

FCC TEST REPORT

for

47 CFR, Part 15, Subpart C

Equipment : Wireless Keyboard

Model No. : PT-2002-K2C

FCC ID : O3L-PT-02-K2C

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: May 20, 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 Keyboard
Model No. : PT-2002-K2C
FCC ID : O3L-PT-02-K2C
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 Apr. 29, 2002 at **SPORTON International Inc.** LAB. in Lin Kou.


K. J. Lin
Manager

SPORTON International Inc.

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

SPORTON International Inc.

TEL : 886-2-2696-2468

FAX : 886-2-2696-2255

FCC ID : O3L-PT-02-K2C

Page No. : 1 of 17

Issued Date : May 20, 2002

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

WEI FU Plastics Electronics Factory
Da-Ning Industrial Zone Humen
Dongguan Guangdong, CHINA

1.3. Basic Description of Equipment under Test

Equipment	: Wireless Keyboard
Model No.	: PT-2002-K2C
FCC ID	: O3L-PT-02-K2C
Trade Name	: PATEN PT-2002-A
Power Supply Type	: From Battery
Power Cord	: N/A

1.4. Feature of Equipment under Test

- PS/2 Standard Keyboard Hotkey Function
- Extendable Props on the keyboard may be adjusted in two stages to optimize the position for the user.
- Normal expected battery life for the keyboard and mouse units.
- Frequency : 26.96~27.28MHz

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. Frequency range investigated: conduction 450 KHz to 30 MHz, radiation 30 MHz to 1000MHz.
- c. The complete test system included ASUS PC, REALsync Monitor, HP Printer, ACEEX Modem, PATEN Mouse, PATEN Receiver and EUT for EMI test.

2.2. Description of Test System

Support Unit 1. -- Personal Computer (ASUS)

FCC ID	: N/A
Model No.	: A7V133
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0039
Data Cable	: Shielded, 360 degree via metal backshells
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- Monitor (REALsync)

FCC ID	: N/A
Model No.	: DJ72
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0023
Data Cable	: Shielded, 360 degree via metal backshells, 1.7m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 3. -- Mouse (PATEN)

FCC ID	: N/A
Model No.	: PT-2002-ME
Serial No.	: SP0031

Support Unit 4. -- Printer (HP)

FCC ID : B94C2642X
Model No. : C2642A
Power Supply Type : Linear
Power Cord : Non-Shielded
Serial No. : SP0048
Data Cable : Shielded, 360 degree via metal backshells, 1.8m

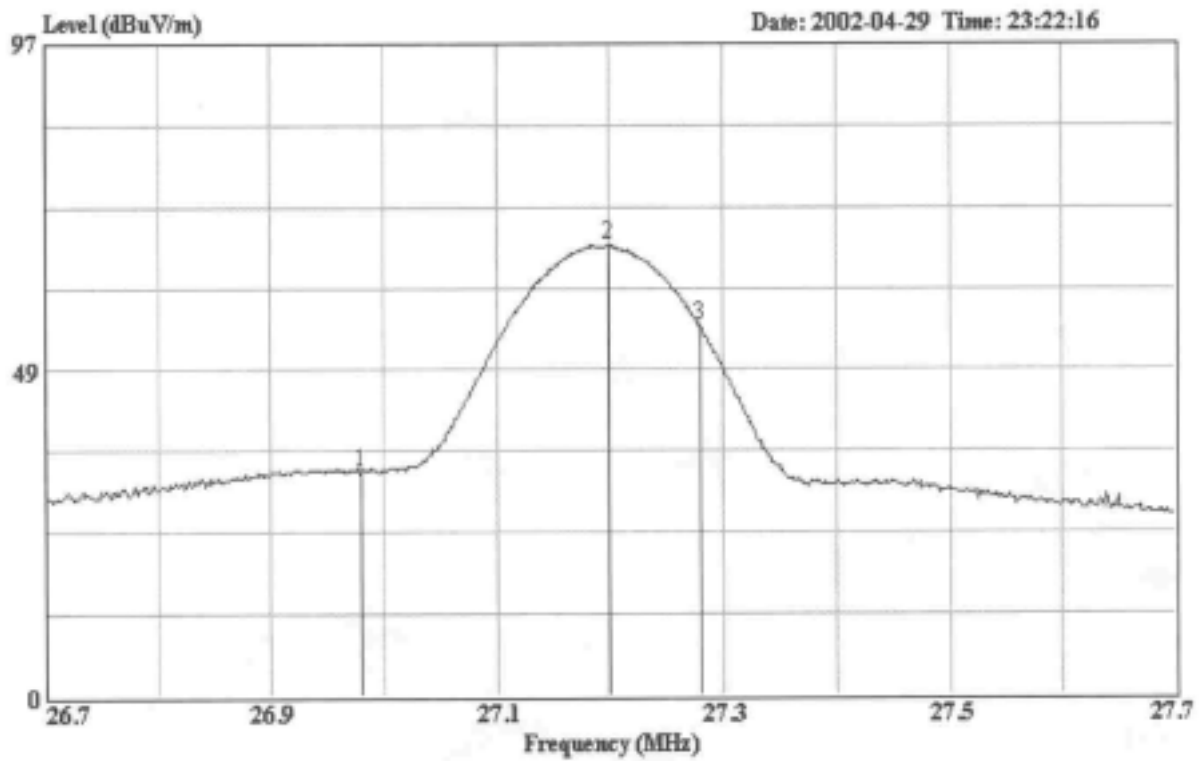
Support Unit 5. -- Modem (ACEEX)

