

FCC TEST REPORT

CATEGORY : Mobile End Product
PRODUCT NAME : FM Transmitter
FCC ID. : R63TWV101
FILING TYPE : Certification
BRAND NAME : COWIN
MODEL NAME : TWV-101

APPLICANT : **TWINWIN TECHNOLOGY CO., LTD.**
6F-2, NO. 400, Sec.1, Changping Rd., Beirict, Taichung City
406, Taiwan (ROC)
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



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

TWINWIN TECHNOLOGY CO., LTD.

6F-2, NO. 400, Sec.1, Changping Rd., Beirict, Taichung City 406, Taiwan (ROC)

1.2. Manufacturer

Same as 1.1

1.3. Basic Description of Equipment under Test

This product is FM Transmitter which is powered by the car cigarette lighter. An cable for ear phone socket is provided for audio signal. Audio signal can be transmit wirelessly to the FM receiver such as car radio. 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	3
Carrier Frequencies	88.5MHz, 106.7MHz, 107.9MHz
Channel Bandwidth	200 kHz
Function Type	Transmitter
Antenna	Printed
Power Rating (DC/AC, Voltage)	12 VDC from car cigarette lighter
Duty Cycle	1.0
Temperature Range (Operating)	-10 ~ 50℃

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 following test modes were performed:
 - Mode 1: 88.5 MHz
 - Mode 2: 106.7 MHz
 - Mode 3: 107.9 MHz
- c. 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.
- d. The configuration is operated in a manner which tends to maximize its emission characteristics in a typical application.
- e. 3 meters measurement distance in semi-anechoic chamber was used in this test.

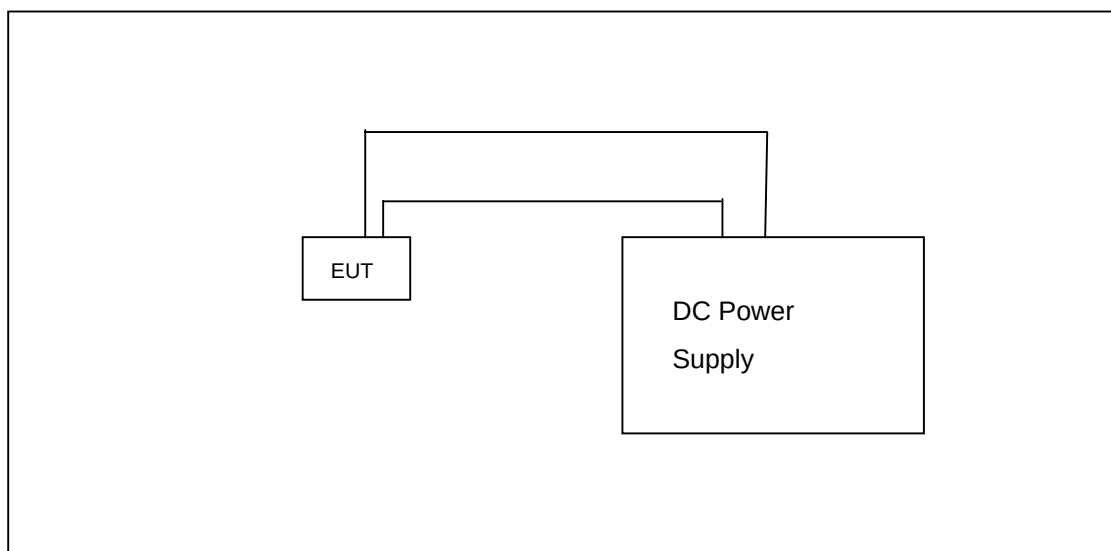
2.2. Frequency Range Investigated

- 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	15.239(b)	Peak and Average Power	Pass
NA	15.107/15.207	AC Power Line Conducted Emission	Not applicable
4.4	15.239(c)	Spurious Radiated Emission	Pass
4.5	15.203	Antenna Requirement	Pass



4.2. Peak and Average Power

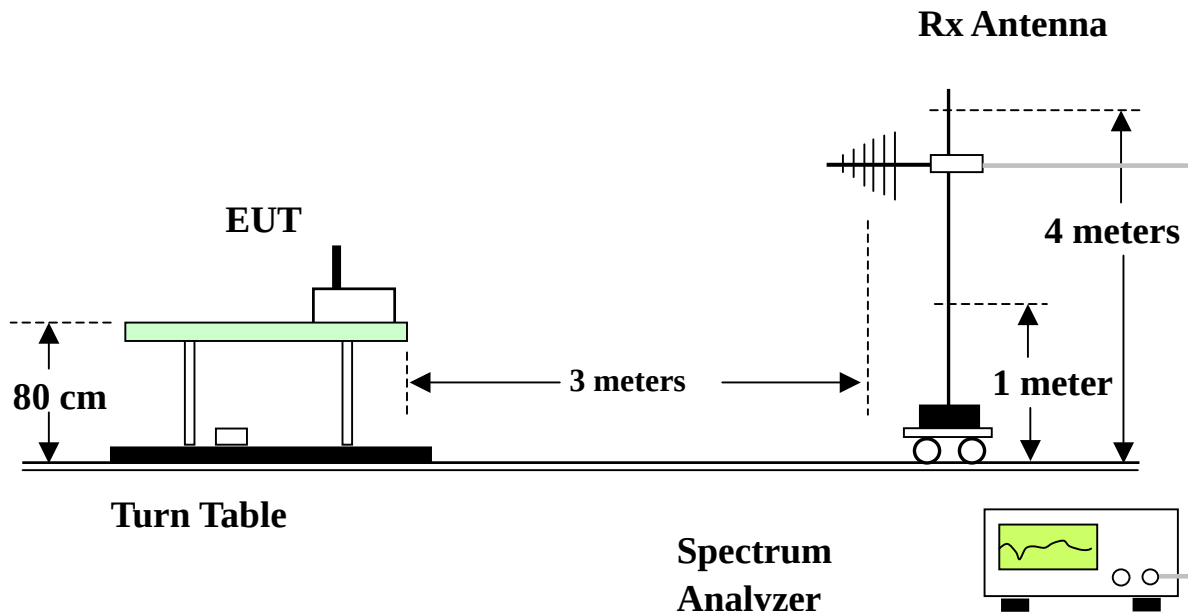
4.2.1. Measuring Instruments

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

4.2.2. 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.

