

FCC TEST REPORT

CATEGORY: Portable End Product
PRODUCT NAME: Remote Control
FCC ID.: PAGTR-004
FILING TYPE: Certification
MODEL NAME: TR-004

APPLICANT: **KAB Enterprise Co., Ltd.**
21F-1, No. 33, Sec. 1, Min Sheng Rd. Panghiao, Taipei
Hsien, Taiwan, R.O.C.
MANUFACTURER: **Verdant Electronics (Dong Guan) Co., Ltd.**
Langxie Administrative District, Qiaotou Dongguan City,
Guangdong China

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

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. Details of the Supporting Units.....	2
2.4. Connection Diagram of Test System	2
3. Test Software	3
4. Test Location and Standards	4
4.1. Test Location.....	4
4.2. Test Standards	4
5. Emission Bandwidth	5
5.1. Measuring Instruments.....	5
5.2. Test Setup Layout	5
5.3. Test Result : See spectrum analyzer plots below.....	5
6. Carrier Field Strength.....	7
6.1. Measuring Instruments.....	7
6.2. Test Procedures	7
6.3. Test Setup Layout	8
6.4. Test Results and Limit.....	9
7. Periodic Transmission Duty Cycle	10
7.1. Measuring Instruments.....	10
7.2. Test Procedures	10
7.3. Test Setup Layout	10
7.4. Test Result : See spectrum analyzer plots below.....	10
8. Conducted Emission Measurement	12
9. Test of Radiated Emission.....	13
9.1. Measuring Instruments.....	13
9.2. Test Procedures	13
9.3. Test Setup Layout	14
9.4. Test Results and Limit.....	15
10. Photographs of Radiated Emission Test Configuration	33
11. List of Measuring Equipments Used	34
Appendix A. Photographs of EUT.....	A1 ~ A6

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

KAB Enterprise Co., Ltd.

21F-1, No. 33, Sec. 1, Min Sheng Rd. Panghiao, Taipei Hsien, Taiwan, R.O.C.

1.2. Manufacturer

Verdant Electronics (Dong Guan) Co., Ltd.

Langxie Administrative District, Qiaotou Dongguan City, Guangdong China

1.3. Basic Description of Equipment under Test

This product is a Remote Control. The technical data has been listed on section “ Features of Equipment under Test ”. This product is used to switch the AC power on and off wirelessly. There are a lot of types with different housing. Their circuit board is completely the same.

1.4. Features of Equipment under Test

ITEMS	DESCRIPTION
Type of Modulation	ASK
Number of Channels	1
Carrier Frequency	315 MHz
Operating Frequency Band	314.6~315.4MHz
Type of Antenna	Printed Antenna
Function Type	Transmitter
Power Rating (DC/AC, Voltage)	12 VDC from battery

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.
- c) There are 3 modes for radiation test due to the alignment of the EUT axis to the turn table central line.

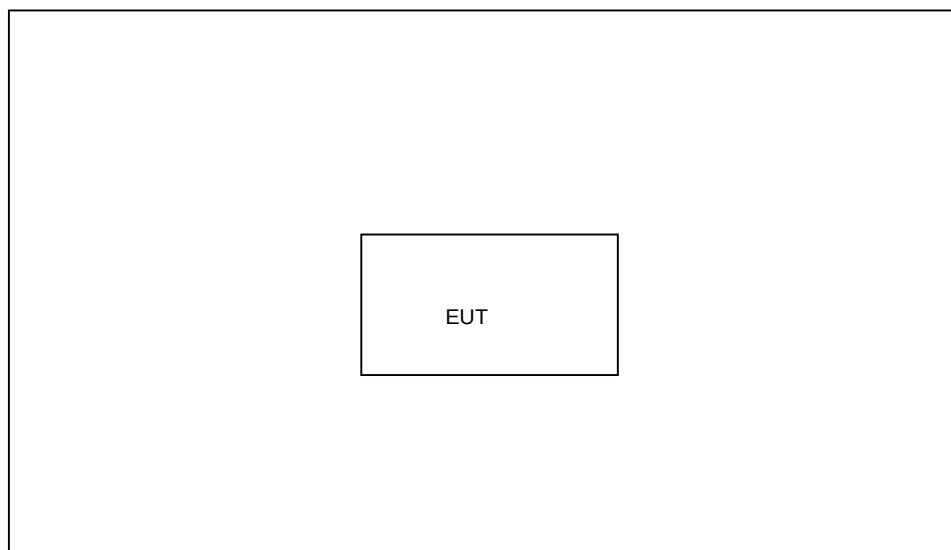
2.2. Frequency Range Investigated

- a) Radiated emission test: from 30 MHz to 10th harmonic of the carrier frequency

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. : 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 15.231)

5. Emission Bandwidth

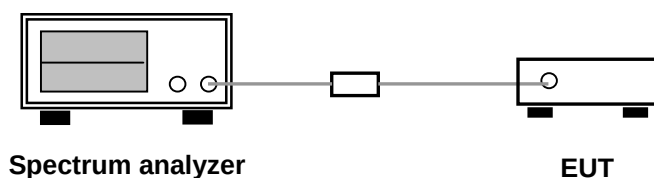
5.1. Measuring Instruments

Item 2 of the table on section 11.

5.1.1. Test Procedures

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 30KHz and VBW to 100KHz.
3. The 99% occupied bandwidth is below the limits.
4. Max. limits is 0.25% of center carrier frequency.

5.2. Test Setup Layout



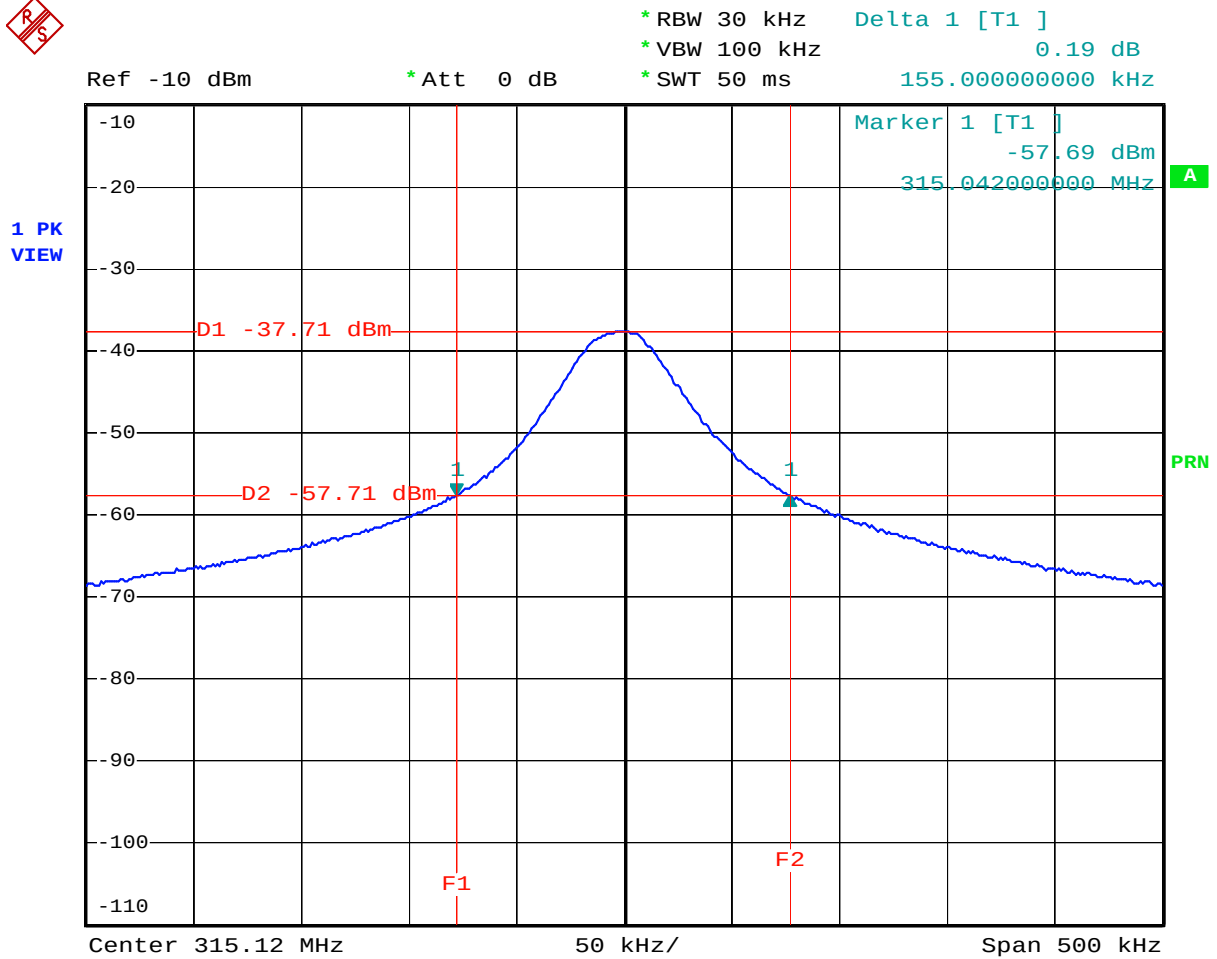
5.3. Test Result : See spectrum analyzer plots below

