

APPLICATION FOR CERTIFICATION
On Behalf of
Silitek Corporation

Keyboard

Model Number: SK-1688

Prepared for : Silitek Corporation
10F., No. 25, Sec. 1, Tung Hwa S. Rd.,
Taipei, Taiwan, R.O.C.

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
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Report Number	ACS-F99066
Date of Test	Oct. 29 / 31, 1999
Date of Report	Nov. 02, 1999

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TEST REPORT

Applicant Silitek Corporation
Manufacturer Yet Foundate Limited
EUT Description Keyboard
(A) MODEL NO. : SK-1688
(B) SERIAL NO. : N/A
(C) POWER SUPPLY : +5V DC

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart B Class B October 1998 & FCC / ANSI C63.4-1992

The device described above is tested by AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart Class B limits both radiated and conducted emissions.

The measurement results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the Equipment Under Test (EUT) is to be technically compliant with the FCC requirements.

This report applies to above tested sample only. This report shall not be reproduced in part without written approval of AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

This report must not be used by the applicant to claim product endorsement by NVLAP or any agency of the U.S. Government.

Date of Test :

Oct. 29 / 31, 1999

Prepared by :

Katherine Ge Nov. 02, 99
(KATHERINE GE / ASSISSANT)

Reviewer :

Martin Lu 2-11
(MARTIN LU / SUPERVISOR)
For and on behalf of
AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

Approved & Authorized Signer :

Alan Liao Nov-9-99
Authorized Signature(s)
(ALAN LIAO / DEPUTY MANAGER)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Keyboard
Model Number	:	SK-1688
Applicant	:	Silitek Corporation 10F., No. 25, Sec. 1, Tung Hwa S. Rd., Taipei, Taiwan, R.O.C.
Manufacturer	:	Yet Foundate Limited West Di, Shi Heng Rd., Shi Jie Xian, Dongguan, Guangdong, China
Data Cable	:	Shielded, Nondetachable, 1.8m
Date of Test	:	Oct. 29 / 31, 1999

1.2. Tested Supporting System Details

1.2.1. PERSONAL COMPUTER

Model Number	P2L97
Serial Number	No. 1
FCC ID	DoC
Manufacturer	Asus Computer International Co.
Switching Power Supply	Model FSP300-60GT Sparkle Power Int'l Ltd.
Floppy Driver	Teac Corp. Model FC-235HF
Hard Disk Driver	Quantum, Model 7218A2C
Disk Ctrl Card	Within Mother Board
Serial/Parallel Card	Within Mother Board
Power Cord	Unshielded, Detachable, 1.8m
VGA CARD	
Model Number	DSV3365
Serial Number	E601604161
Manufacturer	Dataexpert Co., Ltd.
FCC ID	LUT-DSV3365

1.2.2. MONITOR

Model Number	KS-M1421
Serial Number	120954
Manufacturer	KASI Electronics Co., Ltd.
Data Cable	Shielded, Nondetachable, 1.2m
Power Cord	Unshielded, Nondetachable, 1.2m
FCC ID	KVCKS-M1421

1.2.3. MOUSE

Model Number	M-S34
Serial Number	LZA81403347
Manufacturer	LOGITECH
Data Cable	Unshielded, Nondetachable, 2.5m
FCC ID	DZL211029

1.2.4. PRINTER

Model Number	2225C+
Serial Number	2937S56660
FCC ID	DSI6XU2225
Manufacturer	Hewlett Packard
Power Adapter	Hewlett Packard, Model 82241A
Data Cable	Shielded, Detachable, 1.5m

1.2.5. MODEM #1

Model Number	MODEM 1414
Serial Number	980013578
FCC ID	IFAXDM1414
Manufacturer	Aceex
Data Cable	Shielded, Detachable, 1.5m
AC Adapter	M/N: SCP41-91000A

