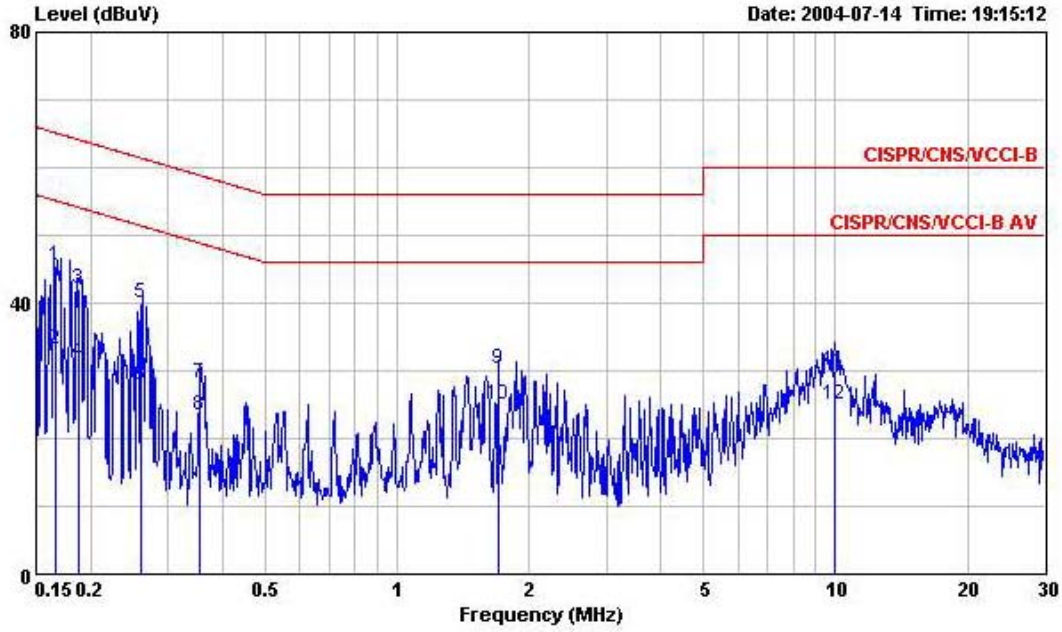


4.2.4 Test Result of AC Powerline Conducted Emission

- EUT connected with computer
- Temperature: 26 °C
- Relative Humidity: 65%
- All emissions not reported here are more than 10 dB below the prescribed limit.

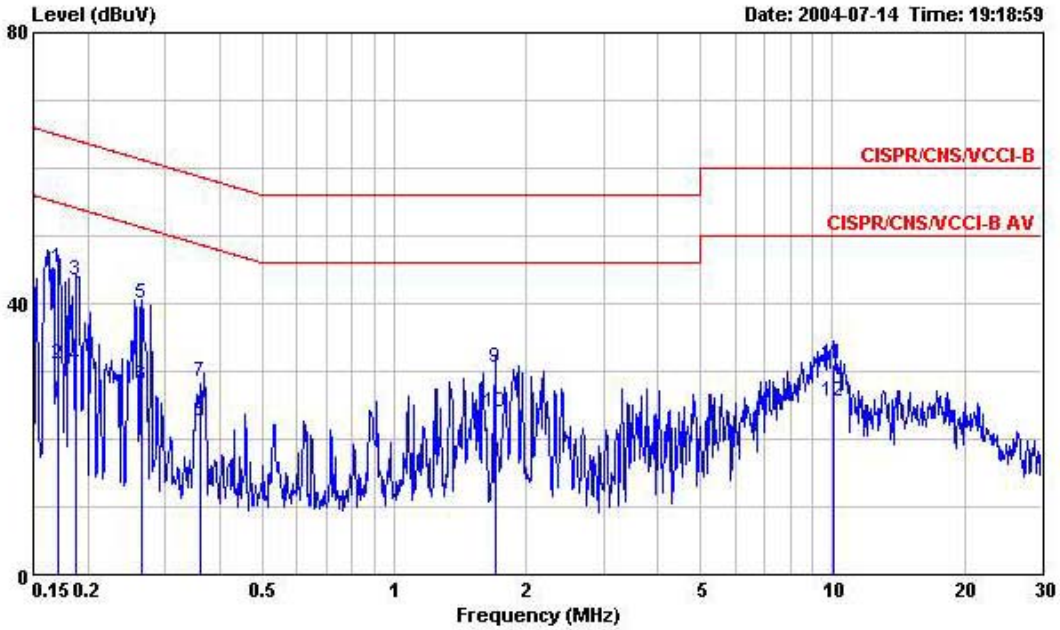
■ The test was passed at the minimum margin that marked by a frame in the following data

