

FCC TEST REPORT

CATEGORY : Mobile End Product
PRODUCT NAME : CARMP3
FCC ID. : NLFCARMP30
FILING TYPE : Certification
BRAND NAME : BILLIONTON
MODEL NAME : CARMP30
APPLICANT : **Billionton Systems Inc.**
No. 21, Sui-Lih Rd., Hsin-Chu, Taiwan
MANUFACTURER : The 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

Table of Contents

History of this test report.....	ii
1. General Description of Equipment under Test.....	1
1.1. Applicant.....	1
1.2. Manufacturer	1
1.3. Basic Description of Equipment under Test	1
1.4. Features of Equipment under Test.....	1
2. Test Configuration of the Equipment under Test.....	2
2.1. Description of the Test	2
2.2. Frequency Range Investigated	2
2.3. Description of Test Supporting Units.....	2
2.4. Connection Diagram of Test System	2
2.5. Test Software	2
3. Test Location and Standards	3
3.1. Test Location.....	3
3.2. Test Conditions	3
3.3. Standards for Methods of Measurement.....	3
3.4. DoC Statement.....	3
4. List of Measurements.....	4
4.1. Summary of the Test Results	4
4.2. Test of Conducted Emission	5
4.3. Bandwidth.....	6
4.4. Field Strength of Carrier Frequency	8
4.5. Test of Spurious Radiated Emission	12
4.6. Antenna Requirements	24
5. List of Measuring Equipments Used	25
Appendix A. Photographs of EUT.....	A1 ~ A7

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

Billionton Systems Inc.

No.21, Sui-Lih Rd., Hsin-Chu, Taiwan

1.2. Manufacturer

The same as Applicant.

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. 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	FM
Number of Channel	8
Carrier Frequencies	88.1, 88.3, 88.5, 88.7 MHz 107.1, 107.3, 107.5, 107.7 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 ~ 55°C

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.

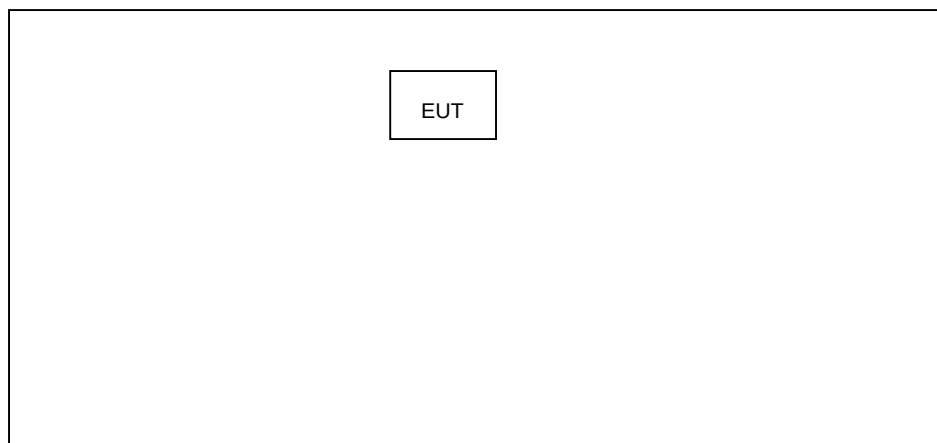
2.2. Frequency Range Investigated

- 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

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

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. : 03CH03-HY

3.2. Test Conditions

Normal Voltage : 12VDC
Normal Temperature : 20 °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 15.239)

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	NA
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

This product is powered by DC source, so there is no need to test this item.

4.3. Bandwidth

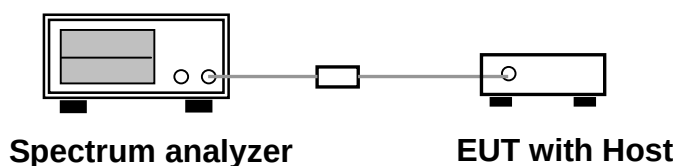
4.3.1. Measuring Instruments

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.

