

**SK TECH CO., LTD.**

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Certificate of Compliance

Test Report No.:	SKTOS-01064		
NVLAP CODE :	200220-0		
Applicant:	SEJIN ELECTRON INC.		
Applicant Address:	60-19, KASAN-DONG, KEUMCHON-KU, SEOUL, KOREA		
Product:	RF Keyboard		
FCC ID:	GJJSWK-1127F1	Model No.:	SWK-1127F1
Receipt No.:	SKE20010205-089	Date of receipt:	Feb. 05, 2001
Date of Issue:	May 07, 2001		
Testing location:	SK TECH CO., LTD. 820-2, Wolmoon-Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea		
Test Standards:	ANSI C63.4 / 1992		
Rule Parts:	FCC part 15 Subpart C		
Equipment Class :	Class B Digital Device Peripheral		
Test Result:	The above mentioned product has been tested and passed.		
Prepared by: E.K. Seong Signature Date Tested by: K.W. Song/Engineer Signature Date Approved by: J.Y. Hyun /Lab. Manager Signature Date			
Other Aspects :			
Abbreviations :	· OK, Pass = passed · Fail = failed · N/A = not applicable		
•This test report is not permitted to copy partly without our permission. •This test result is dependent on only equipment to be used. •This test result is based on a single evaluation of one sample of the above mentioned. •This test report must not be used by the client to claim product endorsement by NVLAP or any agency of the U.S Government. • We certify that this test report has been based on the measurement standards that is traceable to the national or International standards. NVLAP Lab. Code: 200220-0			

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1. General

This equipment has been shown to be capable of compliance with the applicable technical standards and was tested in accordance with the measurement procedures as indicated in this report.

We attest to the accuracy of data. All measurements reported herein were performed by SK Tech Co., Ltd. and were made under Chief Engineer's supervision.

We assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

2. Test Site

SK TECH Co., Ltd.

2.1 Location

820-2, Wolmoon Ri, Wabu-Up, Namyangju-Si, Kyunggi-Do, Korea

The test site is in compliance with ANSI C63.4/1992 for measurement of radio interference.



2.2 List of Test and Measurement Instruments

Table 1 : List of Test and Measurement Equipment

- **Radiated Emissions**

Kind of Equipment	Type	S/N	Calibrated until
EMI Receiver	ESVS 10	825120/013	02.2002
EMI Receiver	ESVS 10	835871/002	11.2001
Spectrum Analyzer	R3361A	11730187	07.2001
Amplifier	8447F	3113A05153	05.2001
Log Periodic Antenna	UHALP9107	91071238	02.2002
Biconical Antenna	BBA9106	N/A	02.2002
Open Site Cable	N/A	N/A	07.2001
Antenna Mast	5907	N/A	N/A
Antenna & Turntable controller	5906	91X519	N/A
Amp & Receiver connection cable	N/A	N/A	07.2001
Amp & Spectrum connection cable	N/A	N/A	07.2001
50Ω Switcher	MP59B	M93083	07.2001

2.3 Test Date

Date of Application : Feb. 05, 2001

Date of Test : Apr. 28, 2001~ May. 04, 2001

2.4 Test Environment

See each test item's description.



3. Description of the tested samples

The EUT is RF Keyboard.

3.1 Rating and Physical Characteristics

- Operation : Compact type 100key (Multi-language available)
- RF Technology : Feel free operation within 2M
- Combination : Compatible with WINDOWS 95/ ME/ 98/ 2000/ LINUX... etc
- Easy installation : Plug & Play
- Battery : 3V(AA Battery 2EA)
- Battery-life : 10 ~ 12 months
- Frequency Range : 27MHz

3.2 Submitted Documents

N/A



4. Measurement Conditions

The operating voltage of EUT is 3V by AA Battery 2EA.

4.1 Modes of Operation

The EUT was in the following operation mode during all testing;

The EUT sent the signal to the receiver wirelessly.

Test was made on the mode of displaying "H" pattern on the monitor screen.