4.2.3. Test Setup Layout



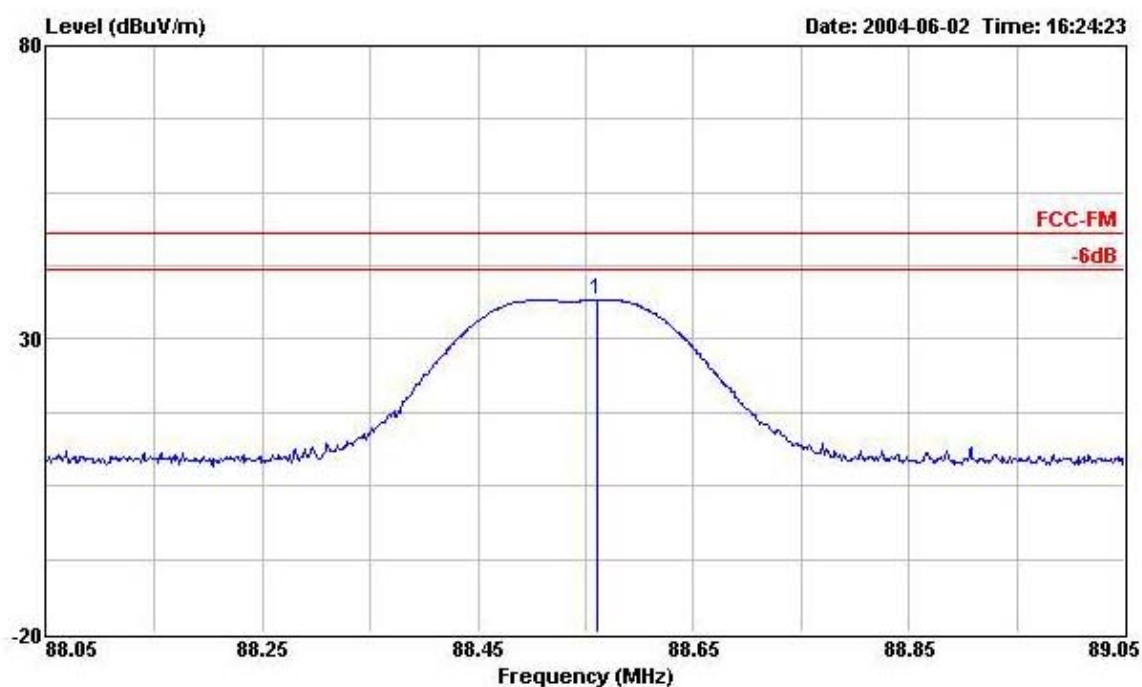


4.2.4. Test and Limit

Standard	15.239 (b)	Limit	AV : 48dBuV/m
Freq. Range	Carrier frequencies		PK : 88 dBuV/m

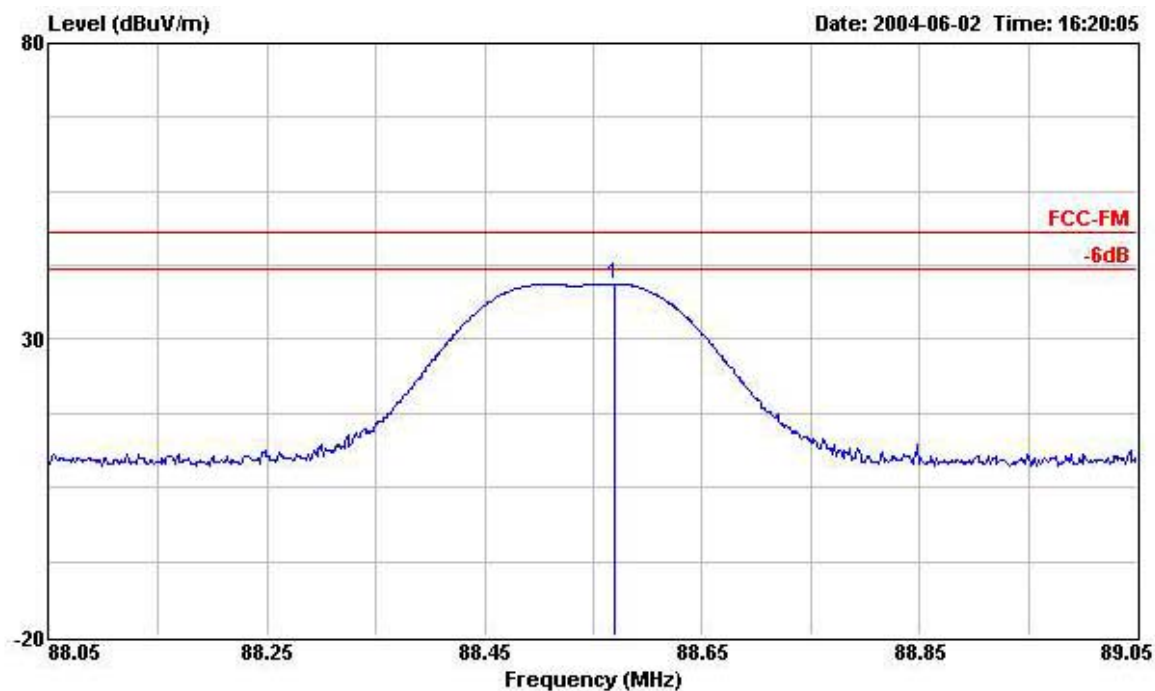
4.2.5. Test Results

Polarization: Horizontal (88.5MHz)



	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	88.560	36.68	-11.27	47.95	53.62	9.37	1.61	27.92	Peak	---	---

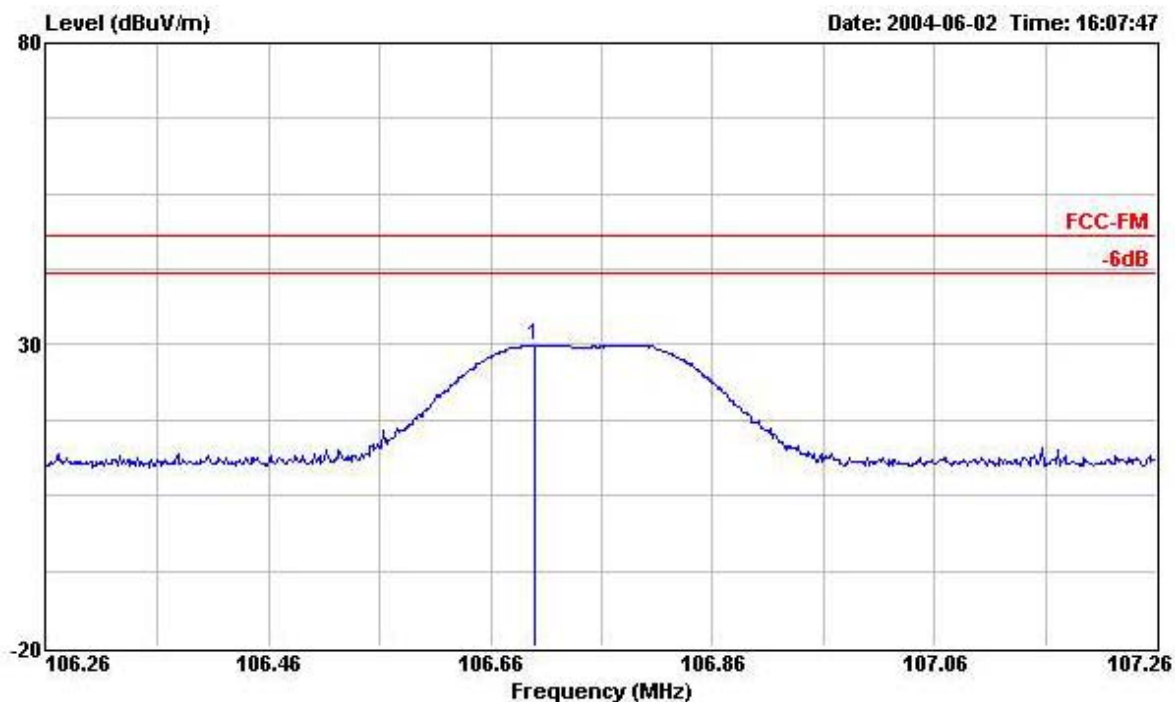
Polarization: Vertical (88.5MHz)