- Modulation Type: ASK
- Temperature: 25°C
- Relative Humidity: 62 %

Channel	Frequency (MHz)	Occupied Bandwidth (kHz)	Max. Limit (MHz)
1	315	0.155	0.7875



Modulation Type: ASK (Channel 01) :



Date: 8.SEP.2004 23:21:16

6. Carrier Field Strength

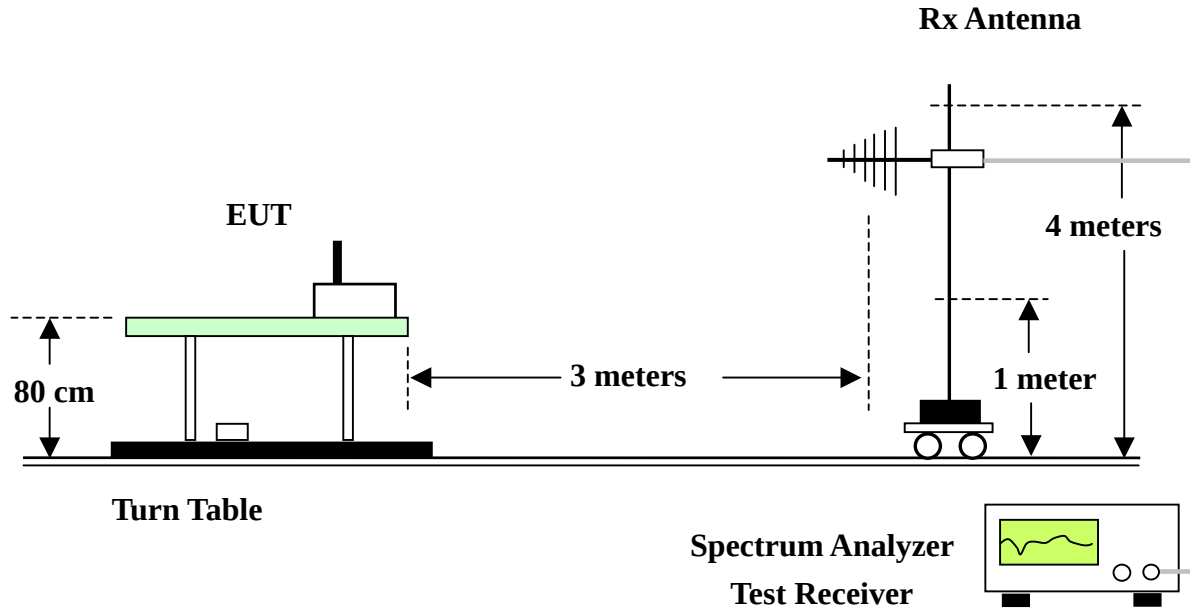
6.1. Measuring Instruments

Please reference item 1~12 in chapter 11 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.

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	
		(dB)	(dBuV/m)	(dBuV)	(dB)	(dB)	(dB)	
314.860	67.12	-8.48	75.6	77.06	14.27	3.17	27.38	Peak
314.860	60.97	-14.63	75.6	70.91	14.27	3.17	27.38	A.V.

7. Periodic Transmission Duty Cycle

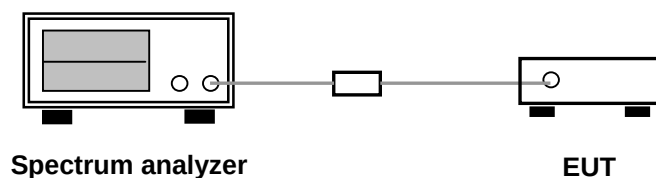
7.1. Measuring Instruments

Item 2 of the table on section 11

7.2. Test Procedures

1. The transmitter output was connected to the spectrum analyzer through an attenuator.
2. Set RBW of spectrum analyzer to 30KHz and VBW to 100KHz.
3. Set span to 0 MHz, check the duty cycle.

7.3. Test Setup Layout



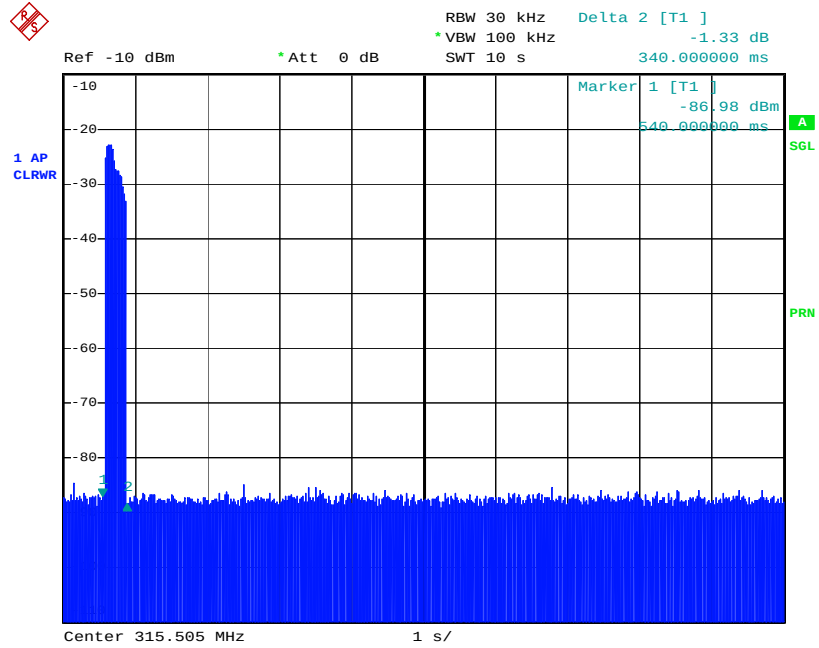
7.4. Test Result : See spectrum analyzer plots below

- Modulation Type: ASK
- Temperature: 25°C
- Relative Humidity: 62 %

Channel	Frequency (MHz)	ON (ms)	OFF (ms)	Duty cycle (%)
1	315	20.4	24.8	41.32

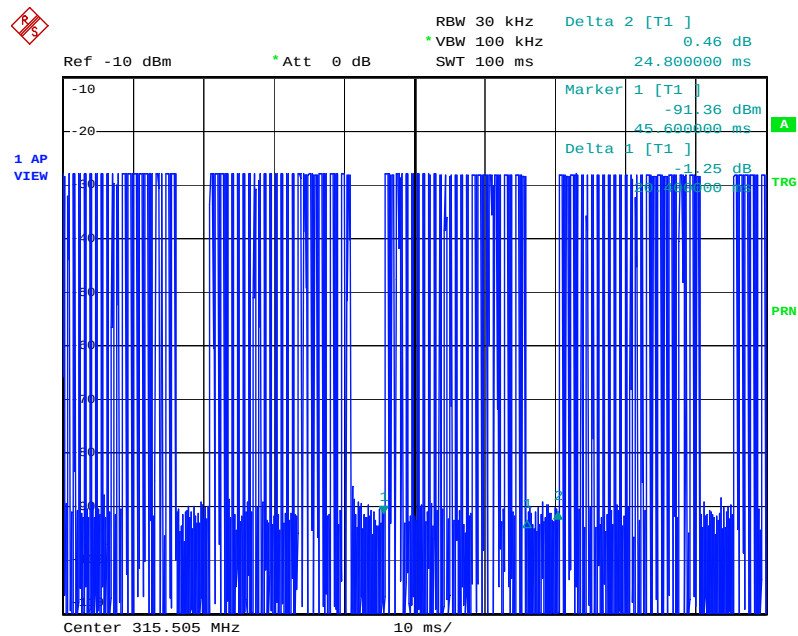


Manually operated transmitter switch off signal within 5 seconds of being released :



Date: 9.SEP.2004 10:31:40

Duty Cycle :



Date: 9.SEP.2004 10:26:04



8. Conducted Emission Measurement

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

9. Test of Radiated Emission

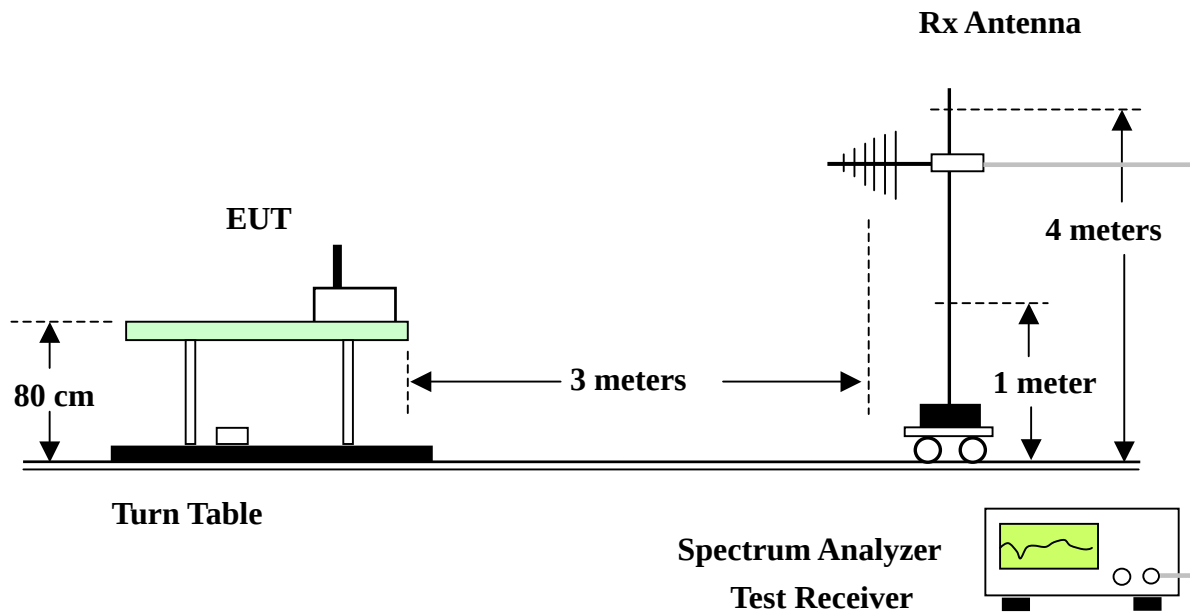
9.1. Measuring Instruments

Please reference item 1~12 in chapter 11 for the instruments used for testing.

