

FCC TEST REPORT

for

47 CFR, Part 15, Subpart C

Equipment : Wireless RF KEYBOARD

Model No. : SK-8810

FCC ID : GYUR95SK

Filing Type : Certification

Applicant : **SILITEK CORPORATION**
5F, No. 760, Sec. 4, Pateh Rd.,
Taipei, 105 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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History of this test report

Original Report Issue Date: Aug. 15, 2001

☒ No additional attachment.

☐ Additional attachment were issued as following record:

Attachment No.	Issue Date	Description

CERTIFICATE OF COMPLIANCE

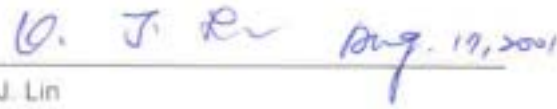
for

47 CFR, Part 15, Subpart C

Equipment : Wireless RF KEYBOARD
Model No. : SK-8810
FCC ID : GYUR95SK
Applicant : **SILITEK CORPORATION**
5F, No. 760, Sec. 4, Pateh Rd.,
Taipei, 105 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 Jul. 31, 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

SILITEK CORPORATION
5F, No. 760, Sec. 4, Pateh Rd.,
Taipei, 105 Taiwan, R.O.C.

1.2. Manufacturer

Same as 1.1.

1.3. Basic Description of Equipment under Test

Equipment	: Wireless RF KEYBOARD
Model No.	: SK-8810
FCC ID	: GYUR95SK
Trade Name	: Silitek
Power Supply Type	: From Battery
Power Cord	: N/A

1.4. Feature of Equipment under Test

- Operating voltage:
 - The operating voltage range for keyboard is 4.5 ~ 5.2 Vdc. There are 4 AA batteries providing 6.0V for operation, fed to keyboard via voltage regulator.
- Current consumption:
 - Typical current consumption is 30mA, Maximum at 50mA

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 HITACHI Monitor, HP Printer, ACEEX Modem, SILITEK Wireless RF Keyboard, FIC PC and EUT for EMI test.
- c. Frequency range investigated: 26 MHz to 1000MHz.

2.2. Description of Test System

Support Unit 1. -- Personal Computer (FIC)

FCC ID	: N/A
Model No.	: P2L97
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 (HITACHI)

FCC ID	: N/A
Model No.	: CM753ET
Power Supply Type	: Switching
Power Cord	: Non-Shielded
Serial No.	: SP0012
Data Cable	: Shielded, 360 degree via metal backshells, 1.15m

Support Unit 3. -- Printer (HP)

FCC ID	: B94C2642X
Model No.	: DESK JET 400
Power Supply Type	: Linear
Power Cord	: Non-Shielded
Serial No.	: SP0015
Data Cable	: Shielded, 360 degree via metal backshells, 1.5Fm

Support Unit 4. -- 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, 1.15m

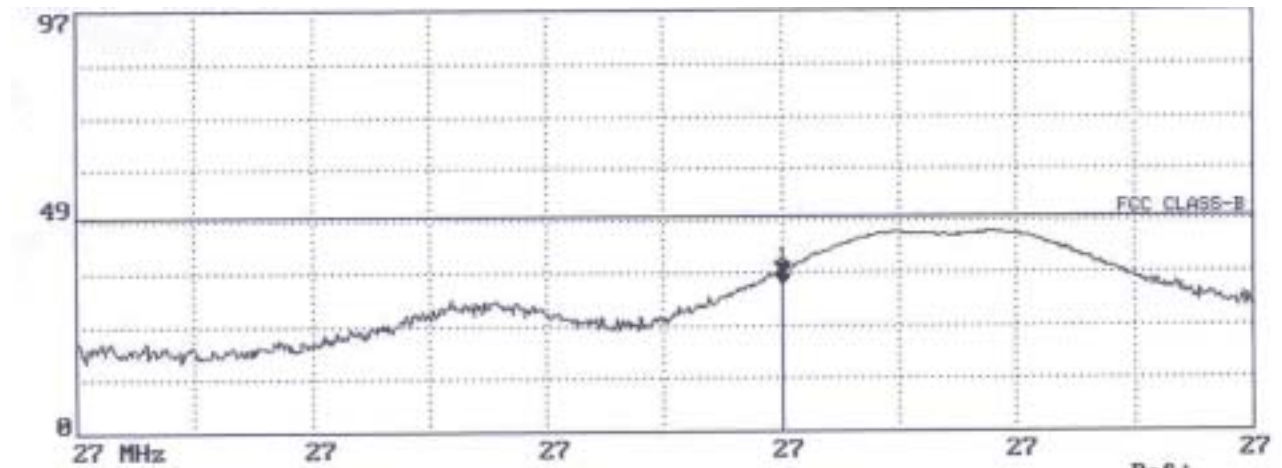
Support Unit 5. – Wireless RF Keyboard (SILITEK)

FCC ID : N/A
Model No. : SK-8810
Serial No. : SP0036
Data cable : Non-Shielded, 1.6m
Remark : This support device was tested to comply with FCC standards and authorized under a declaration of conformity.