	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	88.570	39.28	-8.67	47.95	56.22	9.37	1.61	27.92	Peak	---	---

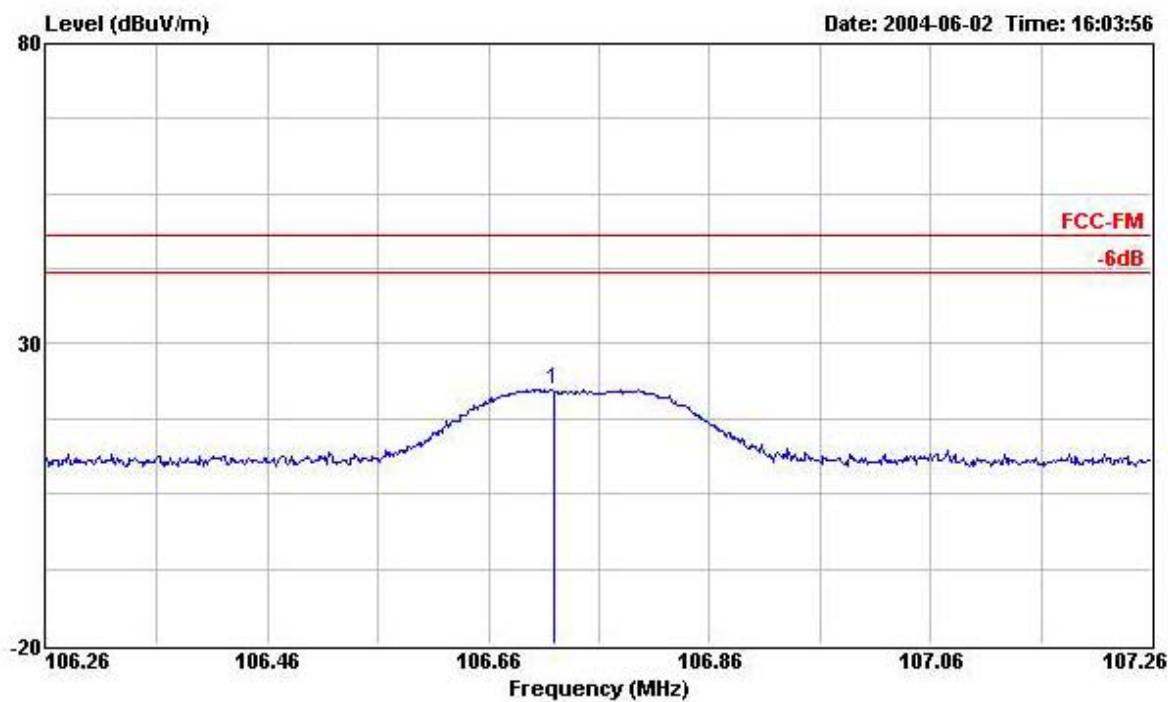


Polarization: Horizontal (106.7 MHz)



	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	106.700	29.96	-17.99	47.95	45.78	10.23	1.84	27.89	Peak	---	---

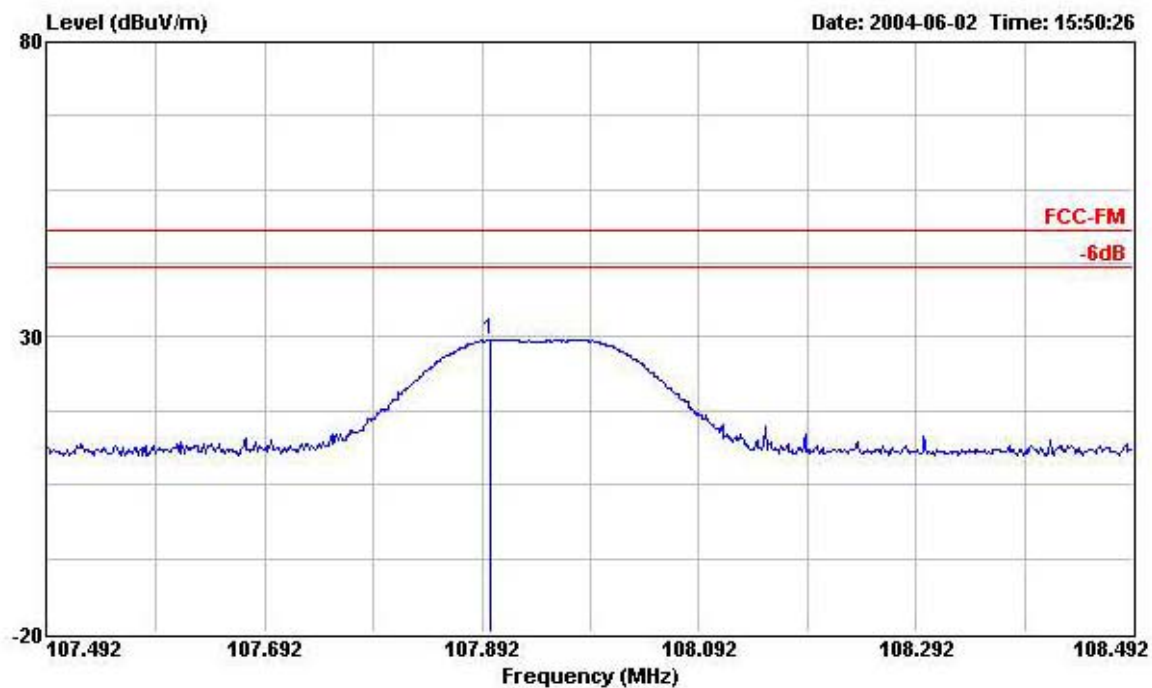
Polarization: Vertical (106.7 MHz)