9.2. 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.

9.3. Test Setup Layout



9.4. Test Results and Limit

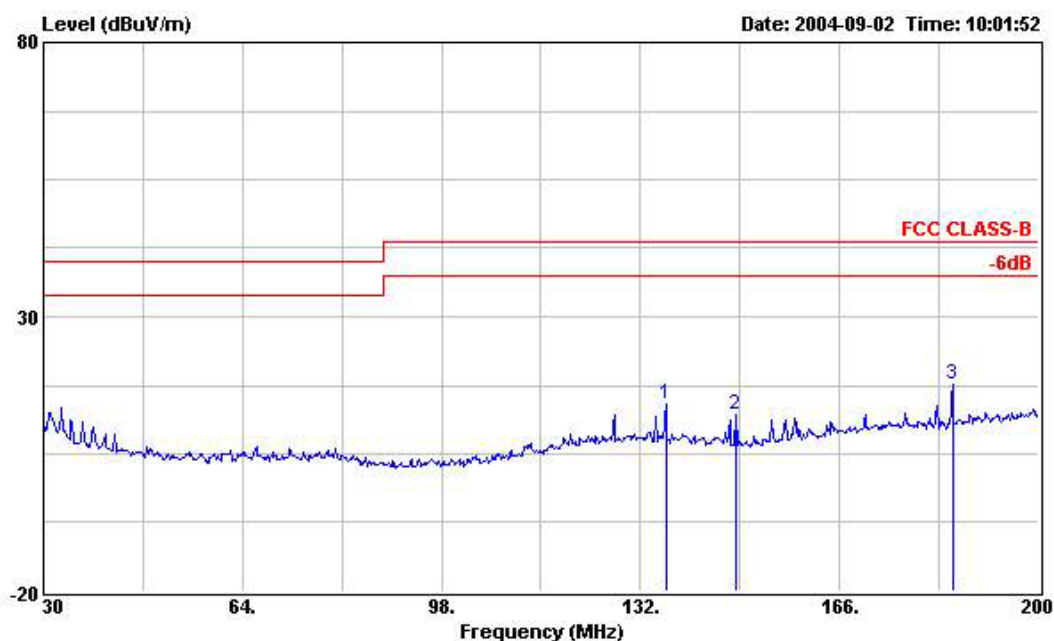
Note:

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

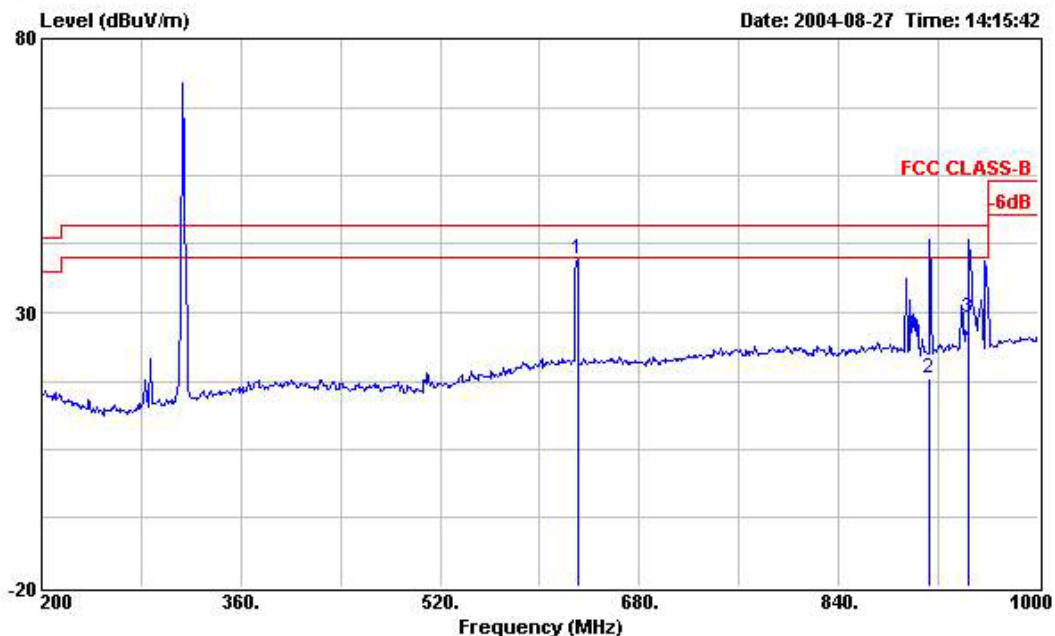
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Test Mode	X	Temperature	25deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	55 %		

(A) Polarization: Horizontal

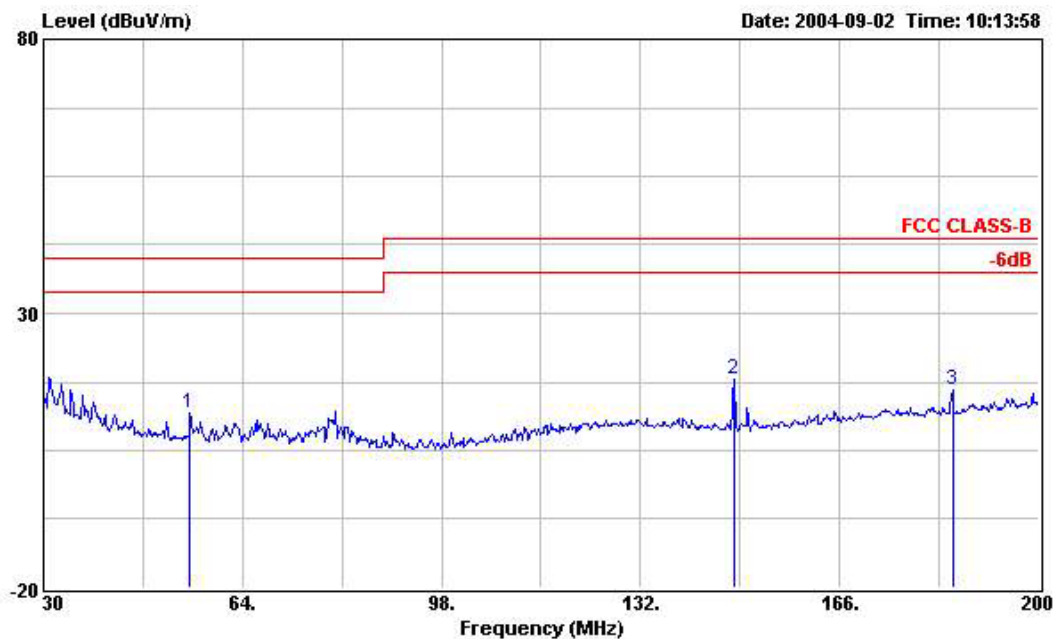


	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	136.420	14.16	-29.34	43.50	27.47	12.51	2.01	27.83	Peak	---	---
2	148.150	12.05	-31.45	43.50	25.60	12.02	2.23	27.80	Peak	---	---
3	185.380	17.69	-25.81	43.50	28.35	14.62	2.45	27.73	Peak	---	---

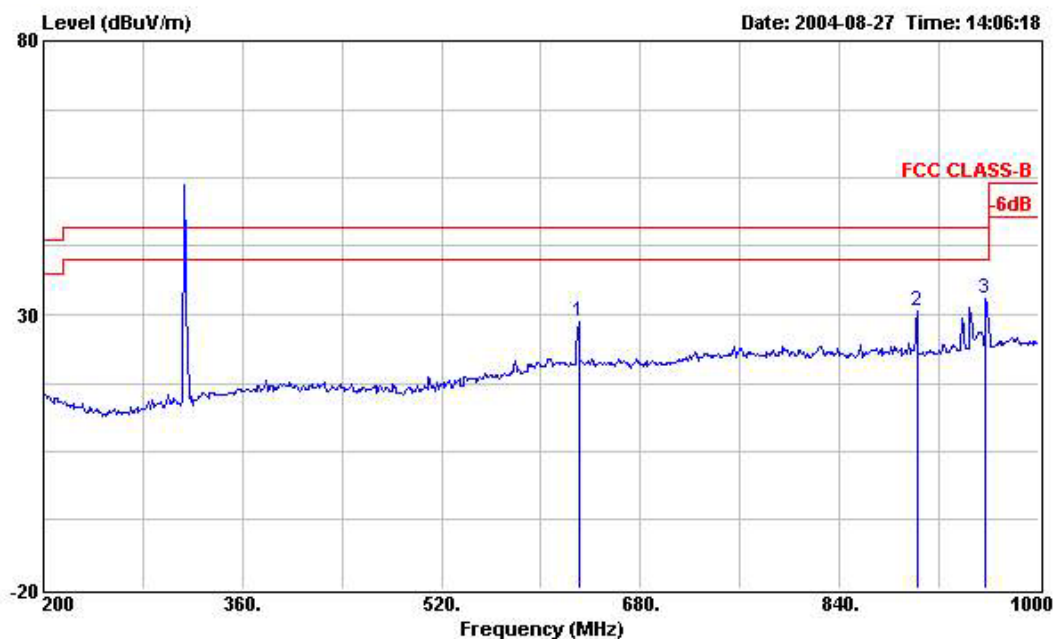


	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	630.400	39.77	-6.23	46.00	43.59	20.49	4.46	28.77	QP	---	---
2	912.800	18.12	-27.88	46.00	19.03	21.99	5.39	28.29	QP	---	---
3	944.800	28.94	-17.06	46.00	28.99	22.69	5.51	28.25	QP	---	---