Line



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1669980	45.44	-19.67	65.11	45.33	0.10	0.01	QP
2	0.1669980	33.13	-21.98	55.11	33.02	0.10	0.01	Average
3	0.1883800	42.02	-22.09	64.11	41.91	0.10	0.01	QP
4	0.1883800	31.24	-22.87	54.11	31.13	0.10	0.01	Average
5	0.2610840	39.94	-21.46	61.40	39.83	0.10	0.01	QP
6	0.2610840	27.90	-23.50	51.40	27.79	0.10	0.01	Average
7	0.3557620	28.26	-30.57	58.83	28.14	0.10	0.02	QP
8	0.3557620	23.40	-25.43	48.83	23.28	0.10	0.02	Average
9	1.700	30.37	-25.63	56.00	30.25	0.10	0.02	QP
10	1.700	25.02	-20.98	46.00	24.90	0.10	0.02	Average
11	9.970	30.12	-29.88	60.00	29.81	0.20	0.11	QP
12	9.970	24.98	-25.02	50.00	24.67	0.20	0.11	Average

Neutral



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	@0.1715700	45.39	-19.49	64.88	45.28	0.10	0.01	QP
2	0.1715700	31.15	-23.73	54.88	31.04	0.10	0.01	Average
3	0.1873850	43.37	-20.78	64.15	43.26	0.10	0.01	QP
4	0.1873850	30.66	-23.49	54.15	30.55	0.10	0.01	Average
5	0.2644240	39.90	-21.39	61.29	39.79	0.10	0.01	QP
6	0.2644240	27.98	-23.31	51.29	27.87	0.10	0.01	Average
7	0.3601040	28.31	-30.42	58.73	28.19	0.10	0.02	QP
8	0.3601040	22.53	-26.20	48.73	22.41	0.10	0.02	Average
9	1.700	30.45	-25.55	56.00	30.33	0.10	0.02	QP
10	1.700	24.04	-21.96	46.00	23.92	0.10	0.02	Average
11	10.020	30.99	-29.01	60.00	30.68	0.20	0.11	QP
12	10.020	25.60	-24.40	50.00	25.29	0.20	0.11	Average

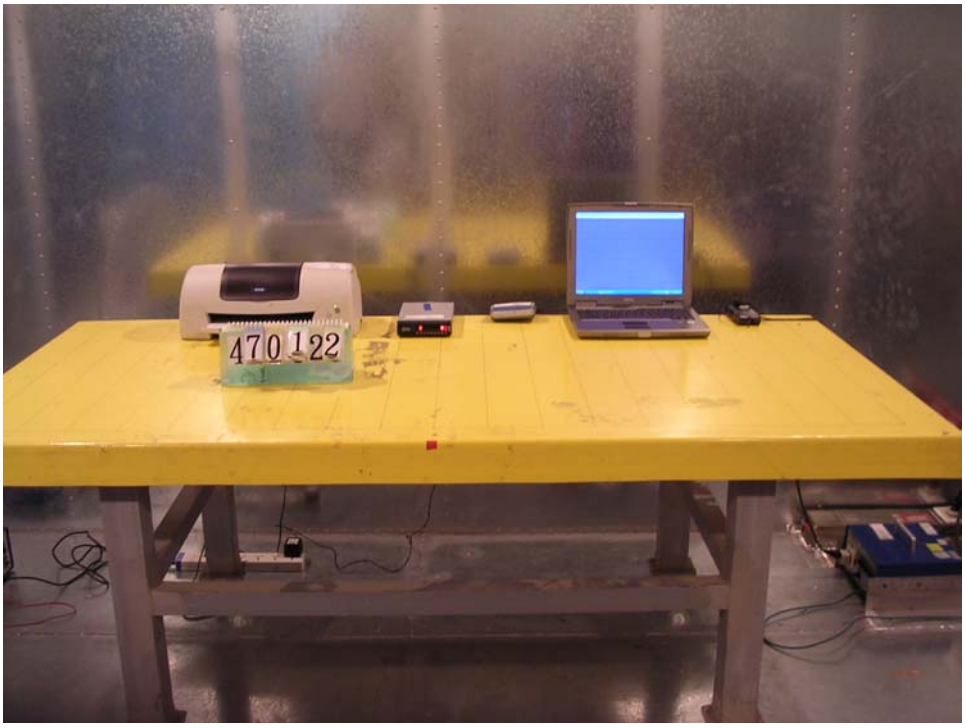
Test Engineer : Jason

Jason Chang

4.2.5 Photographs of Conducted Powerline Test Configuration

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

FRONT VIEW



REAR VIEW

SIDE VIEW

4.3. Bandwidth

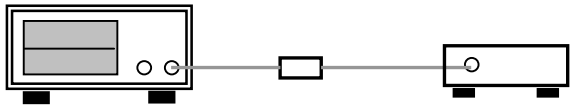
4.3.1. Measuring Instruments

Item 9 of the table on section 6.

4.3.2. Test Procedures

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 1KHz and VBW to 3KHz.
3. The occupied bandwidth is defined as the power spectrum width 99% envelop power.
4. Repeat above 1~3 points for the middle and highest channel of the EUT.

