

FCC TEST REPORT

CATEGORY : Portable
PRODUCT NAME : Belkin Wireless Keyboard and Optical Mouse
FCC ID. : K7SF8E849KYBD
FILING TYPE : Certification
BRANDNAME : BELKIN
MODEL NAME : F8E849-BNDL
APPLICANT : **Paten Wireless Technology Inc.**
8F, No. 407, Zui Kuang RD, NeiHu District, Taipei 114,
Taiwan, R.O.C.
MANUFACTURER : **Paten Wireless (Dongguan) Technology Co., Ltd.**
Da-Ning Industrial Zone, Humen, Dongguan, 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.



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CERTIFICATE OF COMPLIANCE

with

47 CFR FCC Part 15 Subpart C (Section 15.227)

PRODUCT NAME : Belkin Wireless Keyboard and Optical Mouse

MODEL NAME : F8E849-BNDL

APPLICANT : **Paten Wireless Technology Inc.**


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Da-Ning Industrial Zone, Humen, Dongguan, Guangdong,
China

I **HEREBY** CERTIFY THAT:

The measurements shown in this test report were made in accordance with the procedures given in ANSI C63.4 - 2003 and all test are performed according to 47 CFR FCC Part 15. Testing was carried out on Apr. 21, 2005 at SPORTON International Inc. LAB.



Wayne Hsu / Supervisor
Sporton International Inc.



1. General Description of Equipment under Test

1.1. Applicant

Paten Wireless Technology Inc.

8F, No. 407, Zui Kuang RD, NeiHu District, Taipei 114, Taiwan, R.O.C.

1.2. Manufacturer

Paten Wireless (Dongguan) Technology Co., Ltd.

Da-Ning Industrial Zone, Humen, Dongguan, Guangdong, China

1.3. Basic Description of Equipment under Test

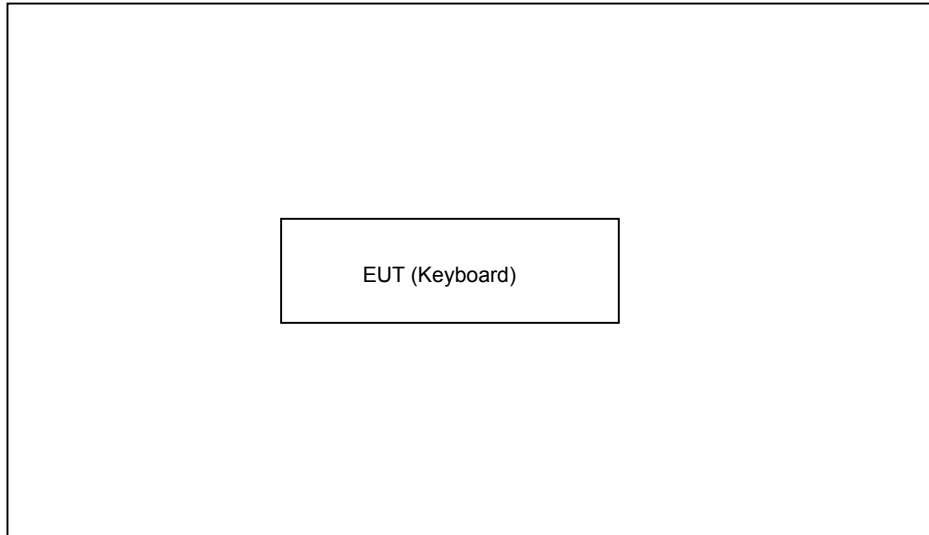
This product is a 27MHz wireless keyboard / mouse and its receiver. The radio technical data has been listed on section " Features of Equipment under Test ". This report is for the keyboard only.

1.4. Features of Equipment under Test

Items	Description
Type of Modulation	: FSK
Number of Channels	: 1
Frequency Band	: 27.045MHz
Antenna Type	: Printed Antenna
Testing Duty Cycle	: 100.00%
Power Rating (DC/AC, Voltage)	: 3 VDC (battery powered)
Temperature Range (Operating)	: -10 ~ 40 °C

2. Test Configuration of the Equipment under Test

2.1. Connection Diagram of Test System



2.2. The Test Mode Description

1. The used peripherals as well as the configuration fulfill the requirements of ANSI C63.4:2003. The configuration is operated in a manner which tends to maximize its emission characteristics in a typical application.
2. 3 meters measurement distance was used in this test.

