

FCC TEST REPORT

CATEGORY : Mobile End Product
PRODUCT NAME : Duplex Long Range Wireless A/V Transmission System
FCC ID. : SC5LR24
FILING TYPE : Certification
MODEL NAME : LRV5-24DS, LRV5-24TX
BRAND NAME : WINPOWER
APPLICANT : **Winpower Electronic Co., Ltd.**
17F-3, No.6, Sec. 2, Dah-Shing W. Rd., Taoyuan City(330),
Taoyuan Hsien, 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.

Without written approval of SPORTON International Inc., the test report shall not be reproduced except in full.

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

WINPOWER ELECTRONIC CO., LTD.

17F-3, No.6, Sec 2, Dah-Shing W. Rd., Taoyuan City (330), Taoyuan Hsien, Taiwan R.O.C.

1.2 Manufacturer

Same as 1.1

1.3 Basic Description of Equipment under Test

This product is Duplex Long Range Wireless A/V Transmission System. The technical data has been listed on section "Features of Equipment under Test". This product is operating on 2 frequency bands. 2.4GHz band is for A/V signal transmitting, 900MHz band is for control signal. The whole set is composed by 2 independent units. One, unit A, is for 2.4GHz Tx and 900MHz Rx, the other one, unit B, is for 2.4GHz Rx and 900MHz Tx. This test report is for unit A. The camera is installed together with unit A, the shooting direction of the camera is controlled by a panel installed together with unit B. The channel can be selected by dip switch.

1.4 Features of Equipment under Test

ITEMS	DESCRIPTION
Type of Modulation	FM
Number of Channels	4
Carrier Frequencies	Please reference table 1.5
Antenna Type	Monopole Antenna
Function Type	Transmitter
Power Rating (DC/AC, Voltage)	12 VDC from power adapter
Duty Cycle	100%
Humidity Range	10% ~ 90%
Temperature Range (Operating)	-10 ~ 55 °C

1.5 Table for Operating Frequencies

Channel	Frequency
1	2411 MHz
2	2434 MHz
3	2453 MHz
4	2473 MHz



2. Test Configuration of the Equipment under Test

2.1 Description of the Test

- a. 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.
- b. The configuration is operated in a manner which tends to maximize its emission characteristics in a typical application.
- c. 3 meters measurement distance in semi-anechoic chamber was used in this test.
- d. DVD player sent the A/V signal to EUT (Tx) and then the EUT transmit signal to the receiver.
- e. The following modes were tested:
 - Mode 1: CH 01 (2411 MHz)
 - Mode 2: CH 02 (2434 MHz)
 - Mode 3: CH 04 (2473 MHz)
- f. Spurious emission below 1GHz is independent of channel selection, so only one channel was tested.

2.2 Frequency Range Investigated

Radiated emission test: from 30 MHz to 10th harmonic of the highest operating frequency or 40GHz whichever is lower.

2.3 Description of Test Supporting Units

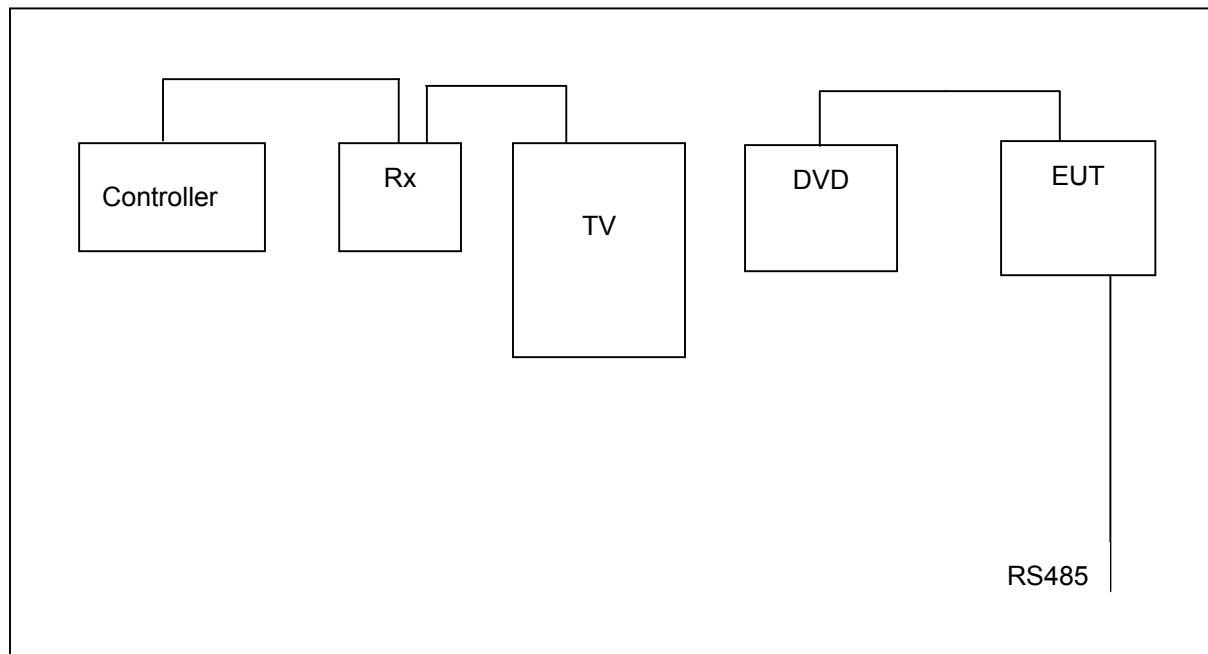
Support Unit1. -- DVD PLAYER(SONY)

FCC ID	: N/A
Model No.	: CVP-35450

Support Unit 2. -- TV (JVC)

FCC ID	: N/A
Model No.	: TM-1700PN
Serial No.	: SP0038
AV Cable	: Non-Shielded, 1.6m

2.3 Connection Diagram of Test System



2.4 Test Software

No Test Software is needed for testing.

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. : 03CH03-HY

3.2 Test Conditions

Normal Voltage : 110VAC

Extreme Voltages : 126.5/ 93.5 VAC

Normal Temperature : 20 °C

Extreme Temperature : -10 °C and 55 °C

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 15.249)

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	Description of Test	Result
5.1	15.249(a)	Carrier field strength	Pass
5.2	15.107/15.207	AC Power Line Conducted Emission	Pass
5.3	15.249(a)/ 15.249(d)	Spurious Radiated Emission	Pass
5.4	15.249(b)	Frequency Tolerance	N/A
5.5	15.235(c)(3)	Antenna Requirement	Pass

5. Test Result

5.1 Carrier Field Strength

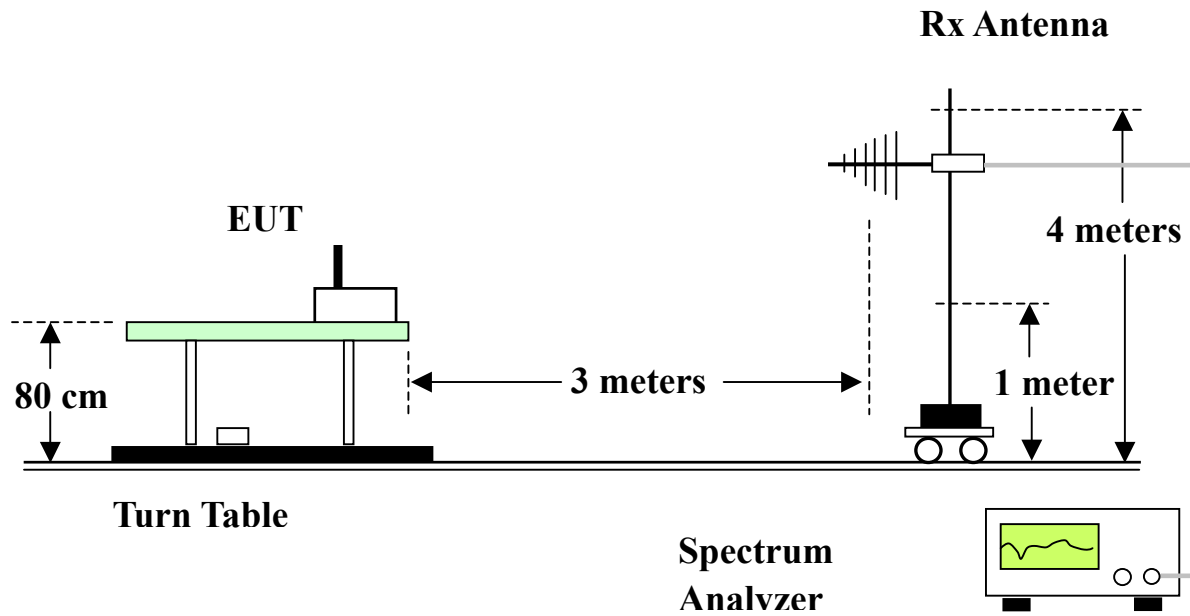
5.1.1 Measuring Instruments

Item 1~9 of the table on section 7.