(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	54.990	11.69	-28.31	40.00	27.46	10.96	1.26	27.99	Peak	---	---
2	147.980	17.95	-25.55	43.50	31.49	12.04	2.22	27.80	Peak	---	---
3	185.380	16.17	-27.33	43.50	26.83	14.62	2.45	27.73	Peak	---	---



	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	630.400	28.82	-17.18	46.00	32.64	20.49	4.46	28.77	Peak	---	---
2	902.400	30.72	-15.28	46.00	31.92	21.75	5.35	28.30	Peak	---	---
3	957.600	33.03	-12.97	46.00	32.66	22.96	5.65	28.24	Peak	---	---



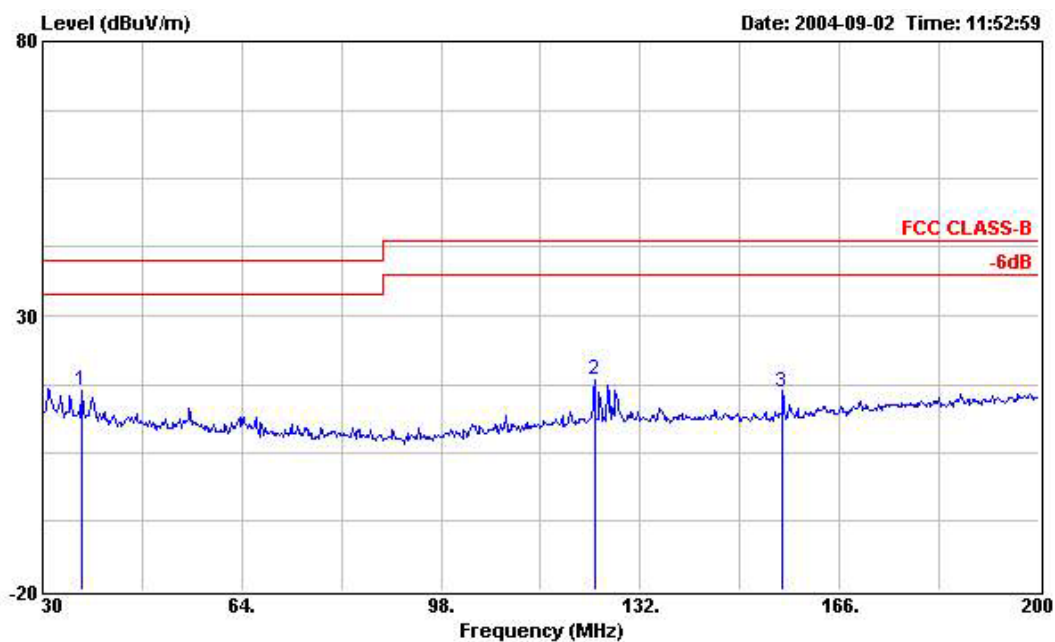
Note:

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

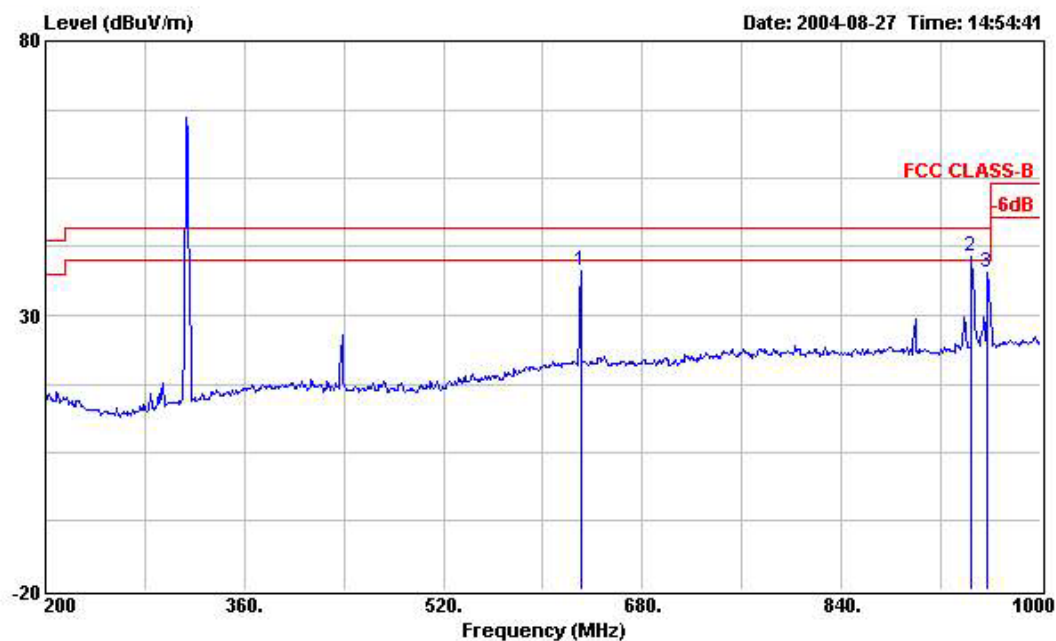
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Test Mode	Y	Temperature	25deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	55 %		

(A) Polarization: Horizontal

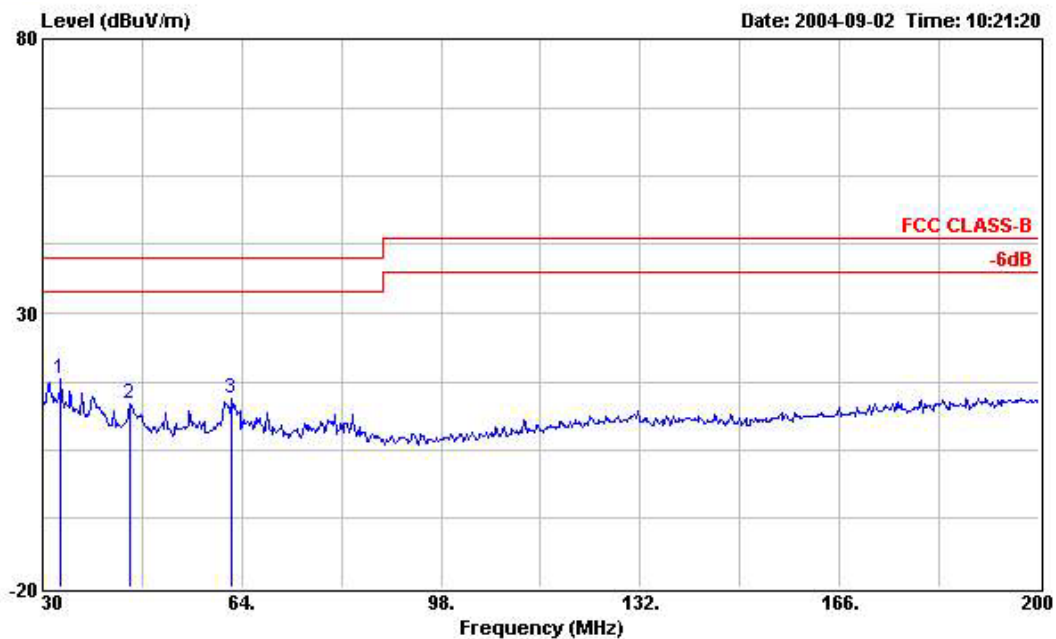


	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	36.630	16.22	-23.78	40.00	31.10	12.12	1.03	28.03	Peak	---	---
2	124.180	18.41	-25.09	43.50	32.12	12.16	1.98	27.85	Peak	---	---
3	156.310	16.20	-27.30	43.50	29.37	12.34	2.28	27.79	Peak	---	---