2.3. Description of Test Supporting Units

The EUT was tested alone.



3. General Information of Test

3.1. Test Facility

Test Site Location : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiag, 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 : 3.0VDC (battery powered)
Normal Temperature : 20°C

3.3. Standards for Methods of Measurement

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

ANSI C63.4-2003
47 CFR Part 15 Subpart C (Section 15.227)

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.

3.5. Frequency Range Investigated

Radiated emission test: from 30 MHz to 10th carrier harmonic.

3.6. Test Distance

The test distance of radiated emission (30MHz~1GHz) test from antenna to EUT is 3 M.
The test distance of radiated emission (1GHz~10th carrier harmonic) test from antenna to EUT is 3 M.

3.7. Test Software

During testing, there is no supporting test software.



4. List of Measurements

4.1. Summary of the Test Results

Applied Standard:47CFR FCC Part 15 Subpart C			
Paragraph	FCC Section	Description of Test	Result
5.1	15.227(a)	Maximum Field Strength of Fundamental	Pass
5.2	15.207	AC Power Line Conducted Emission	Pass
5.3	15.227(b)	Spurious Radiated Emission	Pass
5.4	15.203	Antenna Requirement	Pass

5. Test Result

5.1. Test of Maximum Carrier Field Strength

5.1.1. Applicable Standard

Section 15.227(a): The field strength of any emission within this band shall not exceed 10,000 micro-volts/meter at 3 meters. The emission limit in this paragraph is based on measurement instrumentation employing an average detector.

5.1.2. Measuring Instruments

Item 6~17 of the table on section 6.

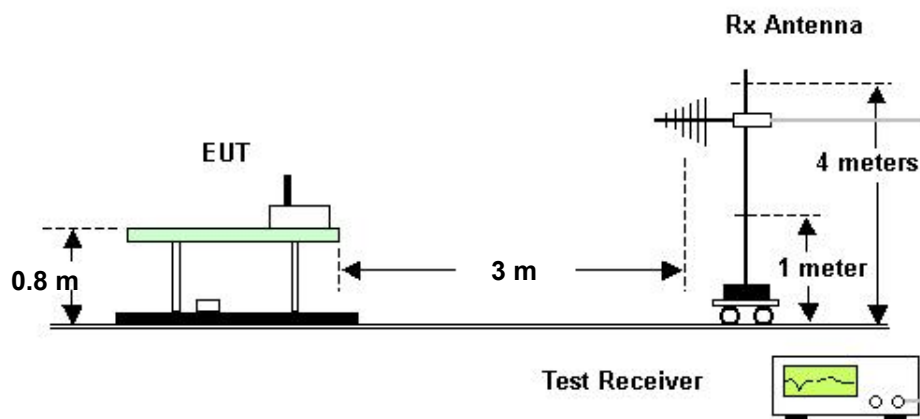
5.1.3. Description of Major Test Instruments Setting

- Test Receiver : (R&S ESCS 30)
Attenuation : Auto
Center Frequency : Carrier Frequency of EUT
IF Bandwidth : 9 KHz

5.1.4. Test Procedures

1. Configure the EUT according to ANSI C63.4.
2. The turntable was rotated by 360 degrees to determine the position of the highest radiation.
3. 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.
4. For carrier field strength emission, the antenna tower was scan (from 1 M to 4 M) and then the turntable was rotated (from 0 degree to 360 degrees) to find the maximum reading.
5. For carrier field strength emission, use 9kHz RBW of Receiver for reading under average and peak detector.

5.1.5 Test Setup Layout





5.1.6 Test Result

- Temperature: 23°C
- Relative Humidity: 55%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Wayne Hsu



Frequency (MHz)	Level (dBuV/m)	Over Limit (dB)	Limit Line (dBuV/m)	Read Level (dBuV/m)	Detector
27.050	53.67	-26.33	80.00	68.26	Peak
27.050	53.55	-46.45	100.00	68.14	Average

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



5.2. Test of AC Power Line Conducted Emission

5.2.1. Applicable Standard

Section 15.207: For a Low-power Radio-frequency Device which is designed to be connected to the AC power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed below limits table.