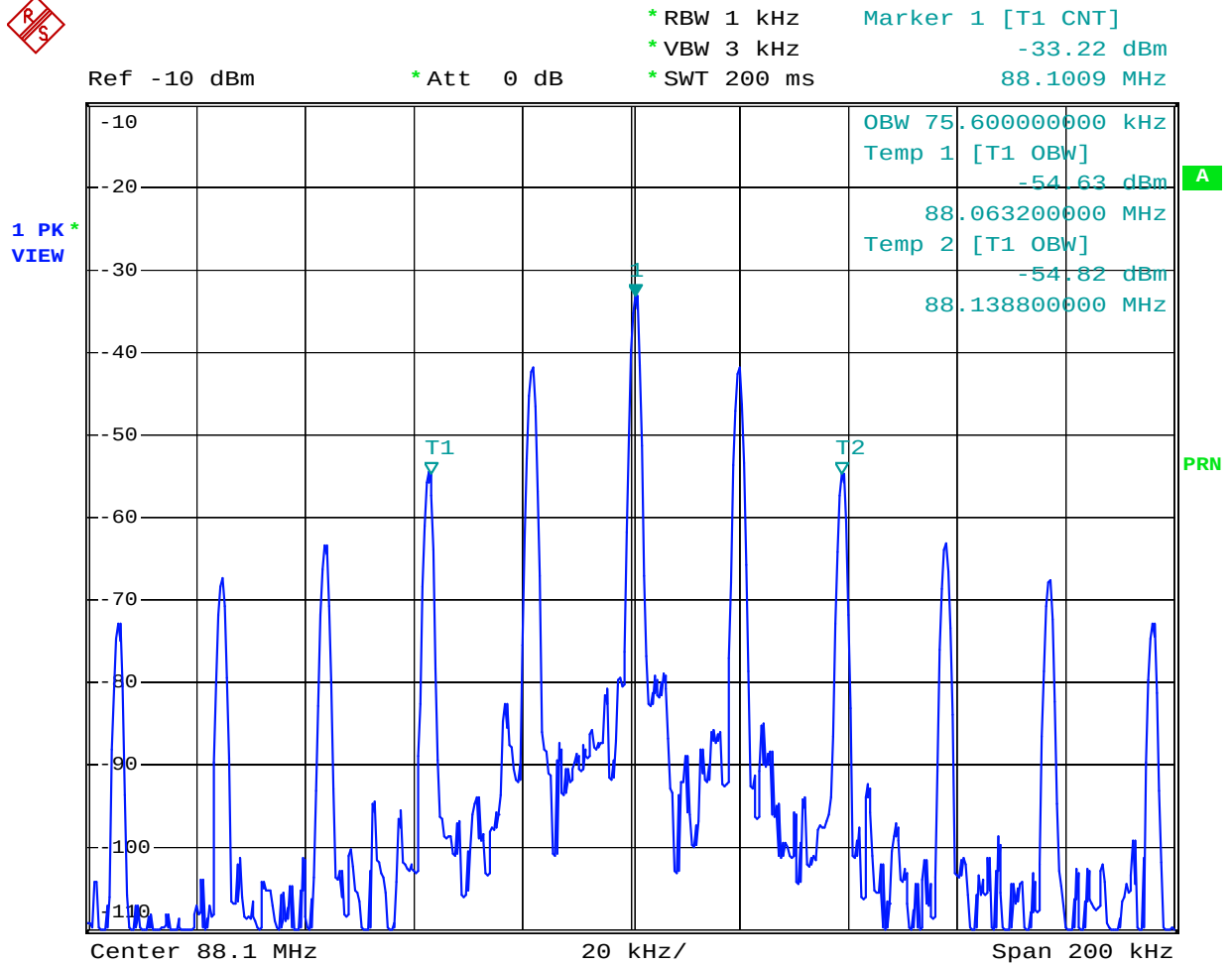
4.3.3. Test Setup Layout



4.3.4. Test Result : See spectrum analyzer plots below

- Temperature: 25°C
- Relative Humidity: 65%
- Duty Cycle of the Equipment During the Test: 100%
- Test Engineer: Bunny Yao