4.3.3. Test Setup Layout

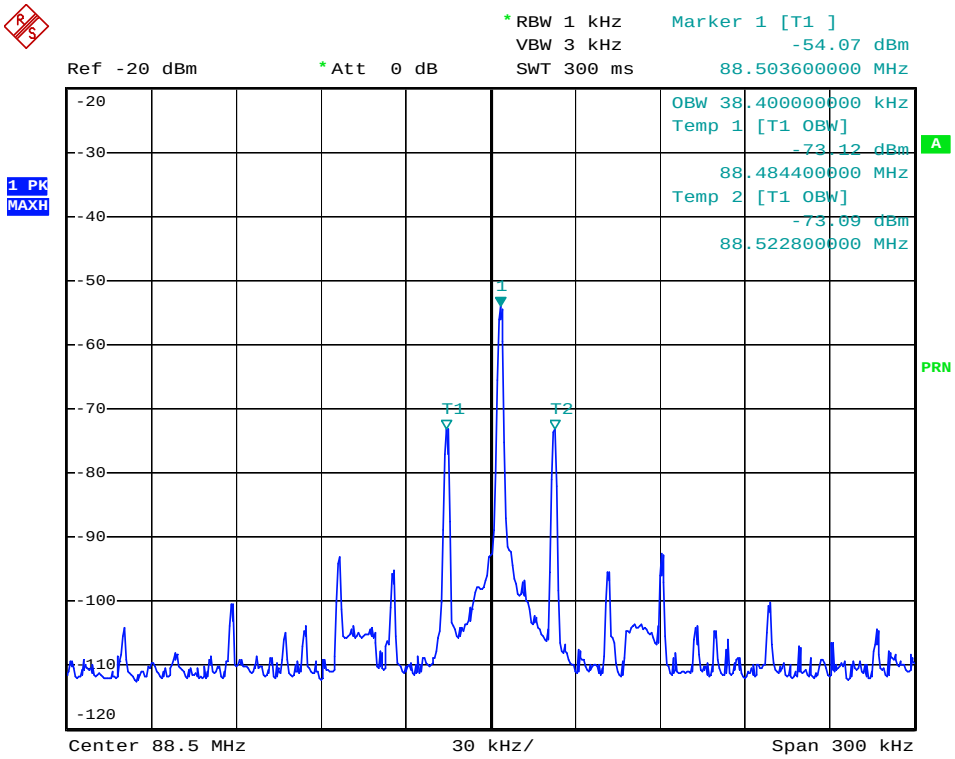


Spectrum analyzer **EUT with Host**

4.3.4. Test Result : See spectrum analyzer plots below

- Temperature: 26°C
- Relative Humidity: 64%
- Duty Cycle of the Equipment During the Test: 100%
- Test Engineer: Bunny Yao