FCC ID : IFAXDM1414
Model No. : DM1414
Power Supply Type : Linear
Power Cord : Non-Shielded
Serial No. : SP0015
Data Cable : Shielded, 360 degree via metal backshells, 1.1m

Support Unit 6. -- Receiver (PATEN)

FCC ID : N/A
Model No. : PT-2002-RLPC
Serial No. : SP0019

2.3. Band edge compliance plot per 15.227(b).

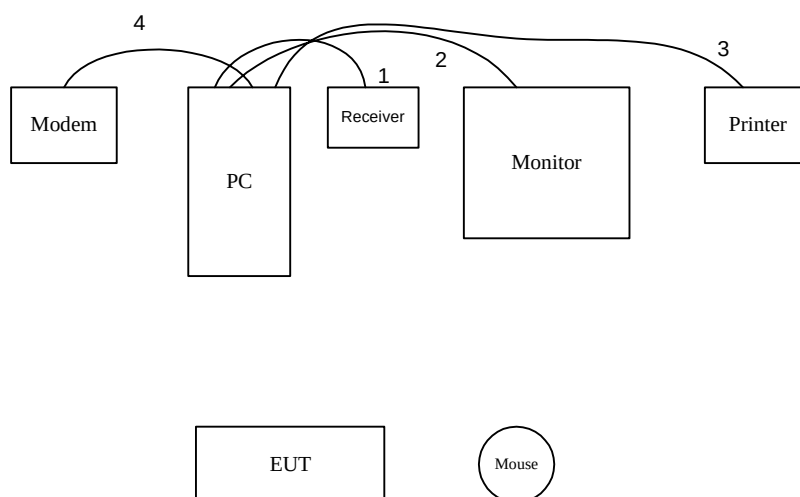


RBW: 120KHz VBW: 300KHz

Frequency	Antenna	Cable	Pre-Amp	Reading	Limits	Emission Level		Margin	Detect
	Factor	Loss	Factor						
(MHz)	(dB/m)	(dB)	(dB)	(dBuV)	(dBuV/m)	(uV/m)	(dBuV/m)	(uV/m)	(dB) Mode
26.960	15.40	0.93	30.31	33.64	69.54	2999	19.66	9.62	-49.88 Peak
27.280	15.40	0.93	30.31	54.73	69.54	2999	40.75	109.02	-28.79 Peak

Conformation of the fundamental frequency

2.4. Connection Diagram of Test System



1. The I/O cable is connected from PC to the support unit 6.
2. The I/O cable is connected from PC to the support unit 2.
3. The I/O cable is connected from PC to the support unit 4.
4. The I/O cable is connected from PC to the support unit 5.