	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	106.720	22.37	-25.58	47.95	38.19	10.23	1.84	27.89	Peak	---	---

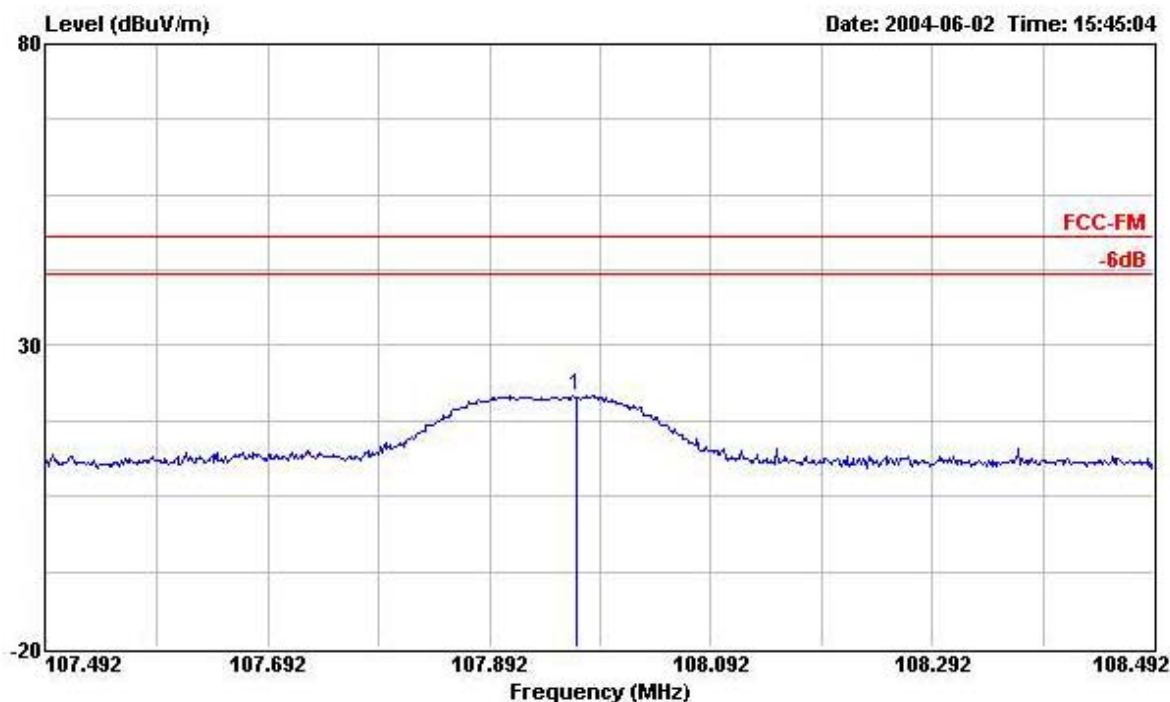


Polarization: Horizontal (107.9 MHz)



	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	107.900	29.60	-18.35	47.95	45.32	10.31	1.85	27.88	Peak	---	---

Polarization: Vertical (107.9 MHz)



	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	107.970	21.66	-26.29	47.95	37.38	10.31	1.85	27.88	Peak	---	---



4.3. Test of Spurious Radiated Emission

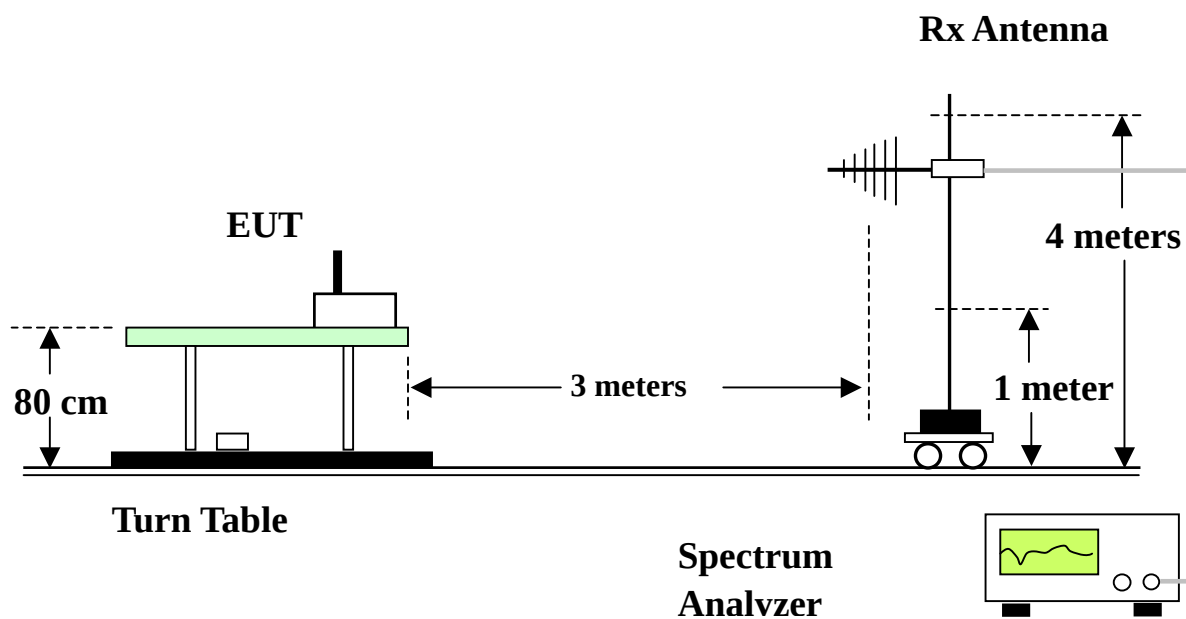
4.3.1. Measuring Instruments

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

4.3.2. Test Procedures

- g) Configure the EUT according to ANSI C63.4.
- h) The EUT was placed on the top of the turn table 0.8 meter above ground.
- i) 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.
- j) Power on the EUT and all the supporting units.
- k) The turn table was rotated by 360 degrees to determine the position of the highest radiation.
- l) 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.
- m) 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.
- n) Set the test-receiver system to Peak or CISPR quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.
- o) For emission above 1GHz, use 1MHz VBW and RBW for peak reading. Then 1MHz RBW and 10Hz VBW for average reading in spectrum analyzer.
- p) 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.
- q) 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.