Channel	Frequency (MHz)	99% Bandwidth (kHz)	Max. Limit (kHz)
01	88.1	75.6	200



Date: 22.SEP.2004 18:21:40



4.4. Field Strength of Carrier Frequency

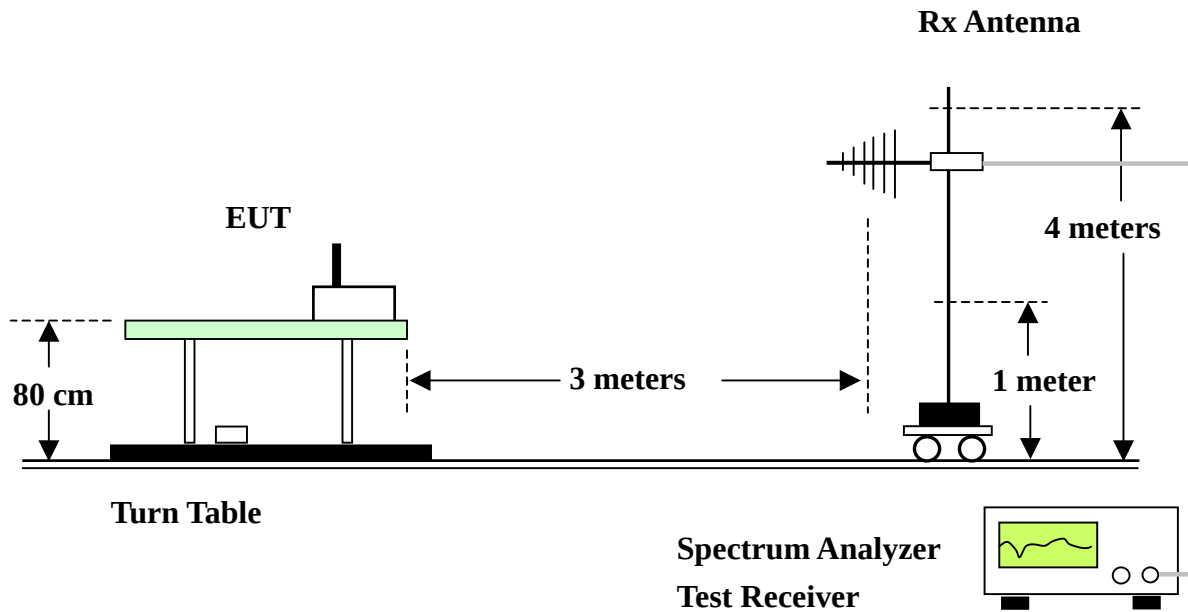
4.4.1. Measuring Instruments

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

4.4.2. Test Procedures

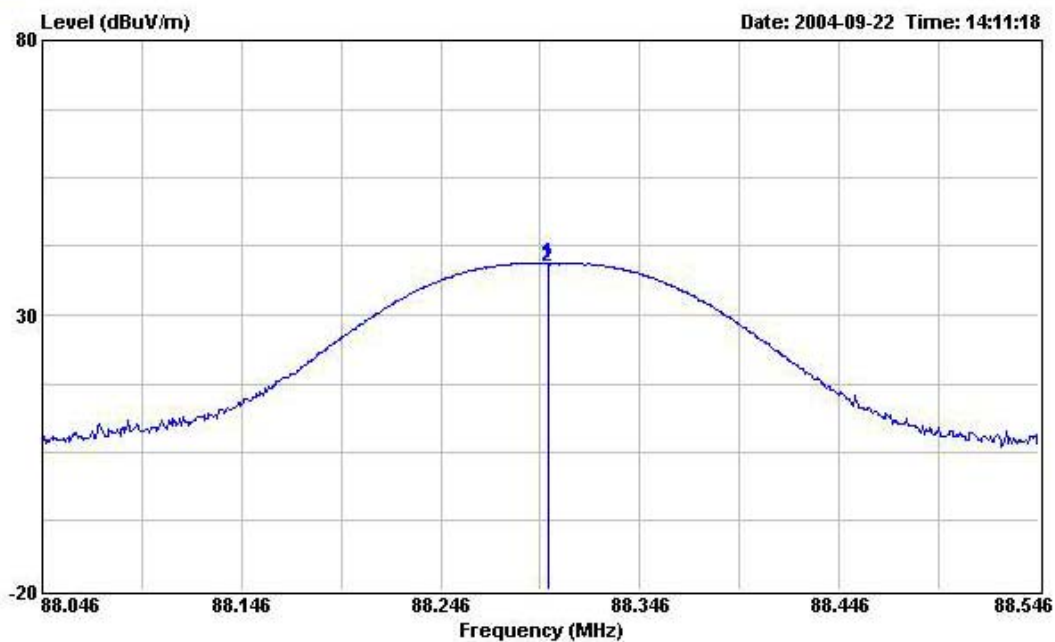
- a) Configure the EUT according to ANSI C63.4.
- b) The EUT was placed on the top of the turn table 0.8 meter above ground.
- c) The phase center of the receiving antenna mounted on the top of a height-variable antenna tower was placed 3 meters far away from the turn table.
- d) Power on the EUT to 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



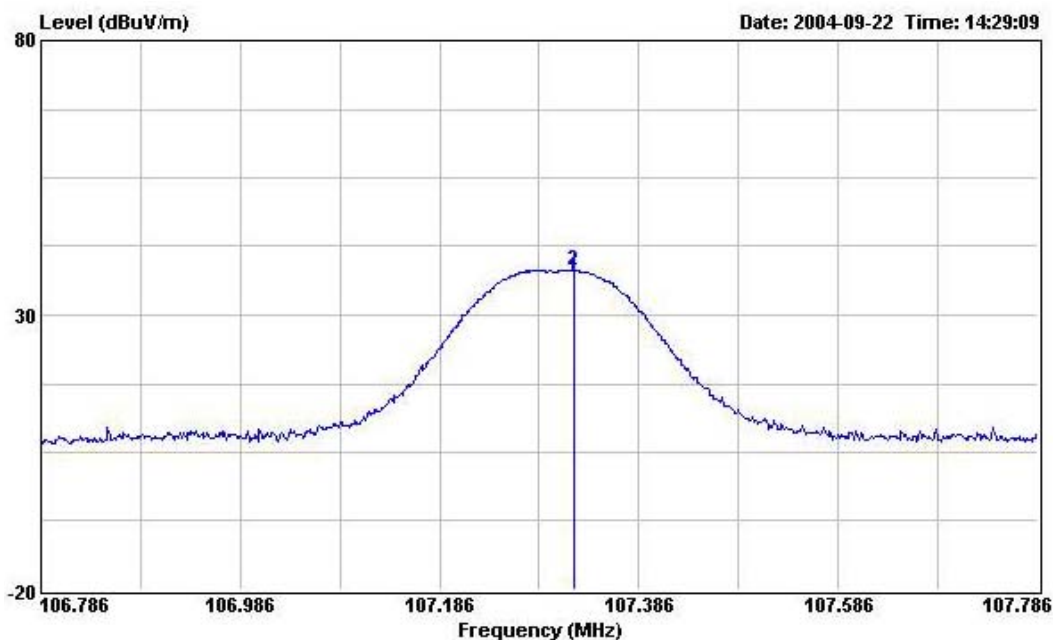
4.4.4. Test Results

88.3MHz



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
88.300	38.63	-28.54	47.95	56.30	8.65	1.60	27.92	AV
88.300	39.41	-9.32	67.95	57.08	8.65	1.60	27.92	Peak

107.3MHz



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
107.320	36.88	-11.07	47.95	52.85	10.06	1.85	27.88	AV
107.320	38.17	-29.78	67.95	54.14	10.06	1.85	27.88	Peak