3. General Information of Test

3.1. Test Facility

This test was carried out by SPORTON International Inc.

Test Site Location : No. 30-2, Lin 6, Diing-Fwu Tsuen, Lin-Kou-Hsiang,
Taipei Hsien, Taiwan, R.O.C.

TEL : 886-2-2601-1640

FAX : 886-2-2601-1695

Test Site No : SH03

3.2. Standard for Methods of Measurement

ANSI C63.4-1992

3.3. Test in Compliance with

FCC Part 15, Subpart C

3.4. Frequency Range Investigated

- a. Conduction: from 450 kHz to 30 MHz
- b. Radiation : from 30 MHz to 1 GHz

3.5. Test Distance

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

4. Test of Conducted Powerline

The power supply of the EUT is from battery.

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

5. Test of Radiated Emission

Radiated emissions from 30 MHz to 1 GHz 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 5.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

5.1. Major Measuring Instruments

5.1.1. from 30MHz to 1GHz

- Amplifier (ADVANTEST BB525C)
 - Attenuation 10 dB
 - RF Gain 30 dB
 - Signal Input 100 KHz to 1.3 GHz

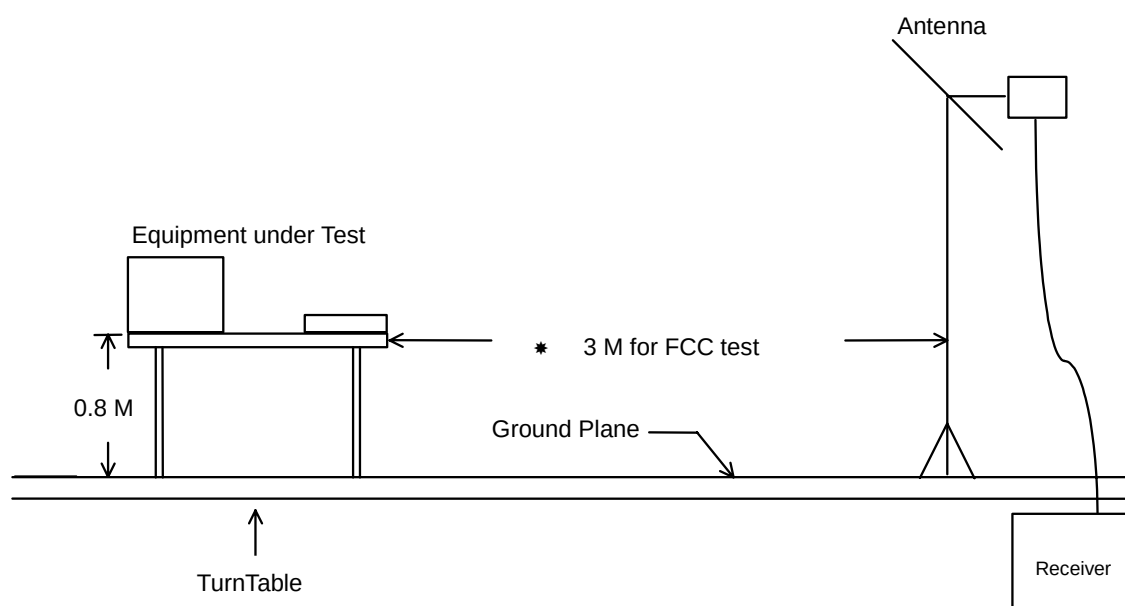
- Spectrum Analyzer (RAHDE&SCHEARZ & FSP)
 - Attenuation 10 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input 9 KHz to 7 GHz

- Test Receiver (RAHDE&SCHEARZ & ESCS30)
 - Resolution Bandwidth 120 KHz
 - Frequency Band 9 MHz to 2750 MHz

5.2. 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 or CISPR quasi-peak Detect Function and specified bandwidth with Maximum Hold Mode.
- g. If the emission level of the EUT in peak mode was 6 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 6 dB margin will be repeated one by one using the quasi-peak method and reported.