Channel	Frequency (MHz)	99% Bandwidth (kHz)	Max. Limit (kHz)
01	88.5	38.4	200



Date: 26.JUL.2004 14:51:33

4.4. Field Strength of Carrier Frequency

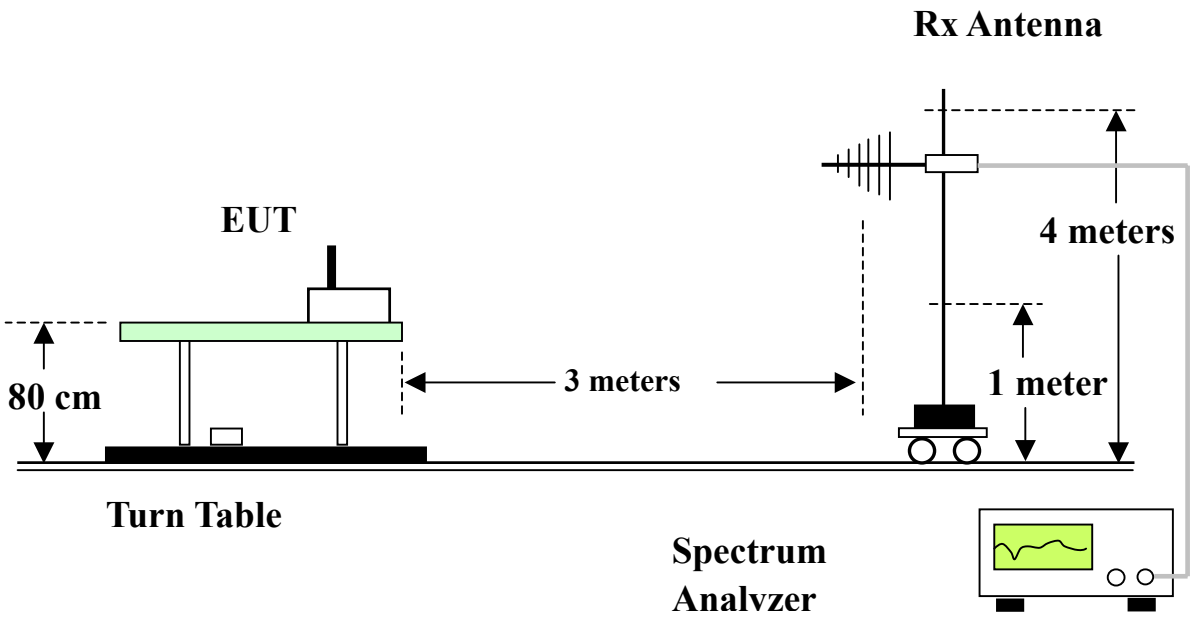
4.4.1. Measuring Instruments

Please reference item 8~19 in chapter 6 for the instruments used for testing.

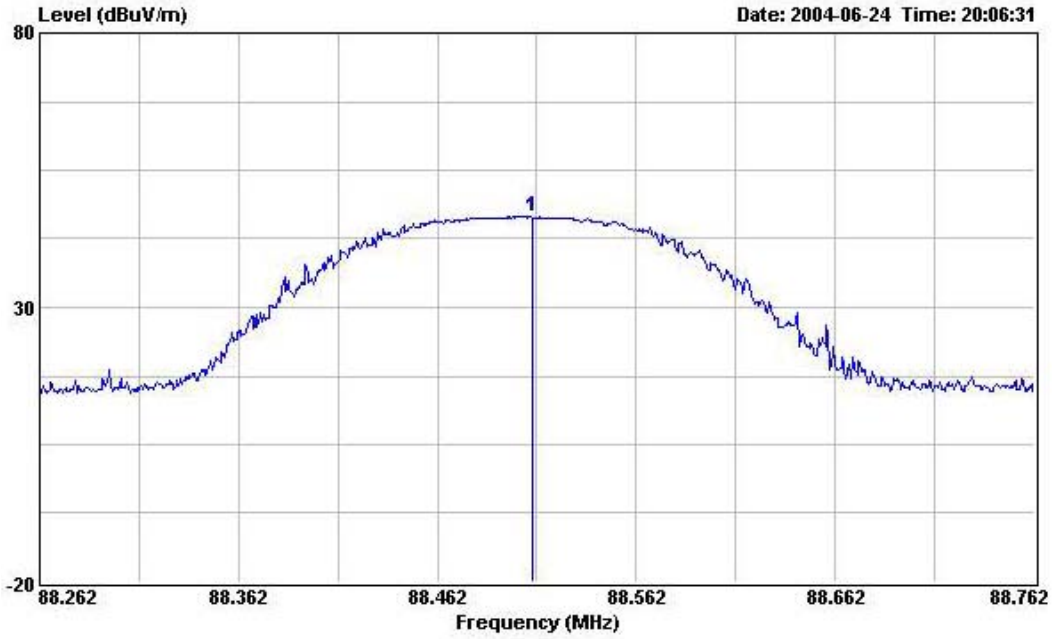
4.4.2. Test Procedures

a) Configure the EUT according to ANSI C63.4.
b) The EUT was placed on the top of the turn table 0.8 meter above ground.
c) 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.
d) Power on the EUT to the selected carrier and also power on all the supporting units.
e) The turn table was rotated by 360 degrees to determine the position of the highest radiation.
f) The height of the broadband receiving antenna was varied between 1 meter and 4 meters above ground to find the maximum carrier field strength of both horizontal and vertical polarization.

4.4.3. Test Setup Layout



4.4.4. Test Results



Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV)	Probe Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Detect Mode
88.510	46.43	-1.52	47.95	63.37	9.38	1.60	27.92	AV
88.510	48.50	-19.45	67.95	65.44	9.38	1.60	27.92	Peak