4.3.3. Test Setup Layout





4.3.4. Test Results and Limit

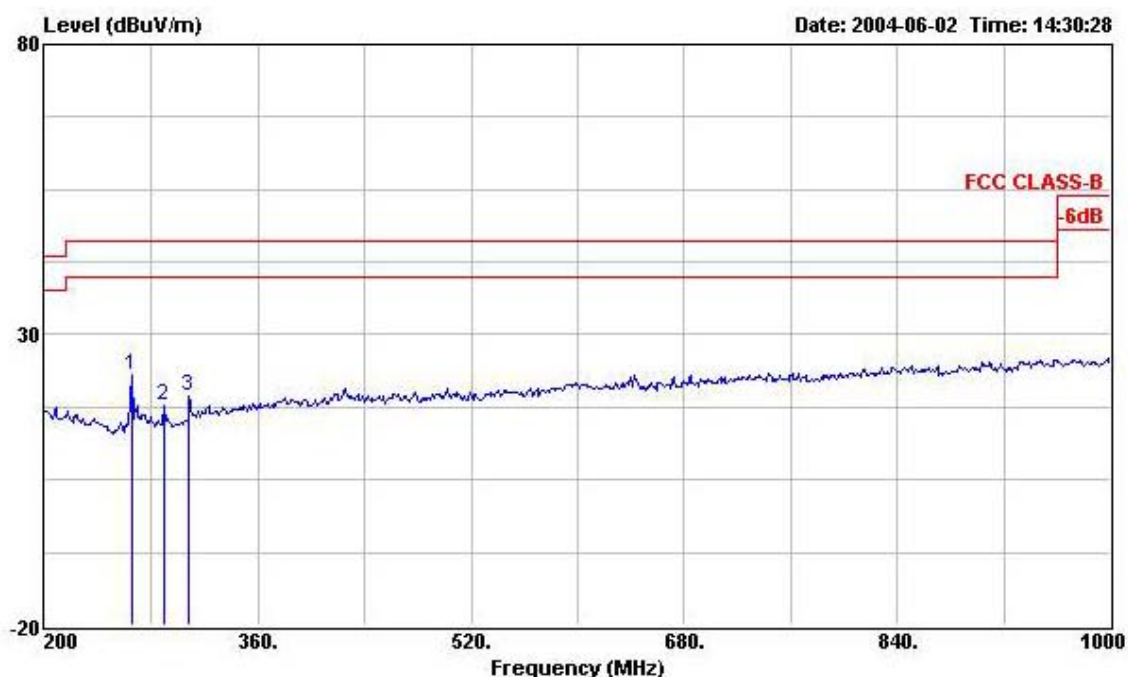
Note:

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

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

Test Mode	Mode 1 (88.5MHz)	Temperature	24deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	67 %		

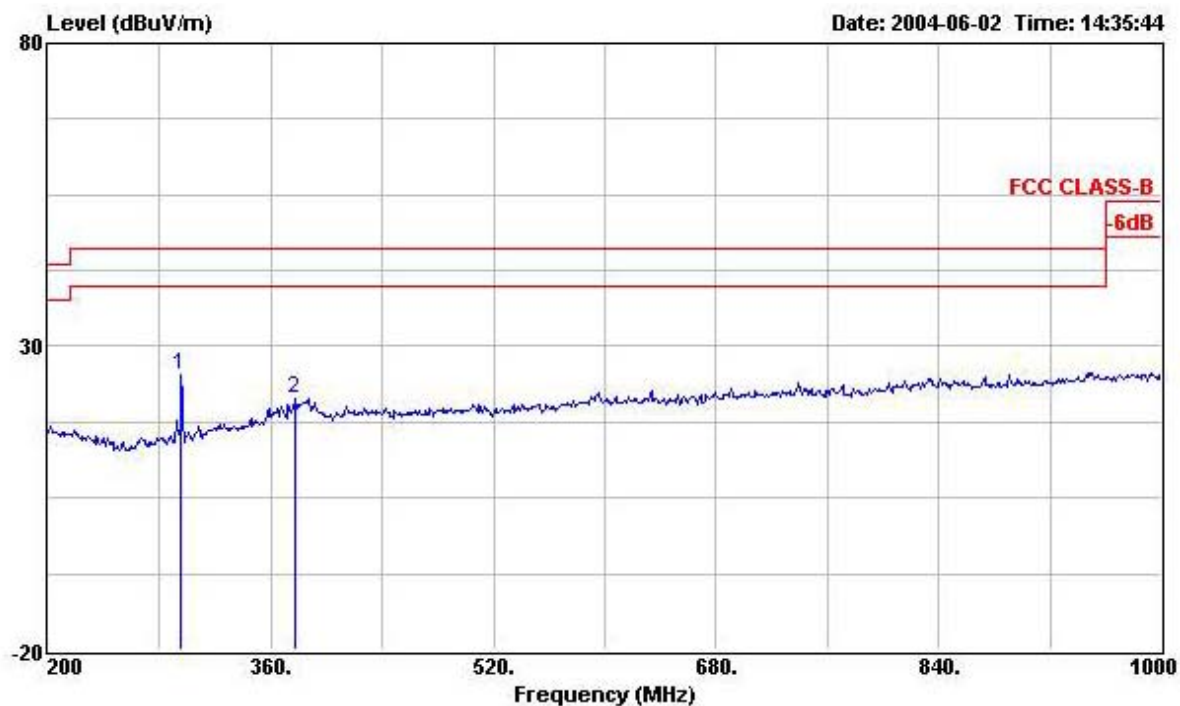
(A) Polarization: Horizontal



	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	265.600	23.12	-22.88	46.00	35.13	12.50	2.93	27.44	Peak	---	---
2	288.800	17.85	-28.15	46.00	29.26	12.89	3.05	27.35	Peak	---	---
3	308.000	19.30	-26.70	46.00	29.85	13.67	3.12	27.34	Peak	---	---