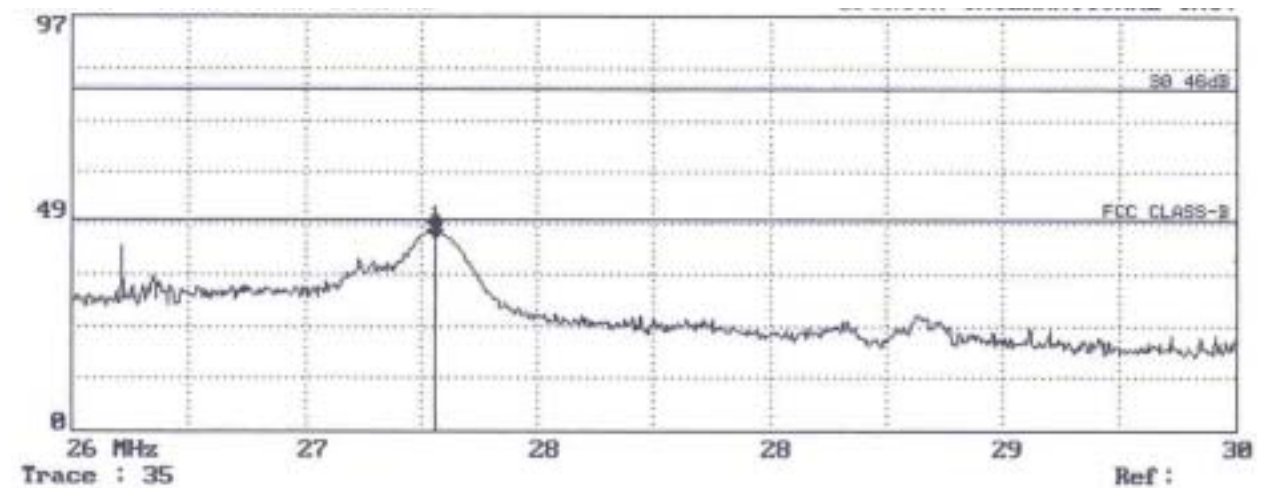
2.3. Band edges measurement

The operation frequency is within the band 26.96 to 27.28MHz

Frequency of channel 1 is 26.96 MHz



Frequency of channel 2 is 27.28 MHz



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

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. Radiation : from 26 MHz to 1 GHz

3.5. Test Distance

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

4. Test of Radiated Emission

Radiated emissions from 26 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 4.3. The interface cables and equipment positions were varied within limits of reasonable applications to determine the positions producing maximum radiated emissions.

4.1. Major Measuring Instruments

- Amplifier (HP 87405A)
 - Attenuation 0 dB
 - RF Gain 20 dB
 - Signal Input 10 MHz to 3 GHz