1.2.6. MODEM #2

Model Number	MODEM 1414
Serial Number	980013579
FCC ID	IFAXDM1414
Manufacturer	Aceex
Data Cable	Shielded, Detachable, 1.5m
AC Adapter	M/N: SCP41-91000A

1.3. Test Facility

Site Description

3m Anechoic Chamber	:	certificated by FCC, USA Aug. 18, 1997
3m & 10m Open Site	:	certificated by FCC, USA Feb. 13, 1998
EMC Lab.	:	certificated by TUV Rheinland Taiwan Dec.05, 1995
		certificated by COMMERCE, New Zealand May 19, 1997
		certificated by NEMKO, Norway Feb. 28, 1998
		certificated by VCCI, Japan Oct. 29, 1998
		certificated by DATech, German Feb. 02, 1999
		certificated by DNV, Norway May 26, 1999
Name of Firm	:	Audix Technology (Shenzhen) Co., Ltd.
Site Location	:	No. 6, Ke Feng Rd., 52 Block, Shenzhen Science & Industrial Park, Nantou, Shenzhen, Guangdong, China
NVLAP Lab Code	:	200372-0 effective until March 31, 2000

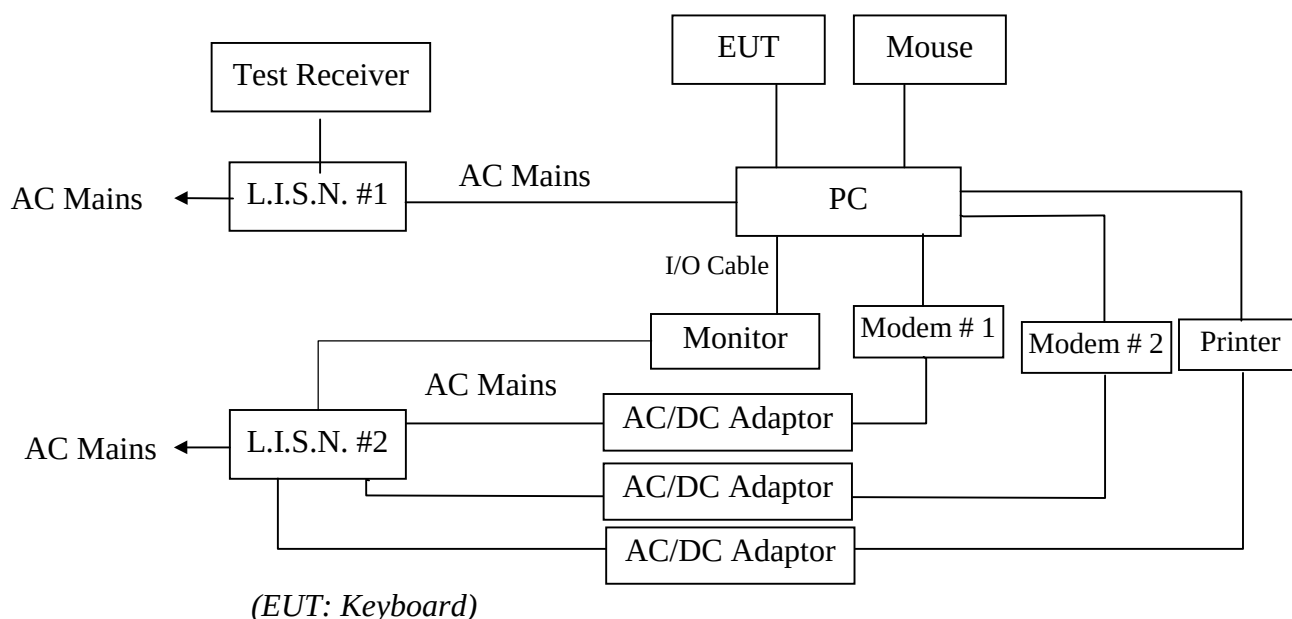
1.4. Measurement Uncertainty

Conduction Uncertainty	=	$\pm 2.66\text{dB}$
Radiation Uncertainty	=	$\pm 4.26\text{dB}$