4.5. Test of Spurious Radiated Emission

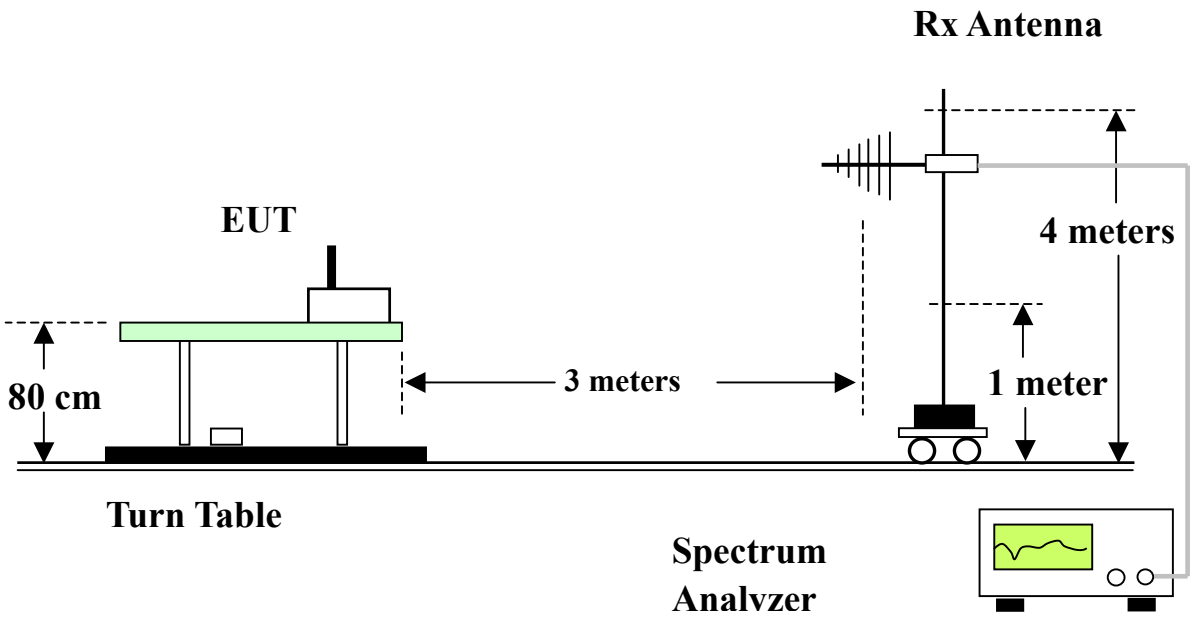
4.5.1. Measuring Instruments

Please reference item 8~19 in chapter 6 for the instruments used for testing.

4.5.2. Test Procedures

a) Configure the EUT according to ANSI C63.4.
b) The EUT was placed on the top of the turn table 0.8 meter above ground.
c) 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.
d) Power on the EUT and all the supporting units.
e) The turn table was rotated by 360 degrees to determine the position of the highest radiation.
f) 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.
g) 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.
h) Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
i) For emission above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
j) If the emission level of the EUT in peak mode was 3 dB lower than the average 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 for below 1GHz and average method for above the 1GHz. the reported.
k) For testing above 1GHz, the emission level of the EUT in peak mode was 20dB higher than average limit (that means the emission level in peak mode also complies with the limit in average mode), then testing will be stopped and peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.

