FCC TEST REPORT

for

47 CFR Part 15, Subpart C

Equipment	:	Cordless Pen
Model No.	:	PEN20
FCC ID	:	M35UCWPENX
Filing Type	:	Certification
Applicant	:	**UC-LOGIC TECHNOLOGY CORP.** 6F, No. 16, Lane 609, Sec. 5, Chung Hsing Rd., San-Chung City, Taipei, Taiwan, R.O.C.

- The test result refers exclusively to the test presented test model / sample.
- Without the written authorization of the test lab., the Test Report may not be copied.
- **Certificate or Test Report must not be used by the applicant to claim the product in this test report endorsement by NVLAP or any agency of U.S. government.**

SPORTON International Inc.

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

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Certificate No. : F142301

CERTIFICATE OF COMPLIANCE

for

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Applicant	:	**UC-LOGIC TECHNOLOGY CORP.** 6F, No. 16, Lane 609, Sec. 5, Chung Hsing Rd., San-Chung City, Taipei, 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 Nov. 07, 2001 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.

1. General Description of Equipment under Test

1.1. Applicant

UC-LOGIC TECHNOLOGY CORP.
6F, No. 16, Lane 609, Sec. 5, Chung Hsing Rd.,
San-Chung City, Taipei, Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1.

1.3. Basic Description of Equipment under Test

Equipment	: Cordless Pen
Model No.	: PEN20
FCC ID	: M35UCWPENX
Trade Name	: UC-LOGIC
Power Supply Type	: From bettery
Power Cord	: N/A

1.4. Feature of Equipment under Test

- Power source: 1.5V / 4 A batter X 1
- Work current: 120 uA
- Stand by current: 2.5 uA
- Average duty cycle: 4000 hour
- Pressure sensitivity: 5 Levels/g
- Autoexec power off: 12-24 min
- Pen point action distance: 0.5 mm
- Pen length: 145 mm
- Pen diameter: 11.8 mm
- Weight: 16g
- Work Frequence: 230KHz-270KHz
- Radiation Power: Less 180uw (120uAX1.5V)

2. Test Configuration of Equipment under Test

2.1. Test Manner

a. The EUT has been associated with personal computer and peripherals pursuant to ANSI C63.4-1992 and configuration operated in a manner which tended to maximize its emission characteristics in a typical application.

b. The HITACHI Monitor, DELL PS/2 Keyboard, HP Printer, ACEEX Modem, LOGITECH PS/2 Mouse and EUT were connected to the FIC PC for Radiated Spurious emission test.

c. Frequency range investigated: radiation 30 MHz to 1000MHz for Radiated Spurious emission test

2.2. Description of Test System for Radiated Spurious emission test

Support Unit 1. -- Personal Computer (FIC)

FCC ID	: N/A
Model No.	: P2L97
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0037
Data Cable	: Shielded
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 2. -- Monitor (HITACHI)

FCC ID	: N/A
Model No.	: CM753ET
Serial No.	: SP0025
Data Cable	: Shielded, 1.15m
Remark	: This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

Support Unit 3. -- PS/2 Keyboard (DELL)

FCC ID	: GYUM92SK
Model No.	: AT101(DE8M)
Serial No.	: SP0054
Data Cable	: Shielded, 360 degree via metal backshells, 1.9m

Support Unit 4. -- Printer (HP)

FCC ID	: B94C2642X
Model No.	: Desk Jet 400
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0048
Data Cable	: Shielded, 360 degree via metal backshells, 1.35m

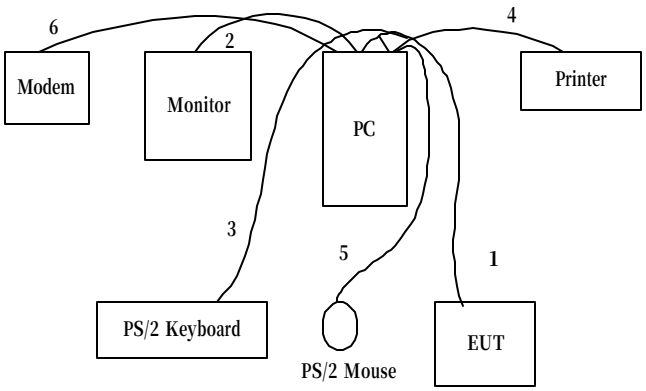
Support Unit 5. -- PS/2 Mouse (LOGITECH)

FCC ID	: DZL211029
Model No.	: M-S34
Serial No.	: SP0108
Data Cable	: Shielded, 1.7m

Support Unit 6. -- 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 backs hells, 1.15m

2.3. Connection Diagram of Test System for Radiated Spurious emission test



1. The data cable is connected from RS-232 port and PS/2 port of PC to the EUT. (The EUT communicates with the PC via RS-232 port and is powered from PC via PS/2 port)
2. The I/O cable is connected from PC to the support unit 2.
3. The I/O cable is connected from PS/2 connector of the EUT to the support unit 3.
4. The I/O cable is connected from PC to the support unit 4.
5. The I/O cable is connected from PC to the support unit 5.
6. The I/O cable is connected from PC to the support unit 6.

