

FCC TEST REPORT

for

47 CFR, Part 15, Subpart C

Equipment : Wireless Desktop (Keyboard)

Model No. : PT-2002-J, PT-2002-K2G

FCC ID : O3L-PT-02-K2G

Filing Type : Certification

Applicant : **Paten Wireless Technology Inc.**
4F, No. 50, Lane. 10, Jihu Road,
Neihu, Taipei 114, Taiwan, R.O.C.

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SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

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History of this test report

Original Report Issue Date: Jan. 27, 2002

☒ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

for

47 CFR, Part 15, Subpart C

Equipment : Wireless Desktop (Keyboard)

Model No. : PT-2002-J, PT-2002-K2G

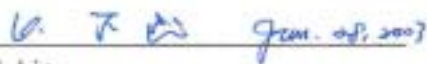
FCC ID : O3L-PT-02-K2G

Applicant : **Paten Wireless Technology Inc.**
4F, No. 50, Lane. 10, Jihu Road,
Neihu, Taipei 114, Taiwan, R.O.C.

I **HEREBY** CERTIFY THAT :

The measurements shown in this test report were made in accordance with the procedures given in **ANSI C63.4 - 1992** and the energy emitted by this equipment was **passed** both radiated and conducted emission limits.

Testing was carried out on **Dec. 10, 2002** at **SPORTON International Inc.** LAB.


K. J. Lin
Manager

SPORTON International Inc.

6F, No.106, Sec. 1, Hsin Tai Wu Rd., Hsi Chih, Taipei Hsien, Taiwan, R.O.C.

1. General Description of Equipment under Test

1.1. Applicant

Paten Wireless Technology Inc.

4F, No. 50, Lane. 10, Jihu Road,
Neihu, Taipei 114, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1.

1.3. Basic Description of Equipment under Test

Equipment	: Wireless Desktop (Keyboard)
Model No.	: PT-2002-J, PT-2002-K2G
Trade Name	: Paten
FCC ID	: O3L-PT-02-K2G
Power Supply Type	: From Battery DC 3V
AC Power Cord	: N/A

1.4. Feature of Equipment under Test

< Keyboard >

- ✧ **Channel** (With Multi Task, Paten's Patent)
- ✧ **Security ID** : 256 Sets
- ✧ **Cordless Technology** : Radio Frequency (TDMA technology)
- ✧ **Carry Frequency** : 27.045MHZ
- ✧ **Modulation Mode** : FSK (Frequency Shift Key)
- ✧ **Transfer Rate** : 10 kbps
- ✧ **Input Power** : 3VDC (2*AAA)
- ✧ **Power Consumption** : 10 mA
- ✧ **RF Power** : 500uv/m at 3m
- ✧ **Switch Activation Mechanism** : Membrane
- ✧ **Indicator LED** : 1 LED (Red, Blinking)
- ✧ **Operation Switch** : 1 Link Switch (Tact switch)
- ✧ **Effective Distance** : 2 M
- ✧ **Battery Life** : 6 Months

2. Test Configuration of Equipment under Test

2.1. Test Manner

- a. The EUT has been configured and operated pursuant to ANSI C63.4-1992 in a manner which tended to maximize its emission characteristics in a typical application.
- b. The complete test system included ViewSonic Monitor, HP Printer, ACEEX Modem, Paten RF Mouse, Paten RF Receiver, EUT and HP PC for EMI test,
- c. Frequency range investigated: Conduction 150 KHz to 30 MHz, Radiation 30 MHz to 1000MHz.

2.2. Description of Test System

Support Unit 1. -- Monitor (View Sonic)

FCC ID	: N/A
Model No.	: VCDTS2315-4P
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0034
Data Cable	: Shielded, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- Printer (HP)

FCC ID	: B94C2642X
Model No.	: DJ400
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0048
Data Cable	: Shielded, 1.35m

Support Unit 3. -- Modem (ACEEX)

FCC ID	: IFAXDM1414
Model No.	: DM1414
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0015
Data Cable	: Shielded, 1.15m

Support Unit 4. – RF Receiver (Paten)

FCC ID : N/A
Model No. : PT-2002-J
Serial No. : SP0100

Support Unit 5. – RF Mouse (Paten)