5.1.2 Test Procedures

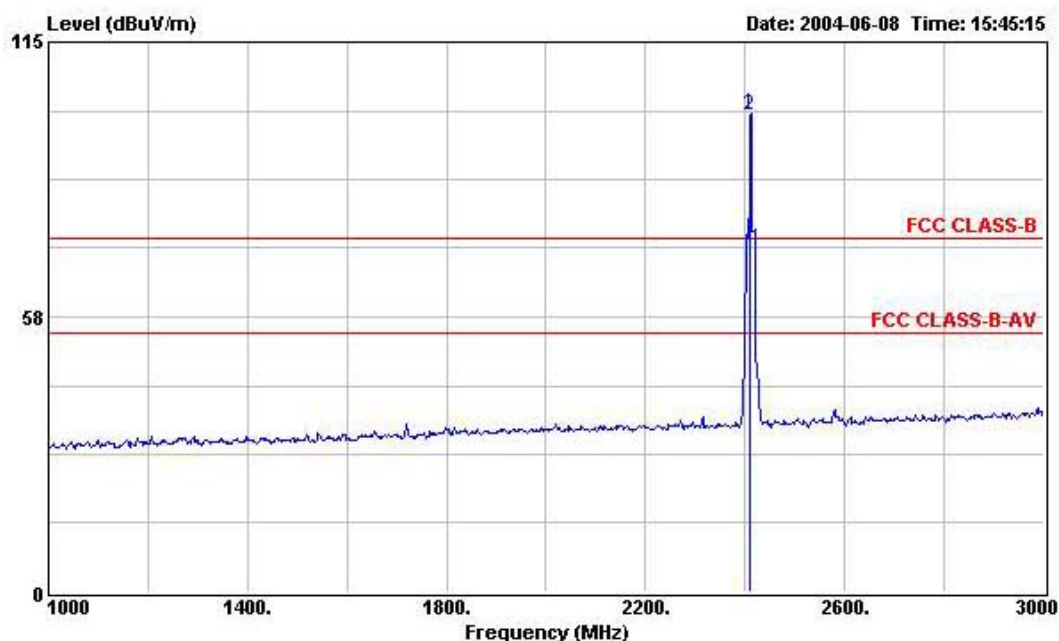
1. Configure the EUT according to ANSI C63.4.
2. The EUT was placed on the top of the turn table 0.8 meter above ground.
3. The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turn table.
4. Power on the EUT and all the supporting units.
5. The turn table was rotated by 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. For emission above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
10. 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.

5.1.3 Test Setup Layout



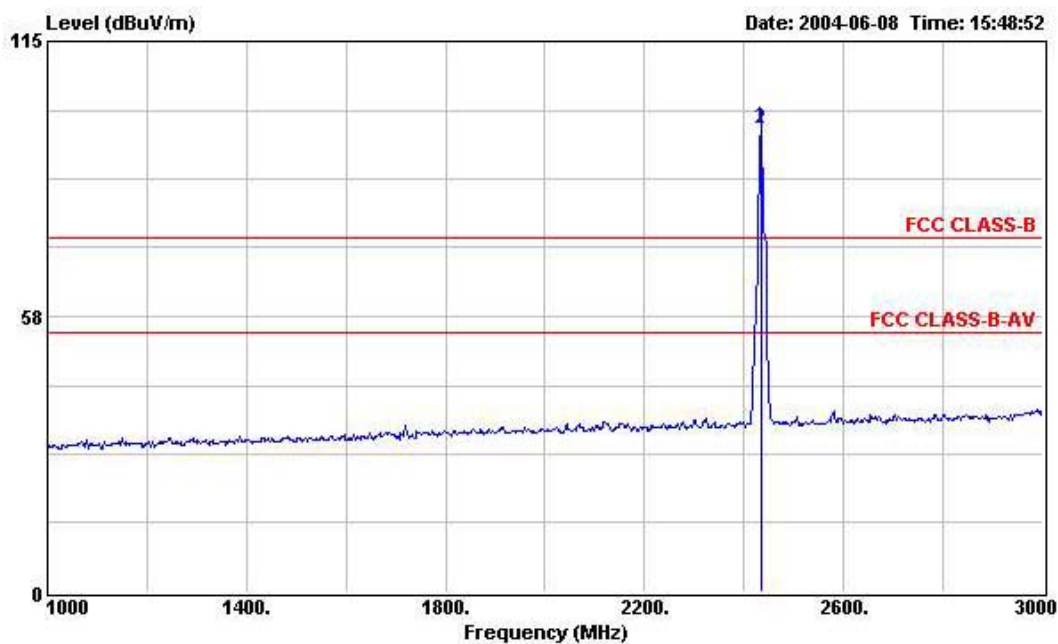
5.1.4 Test Result

Test Mode	Mode 1	Temperature	24 deg. C	Tested By	Steve Chen
Frequency	2411MHz	Humidity	67%		



Frequency	Level	Read	Probe	Cable	Preamp	Limit	Detect
(MHz)	(dBuV/m)	Level	Factor	Loss	Factor	Line	Mode
(MHz)	(dBuV/m)	(dBuV)	(dB)	(dB)	(dB)	(dBuV/m)	
2411.000	100.11	111.32	28.20	1.74	41.15	114	Peak
2411.000	93.66	104.87	28.20	1.74	41.15	94	AV

Test Channel	Mode 2	Temperature	24deg. C	Tested By	Steve Chen
Frequency	2434MHz	Humidity	67		



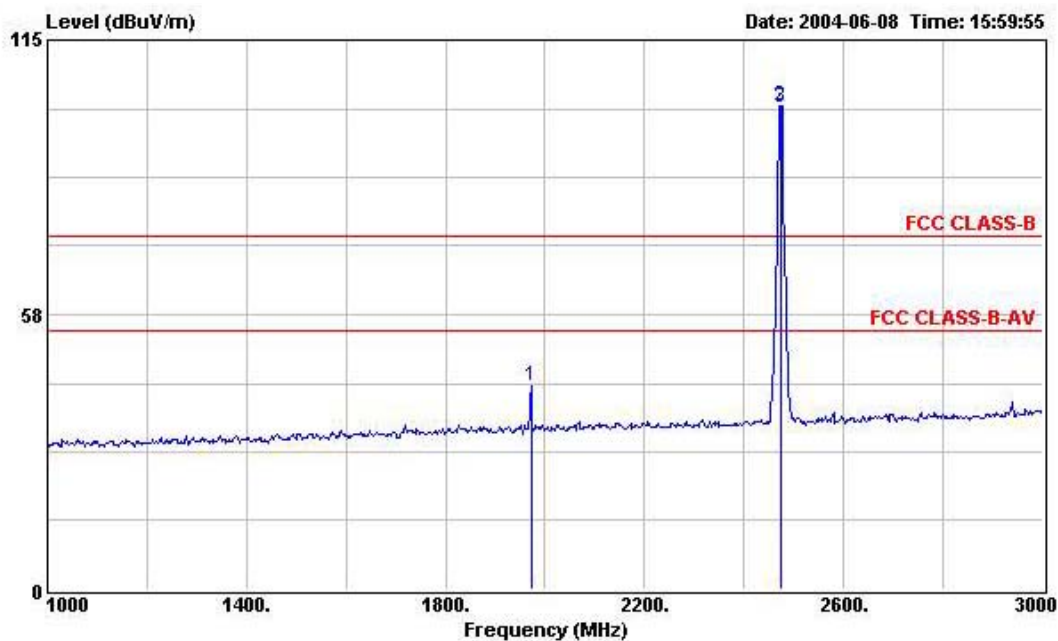
Frequency	Level	Read	Probe	Cable	Preamp	Limit	Detect
(MHz)	(dBuV/m)	Level	Factor	Loss	Factor	Line	Mode
(dBuV)	(dB)	(dB)	(dB)	(dB)	(dB)	(dBuV/m)	
2434.000	97.11	108.26	28.26	1.76	41.17	114	Peak
2434.000	91.70	102.85	28.26	1.76	41.17	94	AV



FCC ID: SC5LR24
 Issued on Aug. 10, 2004

Report No.: F442907

Test Channel	Mode 3	Temperature	24 deg. C	Tested By	Steve Chen
Frequency	2473MHz	Humidity	67%		



Frequency (MHz)	Level (dBuV/m)	Read Level (dBuV)	Probe Factor (dB)	Cable Loss (dB)	Preamp Factor (dB)	Limit Line (dBuV/m)	Detect Mode
2473.000	101.06	112.09	28.36	1.80	41.19	114	Peak
2473.000	93.84	104.87	28.36	1.80	41.19	94	AV

5.2 AC Power Line Conducted Emission

5.2.1 Measuring Instruments

Please reference item 1~7 in chapter 6 for the instruments used for testing.