4.5. Test of Spurious Radiated Emission

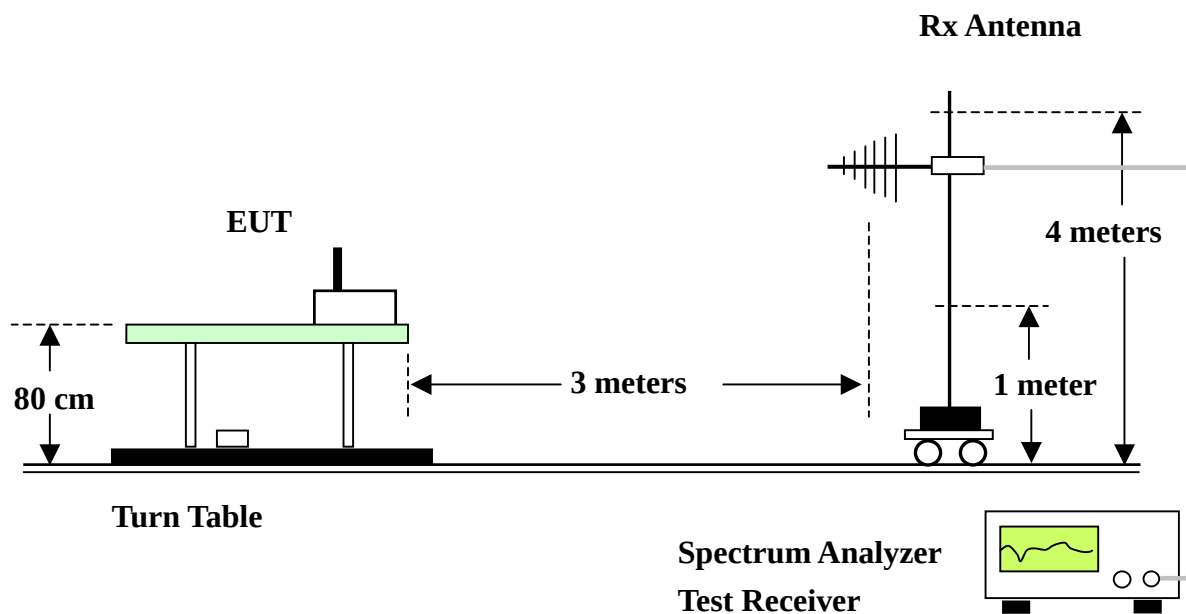
4.5.1. Measuring Instruments

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

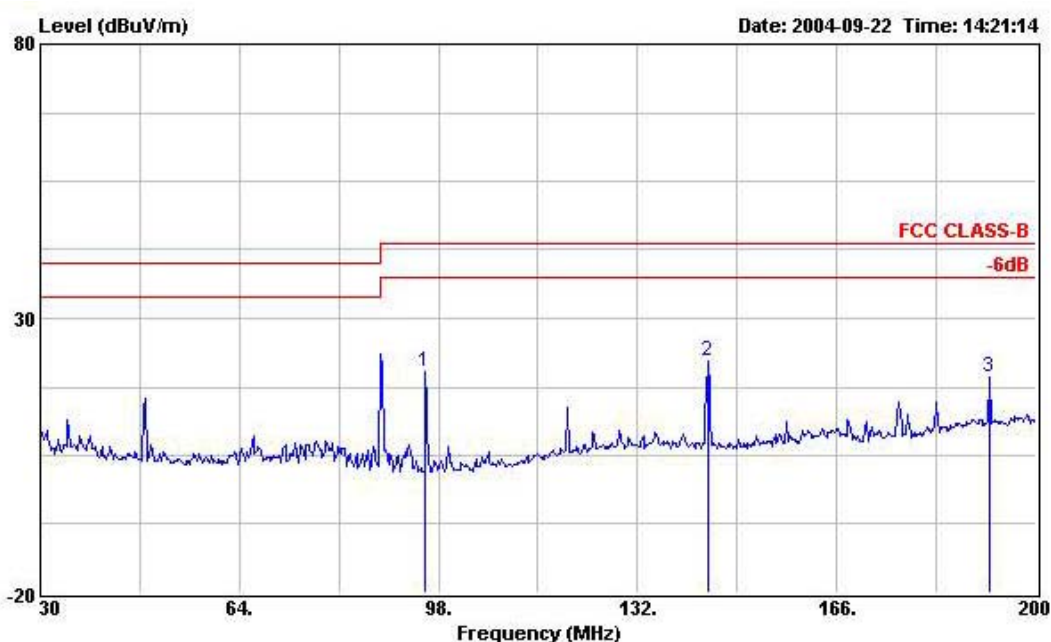
Note:

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

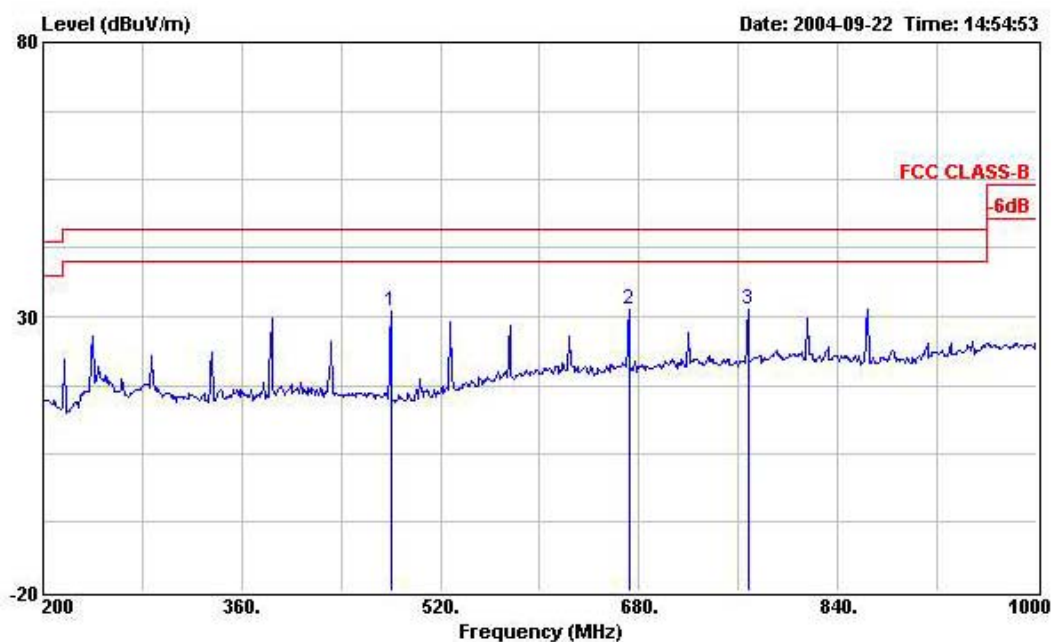
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Test Mode	88.3MHz	Temperature	24deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	65 %		