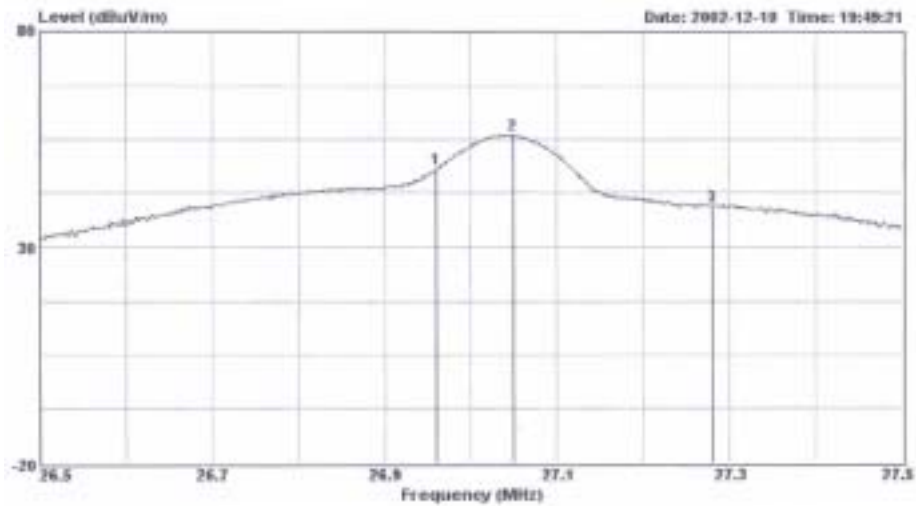
FCC ID : OL2-PT-02-MS
Model No. : PT-2002-MS
Serial No. : SP0101

Support Unit 6. – Personal Computer (HP)

FCC ID : N/A
Model No. : DTP-22
Power Supply Type : Switching
Power Cord : Non-Shielded
Serial No. : SP0002
Remark : This support device was tested to comply with FCC standards and
authorized under a declaration of conformity.

2.3. Band Edge Compliance Plot Per 15.227(b).

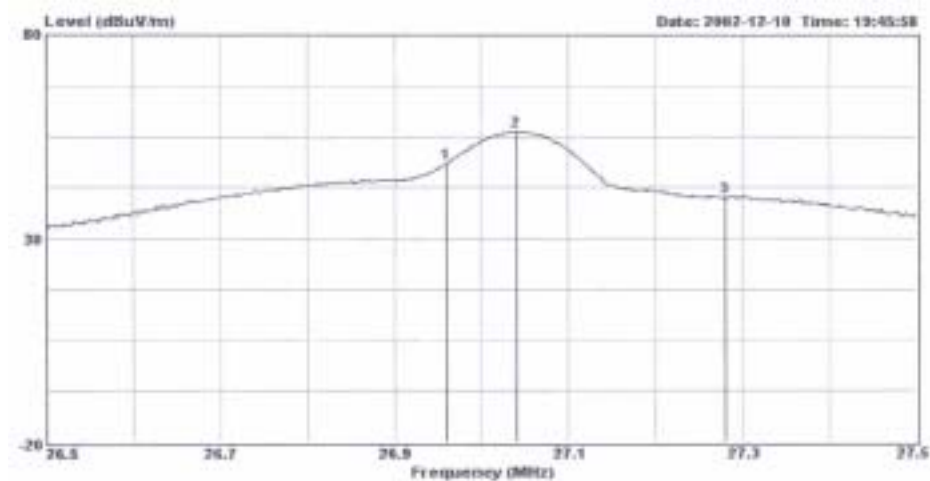
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**Mark 1 :** 26.960 MHz 34.11 dBuV/m**Mark 3 :** 27.280 MHz 25.30 dBuV/m

Conformation of the fundamental frequency

Frequency (MHz)	Antenna Polarity	Cable Factor (dB/m)	Reading Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (uV/m)	Margin (dB)
26.960	H	15.40	0.93	17.78	69.54	2999	34.11	50.76	-35.43
27.280	H	15.40	0.93	8.97	69.54	2999	25.30	18.41	-44.24