4.2 List of Peripherals

Description	Manufacturer	Model Name	Serial No.	FCC ID
Monitor	Samsung	SyncMaster750P	PG17HS9U/ADC	Doc
PC	H.P	Brio BA 600/650	SG03603357	Doc
Printer	H.P	2225C	3132S00310	DSI6XU2225
Mouse 1	Logitech	M-BE55	LZE02551778	Doc
Mouse 2	A4 Tech	AM-5E	951237243	H8GAM555C
Mouse 3	NitGen	MFDP02-C1	N/A	Doc
Mouse 4	Sejin Electronics	SMB-200F1	N/A	N/A
Joystick	Logitech	J-ZA10	LZS01651404	Doc
Speaker	FAN HAI DIAN	DMK660	N/A	N/A
Mic	LG Electronics	N/A	N/A	N/A
Receiver	Sejin Electronics	SWR-1027F1	N/A	N/A



4.3 Type of Used Cables

Description	Length	Type of shield	Manufacturer	Remark
PC power cable	1.8m	Non-Shield	None	
Monitor power cable	1.8m	Non-Shield	None	
Printer power cable	1.5m	Non-Shield	None	
Mouse 1 interface cable	1.2m	Non-Shield	Logitech	
Mouse 2 interface cable	1.2m	Non-Shield	A4 Tech	
Mouse 3 interface cable	1.2m	Non-Shield	NitGen	
Printer interface cable	1.6m	Shield	H.P	
Video interface cable	1.6m	Shield	H.P	
Speaker interface cable	1.8m	Shield	FAN HAI DIAN	
Joystick interface cable	2.0m	Shield	Logitech	
Mic interface cable	2.0m	Shield	LG Electronics	
Receiver Interface cable	1.0m	Non-Shield	Sejin Electronics	

4.4 Test Setup

The test setup photographs showed the external supply connections and interfaces.

4.5 Uncertainty

1) Radiated disturbance

U_c (Combined standard Uncertainty) = $\pm 1.9\text{dB}$

Expanded uncertainty $U = KU_c$

$K = 2$

$\therefore U = \pm 3.8\text{dB}$

2) Conducted disturbance

$U_c = \pm 0.88\text{dB}$

$U = KU_c = 2 \times U_c = \pm 1.8\text{dB}$



5. EMISSION Test

5.1 Radiated Emissions

Result :**Pass**

Preliminary measurements were made indoors at 1 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 300 MHz using biconical antenna and from 300 to 1000 MHz using log-periodic antenna. Above 1GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3-meter test range using SCHWARZBECK dipole antennas. The test equipment was placed on a wooden table situated on a 4x4 meter area adjacent to the measurement area. Turntable was to protect from weather in the dome that made with FRP. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter(ESVS 10) and Quasi-Peak Adapter. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 100kHz or 1MHz depending on the frequency or type of signal.

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 x 1.5 meter table.

The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed, and/or support equipment, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission.

Photographs of the worst-case emission can be seen in photograph of radiated emission test. Each EME reported was calibrated using self-calibrating mode.

**Table 2 : Test Data, Radiated Emissions**

Frequency (MHz)	Pol.	Height [m]	Angle [°]	(1) Reading (dBμV)	(2) AFCL (dB/m)	(3) Actual (dBμV/m)	(4) Limit (dBμV/m)	(5) Margin (dB)
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Table. Radiated Measurements at 3-meters

✱ *We couldn't find any unwanted emissions except the fundamental frequency during the test.*

Table 3 : Test Data, Operating Frequency

Frequency (MHz)	Pol.	Height [m]	Angle [°]	(1) Reading (dBμV)	(2) AFCL (dB/m)	(3) Actual (dBμV/m)	(4) Limit (dBμV/m)	(5) Margin (dB)
27.11	V	1.2	102	18.05	12.3	30.80	80.0	49.20
27.15	V	1.9	156	18.74	12.3	31.04	80.0	48.96
27.18	V	2.1	210	19.83	12.3	32.13	80.0	47.87
27.21	V	2.0	312	17.81	12.3	57.32	80.0	22.68

Table. Radiated Measurements at 3-meters

NOTES:

1. All modes of operation were investigated and the worst-case emission are reported.
2. All other emission are non-significant.
3. All readings are calibrated by self-mode in receiver.
4. Measurements using CISPR quasi-peak mode.
5. AFCL = Antenna factor and cable loss
6. H = Horizontal, V = Vertical Polarization

♠ **Margin Calculation**

$$(5)\text{Margin} = (4)\text{Limit} - (3)\text{Actual}$$

$$[(3)\text{Actual} = (1)\text{Reading} + (2)\text{AFCL}]$$