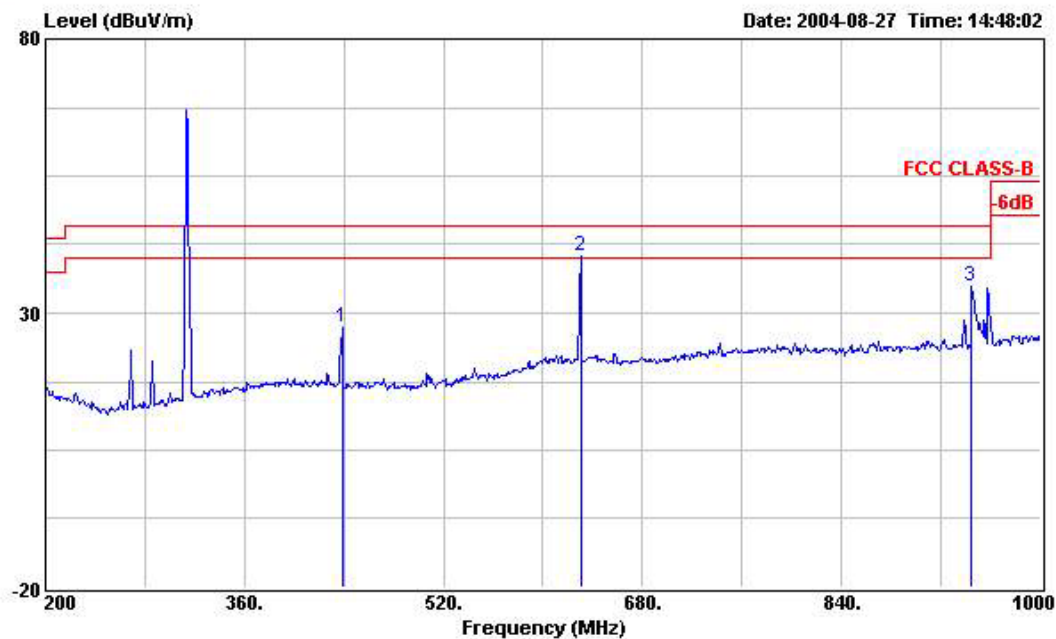


	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	630.400	38.00	-8.00	46.00	41.82	20.49	4.46	28.77	Peak	---	---
2	944.800	40.68	-5.32	46.00	40.73	22.69	5.51	28.25	Peak	---	---
3	957.600	37.76	-8.24	46.00	37.39	22.96	5.65	28.24	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	33.060	17.86	-22.14	40.00	32.58	12.33	0.99	28.04	Peak	---	---
2	44.790	13.57	-26.43	40.00	28.02	12.41	1.15	28.01	Peak	---	---
3	62.300	14.33	-25.67	40.00	30.64	10.34	1.32	27.97	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	438.400	27.38	-18.62	46.00	35.39	16.49	3.64	28.14	Peak	---	---
2	630.400	40.29	-5.71	46.00	44.11	20.49	4.46	28.77	Peak	---	---
3	944.800	34.78	-11.22	46.00	34.83	22.69	5.51	28.25	Peak	---	---



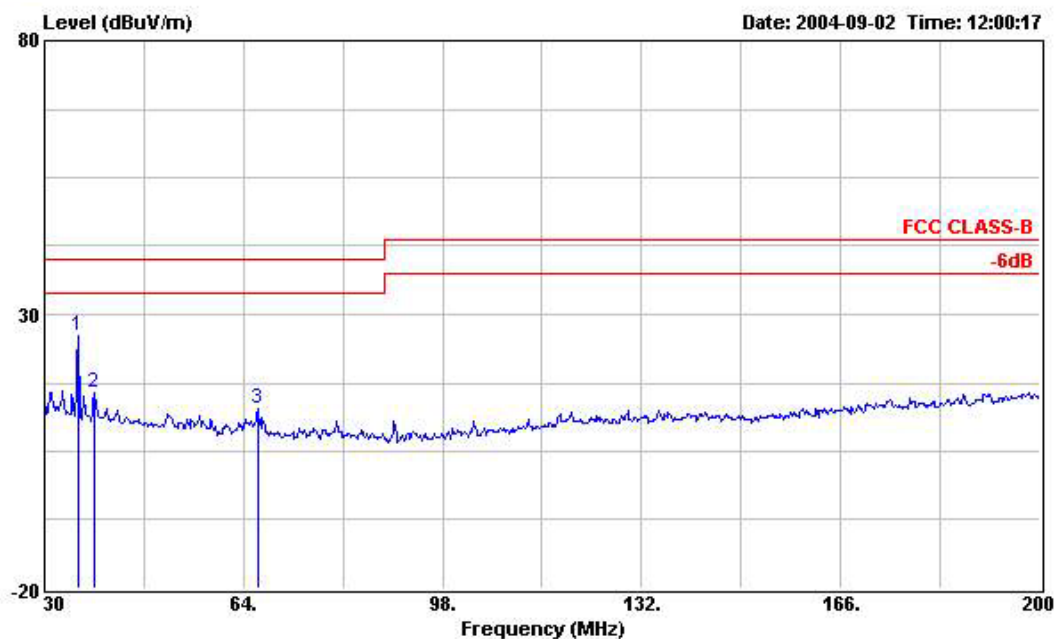
Note:

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

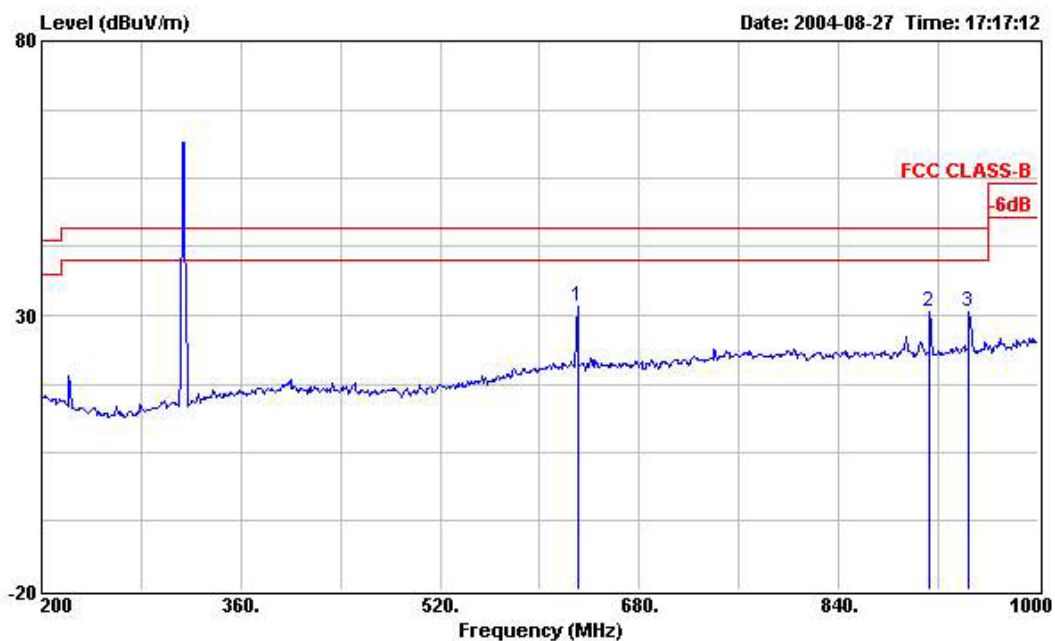
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

Test Mode	Z	Temperature	25deg. C	Tested By	Steve Chen
Freq. Range	30MHz~1GHz	Humidity	55 %		

(A) Polarization: Horizontal

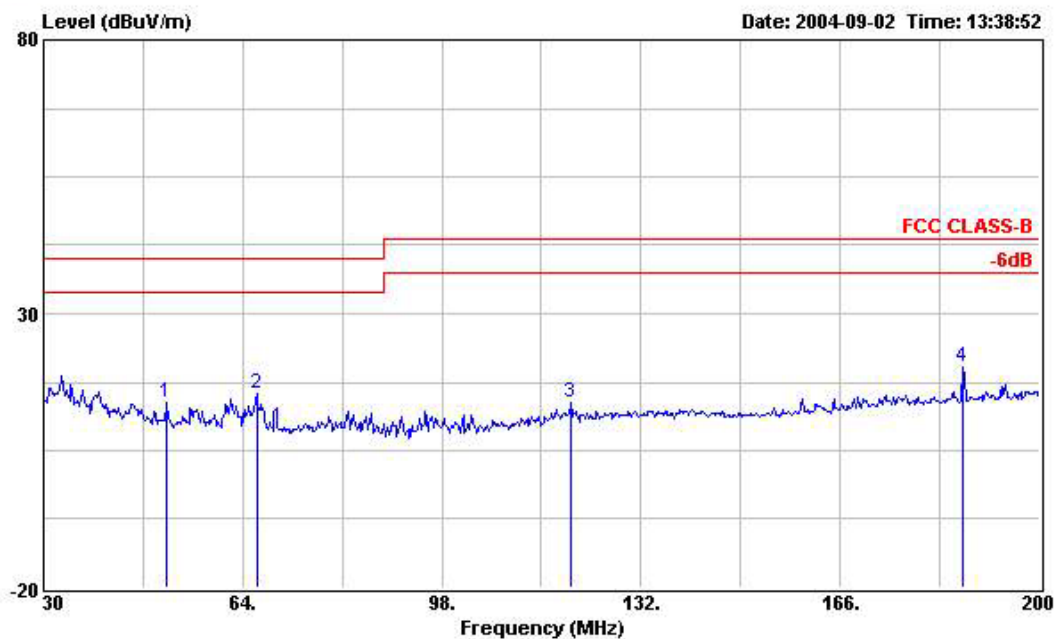


	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	35.780	26.11	-13.89	40.00	41.09	12.02	1.03	28.03	Peak	---	---
2	38.500	15.82	-24.18	40.00	30.42	12.38	1.05	28.03	Peak	---	---
3	66.380	12.75	-27.25	40.00	29.29	10.06	1.37	27.97	Peak	---	---