(B) Polarization: Vertical

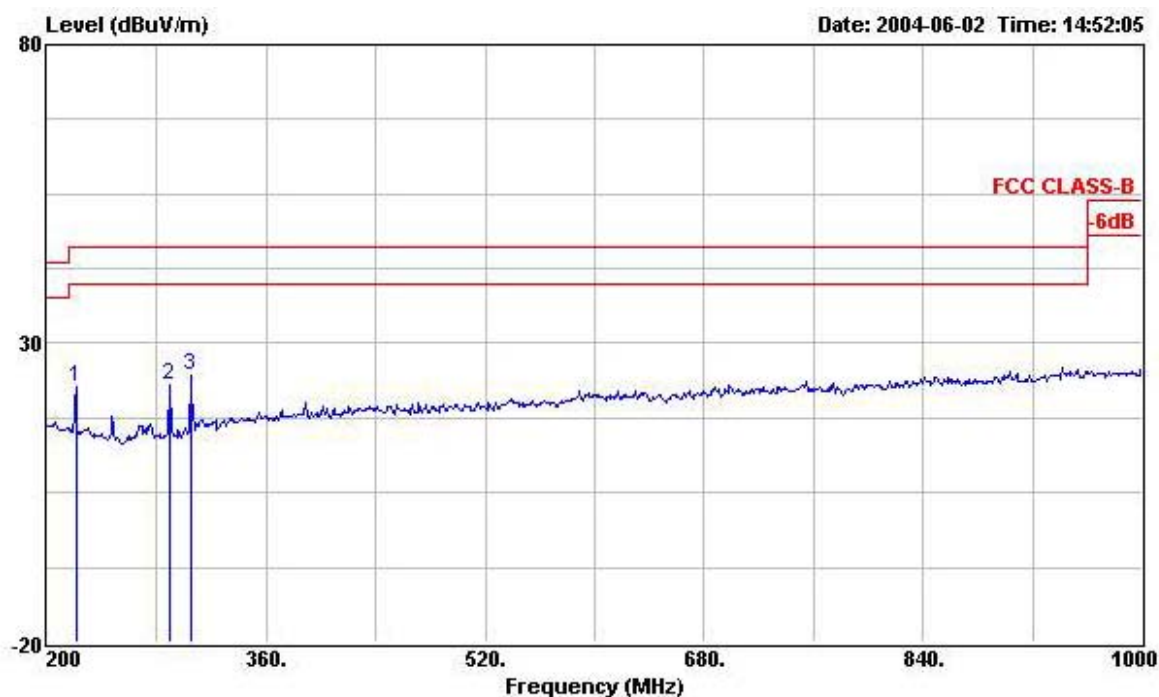


	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	295.200	25.38	-20.62	46.00	36.57	13.06	3.07	27.32	Peak	107	112
2	377.600	21.37	-24.63	46.00	30.29	15.37	3.40	27.69	Peak	---	---



Test Mode	Mode 2 (106.7MHz)	Temperature	24 deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	67%		

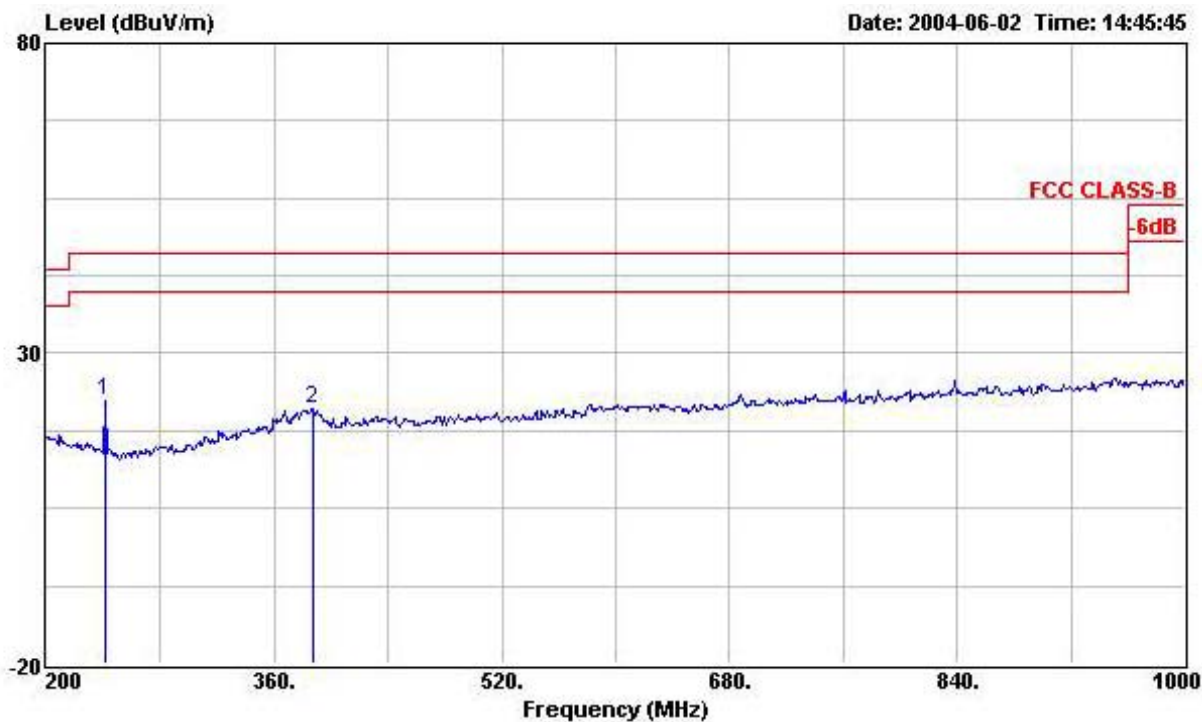
(A) Polarization: Horizontal



	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	220.800	22.72	-23.28	46.00	33.64	14.03	2.67	27.62	Peak	---	---
2	288.800	23.03	-22.97	46.00	34.44	12.89	3.05	27.35	Peak	---	---
3	304.800	24.59	-21.41	46.00	35.32	13.49	3.10	27.32	Peak	102	172