5.3. Typical Test Setup Layout of Radiated Emission



5.4. Test Result of Radiated Emission

- Test Distance : 3 M
- Temperature : 26°C
- Relative Humidity : 59 %
- Test Date : Apr. 29, 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

54.30 MHz / 30.13 dBuV/m (HORIZONTAL) Antenna Height 4 Meter, Turntable Degree 183 °.

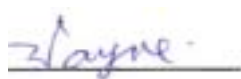
- Spurious Emissions:

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
54.30	V	6.59	1.32	21.09	40.00 100	29.00	28.18	-11.00	Peak
108.57	V	11.15	1.91	15.07	43.50 150	28.13	25.50	-15.37	Peak
54.30	H	6.59	1.32	22.22	40.00 100	30.13	32.10	-9.87	Peak
81.57	H	7.32	1.64	17.50	40.00 100	26.46	21.04	-13.54	Peak
108.57	H	11.15	1.91	19.55	43.50 150	32.61	42.71	-10.89	Peak
379.80	H	14.70	3.63	8.10	46.00 200	26.43	20.97	-19.57	Peak

- Field strength of fundamental and harmonics

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-Amp Factor (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)	Emission Level (dBuV/m) (uV/m)		Margin (dB)	Detect Mode
27.195	H	15.40	0.93	30.31	66.92	100.00 100000	83.25	14537.84	-16.75	Peak
27.195	H	15.40	0.93	30.31	49.33	80.00 10000	65.66	1918.67	-14.34	A.V.
27.190	V	15.40	0.93	30.31	65.33	100.00 100000	81.66	12105.98	-18.34	Peak
27.190	V	15.40	0.93	30.31	46.97	80.00 10000	63.30	1462.18	-16.70	A.V.

Test Engineer :



Wayue Hsu

5.5. Photographs of Radiated Emission Test Configuration

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

FRONT VIEW



REAR VIEW



6. EMI Suppression Component List

⇒No EMI suppression components.

7. Antenna Factor & Cable Loss

Frequency (Mhz)	Antenna Factor (dB)	Cable Loss (dB)
30	18.10	0.99
35	16.00	1.07
40	13.29	1.13
45	10.75	1.20
50	8.10	1.26
55	6.40	1.32
60	5.36	1.40
65	4.94	1.41
70	5.19	1.51
75	6.05	1.57
80	6.96	1.60
85	8.04	1.70
90	8.76	1.70
95	9.70	1.75
100	10.30	1.79
110	11.17	1.93
120	11.60	1.95
130	11.23	2.01
140	10.61	2.12
150	10.10	2.20
160	9.20	2.26
170	9.01	2.33
180	8.71	2.40
190	8.80	2.52
200	8.24	2.55
220	8.80	2.64
240	10.72	2.78
260	13.20	2.89
280	12.50	2.98
300	12.96	3.11
320	13.50	3.20
340	13.93	3.25
360	14.39	3.44
380	14.70	3.63
400	15.76	3.50
450	16.35	3.82
500	17.29	4.01
550	18.50	4.16
600	18.43	4.39
650	18.85	4.72
700	18.93	4.71
750	19.75	4.83
800	19.92	5.27
850	20.24	5.22
900	20.30	5.22
950	20.46	5.54
1000	20.80	5.81

8. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Spectrum Analyzer	RAHDE & SCHEARZ	FSP	838858/039	9KHz – 7GHz	Jan. 7, 2002	Radiation (SH03)
Receiver	RAHDE & SCHEARZ	ESCS30	838251/002	9KHz – 2750MHz	Nov. 28, 2001	Radiation (SH03)
Amplifier	ADVANTEST	BB525C	CH300001	100KHz – 1.3GHz	Nov. 15, 2001	Radiation (SH03)
Bilog Antenna	SCHAFFNER	CBL61128	2681	30MHz –2GHz	Dec. 23, 2001	Radiation (SH03)
Turn Table	HD	DS630	CH100011/683	0 ~ 360 degree	N/A	Radiation (SH03)
Antenna Mast	HD	MA240	MA240/559	1 m - 4 m	N/A	Radiation (SH03)

※ Calibration Interval of instruments listed above is one year.

9. 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

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

$U = \sqrt{\{(1/2)^2 + (0.3/2)^2 + (2^2 + 3^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.7$ 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

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