2.1. Test Equipment

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESHS20	836600/006	Jun. 06, 99	1 Year
2.	L.I.S.N. #1	Kyoritsu	KNW-407	8-541-4	Jun. 06, 99	1 Year
3.	L.I.S.N. #2	EMCO	3825/2	9006-1660	Jun. 06, 99	1 Year
4.	Terminator	EMCO	50Ω	No. 1	Jun. 06, 99	1 Year
5.	Terminator	EMCO	50Ω	No. 2	Jun. 06, 99	1 Year
6.	RF Cable	FUJIKURA	RG-55/U	LISN Cable	Aug. 31, 99	1/2 Year
7.	Coaxial Switch	Anritsu	MP59B	M73989	Jun. 06, 99	1/2 Year

2.2.1. Block diagram of connection between the EUT and simulators



Frequency MHz	Maximum RF Line Voltage	
	μV	dB(μV)
0.45 ~ 30	250	48

Remarks: RF Line Voltage (dB(μ V)) = 20 log RF Line Voltage (μ V)

2.4. Configuration of EUT on Measurement

The following equipment are installed on Power Line Conducted Emission Measurement to meet the commission requirement and operating regulations in a manner which tends to maximize its emission characteristics in a normal application.

2.4.1. Keyboard (EUT)

Model Number	: SK-1688
Serial Number	: N/A
Manufacturer	: Yet Foundate Limited

2.4.2. Support Equipment : As Tested Supporting System Detail, in Section 1.2..

2.5. Operating Condition of EUT

2.5.1. Setup the EUT and simulator as shown as Section 2.2.

2.5.2. Turn on the power of all equipment.

2.5.3. Let the EUT work in test mode (Running) and measure it.

2.6. Test Procedure

The EUT is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm coupling impedance for the EUT. Please refer the block diagram of the test setup and photographs. Both sides of AC line are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to FCC ANSI C63.4-1992 on Conducted Emission Measurement.

The bandwidth of test receiver (R & S ESHS20) is set at 10KHz.

The frequency range from 450KHz to 30MHz is checked.

The test result are reported on Section 2.7., all the scanning waveforms for Conducted Emission Measurement are attached in Appendix I.

2.7. Power Line Conducted Emission Measurement Results

PASS.

The frequency range from 450KHz to 30 MHz is investigated. All emissions not reported below are too low against the prescribed limits.

Date of Test	Oct. 31, 1999	Temperature	26
EUT	Keyboard	Humidity	57
Model No.	SK-1688	Test Mode	Running
Test Engineer	Ace Liu		

Frequency MHz	Reading		Limit dB(μ V)
	Phase VA dB(μ V)	Phase VB dB(μ V)	
1.235	38.8	38.8	48.0
1.550	39.1	39.0	48.0
2.180	*	40.1	48.0
2.215	39.2	*	48.0
7.745	39.1	38.6	48.0

Remark

1. All readings are Quasi-Peak values.
2. The worst emission is detected at 2.180MHz with corrected signal level of 40.1dB(μ V) (limit is 48dB(μ V)) when the VB side of the EUT is connected to L.I.S.N.

Reviewer :