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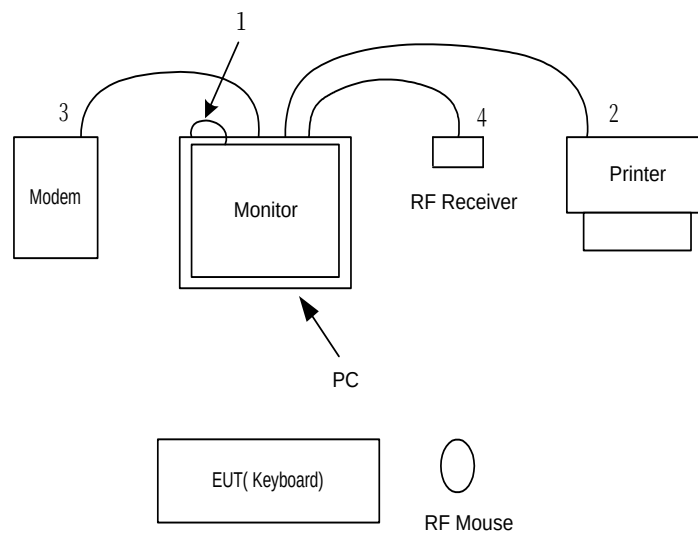
Mark 1 : 26.960 MHz 34.64 dBuV/m

Mark 3 : 27.280 MHz 26.18 dBuV/m

Conformation of the fundamental frequency

Frequency (MHz)	Antenna Polarity	Cable Factor	Cable Loss	Reading (dBuV)	Limits (dBuV/m)	Emission (uV/m)	Level (dBuV/m)	Margin (uV/m)	Margin (dB)
26.960	H	15.40	0.93	18.31	69.54	2999	34.64	53.95	-34.90
27.280	H	15.40	0.93	9.85	69.54	2999	26.18	20.37	-43.36

2.4. Connection Diagram of Test System



1. The VGA cable is connected from PC to the support unit 1.
2. The printer cable is connected from PC to the support unit 2
3. The I/O cable is connected from PC to the support unit 3
4. The receiver cable is connected from PC to the support unit 4

3. Test Software

An executive program, EMCTEST.EXE" under WIN 2000, which generate a completes line of continuously repeating " H " pattern was used as the test software.

The programs was executed as follows :

- a. Turn on the power of all equipment.
- b. The PC reads the test program from the hard disk drive and runs it.
- c. The PC sends "H" messages to the monitor, and the monitor displays "H" patterns on the screen.
- d. The PC sends "H" messages to the printer, then the printer prints them on the paper.
- e. The PC sends "H" messages to the modem.
- f. The PC sends "H" messages to the internal hard disk, and the Hard Disk reads and writes the message.
- g. Repeat the steps from c to f.

4. General Information of Test

4.1. Test Facility

This test was carried out by SPORTON International Inc.

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. : 03CH03-HY

4.2. Test Voltage

DC 3V

4.3. Standard for Methods of Measurement

ANSI C63.4-1992

4.4. Test in Compliance with

FCC Part 15, Subpart C

4.5. Frequency Range Investigated

Radiation : from 30 MHz to 1000 MHz

4.6. Test Distance

The test distance of radiated emission from antenna to EUT is 3 M.

5. Test of Conducted Powerline

→ The power supply of the EUT is from battery.

So the conducted powerline test is not applicable to the EUT.

6. Test of Radiated Emission

Radiated emissions from 30 MHz to 1000 MHz were measured with a bandwidth of 120 kHz according to the methods defines in ANSI C63.4-1992. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meter above the ground plane, as shown in section 6.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