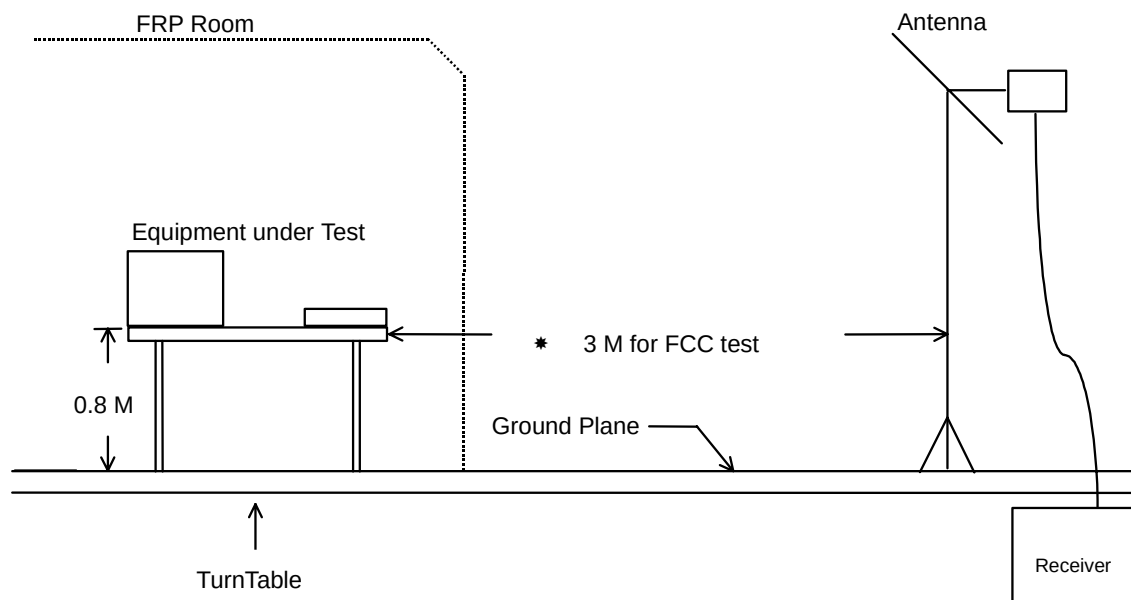
- Spectrum Analyzer (HP 8560E)
 - Attenuation 0 dB
 - Start Frequency 30 MHz
 - Stop Frequency 1000 MHz
 - Resolution Bandwidth 1 MHz
 - Video Bandwidth 1 MHz
 - Signal Input 30 Hz to 2.9 GHz

- 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

4.2. 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.

4.3. Typical Test Setup Layout of Radiated Emission



4.4. Test Result of Radiated Emission

4.4.1. Test mode : CHANNEL 1

- Test Distance : 3 M
- Temperature : 29°C
- Relative Humidity : 57 %
- Test Date : Jul. 31, 2001
- 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

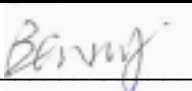
54.00 MHz / 33.86 dBuV (HORIZONTAL) Antenna Height 3 Meter, Turntable Degree 40 °.

- Spurious Emissions:

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m)	(uV/m)	Emission (dBuV/m)	Level (uV/m)	Margin (dB)	Detect Mode
54.00	V	7.14	1.20	24.52	40.00	100	32.86	43.95	-7.14	Peak
501.60	V	17.33	3.31	11.34	46.00	200	31.98	39.72	-14.02	Peak
902.40	V	20.51	5.19	9.67	46.00	200	35.37	58.68	-10.63	Peak
54.00	H	7.14	1.20	25.52	40.00	100	33.86	49.32	-6.14	Peak
296.80	H	12.72	2.47	21.10	46.00	200	36.29	65.24	-9.71	Peak
902.40	H	20.51	5.19	5.84	46.00	200	31.54	37.76	-14.46	Peak

- Field strength of fundamental

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
26.98	V	15.40	0.80	32.06	100.00	100000	48.26	258.82	-51.74	Peak
26.98	V	15.40	0.80	28.40	80.00	10000	44.60	169.82	-35.40	A.V.
26.97	H	15.40	0.80	23.22	100.00	100000	39.42	93.54	-60.58	Peak
26.97	H	15.40	0.80	18.80	80.00	10000	35.00	56.23	-45.00	A.V.

Test Engineer : 

Benny Lee

4.4.2. Test mode : CHANNEL 2

- Test Distance : 3 M
- Temperature : 29°C
- Relative Humidity : 57 %
- Test Date : Jul. 31, 2001
- 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

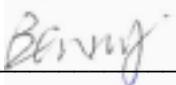
54.10 MHz / 33.03 dBuV (HORIZONTAL) Antenna Height 3 Meter, Turntable Degree 45 °.

- Spurious Emissions:

Frequency (MHz)	Polarity	Antenna Factor (dB/m)	Cable Loss (dB)	Reading (dBuV)	Limits (dBuV/m) (uV/m)	Emission (dBuV/m) (uV/m)	Level (dB)	Margin (dB)	Detect Mode
54.10	V	7.14	1.20	21.60	40.00 100	29.94 31.41	-10.06	Peak	
120.00	V	11.50	1.50	16.60	43.50 150	29.60 30.20	-13.90	Peak	
902.40	V	20.51	5.19	6.50	46.00 200	32.20 40.74	-13.80	Peak	
48.00	H	8.89	1.16	16.96	40.00 100	27.01 22.41	-12.99	Peak	
54.10	H	7.14	1.20	24.69	40.00 100	33.03 44.82	-6.97	Peak	
902.40	H	20.51	5.19	6.50	46.00 200	32.20 40.74	-13.80	Peak	