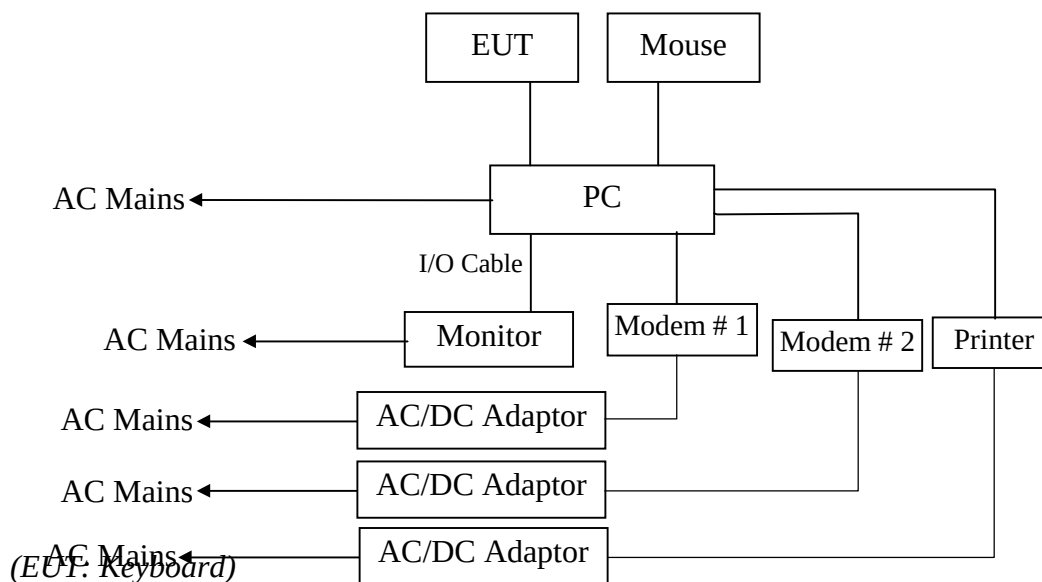
Martin Lu

3.1. Test Equipment

3.1.1. For Anechoic Chamber

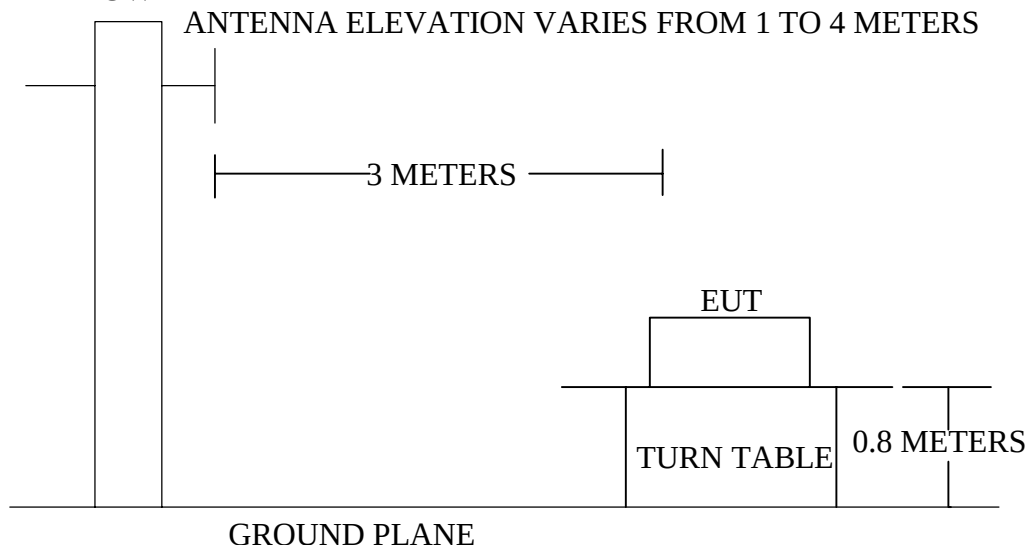
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	HP	85422E	3625A00181	Jun. 06, 99	1 Year
2.	Test Receiver	Rohde & Schwarz	ESVS20	830350/005	Jun. 06, 99	1 Year
3.	Amplifier	HP	8447D	2944A07794	Jun. 06, 99	1/2 Year
4.	Bilog Antenna	Chase	CBL6112A	2176	Sep. 27, 99	1 Year
5.	Computer	N/A	N/A	N/A	N/A	N/A
6.	Printer	NEC	P3800	568101448	N/A	N/A
7.	FR Cable	MIYAZAKI	5D-2W	3# Chamber No.1	Aug. 11, 99	1/2 Year
8.	FR Cable	MIYAZAKI	5D-2W	3# Chamber No.2	Aug. 11, 99	1/2 Year
9.	FR Cable	FUJIKURA	RG-55/U	3# Chamber No.3	Aug. 11, 99	1/2 Year
10.	FR Cable	FUJIKURA	RG-55/U	3# Chamber No.4	Aug. 11, 99	1/2 Year
11.	Coaxial Switch	Anritsu	MP59B	M74389	Jun. 06, 99	1/2 Year