(A) Polarization: Horizontal

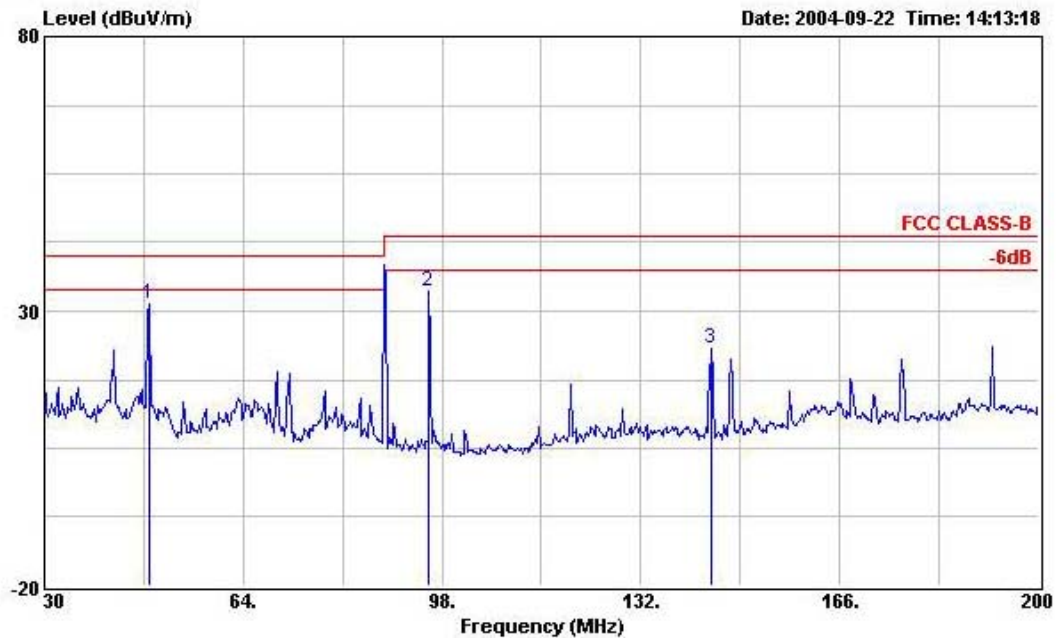


	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp	Remark	Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor		Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	95.790	20.16	-23.34	43.50	37.60	8.79	1.68	27.91	Peak	---	---
2	144.070	22.05	-21.45	43.50	35.43	12.31	2.12	27.81	Peak	---	---
3	192.180	19.42	-24.08	43.50	29.47	15.17	2.49	27.71	Peak	---	---

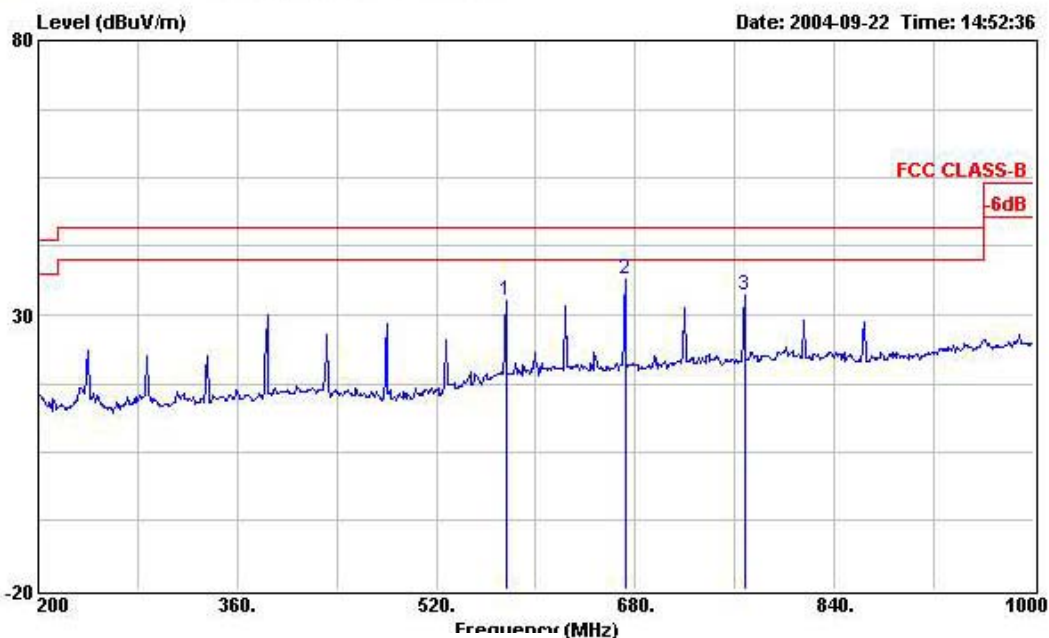


	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	480.000	30.83	-15.17	46.00	39.37	16.16	3.82	28.52	Peak	---	---
2	672.000	31.31	-14.69	46.00	34.80	20.62	4.62	28.73	Peak	---	---
3	768.000	31.24	-14.76	46.00	33.61	21.52	4.88	28.77	Peak	---	---

(B) Polarization: Vertical



	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp	Remark	Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor		Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	48.020	31.37	-8.63	40.00	46.42	11.78	1.17	28.00	Peak	124	153
2	95.790	33.56	-9.94	43.50	51.00	8.79	1.68	27.91	Peak	---	---
3	144.070	23.30	-20.20	43.50	36.68	12.31	2.12	27.81	Peak	---	---