Frequency (MHz)	QP Limit (dBuV)	AV Limit (dBuV)
0.15~0.5	66~56	56~46
0.5~5	56	46
5~30	60	50

5.2.2. Measuring Instruments

Please reference item 1~5 in chapter 6 for the instruments used for testing.

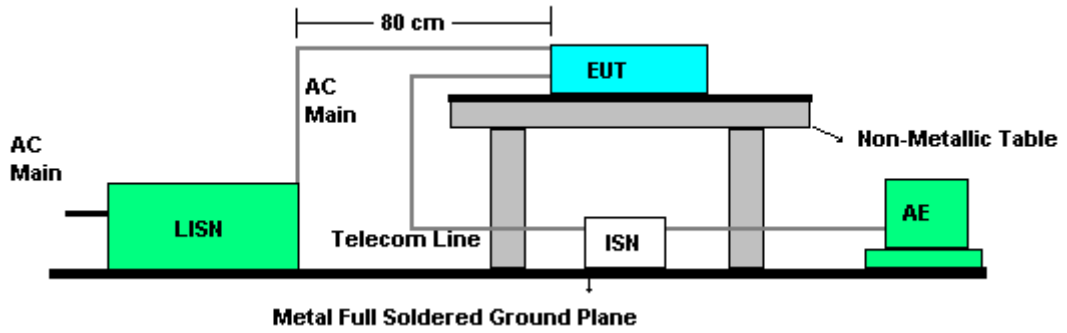
5.2.3. Description of Major Test Instruments Setting

- Test Receiver : R&S ESCS 30
- Attenuation : 10 dB
- Start Frequency : 0.15 MHz
- Stop Frequency : 30 MHz
- IF Bandwidth : 9 KHz

5.2.4. 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. Use the Channel & Power Controlling software to make the EUT working on selected channel and expected output power, then use the "H" Patter Generator software to make the supporting equipments stay on working condition.
7. Set the test-receiver system to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
8. 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.

5.2.5. Test Setup Layout



5.2.6. Test Criteria

All test results complied with the requirements of section 15.207. Measurement Uncertainty is 2.54dB.



5.2.7. Test Result of Conducted Emission

The transmitter is battery powered, there is no need to do this testing.

5.3. Test of Spurious Radiated Emission

5.3.1. Applicable Standard

Section 15.227(b): The field strength of any emissions which appear outside of this band shall not exceed the general radiated emission limits in Section 15.209.

5.3.2. Measuring Instruments

Please reference item 6~17 in chapter 6 for the instruments used for testing.

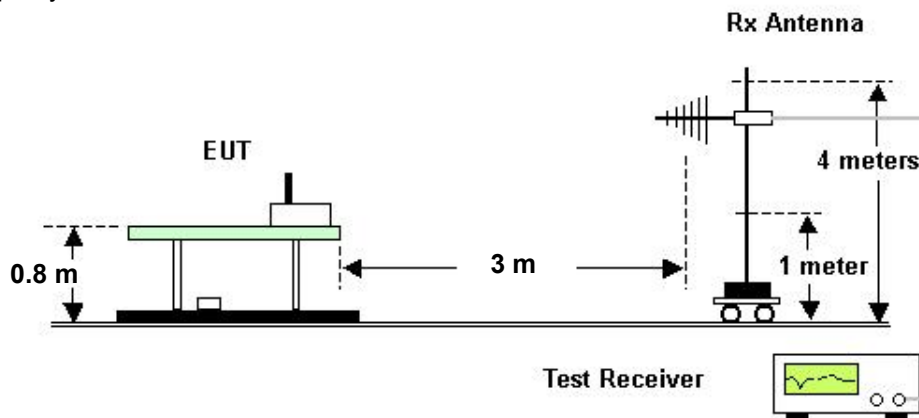
5.3.3. Description of Major Test Instruments Setting

- Test Receiver : R&S ESCS 30
- Attenuation : Auto
- Start Frequency : 30 MHz
- Stop Frequency : 10th carrier harmonic
- RB : 120 KHz for QP or PK

5.3.4. 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 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 quasi-peak Detect Function with specified bandwidth under Maximum Hold Mode.