6.1. Description of Major Test Instruments

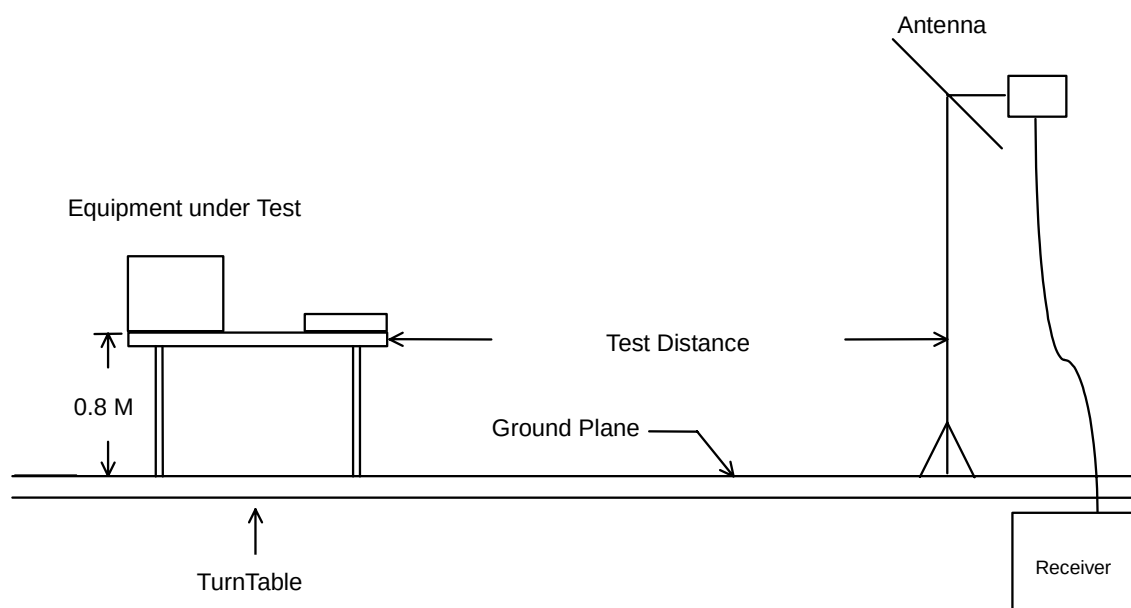
- Amplifier (ADVANTEST BB525C)
 - RF Gain 30 dB
 - Signal Input 100 KHz to 1.3 GHz

- Spectrum Analyzer (R&S FSP7)
 - Attenuation 10 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 120 KHz
 - Signal Input 9 KHz to 7 GHz

6.2. Test Procedures

- a. The EUT was placed on a rotatable table top 0.8 meter above ground.
- b. The EUT was set 3 meters from the interference-receiving antenna which was mounted on the top of a variable height antenna tower.
- c. The table was rotated 360 degrees to determine the position of the highest radiation.
- d. The antenna is a half wave dipole and its height is varied between one meter and four meters above ground to find the maximum value of the field strength both horizontal polarization and vertical polarization of the antenna are set to make the measurement.
- e. For each suspected emission the EUT was arranged to its worst case and then tune the antenna tower (from 1 M to 4 M) and turn table (from 0 degree to 360 degrees) to find the maximum reading.
- f. Set the test-receiver system to Peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. 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.

6.3. Typical Test Setup Layout of Radiated Emission



6.4. Test Result of Radiated Emission

- Frequency Range of Test : from 30 MHz to 1000 MHz
- Test Distance : 3 M
- Temperature : 24°C
- Relative Humidity : 55%
- Test Date : Dec. 10, 2002
- Emission level (dBuV/m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

The Radiated Emission test was passed at minimum margin:

Vertical 210.090 MHz / 34.79 dBuV/m Antenna Height 1.0 Meter, Turntable Degree 90 °.

- Spurious Emissions :

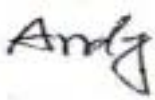
Frequency		Antenna	Cable	Reading	Limits		Emission	Level	Margin	Detect
	Polarity	Factor	Loss							
(MHz)		(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode
206.85	H	8.30	2.40	7.92	43.50	150	18.62	8.53	-24.88	Peak

Remark : Except for the emission listed above, the emission emitted by the EUT is low to be measured.

- Field strength of fundamental and harmonics :

Frequency	Antenna	Cable	Reading	Limits	Emission	Level	Margin	Detect		
Polarity	Factor	Loss								
(MHz)	(dB/m)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB)	Mode	
27.050	H	15.40	0.93	25.64	80.00	10000	41.97	125.46	-38.03	Peak
53.490	H	6.75	1.28	17.11	40.00	100	25.14	18.07	-14.86	Peak
80.490	H	6.95	1.51	9.93	40.00	100	18.39	8.31	-21.61	Peak
108.300	H	11.14	1.70	18.01	43.50	150	30.85	34.87	-12.65	Peak
258.420	H	13.01	2.70	17.39	46.00	200	33.10	45.19	-12.90	Peak
371.400	H	14.65	3.30	5.43	46.00	200	23.38	14.76	-22.62	Peak
27.040	V	15.40	0.93	25.99	80.00	10000	42.32	130.62	-37.68	Peak
53.490	V	6.75	1.28	17.07	40.00	100	25.10	17.99	-14.90	Peak
108.300	V	11.14	1.70	13.08	43.50	150	25.92	19.77	-17.58	Peak
158.250	V	9.33	2.07	12.02	43.50	150	23.42	14.83	-20.08	Peak
210.090	V	8.43	2.41	23.95	43.50	150	34.79	54.89	-8.71	Peak
318.200	V	13.47	3.00	9.08	46.00	200	25.55	18.95	-20.45	Peak
579.300	V	18.40	4.08	9.64	46.00	200	32.12	40.36	-13.88	Peak

Remark : Except for the emission listed above, the emission emitted by the EUT is low to be measured.