3.2.1. Block diagram of connection between the EUT and simulators



3.2.2. In 3# Chamber

ANTENNA TOWER



3.3. Radiated Emission Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V/m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0

- Remark
- (1) Emission level $(\text{dB})\mu\text{V} = 20 \log \text{Emission level } \mu\text{V/m}$
 - (2) The smaller limit shall apply at the cross point between two frequency bands.
 - (3) Distance is the distance in meters between the measuring instrument, antenna and the closest point of any part of the device or system.

3.4. EUT Configuration on Measurement

The following equipment are installed on Radiated Emission Measurement to meet the commission requirements and operating regulations in a manner which tends to maximize its emission characteristics in normal application.

3.4.1. Keyboard (EUT)

Model Number : SK-1688
 Serial Number : N/A
 Manufacturer : Yet Foundate Limited

3.4.2. Support Equipment : As Tested Supporting System Detail, in Section 1.2..

3.5. Operating Condition of EUT

1. Setup the EUT as shown in Section 3.2..
2. Let the EUT work in test mode (Running) and measure it.

3.6. Test Procedure

EUT and its simulators are placed on a turn table, which is 0.8 meter high above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. EUT is set 3 meters away from the receiving antenna, which is mounted on a antenna tower. The antenna can be moved up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated bilog antenna) is used as receiving antenna. Both horizontal and vertical polarization of the antenna are set on measurement.

The bandwidth of the EMI test receiver (R&S ESVS20) is set at 120KHz.
The frequency range from 30MHz to 1000MHz is checked.

The test mode (Running) are tested in 3# Chamber, and all the scanning waveforms are attached in Appendix II.

3.7. Radiated Emission Noise Measurement Result

PASS.

The frequency range from 30MHz to 1000MHz is investigated. Please see the following pages.

Date of Test :	Oct. 30, 1999	Temperature :	22
EUT :	Keyboard	Humidity :	50
Model No. :	SK-1688	Test Mode :	Running
Test Engineer:	Ace Liu		

Frequency	Antenna	Cable	Meter Reading	Emission Level	Over	Limits
MHz	Factor	Loss	Horizontal	Horizontal	Limits	
	dB/m	dB	dBμV	dBμV/m	dBμV/m	dBμV/m
81.030	10.05	2.42	21.60	34.07	-5.93	40.00
183.630	13.73	3.63	18.30	35.66	-7.84	43.50
216.030	14.23	3.87	19.40	37.50	-8.50	46.00
264.630	17.20	4.17	16.70	38.07	-7.93	46.00

Remark: 1. All readings are Quasi-Peak values.

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading

Date of Test :	Oct. 30, 1999	Temperature :	22
EUT :	Keyboard	Humidity :	50
Model No. :	SK-1688	Test Mode :	Running
Test Engineer:	Ace Liu		

Frequency	Antenna	Cable	Meter Reading	Emission Level	Over	Limits
MHz	Factor	Loss	Vertical	Vertical	Limits	
	dB/m	dB	dBμV	dBμV/m	dBμV/m	dBμV/m
34.590	17.52	1.16	16.90	35.58	-4.42	40.00
83.730	13.57	2.47	17.60	33.63	-6.37	40.00
216.030	16.48	3.87	16.40	36.75	-9.25	46.00
240.330	17.84	4.03	17.20	39.06	-6.94	46.00

Remark: 1. All readings are Quasi-Peak values.