5.3.5. Test Setup Layout



5.3.6. Test Criteria

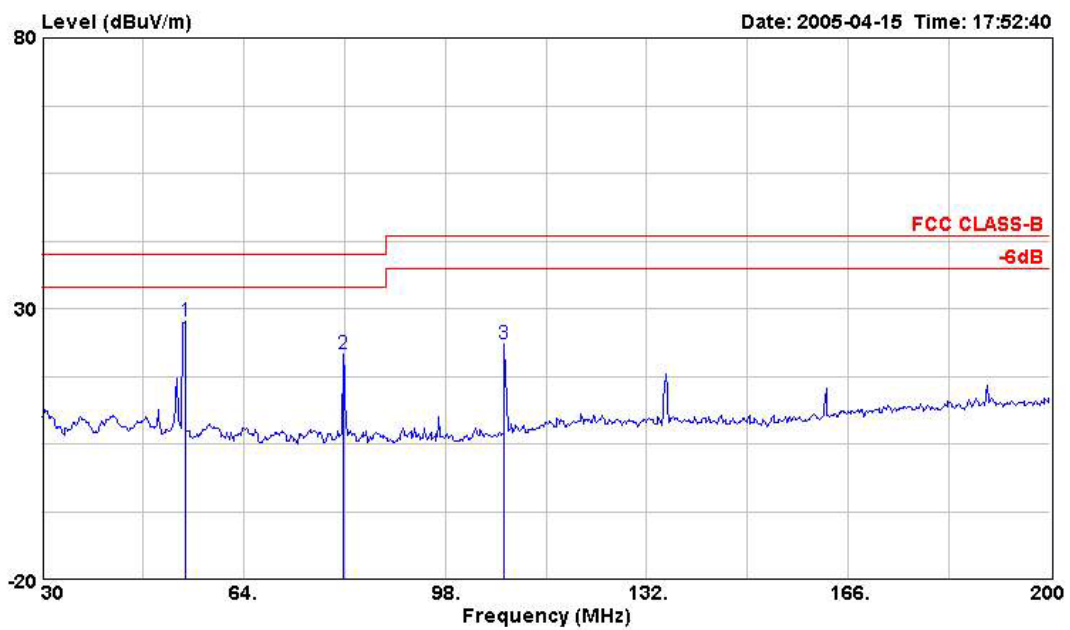
All test results complied with the requirements of the section 15.227(b). Measurement Uncertainty is 2.26dB.