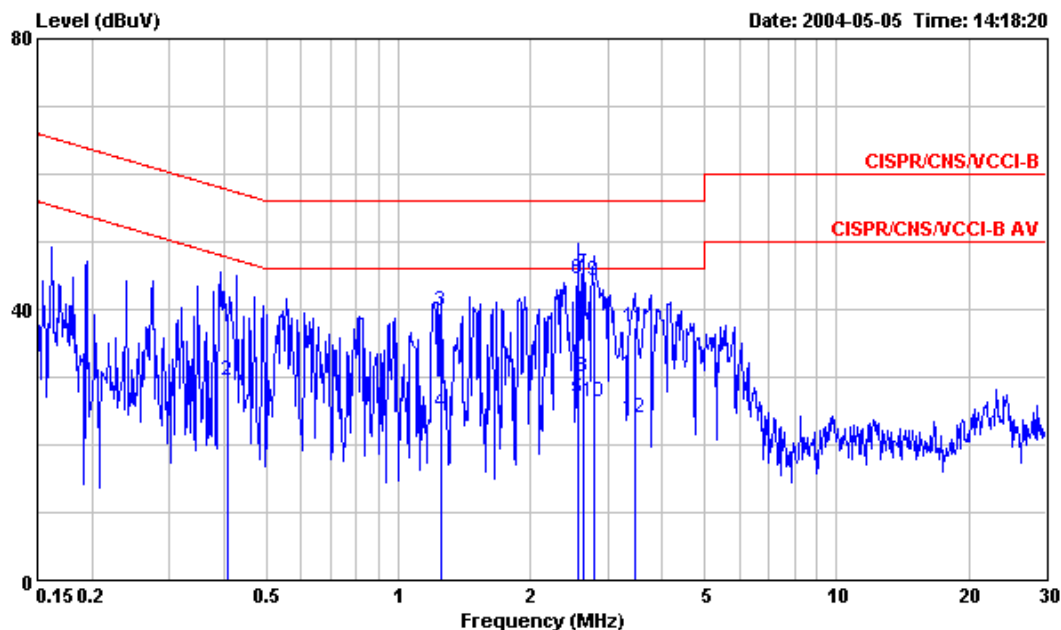
5.2.2 Test Procedures

1. Configure the EUT according to ANSI C63.4.
2. The EUT has to be placed 0.4 meter far from the conducting wall of the shielding room and at least 80 centimeters from any other grounded conducting surface.
3. Connect EUT to the power mains through a line impedance stabilization network (LISN).
4. All the support units are connected to the other LISNs. The LISN should provides 50uH/50ohms coupling impedance.
5. The frequency range from 150 KHz to 30 MHz was searched.
6. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
7. The measurement has to be done between each power line and ground at the power terminal for each RF channel. Only one RF channel has to be investigated since this test is independent with the RF channel selection.

5.2.3 Test Result of Conducted Emission

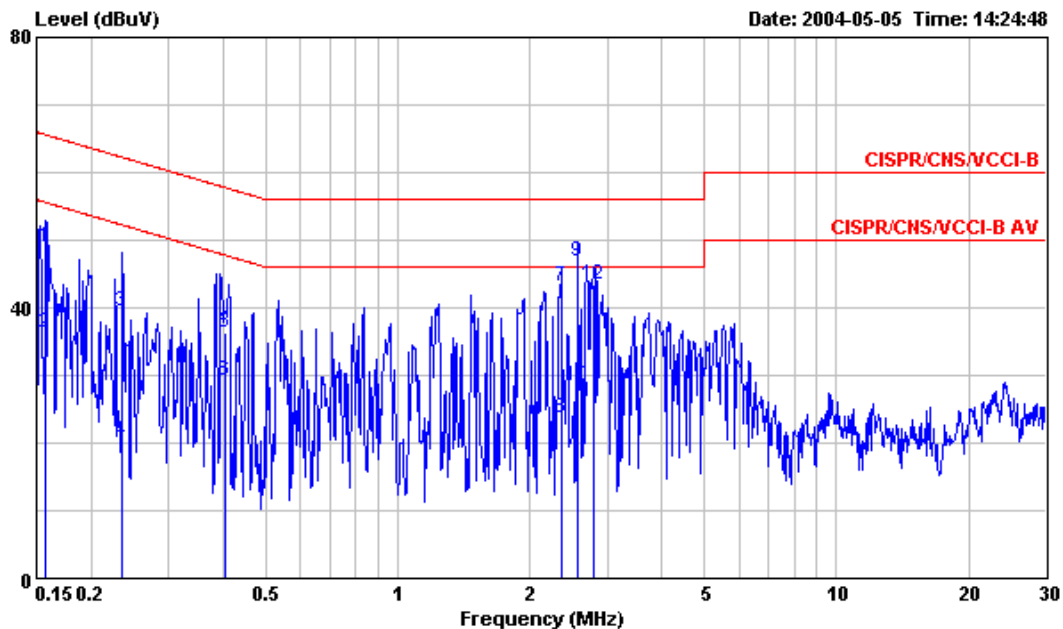
Test Mode	RF LINK	Tested By	Brian Lin
Temperature / Humidity	24deg. C / 52%		

Line to Ground



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.4078150	37.92	-19.77	57.69	37.92	0.00	0.00	QP
2	0.4078150	29.42	-18.27	47.69	29.42	0.00	0.00	Average
3	1.250	39.78	-16.22	56.00	39.78	0.00	0.00	QP
4	1.250	24.72	-21.28	46.00	24.72	0.00	0.00	Average
5	2.565	26.86	-19.14	46.00	26.86	0.00	0.00	Average
6	2.565	44.56	-11.44	56.00	44.56	0.00	0.00	QP
7	2.640	45.19	-10.81	56.00	45.19	0.00	0.00	QP
8	2.640	30.10	-15.90	46.00	30.10	0.00	0.00	Average
9	2.790	44.28	-11.72	56.00	44.28	0.00	0.00	QP
10	2.790	26.19	-19.81	46.00	26.19	0.00	0.00	Average
11	3.470	37.39	-18.61	56.00	37.39	0.00	0.00	QP
12	3.470	23.94	-22.06	46.00	23.94	0.00	0.00	Average

Neutral to Ground



	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.1573260	49.04	-16.56	65.60	49.04	0.00	0.00	QP
2	0.1573260	36.30	-19.30	55.60	36.30	0.00	0.00	Average
3	0.2353310	39.37	-22.89	62.26	39.37	0.00	0.00	QP
4	0.2353310	20.34	-31.92	52.26	20.34	0.00	0.00	Average
5	0.4057360	36.27	-21.47	57.74	36.27	0.00	0.00	QP
6	0.4057360	29.27	-18.47	47.74	29.27	0.00	0.00	Average
7	2.360	43.26	-12.74	56.00	43.26	0.00	0.00	QP
8	2.360	23.58	-22.42	46.00	23.58	0.00	0.00	Average
9	2.570	46.92	-9.08	56.00	46.92	0.00	0.00	QP
10	2.570	28.54	-17.46	46.00	28.54	0.00	0.00	Average
11	2.790	26.08	-19.92	46.00	26.08	0.00	0.00	Average
12	2.790	43.43	-12.57	56.00	43.43	0.00	0.00	QP

Test Engineer : 

Brian Lin

5.2.4 Photographs of Conducted Emission Test Configuration

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

FRONT VIEW



REAR VIEW



SIDE VIEW



5.3 Test of Radiated Emission

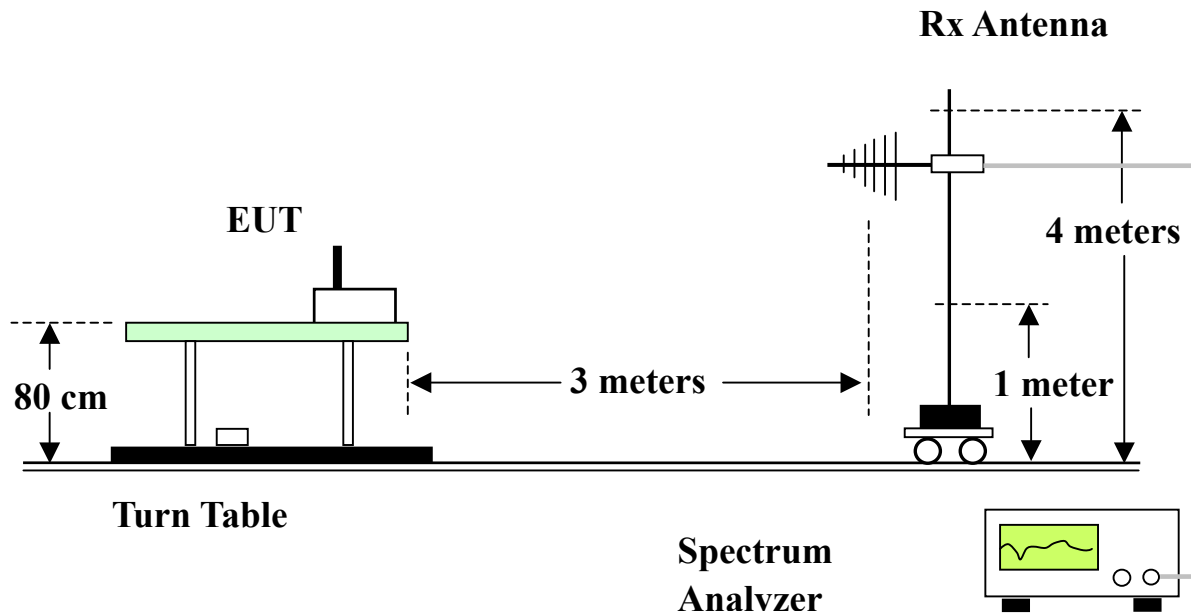
5.3.1 Measuring Instruments

Item 1~9 of the table on section 7.