- Field strength of fundamental

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
27.24	V	15.22	0.80	30.64	100.00 100000	46.66 215.28	-53.34	Peak
27.25	V	15.22	0.80	28.90	80.00 10000	44.92 176.20	-35.08	A.V.
27.23	H	15.22	0.80	19.10	80.00 10000	35.12 57.02	-44.88	A.V.
27.23	H	15.22	0.80	21.97	100.00 100000	37.99 79.34	-62.01	Peak

Test Engineer : 

Benny Lee

5. EMI Suppression Component List

No. EMI suppression component.

6. Antenna Factor & Cable Loss

Frequency (Mhz)	Antenna Factor (dB)	Cable Loss (dB)
25	15.4	0.8
26	15.4	0.8
27	15.4	0.8
28	14.7	0.8
29	13.9	0.8
30	13.4	0.8
35	14.9	0.9
40	15.5	1.0
45	10.1	1.1
50	8.1	1.2
55	6.9	1.2
60	5.7	1.2
65	6.5	1.3
70	7.3	1.3
75	7.1	1.3
80	6.9	1.3
85	7.8	1.4
90	8.7	1.5
95	9.6	1.5
100	10.6	1.5
110	11.1	1.5
120	11.5	1.5
130	11.2	1.6
140	10.7	1.7
150	10.2	1.8
160	9.6	2.0
170	8.9	2.1
180	8.4	2.2
190	8.3	2.2
200	8.3	2.2
220	9.5	2.2
240	10.8	2.2
260	11.7	2.3
280	12.3	2.3
300	12.8	2.5
320	13.4	2.6
340	14.0	2.6
360	14.6	2.7
380	15.0	2.8
400	15.5	2.8
450	16.3	3.3
500	17.3	3.3
550	18.7	3.7
600	18.7	3.8
650	18.6	4.0
700	18.7	4.2
750	20.0	4.3
800	19.9	4.5
850	20.2	4.7
900	20.5	5.2
950	20.7	5.0
1000	21.2	5.2
2000	28.1	5.8
3000	30.3	7.2

7. List of Measuring Equipments Used

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Remark
Biconico Antenna	EMCO	3109	9509-2937	27MHz – 300MHz	May 31, 2001	Radiation
Spectrum Analyzer (Site 6)	HP	8560E	3728A03186	30KHz – 2.9GHz	Sep. 15, 2000	Radiation
Receiver (Site 6)	R&S	ESCS30	8477931/003	9 K – 2.75 GHz	Dec. 27, 2000	Radiation
Amplifier (Site 6)	HP	87405A	3207A01437	100K - 3GHz	Aug. 03, 2000	Radiation
Bilog Antenna (Site 6)	CHASE	CBL6112A	2442	30MHz -2GHz	Jun. 23, 2001	Radiation
Half-wave dipole antenna (Site 6)	EMCO	3121C	9705-1285	28 M - 1GHz	May 16, 2001	Radiation
Turn Table (site 6)	EMCO	2080	9711-2021	0 ~ 360 degree	N/A	Radiation
Antenna Mast (site 6)	EMCO	2075	9711-2115	1 m- 4 m	N/A	Radiation

※ Calibration Interval of instruments listed above is one year.

8. 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 $\Gamma_1=0.09$ LISN VSWR $\Gamma_2=0.33$ Uncertainty= $20\log(1-\Gamma_1*\Gamma_2)$	U-shaped	0.2
combined standard uncertainty Ue(y)	normal	±1.7
Measuring uncertainty for a level of confidence of 95% U=2Ue(y)	normal (k=2)	±3.4

$$U = \sqrt{\{(0.3/2)^2 + (2.5^2 + 1.5^2 + 0.2^2)/3 + (0.2)^2/2\}} = 1.7$$

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 $\Gamma_1=0.09$ Antenna VSWR $\Gamma_2=0.67$ Uncertainty= $20\log(1-\Gamma_1*\Gamma_2)$	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

$$U = \sqrt{\{(1.6/2)^2 + (0.3/2)^2 + (3^2 + 0.5^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.4 \quad \text{for 10m test distance}$$

$$U = \sqrt{\{(1.6/2)^2 + (0.3/2)^2 + (3^2 + 3^2 + 2^2 + 0.25^2 + 2^2)/3 + (0.54)^2/2\}} = 2.9 \quad \text{for 3m test distance}$$