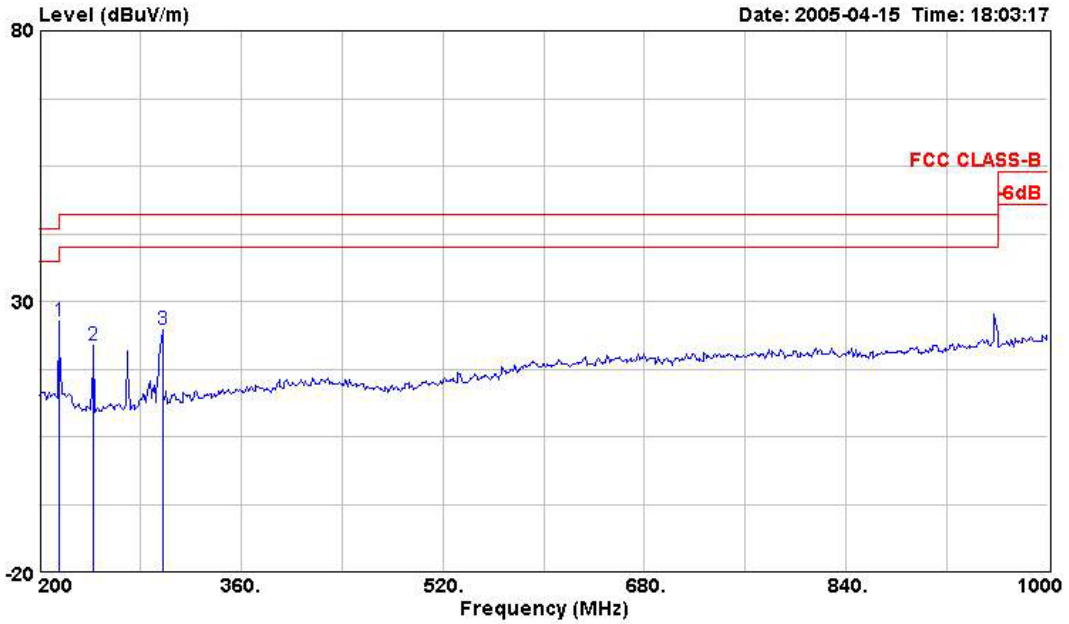
5.3.7. Test Results

- Temperature: 23°C
- Relative Humidity: 55%
- Duty Cycle of the Equipment During the Test: 100.00%
- Test Engineer: Wayne Hsu

(A) Polarization: Horizontal



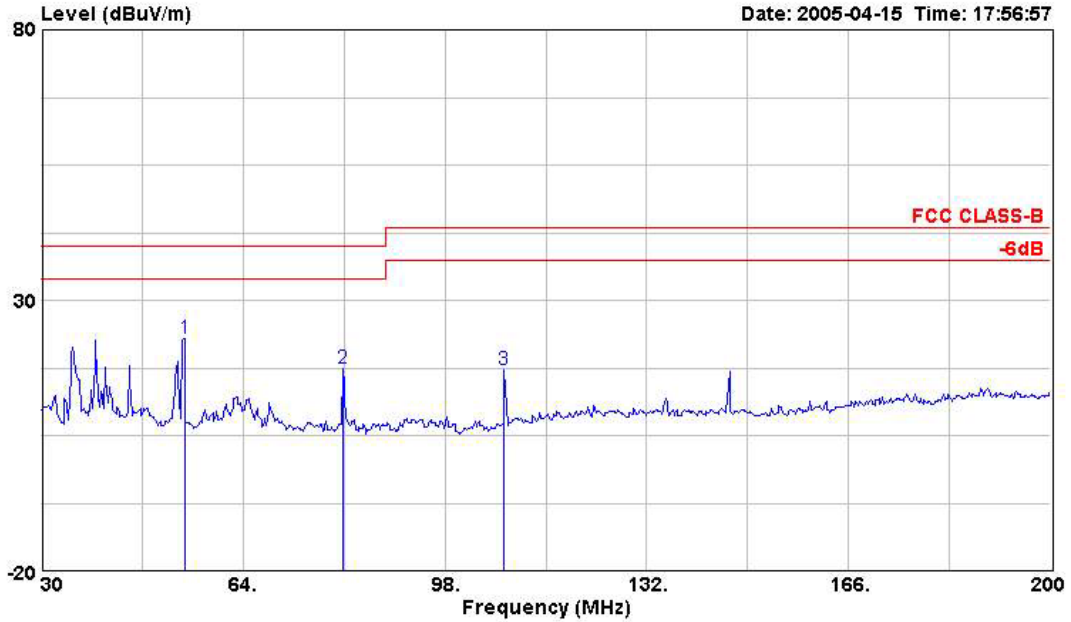
	Freq	Level	Over Limit	Read Level	Limit Line	Cable Loss	Preamp Factor	Remark
	MHz	dBuV/m	dB	dBuV	dBuV/m	dB	dB	
1	54.140	27.54	-12.46	46.05	40.00	-18.51	0.72	30.25 Peak
2	80.830	21.71	-18.29	41.41	40.00	-19.70	0.88	29.99 Peak
3	108.030	23.34	-20.16	42.54	43.50	-19.20	1.01	30.36 Peak