(B) Polarization: Vertical

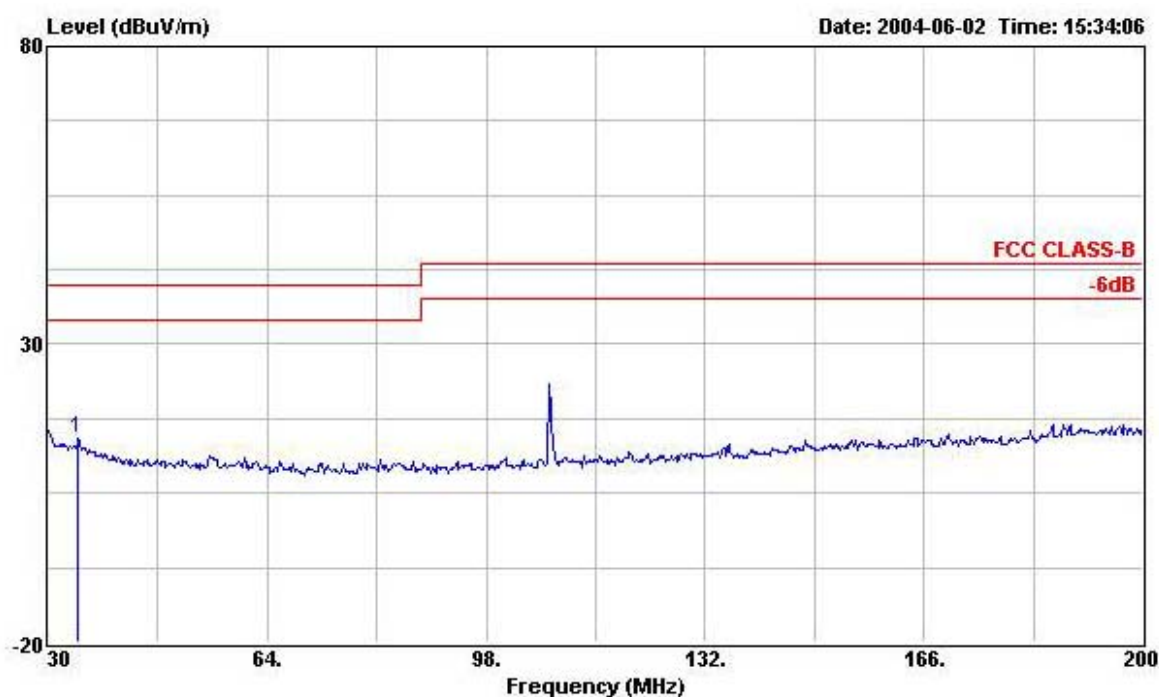


	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	240.800	22.27	-23.73	46.00	34.20	12.81	2.80	27.54	Peak	---	---
2	387.200	21.20	-24.80	46.00	29.99	15.53	3.42	27.74	Peak	---	---

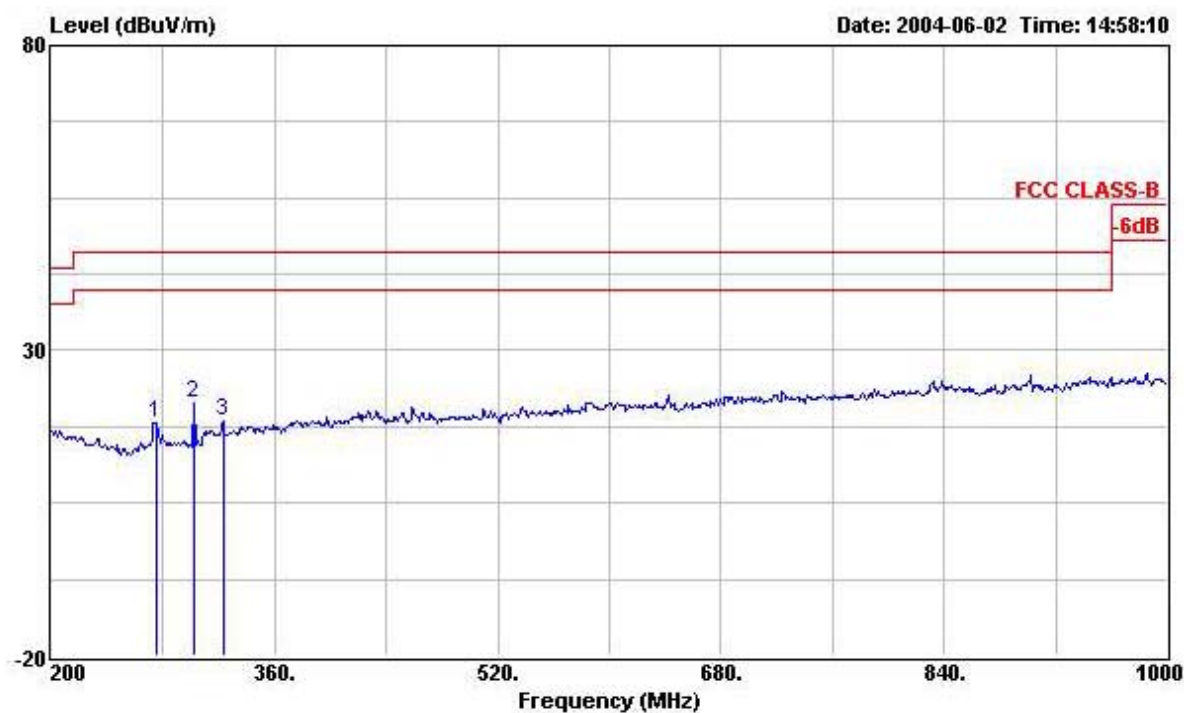


Test Mode	Mode 3 (107.9MHz)	Temperature	24 deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	67%		

(A) Polarization: Horizontal



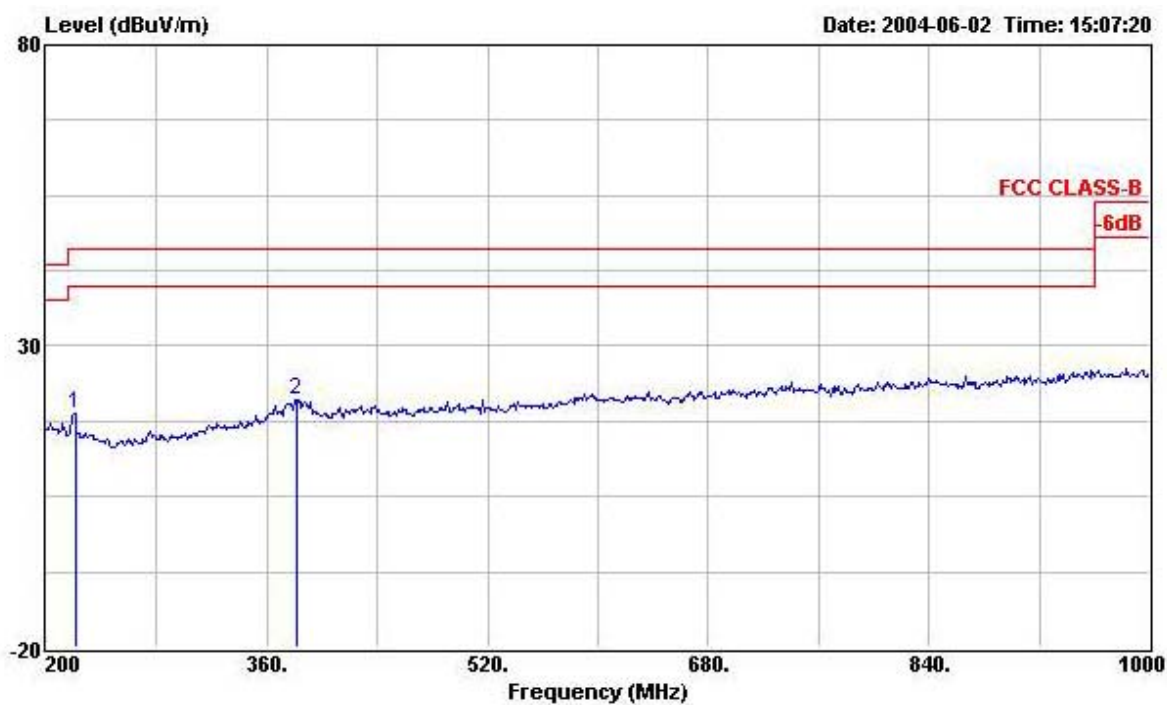
	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	34.590	14.26	-25.74	40.00	28.15	13.14	1.01	28.04	Peak	---	---