3. Test Software for Radiated Spurious emission test

An executive program, EMITEST.EXE under WIN 98, which generates a complete line of continuously repeating " H" pattern was used as the test software.

The program was executed as follows :

a. Turn on the power of all equipment.
b. The PC reads the test program from the floppy 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 b to f.

At the same time," Power Pen" was executed to display the message sent from EUT.

4. General Information of Test

4.1. 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

4.2. Standard for Methods of Measurement

ANSI C63.4-1992

4.3. Test in Compliance with

FCC Part 15, **Subpart C**

4.4. Frequency Range Investigated

a. Conduction : from 150 kHz to 30 MHz
b. Radiation : from 30 MHz to 1000 MHz for Radiated Spurious emission test

4.5. Test Distance

The test distance of radiated emission from antenna to EUT is 10 M for Radiated Spurious emission test.

5. Test of Radiated Emission (Spurious emission)

Radiated emissions from 255KHz to 2.5 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 5.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

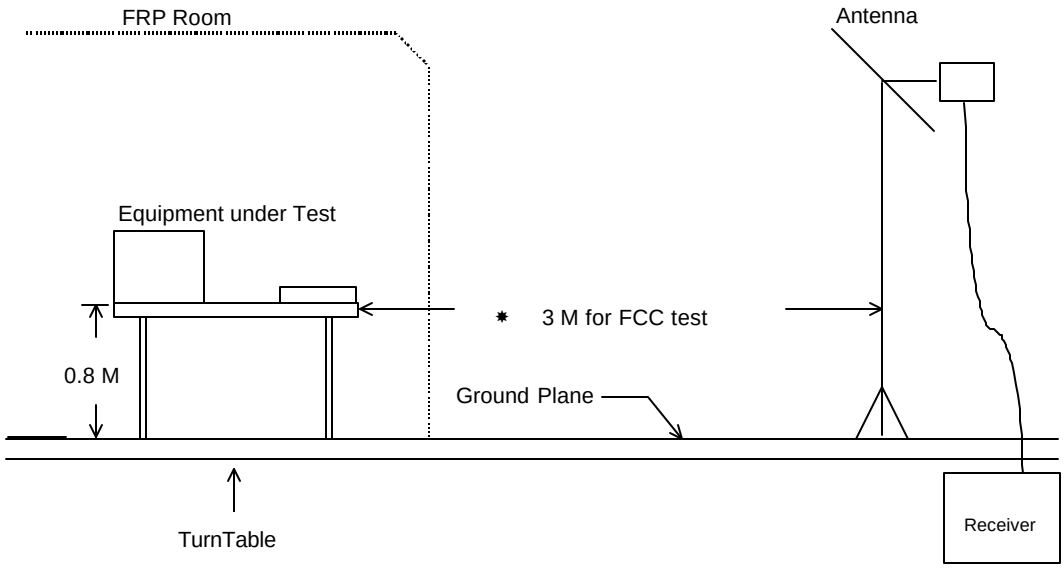
5.1. Major Measuring Instruments

Test Receiver	(R&S ESCS30)
Resolution Bandwidth	120 KHz
Frequency Band	9 KHz to 2.75 GHz
Quasi-Peak Detector	ON for Quasi-Peak Mode
	OFF for Peak Mode

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 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

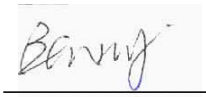


5.4. Test Result of Radiated Emission (Spurious emission)

- Frequency range: 255KHz ~ 2.5 MHz
- Test Distance : 3 M
- Temperature : 21 degree centigrade
- Relative Humidity : 63 %
- Test Date : Nov. 06, 2001
- Emission level (dBuV/ m) = 20 log Emission level (uV/m)
- Corrected Reading : Antenna Factor + Cable Loss + Reading = Emission

All emissions were too low to be measured. All emissions were more than 20 dB below the FCC limit.

So, the test result of the fundamental emission is PASS.

Test Engineer : 

Benny Lee

6. Test of Radiated Emission (Fundamental emission)

Radiated emissions from 0.255 MHz to 30 MHz were measured with a bandwidth of 120 kHz according to the methods defines in ANSI C63.4-1992.

6.1. Major Measuring Instruments

Test Receiver	(R&S ESCS30)
Resolution Bandwidth	120 KHz
Frequency Band	9 KHz to 2.75 GHz
Quasi-Peak Detector	ON for Quasi-Peak Mode
	OFF for Peak Mode

6.2. Test Result of Radiated Emission (Fundamental emission)

- Equipment meets the technical specifications of 15.209
- Frequency Range of Test : from 230KHz to 30 MHz
- Test Distance : 3 M
- Temperature : 27
- Relative Humidity : 58% RH
- Test Date : Aug. 06, 2001
- Limits at 3 meters are calculated by following methed:

  for the limit at 255KHz per 15.209 is 2400/255=9.41uV/m at 300m, To determine the level at the 3m test distance take 20 log (9.41) = 19.47 dBuV/m and then per 15.31 (f)(2) a 40dB/decade correction factor may be used below 30Mhz giving a 3m limit of 99.47 dBuV/m.
- Emission level (dBuV/m)=20log emission level (uV/m)
- Remark: The R&S test receiver will automatically offset the antenna factor, therefore, the reading value shown on the R&S test receiver is included receiving value added antenna factor.