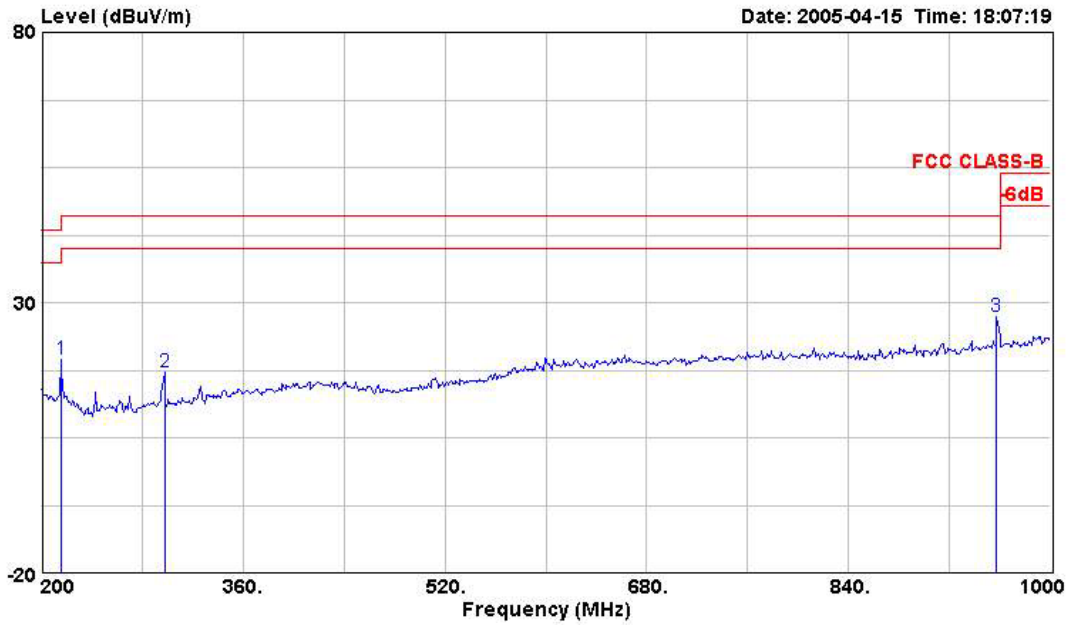
	Freq	Level	Over	Read	Limit	Cable	Preamp	
	MHz	dBuV/m	Limit	Level	Line	Loss	Factor	Remark
			dB	dBuV	dBuV/m	dB	dB	
1	215.200	26.26	-17.24	40.28	43.50	-14.02	1.28	30.28 Peak
2	243.200	21.81	-24.19	38.49	46.00	-16.68	1.54	31.03 Peak
3	297.600	24.75	-21.25	39.93	46.00	-15.18	1.67	30.58 Peak



(B) Polarization: Vertical



	Freq	Level	Over	Read	Limit	Cable	Preamp	Remark
	MHz	dBuV/m	Limit	Level	Line	Loss	Factor	
			dB	dBuV	dBuV/m	dB	dB	
1	54.140	23.02	-16.98	41.53	40.00	-18.51	0.72	30.25 Peak
2	80.830	17.49	-22.51	37.19	40.00	-19.70	0.88	29.99 Peak
3	108.030	17.02	-26.48	36.22	43.50	-19.20	1.01	30.36 Peak



	Freq	Level	Over	Read	Limit	Cable	Preamp	Remark
	MHz	dBuV/m	Limit	Level	Line	Loss	Factor	
			dB	dBuV	dBuV/m	dB	dB	
1	215.200	19.54	-23.96	33.56	43.50	-14.02	1.28	30.28 Peak
2	297.600	17.21	-28.79	32.39	46.00	-15.18	1.67	30.58 Peak
3	957.600	27.30	-18.70	30.63	46.00	-3.33	3.01	29.30 Peak