	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	275.200	18.18	-27.82	46.00	29.86	12.73	2.99	27.40	Peak	---	---
2	301.600	21.52	-24.48	46.00	32.44	13.30	3.09	27.31	Peak	105	167
3	323.200	18.42	-27.58	46.00	28.14	14.52	3.18	27.42	Peak	---	---



(B) Polarization: Vertical

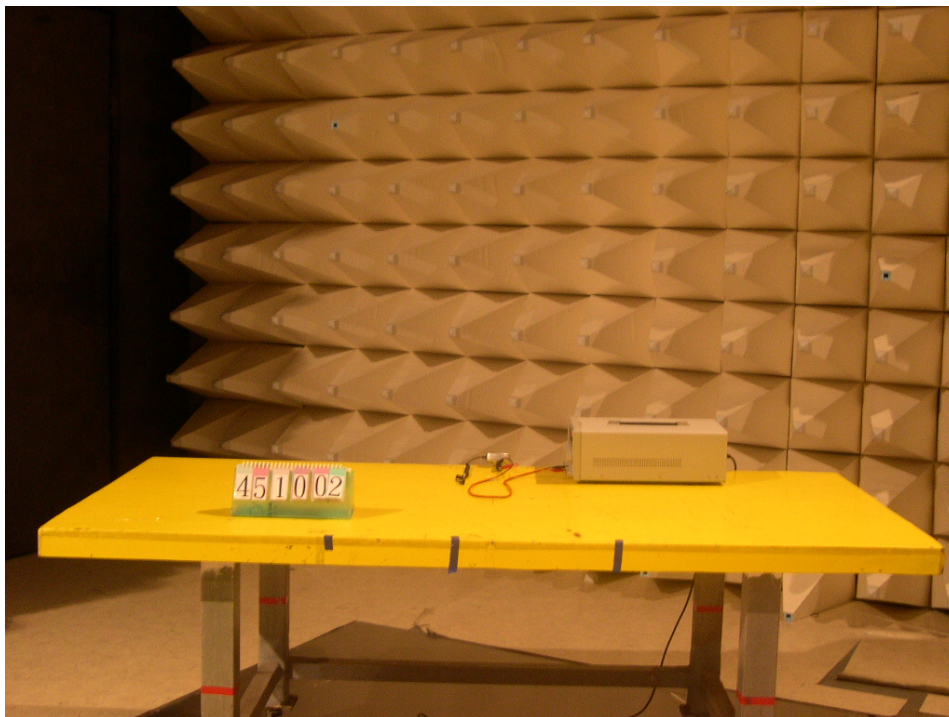


	Freq	Level	Over Limit	Limit Line	Read Level	Probe Factor	Cable Loss	Preamp Factor	Remark	Ant Pos	Table Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	220.800	18.85	-27.15	46.00	29.77	14.03	2.67	27.62	Peak	---	---
2	381.600	21.00	-25.00	46.00	29.88	15.42	3.41	27.71	Peak	---	---

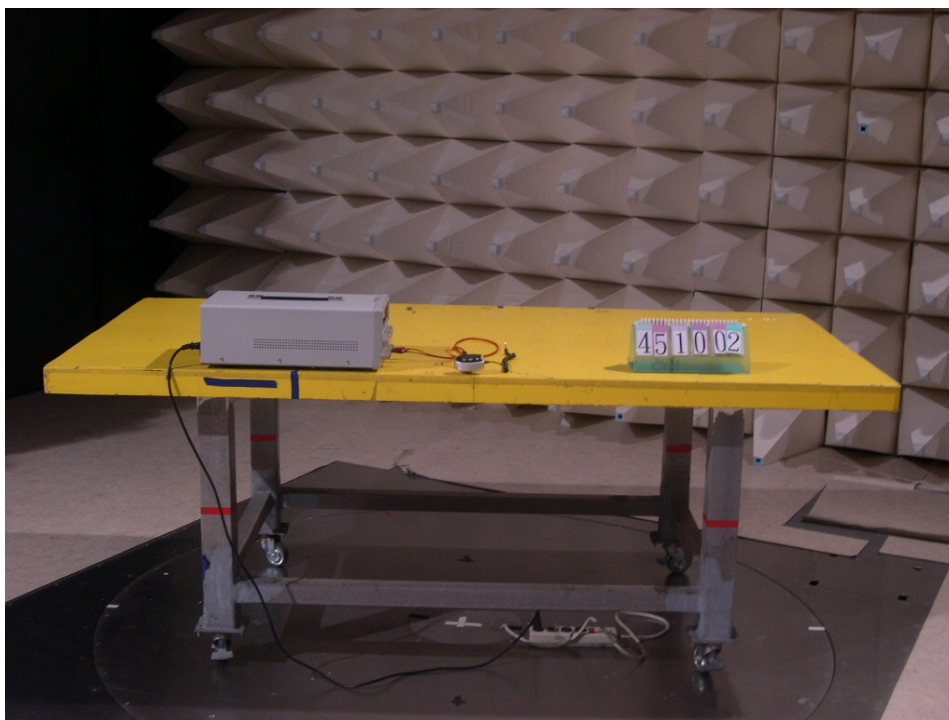
4.3.5. Photographs of Radiated Emission Test Configuration

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

FRONT VIEW



REAR VIEW





4.4. Antenna Requirements

4.4.1. 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.

47 CFR Part15 Section 15.247 (b):

If transmitting antennas of directional gain greater than 6 dBi are used, the peak output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

If the intentional radiator is used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

4.4.2. Antenna Connected Construction

The antenna used in this product is printed 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, 2003	Radiation (03CH03-HY)
2	Spectrum analyzer	R&S	FSP40	100004	9KHZ~40GHz	Aug. 23, 2003	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. 24, 2003	Radiation (03CH03-HY)
5	Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 24, 2003	Radiation (03CH03-HY)
6	RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 03, 2003	Radiation (03CH03-HY)
7	Turn Table	HD	DS 420	420/650/00	0 ~ 360 degree	N/A	Radiation (03CH03-HY)
8	Antenna Mast	HD	MA 240	240/560/00	1 m - 4 m	N/A	Radiation (03CH03-HY)

※ Calibration Interval of instruments listed above is one year.