Because the fundamental emission , **255KHz**, emitted by the EUT is too low to be measured at 3-meter test distance. The EUT was put at the center of the loop antenna to measure the fundamental emission. The emission emitted by the EUT at the center of the loop antenna is 16.1dBuV/m (Peak mode) and 12.2 dBuV/m (Peak mode) which both below the limit at 3m. And all other emissions were more than 20 dB below the FCC limit.

So, the test result of the fundamental emission is PASS.

7. Antenna Factor & Cable Loss for Radiated Spurious emission test

Frequency (Mhz)	Antenna Factor (dB)	Cable Loss (dB)
30	18.0	0.8
35	15.4	0.9
40	12.6	1.0
45	9.5	1.1
50	7.8	1.2
55	6.4	1.2
60	5.1	1.2
65	5.1	1.2
70	5.1	1.2
75	5.9	1.2
80	6.8	1.2
85	7.8	1.3
90	8.7	1.5
95	9.5	1.4
100	10.3	1.3
110	10.9	1.3
120	11.5	1.3
130	11.3	1.5
140	11.0	1.7
150	10.5	1.8
160	9.2	1.8
170	8.9	1.9
180	8.7	2.0
190	8.3	1.9
200	8.0	1.8
220	9.5	2.0
240	11.0	2.2
260	12.0	2.3
280	12.5	2.3
300	13.0	2.5
320	13.4	2.6
340	13.9	2.6
360	14.5	2.7
380	15.1	2.9
400	15.7	3.0
450	16.3	3.2
500	17.3	3.5
550	19.0	3.7
600	18.5	3.8
650	18.9	4.0
700	19.2	4.3
750	19.9	4.5
800	20.0	4.7
850	20.2	4.8
900	20.2	5.2
950	20.6	5.5
1000	21.0	5.5

8. EMI Suppression Component List

No EMI Suppression component.

9. List of Measuring Equipments Used

for Radiated Spurious emission test

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date
Spectrum Analyzer (Site 6)	HP	8560E	3728A03186	9KHz – 2.6GHz	Sep. 15, 2000
Receiver (Site 6)	R&S	ESCS30	847793/003	9 K – 2.75 GHz	Dec. 27, 2000
Amplifier (Site 6)	HP	87405A	3207A01437	100K - 3GHz	Aug. 03, 2000
Bilog Antenna (Site 6)	CHASE	CBL6112A	2442	30MHz -2GHz	Jun. 23, 2000
Half-wave dipole antenna (Site 6)	EMCO	3121C	9705-1285	28 M - 1GHz	May 17, 2000
Turn Table (site 6)	EMCO	2080	9711-2021	0 ~ 360 degree	N/A
Antenna Mast (site 6)	EMCO	2075	9711-2115	1 m - 4 m	N/A

for Radiated Fundamental emission test

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date
Receiver	R&S	ESCS30	847793/003	9 K – 2.75 GHz	Dec. 16, 2000
Loop Antenna	R&S	HFH2-Z2	824132	10KHz - 30MHz	Dec. 18, 2000

Calibration Interval of instruments listed above is one year.

10. Uncertainty of Test Site

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	2.5
LISN coupling specification	rectangular	1.5
Transducer factor frequency interpolation	rectangular	0.2
Mismatch Receiver VSWR Γ1=0.09 LISN VSWR Γ2=0.33 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	0.2
combined standard uncertainty Ue(y)	**normal**	**1.7**
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	**normal (k=2)**	**3.4**

U= {(0.3/2)² +(2.5²+1.5²+0.2²)/3+(0.2)²/2}=1.7

Uncertainty of Radiated Emission Measurement

Contribution	**Probability Distribution**	3m	10m
Antenna factor calibration	normal(k=2)	1.6	1.6
cable loss calibration	normal(k=2)	0.3	0.3
RCV/SPA specification	rectangular	2.5	2.5
Antenna Directivity	rectangular	3	0.5
Antenna Factor V.S. Height	rectangular	2	2
Antenna Factor Interpolation for Frequency	rectangular	0.25	0.25
site imperfection	rectangular	2	2
Mismatch Receiver VSWR Γ1=0.09 Antenna VSWR Γ2=0.67 Uncertainty=20log(1-Γ1*Γ2)	U-shaped	0.54	0.54
combined standard uncertainty Ue(y)	**normal**	**2.9**	**2.4**
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	**normal (k=2)**	**5.8**	**4.8**

U= {(1.6/2)²+(0.3/2)²+(3²+0.5²+2²+0.25²+2²)/3+(0.54)²/2}=2.4 for 10m test distance

U= {(1.6/2)²+(0.3/2)²+(3²+3²+2²+0.25²+2²)/3+(0.54)²/2}=2.9 for 3m test distance