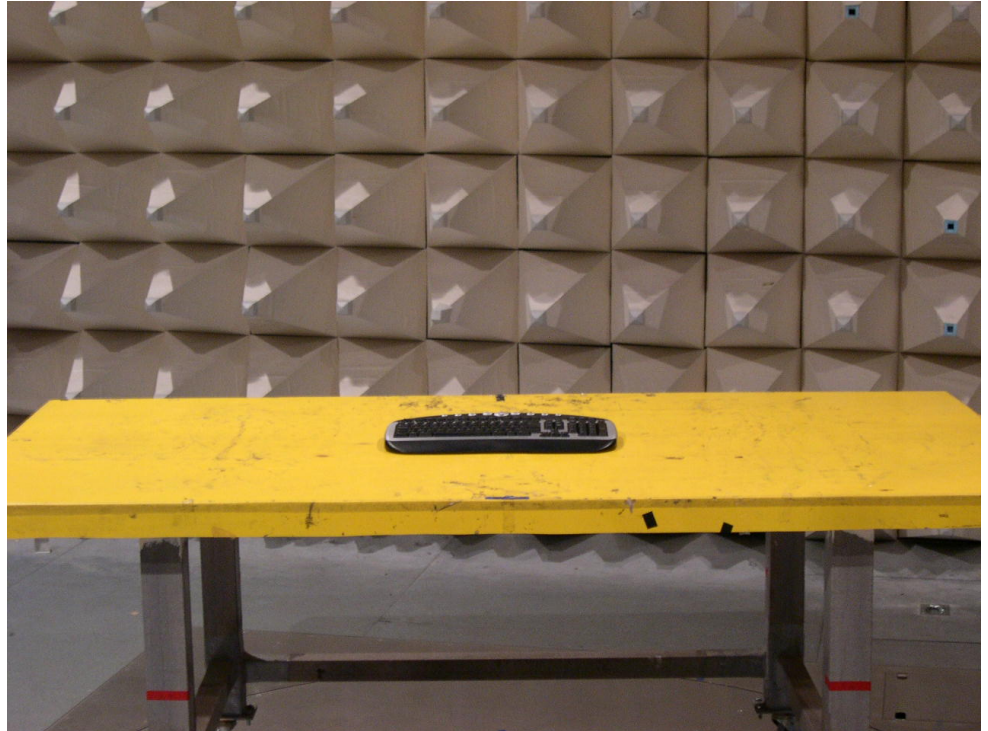
Note:

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

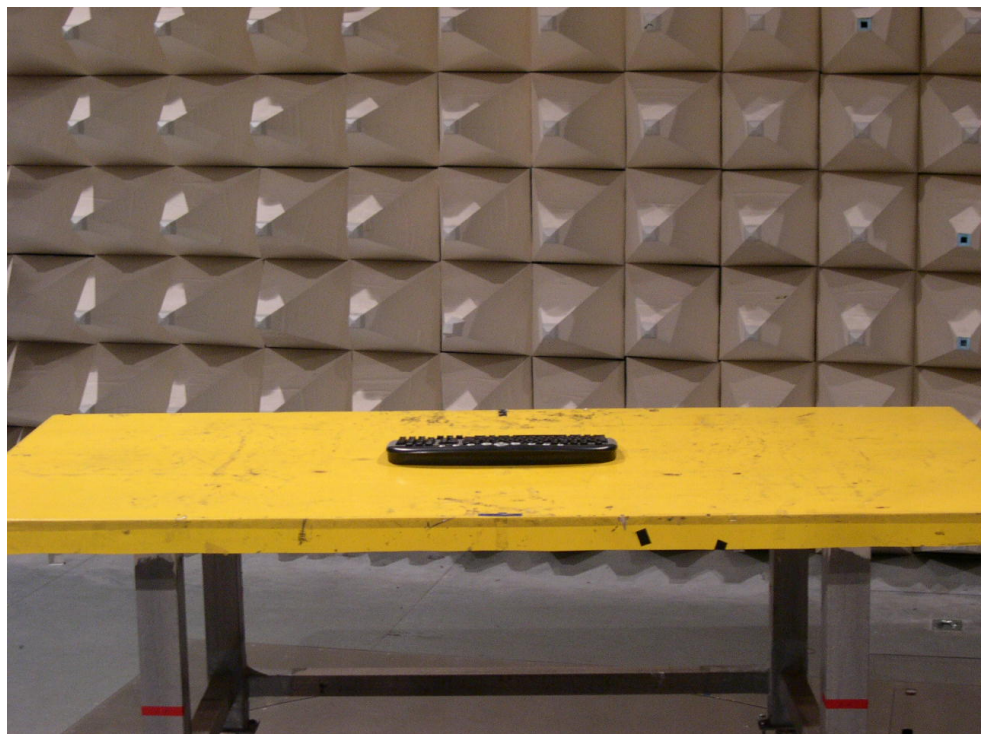
Corrected Reading: Probe Factor + Cable Loss + Read Level - Preamp Factor = Level