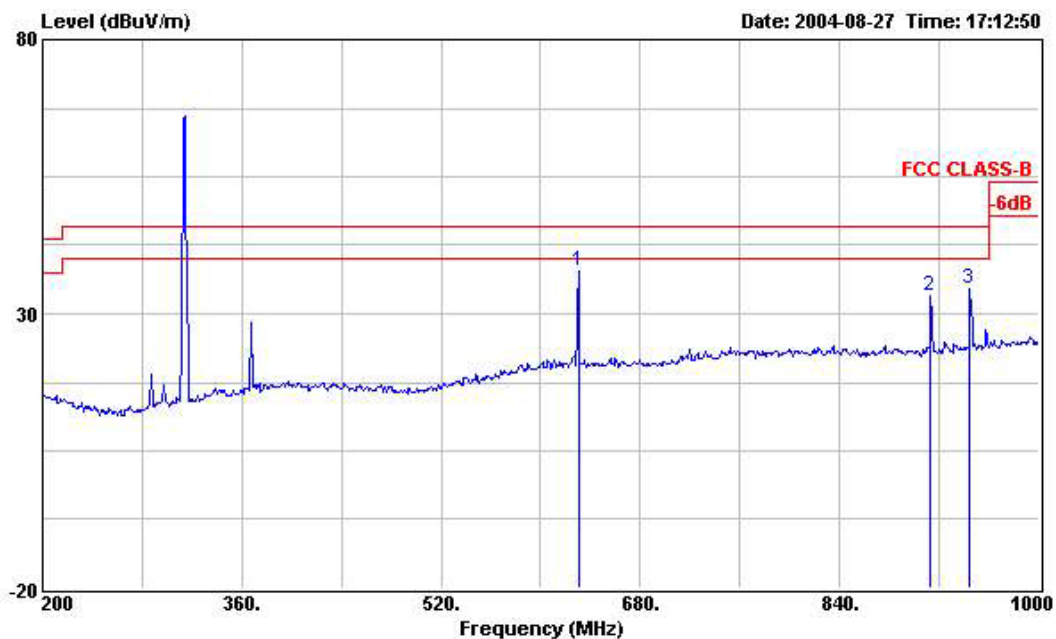


	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
	MHz	dBuV/m	dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	630.400	31.74	-14.26	46.00	35.56	20.49	4.46	28.77	Peak	---	---
2	912.800	30.66	-15.34	46.00	31.57	21.99	5.39	28.29	Peak	---	---
3	944.800	30.76	-15.24	46.00	30.81	22.69	5.51	28.25	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	50.910	13.79	-26.21	40.00	29.27	11.32	1.20	28.00	Peak	---	---
2	66.380	15.35	-24.65	40.00	31.89	10.06	1.37	27.97	Peak	---	---
3	120.100	13.82	-29.68	43.50	27.82	11.90	1.96	27.86	Peak	---	---
4	186.910	20.21	-23.29	43.50	30.73	14.75	2.46	27.73	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	630.400	37.91	-8.09	46.00	41.73	20.49	4.46	28.77	Peak	---	---
2	912.800	33.12	-12.88	46.00	34.03	21.99	5.39	28.29	Peak	---	---
3	944.800	34.48	-11.52	46.00	34.53	22.69	5.51	28.25	Peak	---	---



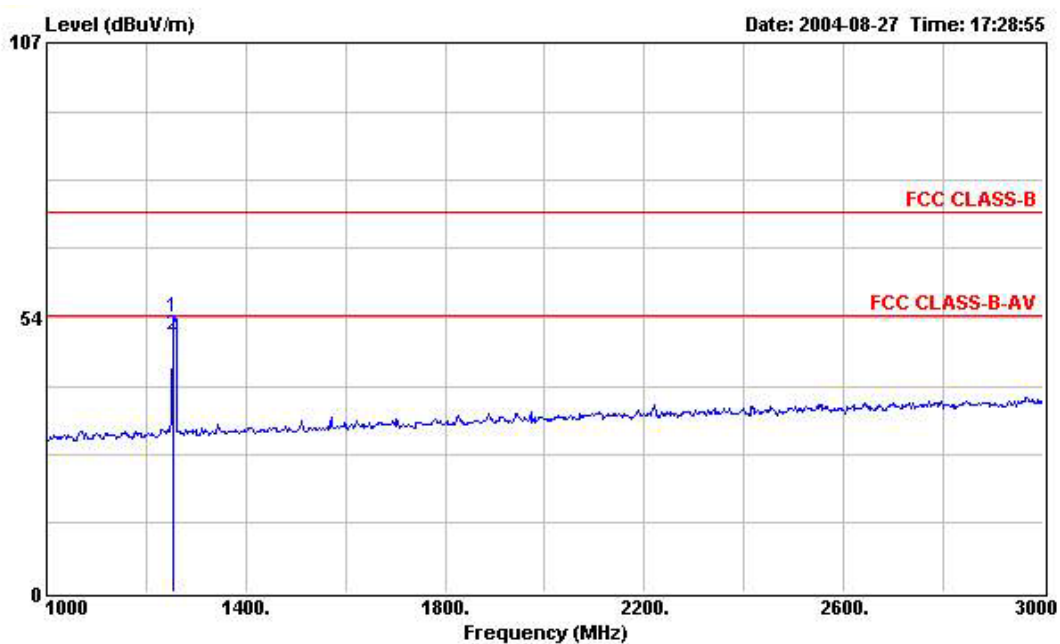
Note:

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

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

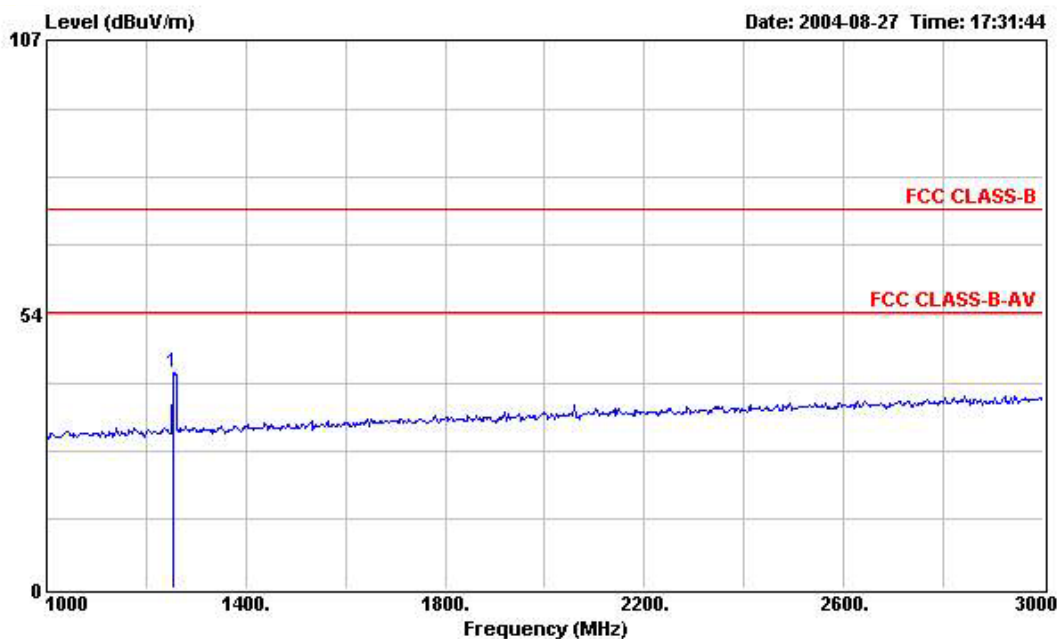
Test Mode	X	Temperature	25deg. C	Tested By	Steve Chen
Freq. Range	1GHz~3GHz	Humidity	55 %		

(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	1254.000	53.60	-20.40	74.00	70.18	24.54	1.38	42.50	Peak	---	---
2	1254.000	49.87	-4.13	54.00	66.45	24.54	1.38	42.50	Average	164	215

(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	1254.000	42.20	-11.80	54.00	58.78	24.54	1.38	42.50	Average	---	---



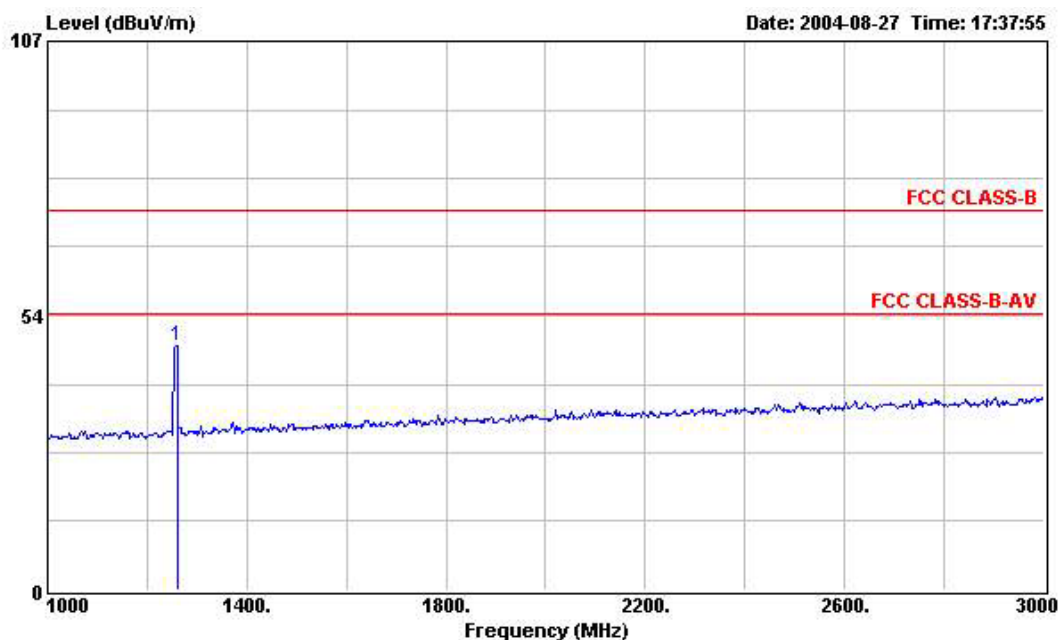
Note:

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

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

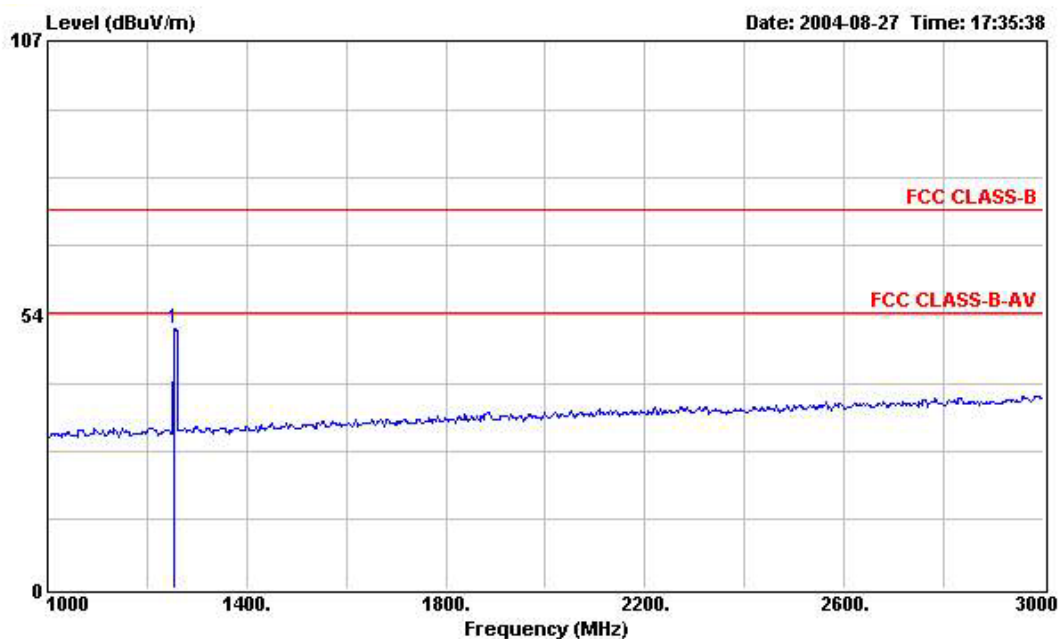
Test Mode	Y	Temperature	25deg. C	Tested By	Steve Chen
Freq. Range	1GHz~3GHz	Humidity	55 %		

(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	1260.000	47.66	-6.34	54.00	64.23	24.56	1.38	42.51	Average	---	---

(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	1254.000	50.63	-3.37	54.00	67.21	24.54	1.38	42.50	Average	141	169



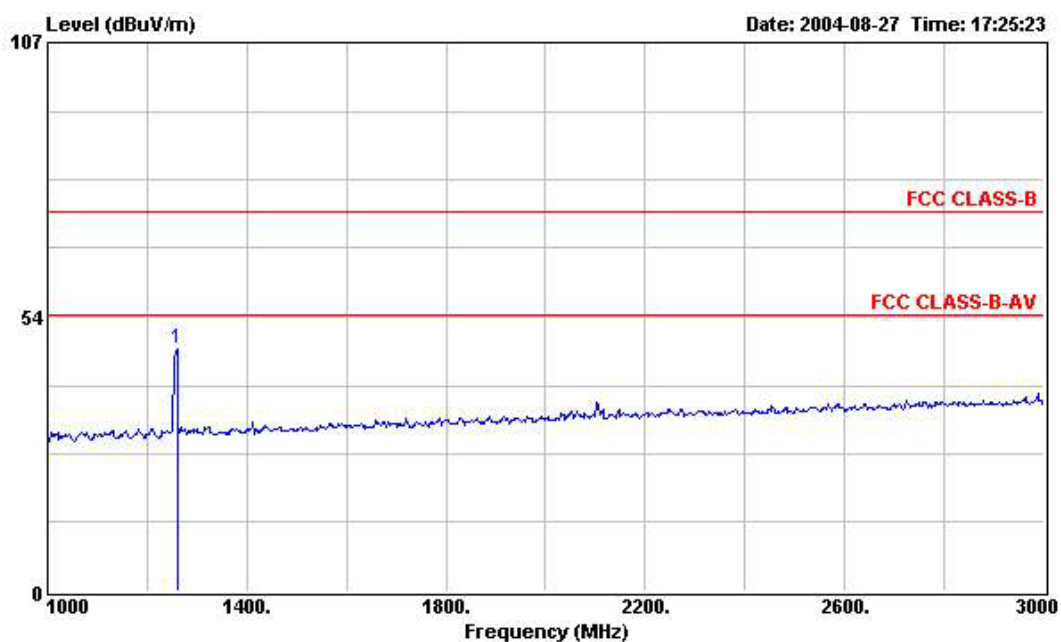
Note:

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

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

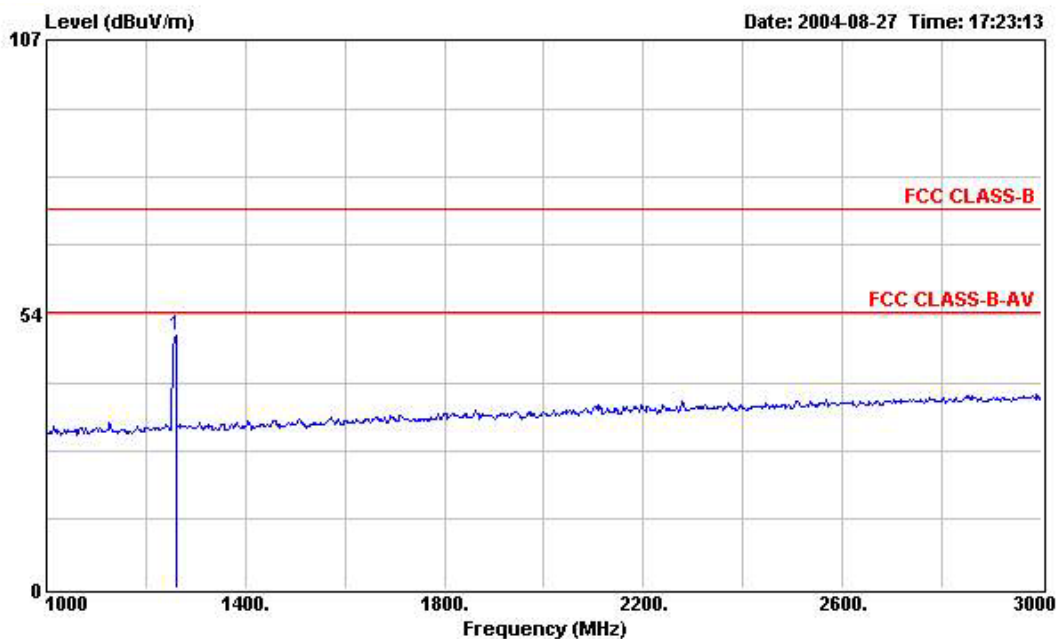
Test Mode	Z	Temperature	25deg. C	Tested By	Steve Chen
Freq. Range	1GHz~3GHz	Humidity	55 %		

(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	1260.000	47.38	-6.62	54.00	63.95	24.56	1.38	42.51	Average	---	---