5.3.2 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 by 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. For emission above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
10. 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.
11. 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.

5.3.3 Test Setup Layout





5.3.4 Test Results and Limit

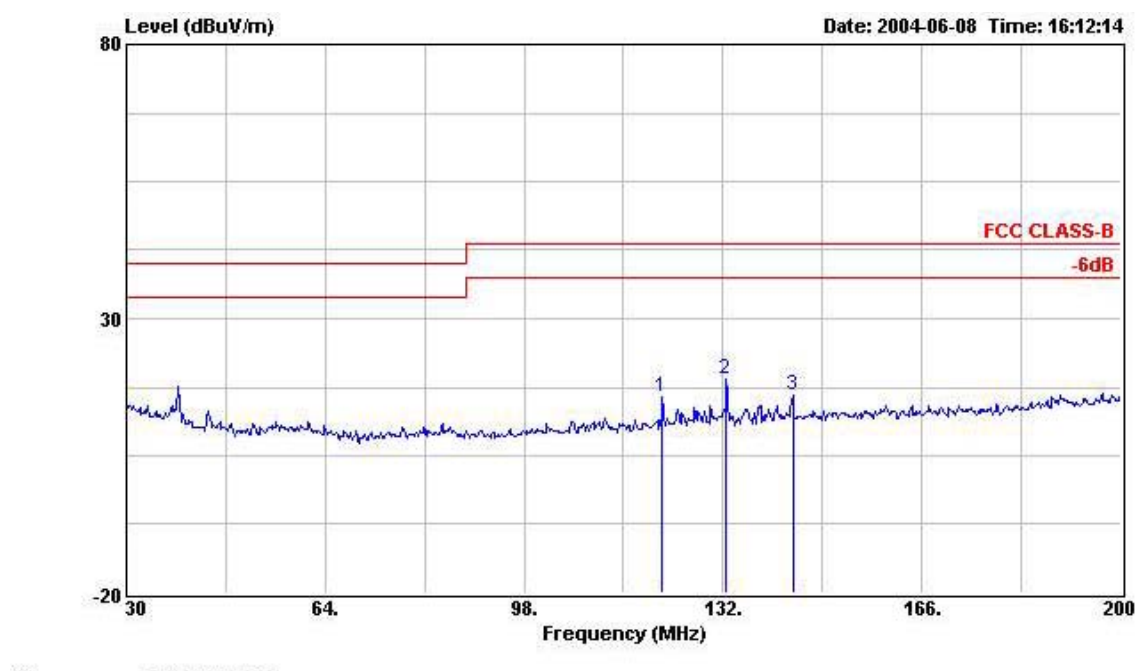
Note:

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

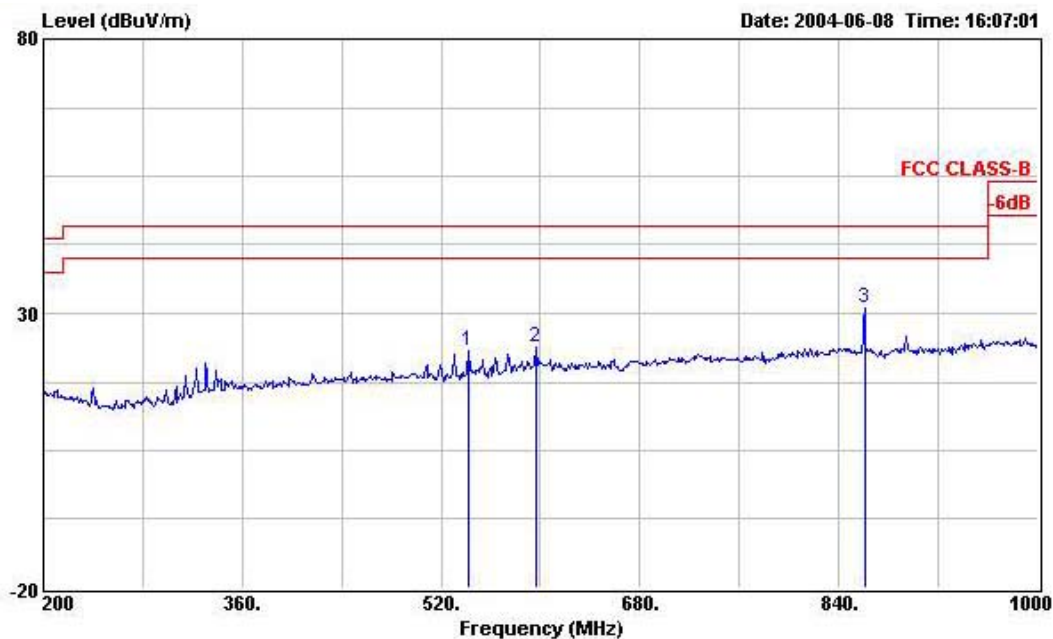
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Test Mode	RF LINK	Temperature	24 deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	52%		

(A) Polarization: Horizontal

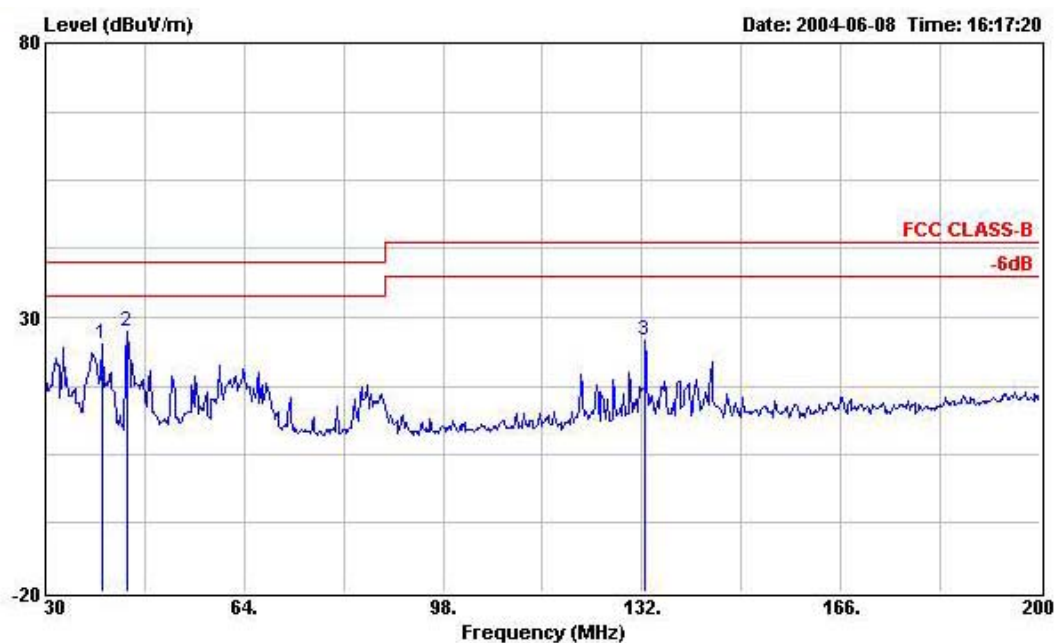


	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	121.630	15.58	-27.92	43.50	30.77	10.70	1.97	27.86	QP	---	---
2	132.510	19.00	-24.50	43.50	33.32	11.46	2.05	27.83	QP	---	---
3	143.900	16.05	-27.45	43.50	29.75	11.99	2.12	27.81	QP	---	---

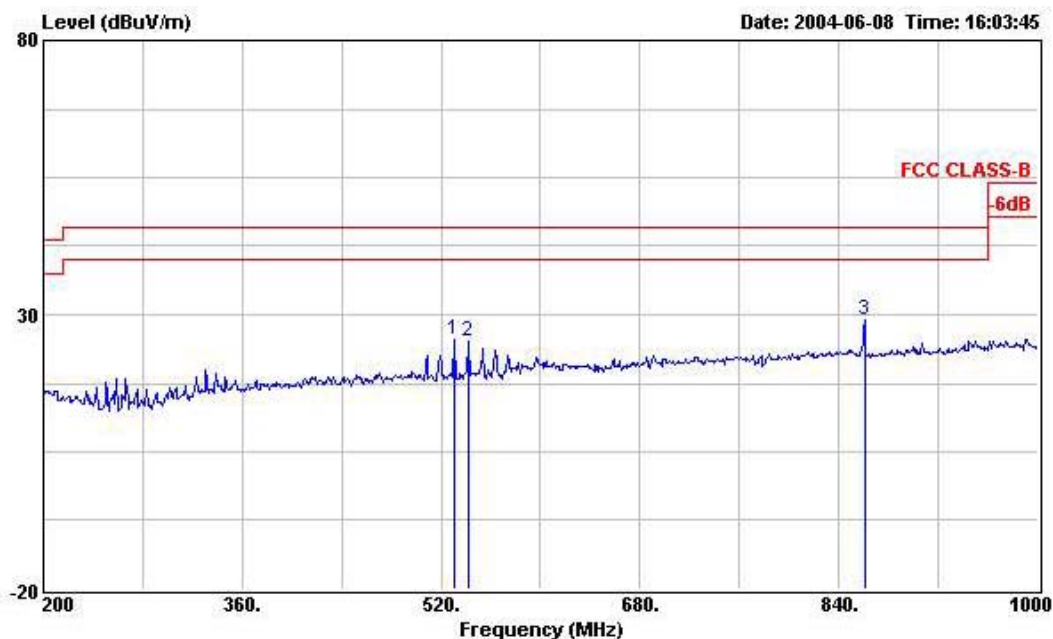


	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	541.600	23.22	-22.78	46.00	30.13	17.70	4.13	28.74	QP	---	---
2	596.000	23.83	-22.17	46.00	29.38	18.90	4.35	28.80	QP	---	---
3	860.800	30.90	-15.10	46.00	33.25	20.91	5.23	28.49	QP	---	---