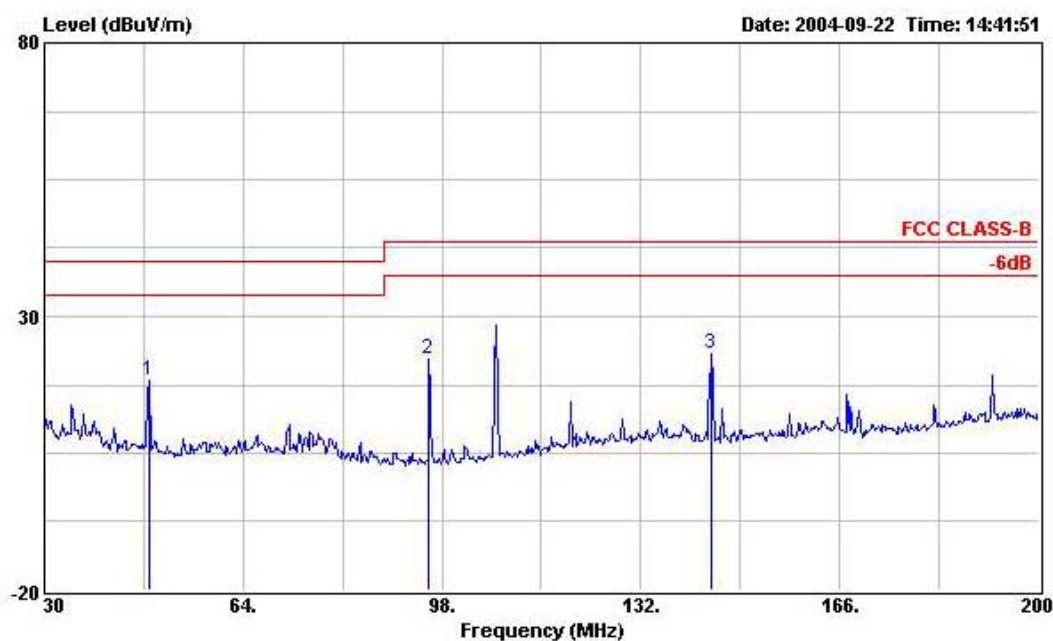


	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	576.000	32.68	-13.32	46.00	37.89	19.35	4.22	28.78	Peak	---	---
2	672.000	36.46	-9.54	46.00	39.95	20.62	4.62	28.73	Peak	---	---
3	768.000	33.46	-12.54	46.00	35.83	21.52	4.88	28.77	Peak	---	---

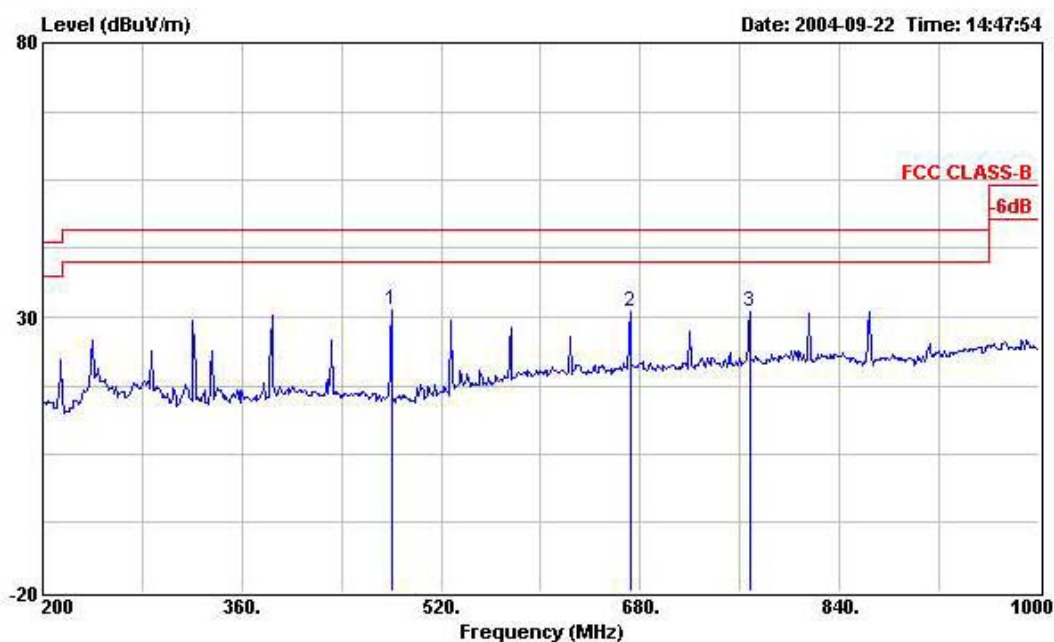


Test Mode	107.3MHz	Temperature	24deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	65 %		

(A) Polarization: Horizontal



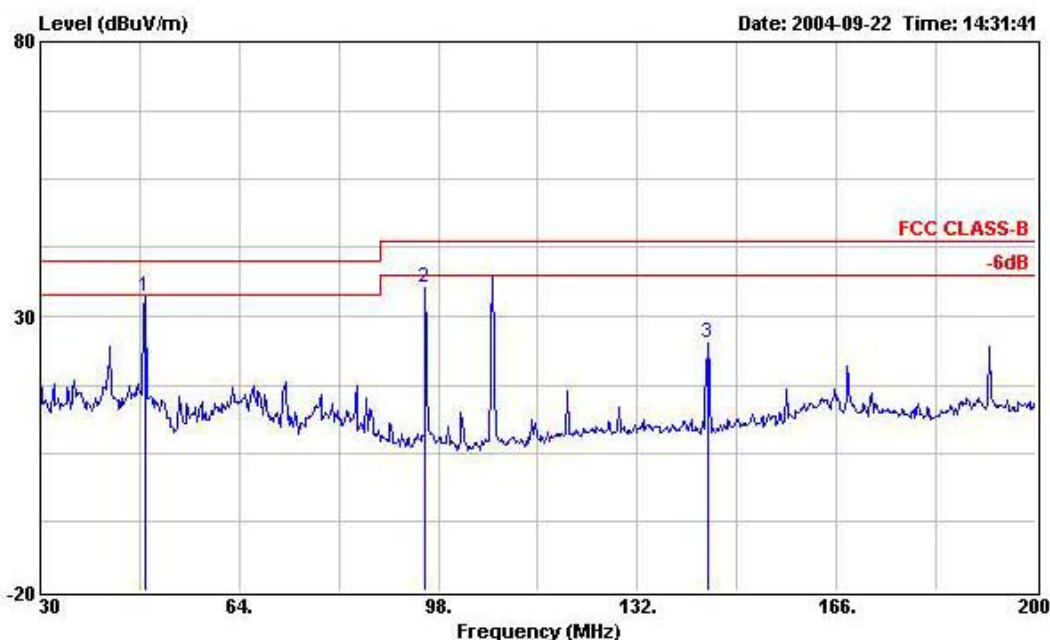
	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	48.020	18.26	-21.74	40.00	33.31	11.78	1.17	28.00	Peak	---	---
2	95.790	22.26	-21.24	43.50	39.70	8.79	1.68	27.91	Peak	---	---
3	144.070	23.04	-20.46	43.50	36.42	12.31	2.12	27.81	Peak	---	---