Test Engineer : 

Andy Yang

7. EMI Suppression Component List

⇒ No EMI Suppression Components.

8. Antenna Factor & Cable Loss

Frequency (MHz)	Antenna Factor (dB)	Cable Loss (dB)
30	18.10	0.90
35	16.00	0.90
40	13.19	1.09
45	10.57	1.10
50	8.00	1.21
55	6.30	1.30
60	5.30	1.30
65	4.95	1.40
70	5.19	1.40
75	6.05	1.49
80	6.86	1.50
85	7.94	1.60
90	8.60	1.60
95	9.70	1.60
100	10.26	1.69
110	11.19	1.70
120	11.60	1.81
130	11.42	1.90
140	10.92	1.99
150	10.20	2.00
160	9.20	2.11
170	9.00	2.20
180	8.60	2.29
190	8.70	2.30
200	8.10	2.40
220	8.86	2.51
240	10.70	2.60
260	13.10	2.71
280	12.50	2.80
300	13.00	2.90
320	13.51	3.00
340	13.90	3.10
360	14.43	3.30
380	14.79	3.30
400	15.80	3.40
450	16.37	3.59
500	17.40	3.80
550	18.57	3.90
600	18.50	4.20
650	18.93	4.40
700	19.03	4.40
750	19.84	4.71
800	19.82	4.90
850	20.30	5.00
900	20.32	5.11
950	20.82	5.60
1000	21.20	5.50

9. List of Measuring Equipment Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	R&S	FSP	838858/037	9KHz – 7GHz	Jan. 08, 2002	Radiation (03CH03-HY)
Amplifier	HP	8447D	2944A09072	100KHz – 1.3GHz	Oct. 21, 2002	Radiation (03CH03-HY)
Bilog Antenna	SCHAFFNER	CBL6112B	2687	30MHz –2GHz	Dec. 21, 2002	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)
Half-wave dipole antenna	R&S	HZ12 HZ13	83924403 83924503	30MHz - 1GHz	Sep. 23, 2002	Radiation (03CH03-HY)

※ Calibration Interval of instruments listed above is one year.

10. Uncertainty of Test Site

Uncertainty of Radiated Emission Measurement

Contribution	Probability Distribution	3m
Antenna factor calibration	normal(k=2)	± 1
cable loss calibration	normal(k=2)	± 0.3
RCV/SPA specification	rectangular	± 2
Antenna Directivity	rectangular	± 3
Antenna Factor V.S. Height	rectangular	± 2
Antenna Factor Interpolation for Frequency	rectangular	± 0.25
site imperfection	rectangular	± 2
Mismatch Receiver VSWR $\Gamma_1=0.09$ Antenna VSWR $\Gamma_2=0.67$ Uncertainty= $20\log(1-\Gamma_1*\Gamma_2)$	U-shaped	± 0.54
combined standard uncertainty Ue(y)	normal	± 2.7
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	± 5.4

$$U = \sqrt{\{(1/2)^2 + (0.3/2)^2 + (2^2 + 0.5^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.2 \quad \text{for 10m test distance}$$

$$U = \sqrt{\{(1/2)^2 + (0.3/2)^2 + (2^2 + 3^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.7 \quad \text{for 3m test distance}$$

Uncertainty of Conducted Emission Measurement

Contribution	Probability Distribution	150KHz – 30MHz
Cable and I/P attenuator calibration	normal(k=2)	± 0.3
RCV/SPA specification	rectangular	± 2
LISN coupling specification	rectangular	± 1.5
Transducer factor frequency interpolation	rectangular	± 0.2
Mismatch Receiver VSWR $\Gamma_1=0.09$ LISN VSWR $\Gamma_2=0.33$ Uncertainty= $20\log(1-\Gamma_1*\Gamma_2)$	U-shaped	0.2
combined standard uncertainty Ue(y)	normal	± 1.66
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	± 3.32

$$U = \sqrt{\{(0.3/2)^2 + (2^2 + 1.5^2 + 0.2^2)/3 + (0.2)^2/2\}} = 1.66$$