(B) Polarization: Vertical



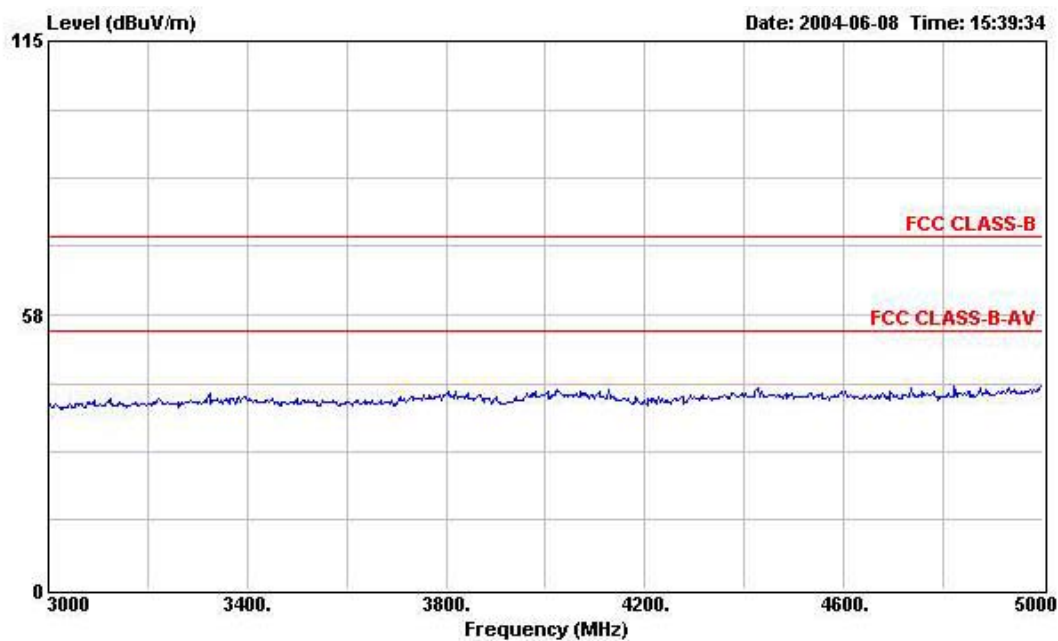
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	39.860	25.29	-14.71	40.00	40.50	11.74	1.07	28.02	QP	---	---
2	43.940	27.46	-12.54	40.00	43.61	10.73	1.13	28.01	QP	105	116
3	132.510	25.83	-17.67	43.50	40.15	11.46	2.05	27.83	QP	---	---



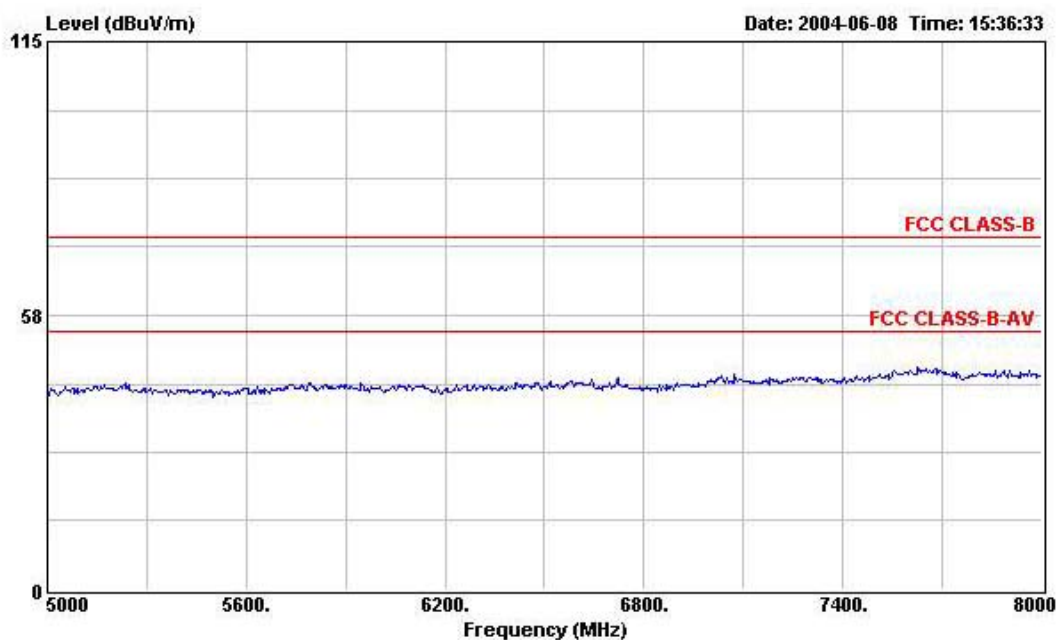
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	531.200	25.40	-20.60	46.00	32.44	17.62	4.07	28.73	QP	---	---
2	541.600	25.06	-20.94	46.00	31.97	17.70	4.13	28.74	QP	---	---
3	860.800	28.89	-17.11	46.00	31.24	20.91	5.23	28.49	QP	---	---

Test Mode	Mode 1	Temperature	24 deg. C	Tested By	Steve Chen
Freq. Range	1GHz~25GHz	Humidity	67%		

(A) Polarization: Horizontal

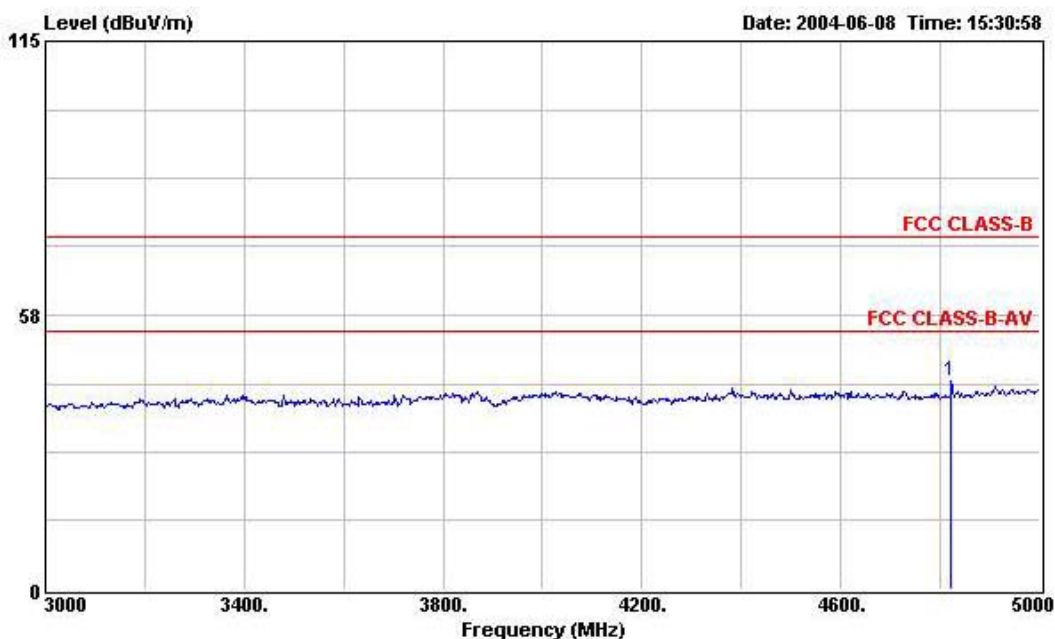


Remark: Spurious emission emitted by the EUT is too low to be measured.