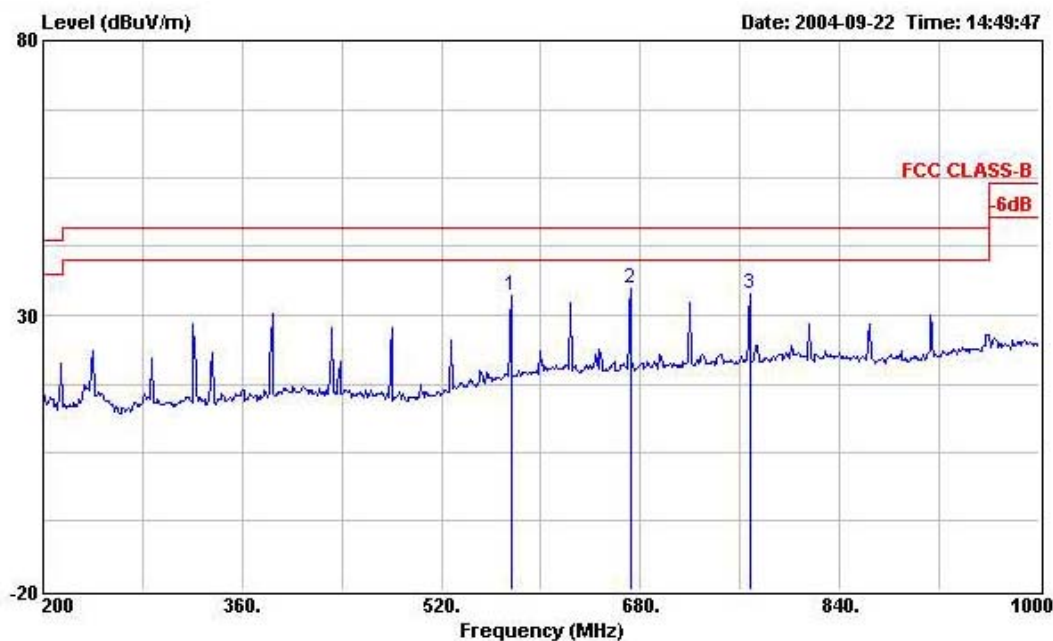
	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	480.000	31.19	-14.81	46.00	39.73	16.16	3.82	28.52	Peak	---	---
2	672.000	31.03	-14.97	46.00	34.52	20.62	4.62	28.73	Peak	---	---
3	768.000	31.09	-14.91	46.00	33.46	21.52	4.88	28.77	Peak	---	---



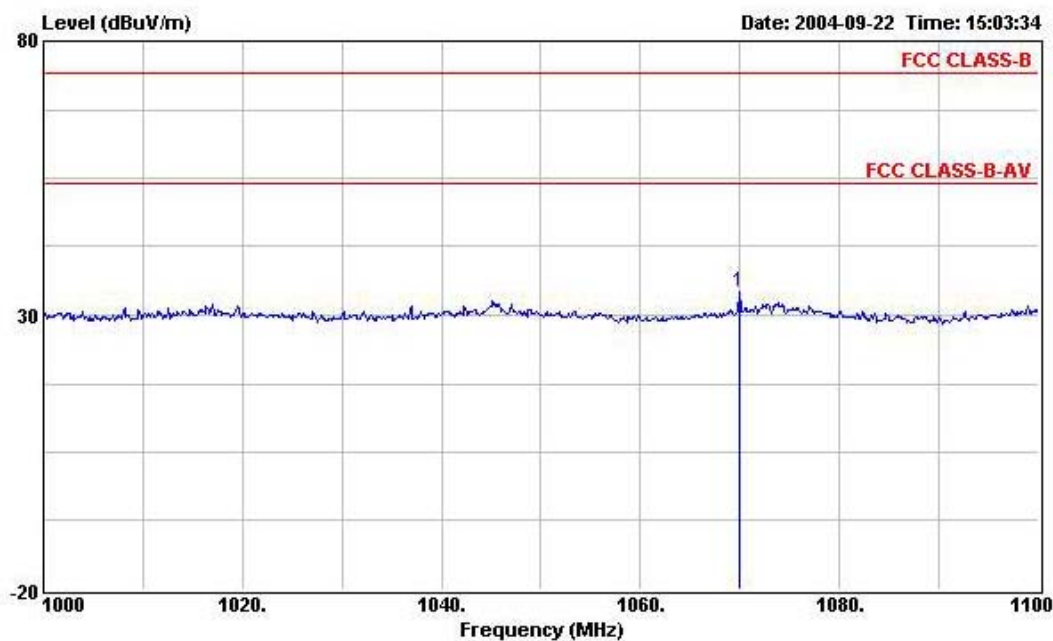
(B) Polarization: Vertical



	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	48.020	33.56	-6.44	40.00	48.61	11.78	1.17	28.00	Peak	157	181
2	95.790	35.19	-8.31	43.50	52.63	8.79	1.68	27.91	Peak	---	---
3	144.070	25.22	-18.28	43.50	38.60	12.31	2.12	27.81	Peak	---	---