4.5.3. Test Setup Layout

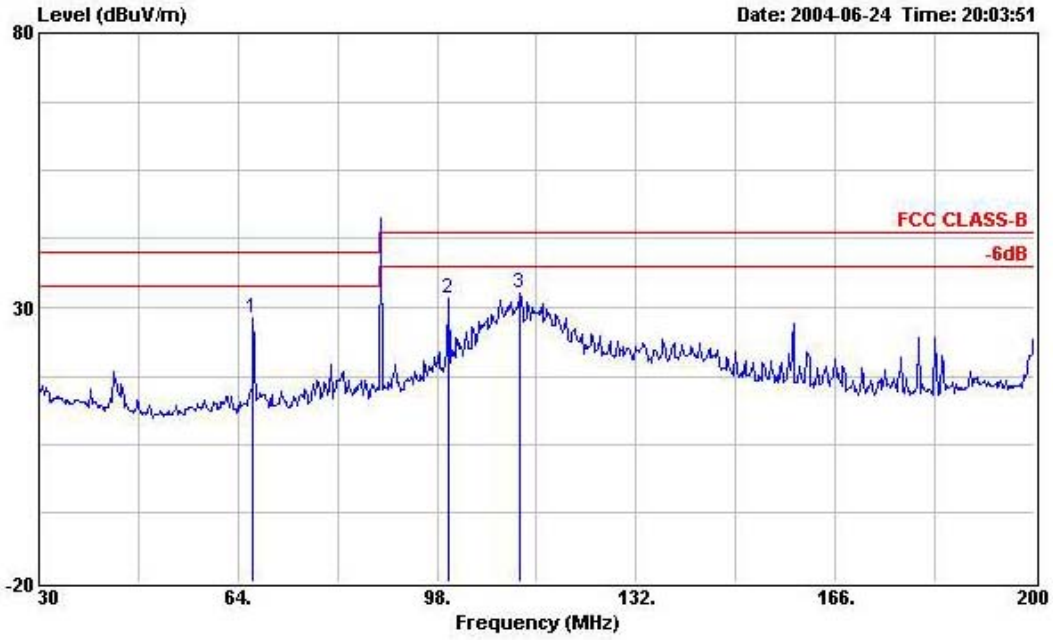


4.5.4. Test Results and Limit

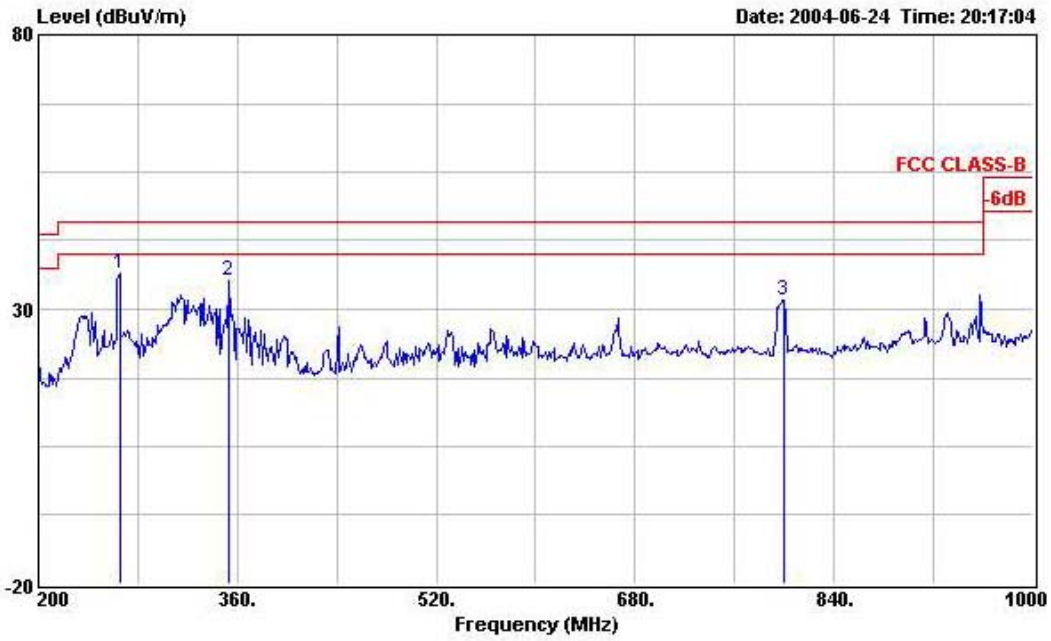
Note:
Emission level (dBuV/m) = 20 log Emission level (uV/m)
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Test Mode	88.5MHz	**Temperature**	25deg. C	**Tested By**	Steve Chen
Freq. Range	30MHz~1GHz	**Humidity**	63 %		

(A) Polarization: Horizontal

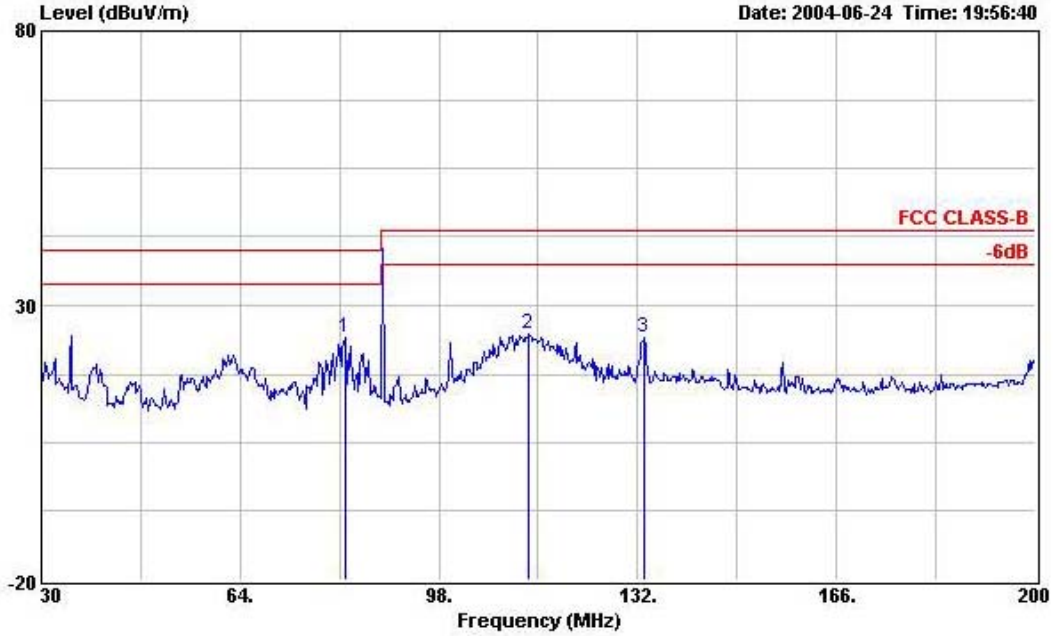


	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	66.550	28.00	-12.00	40.00	45.46	9.14	1.37	27.97	Peak	---	---
2	99.870	31.63	-11.87	43.50	47.97	9.78	1.78	27.90	Peak	---	---
3	112.110	32.47	-11.03	43.50	47.99	10.47	1.89	27.88	Peak	---	---