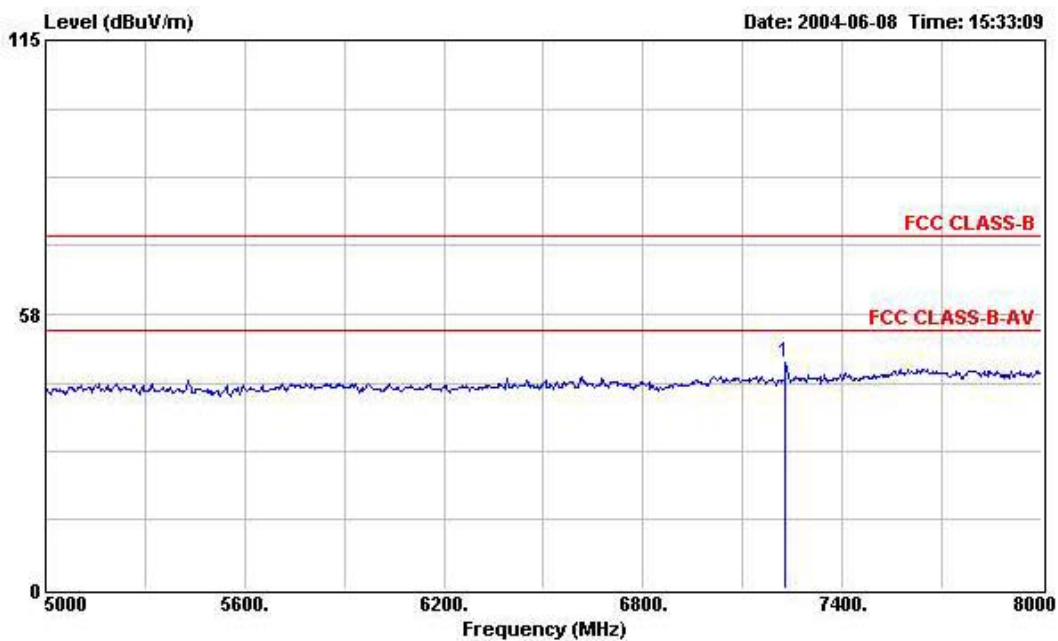


Remark: Spurious emission emitted by the EUT is too low to be measured.

(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
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	4822.000	43.86	-10.14	54.00	50.53	33.23	2.47	42.37	Average	---	---

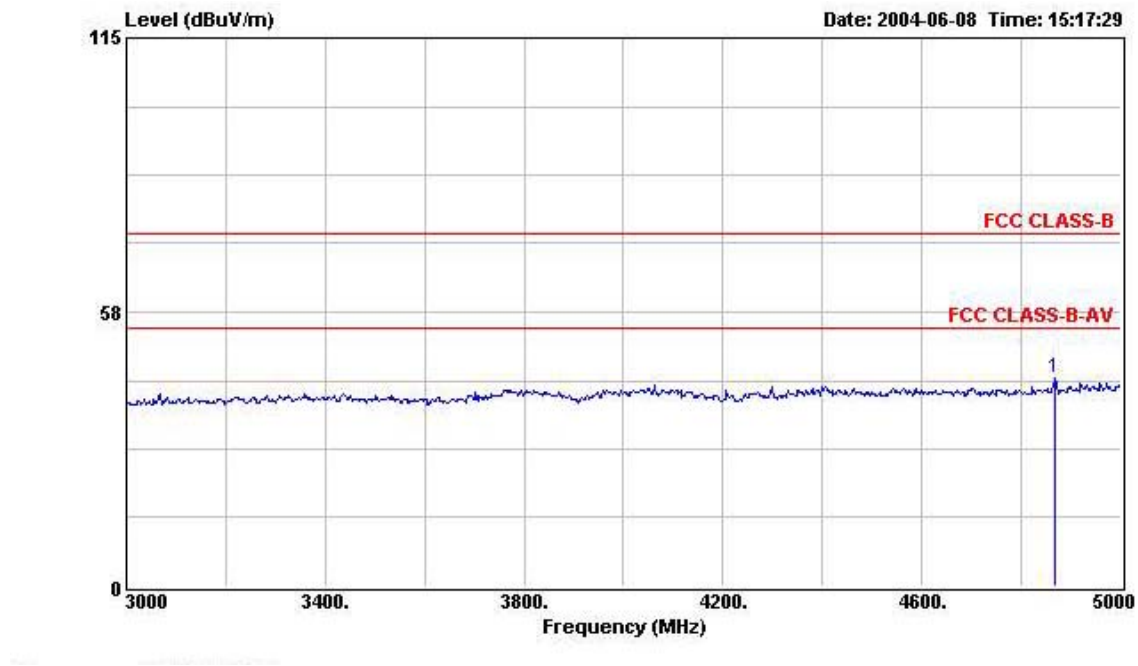


	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	7229.000	47.47	-6.53	54.00	51.24	36.07	2.87	42.71	Average	102	226

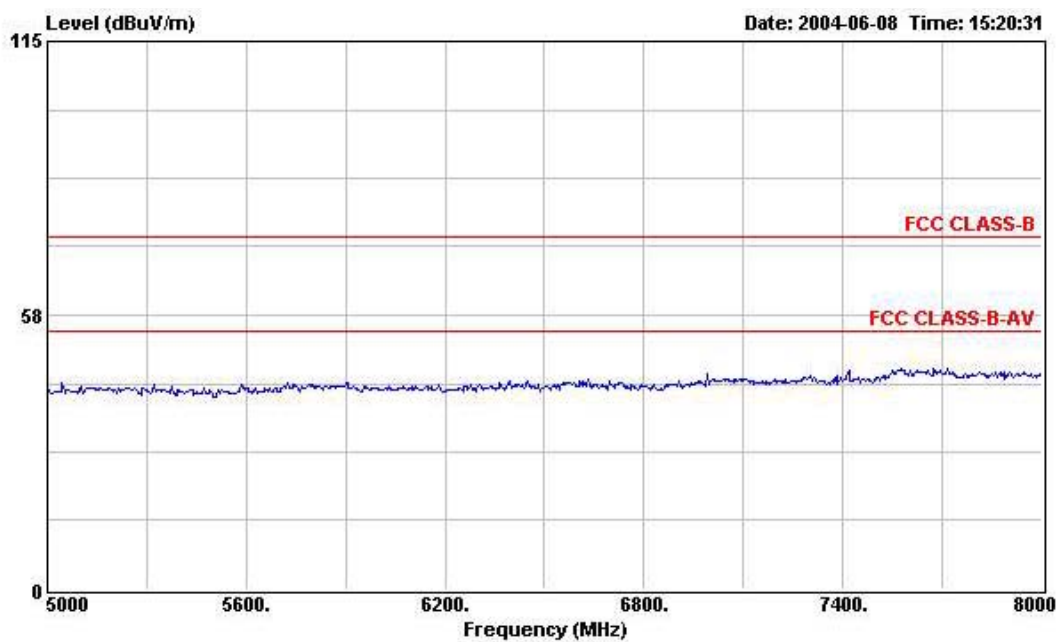


Test Mode	Mode 2	Temperature	24 deg. C	Tested By	Steve Chen
Freq. Range	1GHz~25GHz	Humidity	67%		

(A) Polarization: Horizontal

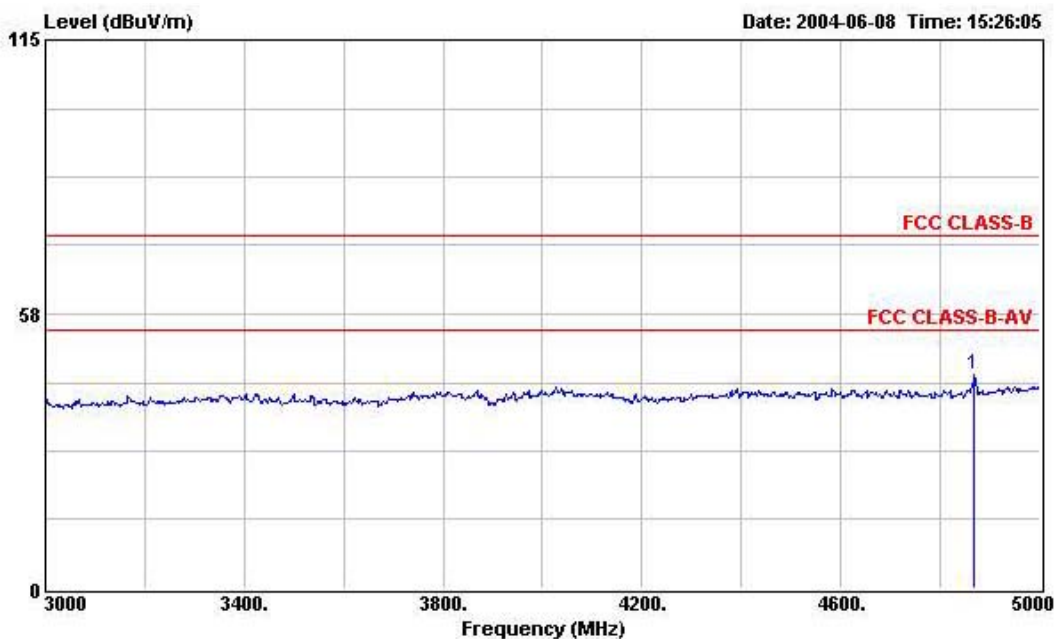


	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	4868.000	43.85	-10.15	54.00	50.43	33.33	2.52	42.43	Average	---	---