(B) Polarization: Vertical

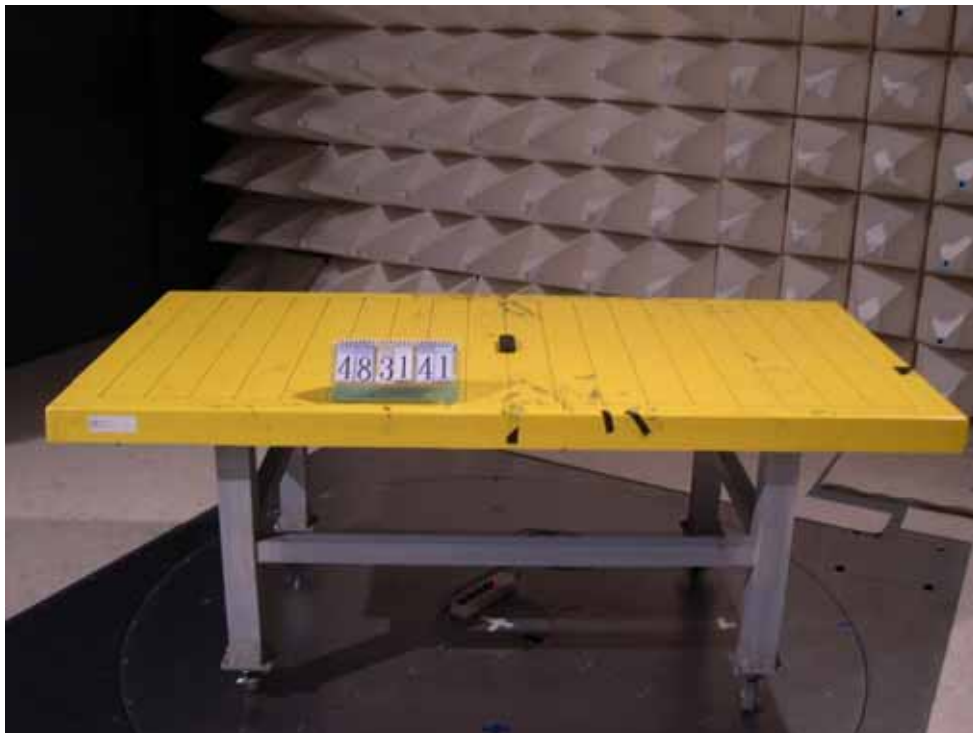


	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp		Ant	Table
	MHz	dBuV/m	Limit	Line	Level	Factor	Loss	Factor	Remark	Pos	Pos
			dB	dBuV/m	dBuV	dB	dB	dB		cm	deg
1	1260.000	49.49	-4.51	54.00	66.06	24.56	1.38	42.51	Average	139	199

10. Photographs of Radiated Emission Test Configuration

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

FRONT VIEW



REAR VIEW



11. 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. 22, 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. 12, 2003	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	15GHz~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)

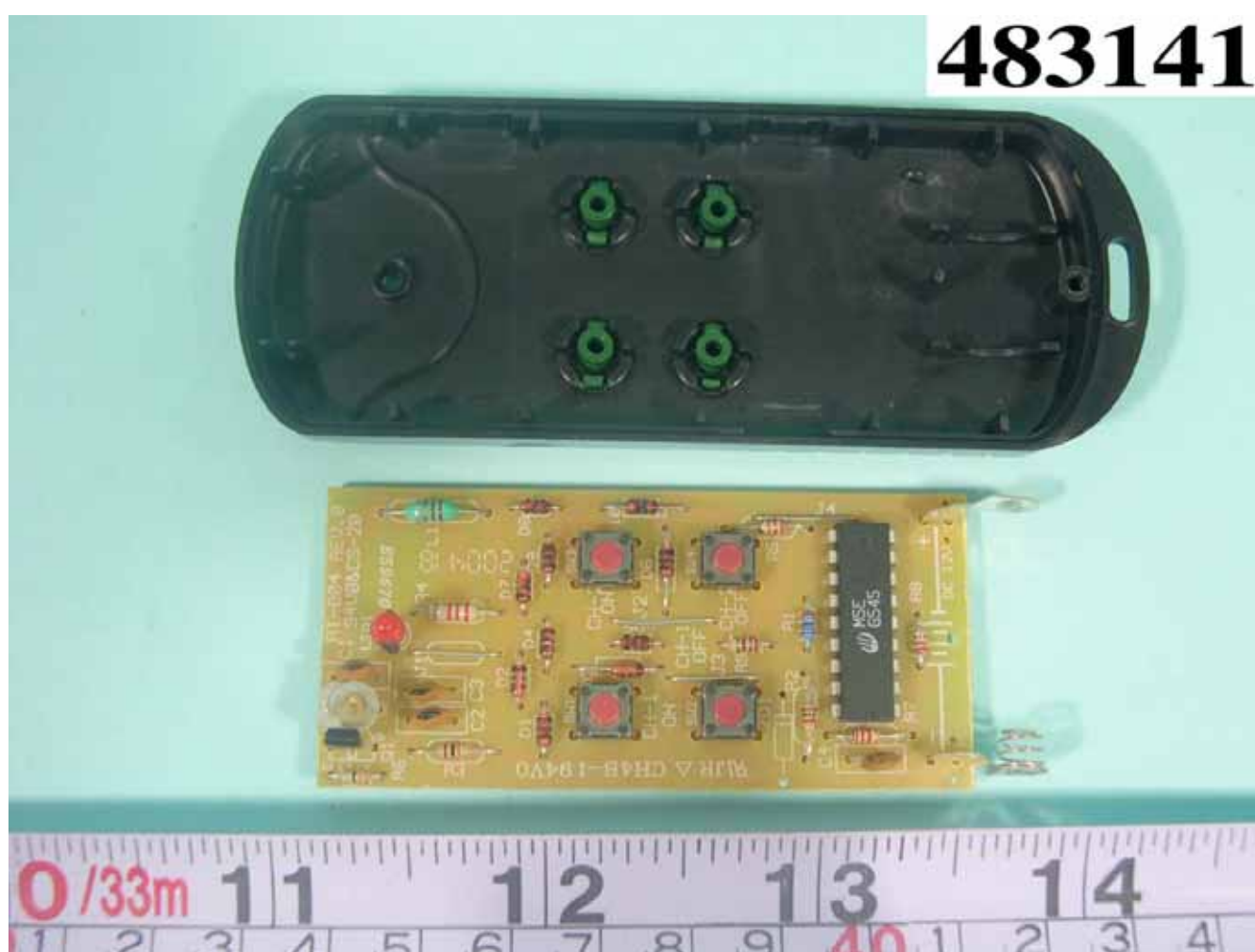
※ Calibration Interval of instruments listed above is one year.

APPENDIX A. Photographs of EUT

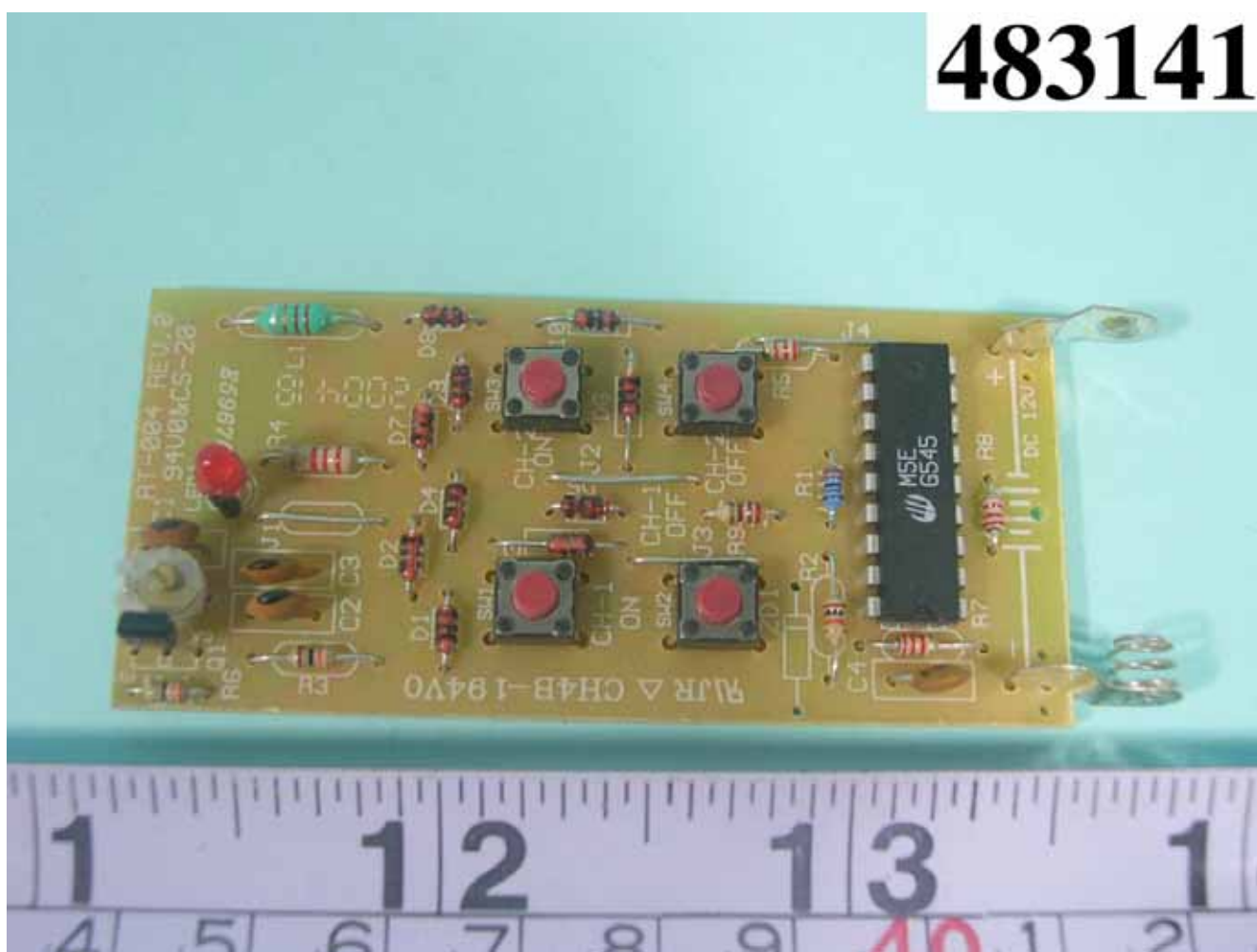








483141



483141