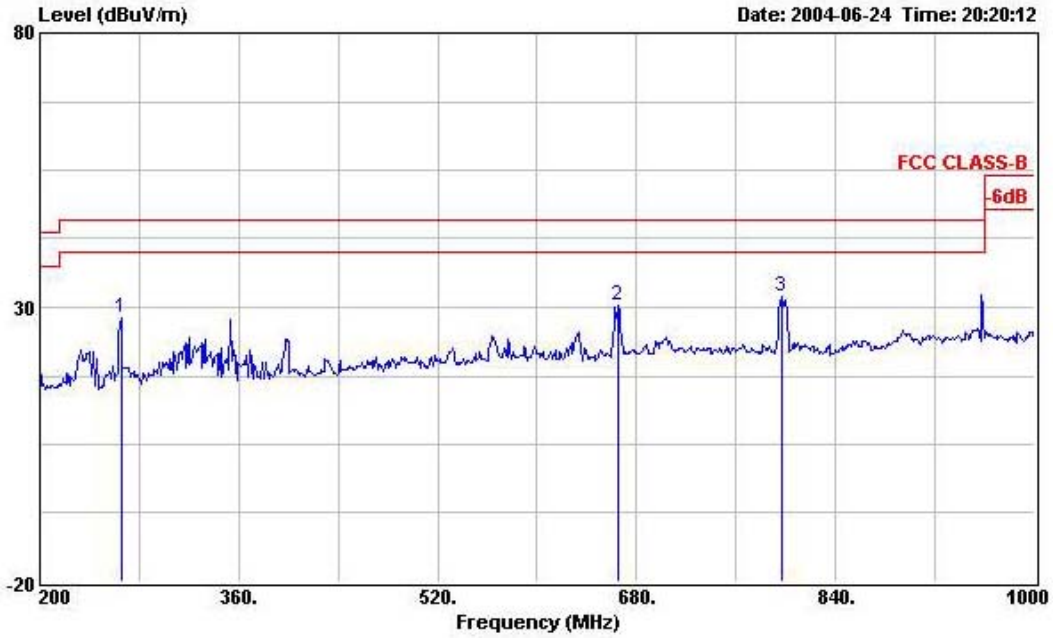


	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	265.600	36.47	-9.53	46.00	48.48	12.50	2.93	27.44	Peak	112	235
2	352.800	35.10	-10.90	46.00	44.12	15.26	3.28	27.56	Peak	---	---
3	800.000	31.60	-14.40	46.00	34.88	20.38	5.14	28.80	Peak	---	---

(B) Polarization: Vertical



	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	82.020	24.01	-15.99	40.00	40.75	9.64	1.55	27.93	Peak	---	---
2	113.470	24.66	-18.84	43.50	40.14	10.49	1.90	27.87	Peak	---	---
3	133.190	24.18	-19.32	43.50	38.49	11.49	2.03	27.83	Peak	---	---

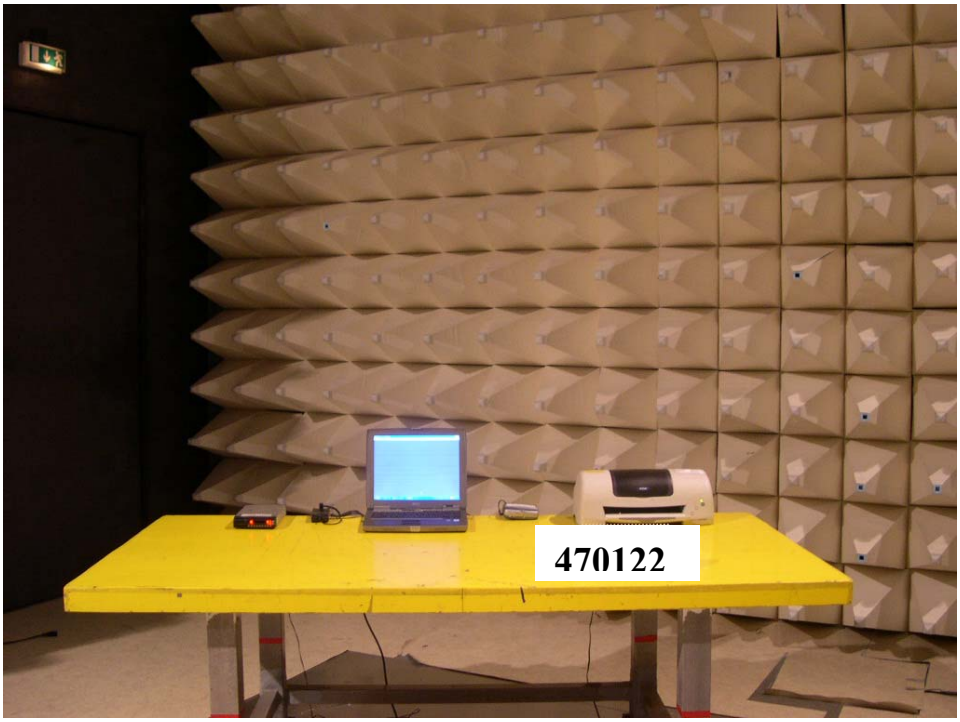


	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	265.600	27.93	-18.07	46.00	39.94	12.50	2.93	27.44	Peak	---	---
2	665.600	30.20	-15.80	46.00	35.18	19.10	4.65	28.73	Peak	---	---
3	796.800	32.03	-13.97	46.00	35.36	20.36	5.11	28.80	Peak	---	---