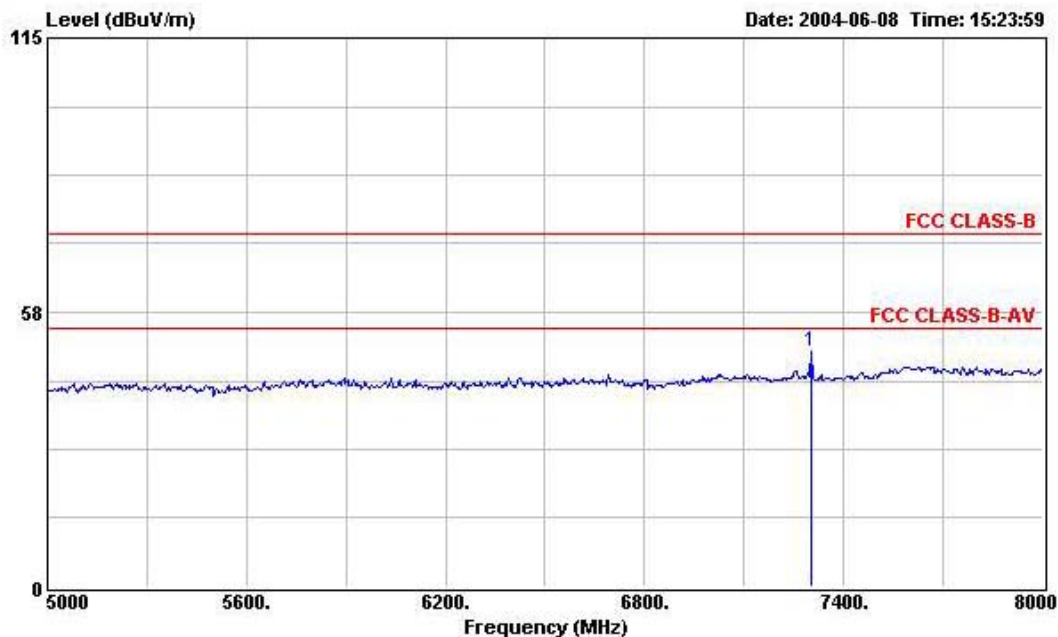


Remark: Spurious emission emitted by the EUT is too low to be measured.

(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	4868.000	44.84	-9.16	54.00	51.42	33.33	2.52	42.43	Average	---	---

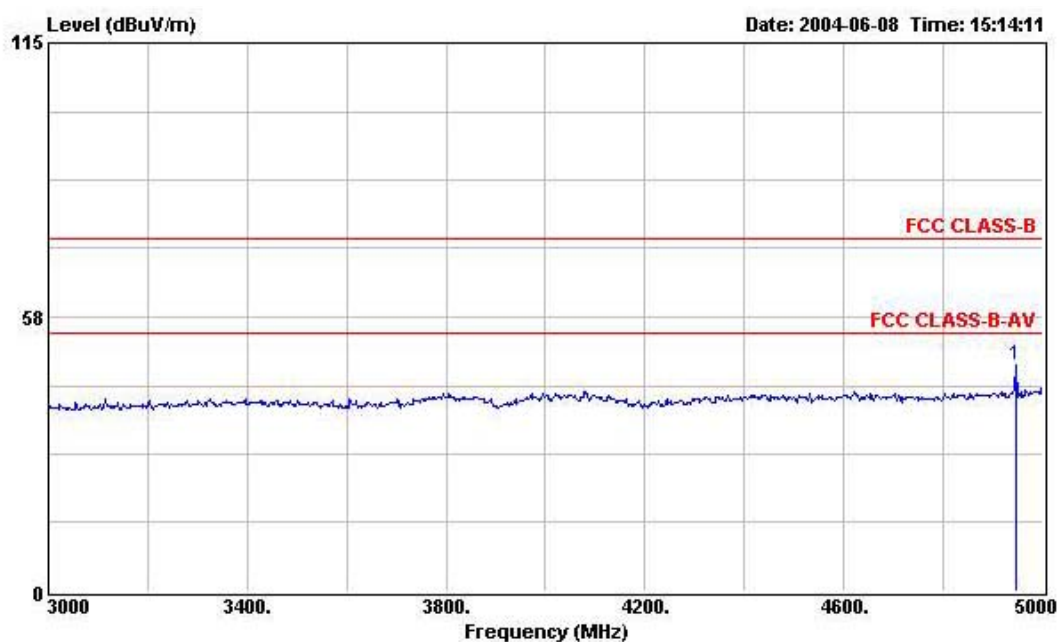


Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamplifier	Remark	Ant Pos	Table Pos
MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	7301.000	49.12	-4.88	54.00	52.20	36.24	3.30	42.62	Average	106 228

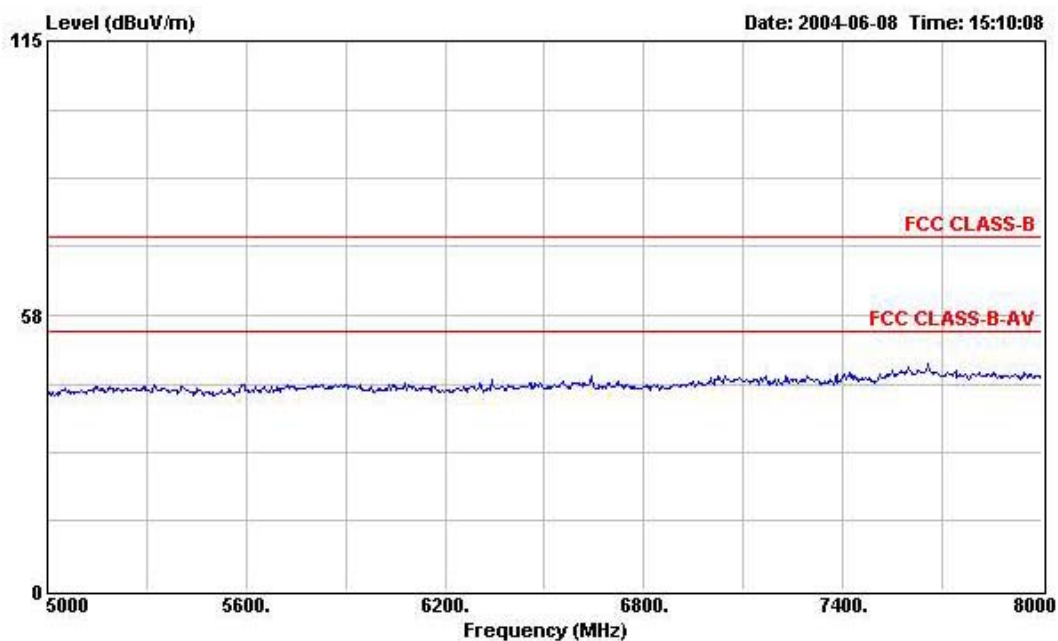


Test Mode	Mode 3	Temperature	24 deg. C	Tested By	Steve Chen
Freq. Range	1GHz~25GHz	Humidity	67%		

(A) Polarization: Horizontal

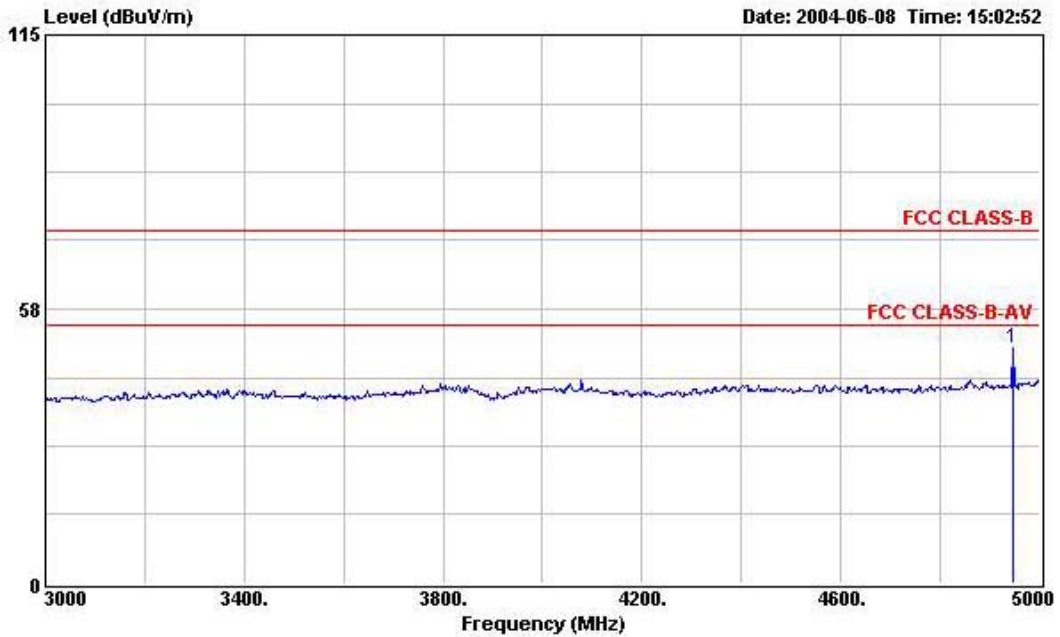


	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	4948.000	47.41	-6.59	54.00	53.99	33.51	2.45	42.54	Average	---	---