	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	576.000	33.43	-12.57	46.00	38.64	19.35	4.22	28.78	Peak	---	---
2	672.000	34.85	-11.15	46.00	38.34	20.62	4.62	28.73	Peak	---	---
3	768.000	33.89	-12.11	46.00	36.26	21.52	4.88	28.77	Peak	---	---

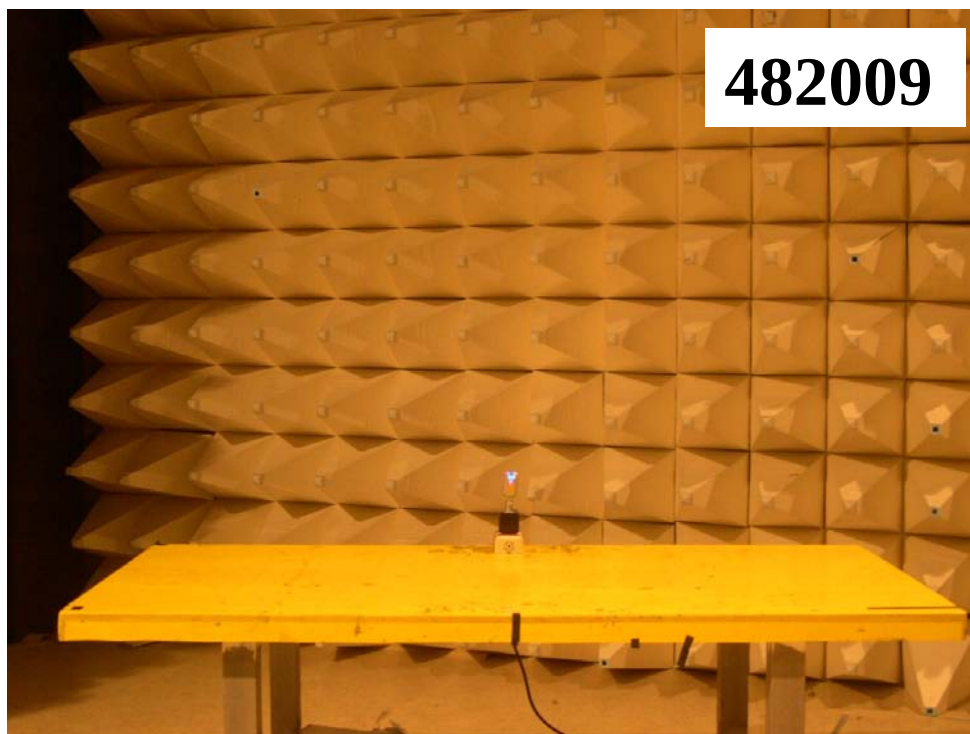


	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1069.900	34.38	-19.62	54.00	51.27	24.34	1.20	42.43	Average	---	---

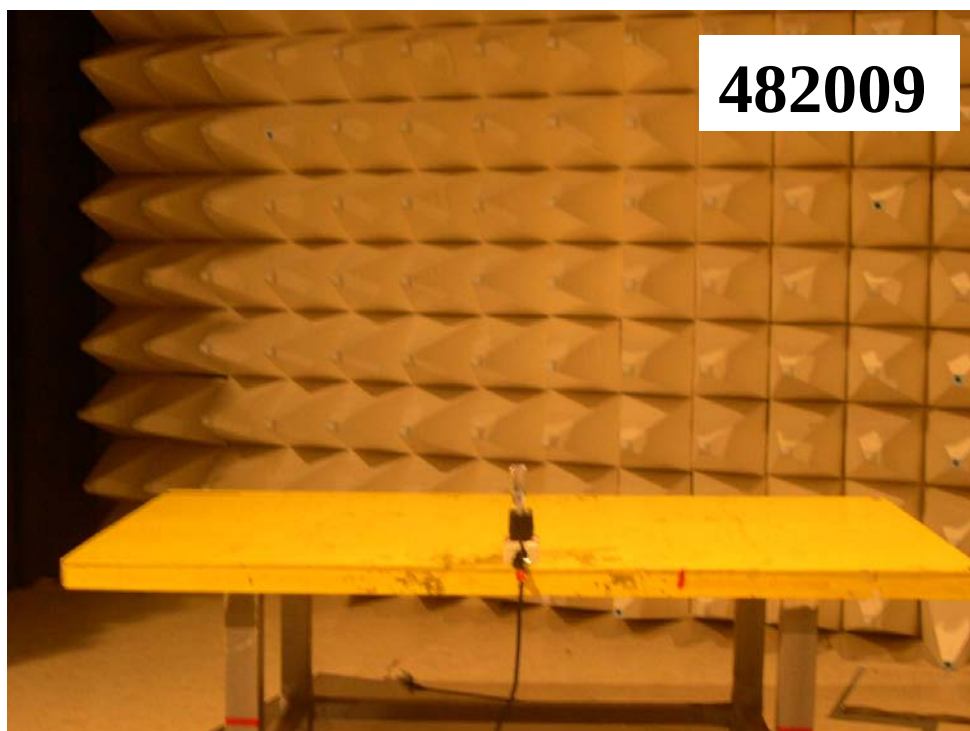
4.5.5. Photographs of Radiated Emission Test Configuration

- 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	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	6741	1GHz – 18GHz	Apr. 07, 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)

※ Calibration Interval of instruments listed above is one year.