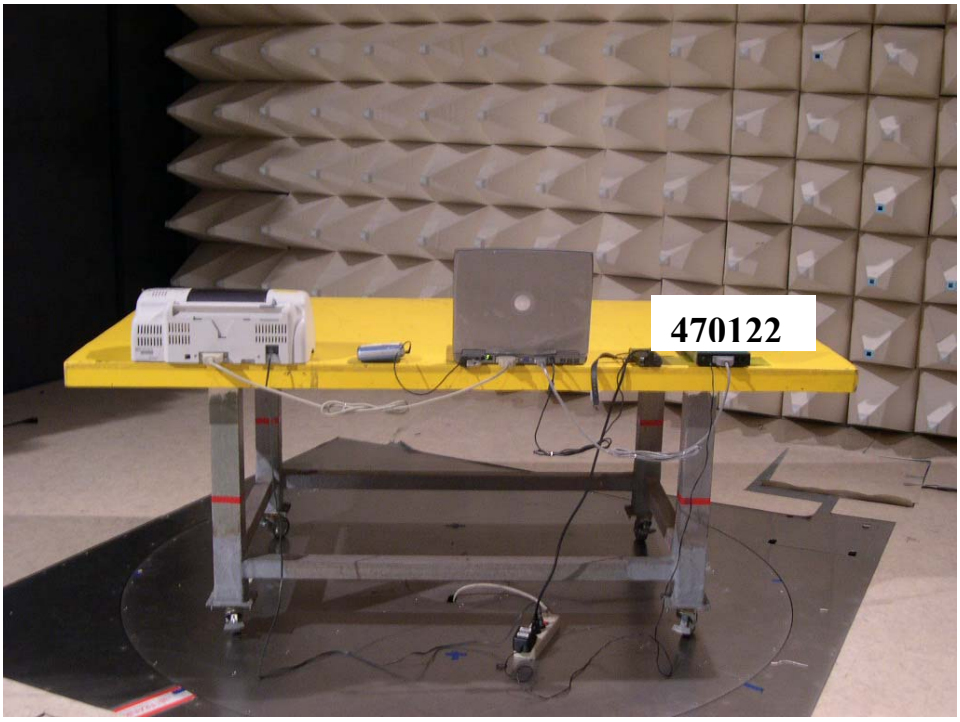
4.5.5. Photographs of Radiated Emission Test Configuration

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

FRONT VIEW



REAR VIEW



4.6. Antenna Requirements

4.6.1. Standard Applicable

47 CFR Part15 Section 15.203:

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

4.6.2. Antenna Connected Construction

The antenna used in this product is wire antenna.

5. List of Measuring Equipments Used

Items	Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
1	EMC Receiver	R&S	ESCS 30	100174	9 KHz – 2.75 GHz	Feb. 16, 2004	Conduction (CO04-HY)
2	LISN	MessTec	NNB-2/16Z	2001/004	9 KHz – 30 MHz	Jun. 09, 2004	Conduction (CO04-HY)
3	LISN (Support Unit)	MessTec	NNB-2/16Z	99041	9 KHz – 30 MHz	Apr. 27, 2004	Conduction (CO04-HY)
4	EMI Filter	LINDGREN	LRE-2030	2651	< 450 Hz	N/A	Conduction (CO04-HY)
5	RF Cable-CON	UTIFLEX	3102-26886-4	CB044	9KHz~30MHz	Apr. 21, 2004	Conduction (CO04-HY)
6	3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 21, 2004	Radiation (03CH03-HY)
7	Spectrum analyzer	R&S	FSP40	100004	9KHZ~40GHz	Aug. 23, 2003	Radiation (03CH03-HY)
8	Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Nov. 05, 2003	Radiation (03CH03-HY)
9	Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz –200MHz	Jul. 24, 2003	Radiation (03CH03-HY)
10	Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 24, 2004	Radiation (03CH03-HY)
11	RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 03, 2003	Radiation (03CH03-HY)
12	Amplifier	MITEQ	AFS44	879981	100MHz~26.5GHz	Jul. 23, 2004	Radiation (03CH03-HY)
13	Horn Antenna	EMCO	3115	6821	1GHz – 18GHz	Sep. 12, 2003	Radiation (03CH03-HY)
14	Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
15	Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
16	Horn Antenna	Schwarzbeck	BBHA9170	154	15GHz~40GHz	Jun. 09, 2004	Radiation (03CH03-HY)
17	RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Dec. 05, 2003	Radiation (03CH03-HY)

※ Calibration Interval of instruments listed above is one year.