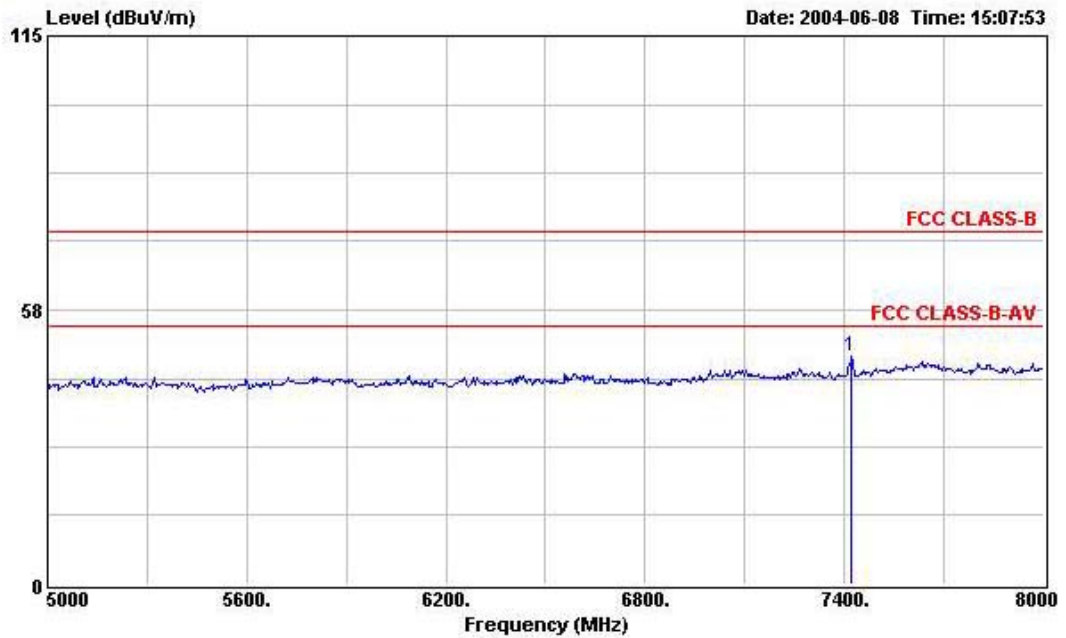


Remark: Spurious emission emitted by the EUT is too low to be measured.

(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	4948.000	49.40	-4.60	54.00	55.98	33.51	2.45	42.54	Average	102	217

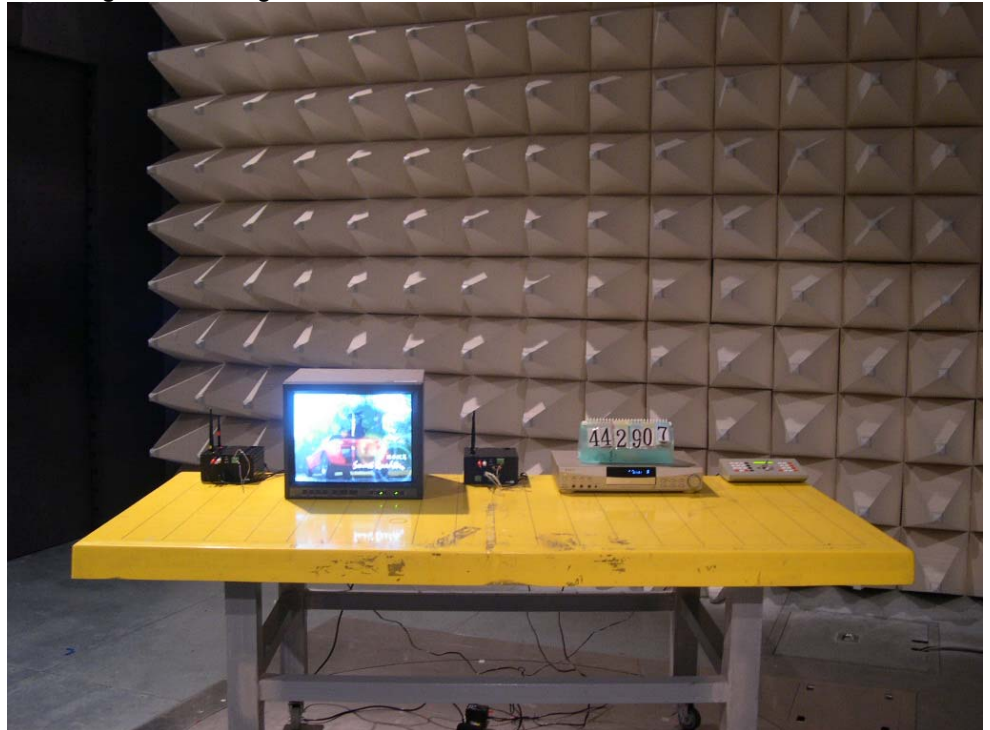


	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	7421.000	47.68	-6.32	54.00	50.71	36.54	2.91	42.48	Average	---	---

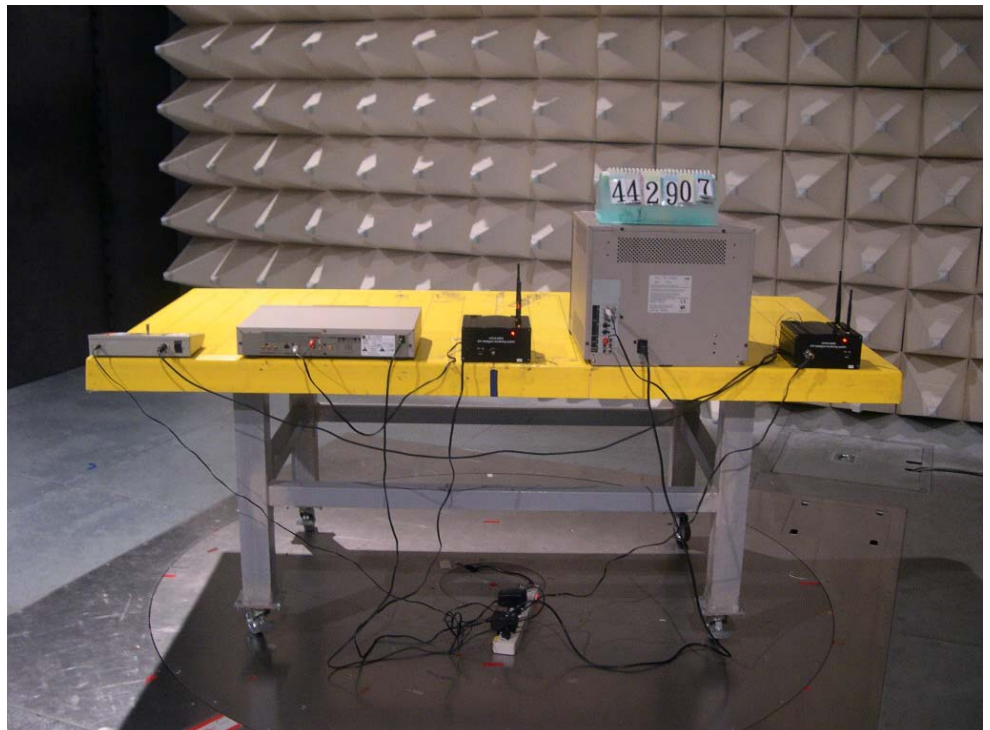
5.3.5 Photographs of Radiated Emission Test Configuration

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

FRONT VIEW



REAR VIEW





6 Antenna Requirements

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.

6.2 Antenna Construction

The antenna used in this device is monopole antenna, and the antenna connector is the reversed SMA.

7 List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
3m Semi Anechoic Chamber	SIDT FRANKONIA	SAC-3M	03CH03-HY	30MHz~1GHz 3m	Jun. 20, 2004	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP40	100004	9KHZ~40GHz	Aug. 23, 2003	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Nov. 05, 2003	Radiation (03CH03-HY)
Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz –200MHz	Jul. 24, 2003	Radiation (03CH03-HY)
Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 24, 2003	Radiation (03CH03-HY)
RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 03, 2003	Radiation (03CH03-HY)
Amplifier	MITEQ	AFS44	879981	100MHz~26.5GHz	Jul. 23, 2003	Radiation (03CH03-HY)
Horn Antenna	COM-POWER	3115	6821	1GHz – 18GHz	Sep. 12, 2003	Radiation (03CH03-HY)
Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)
Horn Antenna	EMCO	3115	6821	1GHz – 18GHz	Sep. 12, 2003	Radiation (03CH03-HY)
RF Cable-HIGH	Jye Bao	RG142	CB030-HIGH	1GHz~29.5GHz	Dec. 05, 2003	Radiation (03CH03-HY)
Spectrum analyzer	R&S	FSP7	838858/014	9KHZ~7GHZ	Sep. 03, 2003	Conducted
Power meter	R&S	NRVS	100444	DC~40GHz	Jun. 15, 2004	Conducted
Power sensor	R&S	NRV-Z55	100049	DC~40GHz	Jun. 15, 2004	Conducted
Power Sensor	R&S	NRV-Z32	100057	30MHz-6GHz	Jun. 15, 2004	Conducted
AC power source	HPC	HPA-500W	HPA-9100024	AC 0~300V	May 26, 2004	Conducted
Temp. and Humidity	KSON	THS-C3L	612	N/A	Oct. 01, 2003	Conducted
RF CABLE-1m	Jye Bao	RG142	CB034-1m	20MHz~7GHz	Jan. 01, 2004	Conducted
RF CABLE-2m	Jye Bao	RG142	CB035-2m	20MHz~1GHz	Jan. 01, 2004	Conducted

※ Calibration Interval of instruments listed above is one year.