5.3.8. Photographs of Radiated Emission Test Configuration

FRONT VIEW



REAR VIEW





5.4. Antenna Requirements

5.4.1. Standard Applicable

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. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

5.4.2. Antenna Connected Construction

There is no antenna connector for Printed Antenna.

5.4.3. Test Criteria

All test results complied with the requirements of section 15.203.

6. 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~4GHz	Aug. 31, 2004	Radiation (03CH03-HY)
3	Amplifier	Schaffner	CPA9231A	18667	9KHz – 2GHz	Jan. 04, 2005	Radiation (03CH03-HY)
4	Biconical Antenna	SCHWARZBECK	VHBB 9124	301	30MHz –200MHz	Jul. 23, 2004	Radiation (03CH03-HY)
5	Log Antenna	SCHWARZBECK	VUSLP 9111	221	200MHz -1GHz	Jul. 23, 2004	Radiation (03CH03-HY)
6	RF Cable-R03m	Jye Bao	RG142	CB021	30MHz~1GHz	Dec. 02, 2004	Radiation (03CH03-HY)
7	Amplifier	MITEQ	AFS44	879984	1GHz~26.5GHz	Mar. 25, 2005	Radiation (03CH03-HY)
8	Horn Antenna	COMPOWER	AH-118	10092	1GHz – 18GHz	Feb. 18, 2005	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	SUHNER	SUCOFLES 106	SN30094/6	1GHz~26.5GHz	Mar. 05, 2005	Radiation (03CH03-HY)

※ Calibration Interval of instruments listed above is one year.



7. Company Profile

SPORTON Lab. was established in 1986 with one shielded room: the first private EMI test facility, offering local manufacturers an alternative EMI test facility apart from ERSO. In 1988, one 3M and 10M/3M open area test site were setup and also obtained official accreditation from FCC, VCCI and NEMKO. In 1993, a Safety laboratory was founded and obtained accreditation from UL of USA, CSA of Canada and TUV (Rhineland & PS) of Germany. In 1995, one EMC lab, including EMI and EMS test facilities was setup. In 1997, SPORTON Group has provided financial expense to relocate the headquarter to Orient Scientific Park in Taipei Hsien to offer more comprehensive, more qualified and better service to local suppliers and manufactures. In 1999, Safety Group and Component Group were setup. In 2001, SPORTON has established 3M/10M chamber in Hwa Ya Technology Park.

7.1. Certificate of Accreditation

Taiwan	BSMI, CNLA, DGT
USA	FCC, NVLAP, UL
EU	Nemko, TUV
Japan	VCCI
Canada	Industry Canada

7.2. Test Location

SHIJR	ADD : 6Fl., No. 106, Sec. 1, Shintai 5th Rd., Shijr City, Taipei, Taiwan 221, R.O.C. TEL : 02-2696-2468 FAX : 02-2696-2255
HWA YA	ADD : No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL : 03-327-3456 FAX : 03-318-0055
LINKOU	ADD : No. 30-2, Dingfu Tsuen, Linkou Shiang, Taipei, Taiwan 244, R.O.C TEL : 02-2601-1640 FAX : 02-2601-1695
DUNGHU	ADD : No. 3, Lane 238, Kangle St., Neihu Chiu, Taipei, Taiwan 114, R.O.C. TEL : 02-2631-4739 FAX : 02-2631-9740
JUNGHE	ADD : 7Fl., No. 758, Jungjeng Rd., Junghe City, Taipei, Taiwan 235, R.O.C. TEL : 02-8227-2020 FAX : 02-8227-2626
NEIHU	ADD : 4Fl., No. 339, Hsin Hu 2 nd Rd., Taipei 114, Taiwan, R.O.C. TEL : 02-2794-8886 FAX : 02-2794-9777