2. Emission Level = Antenna Factor + Cable Loss + Meter Reading

Reviewer :

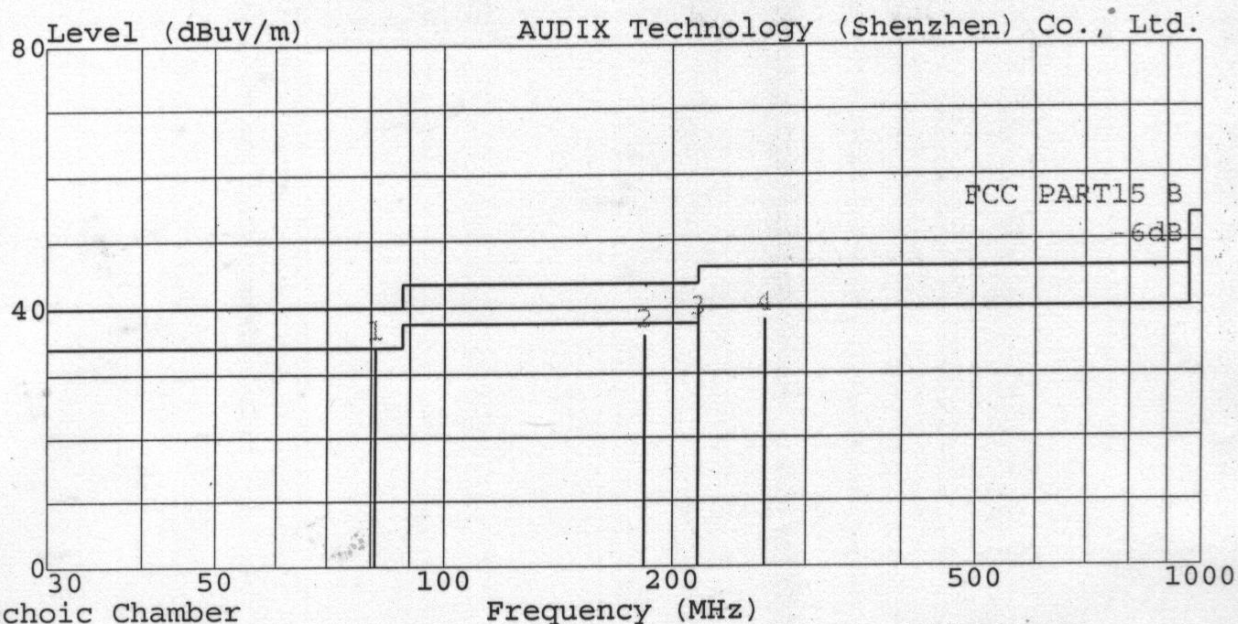
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AUDIX Technology (Shenzhen) Co., Ltd.

Data#: 20 File#: SILITEK.EMI Date: 10-30,1999 Time: 11:39:05



Anechoic Chamber

Trace :

Limit : FCC PART15 B 3m

Probe : 2176FACTOR HORIZONTAL

Margin: -6.0dB

EUT : Keyboard M/N:SK-1688

Power : +5V DC

Memo : Running

:

:

Ref Trace:

Page: 1

	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp	
	MHz	dB	Limit	Line	Level	Factor	Loss	Factor	Remark
			dB	dB	dB	dB	dB	dB	
1 !	81.030	34.07	-5.93	40.00	21.60	10.05	2.42	0.00	
2	183.630	35.66	-7.84	43.50	18.30	13.73	3.63	0.00	
3	216.030	37.50	-8.50	46.00	19.40	14.23	3.87	0.00	
4	264.630	38.07	-7.93	46.00	16.70	17.20	4.17	0.00	

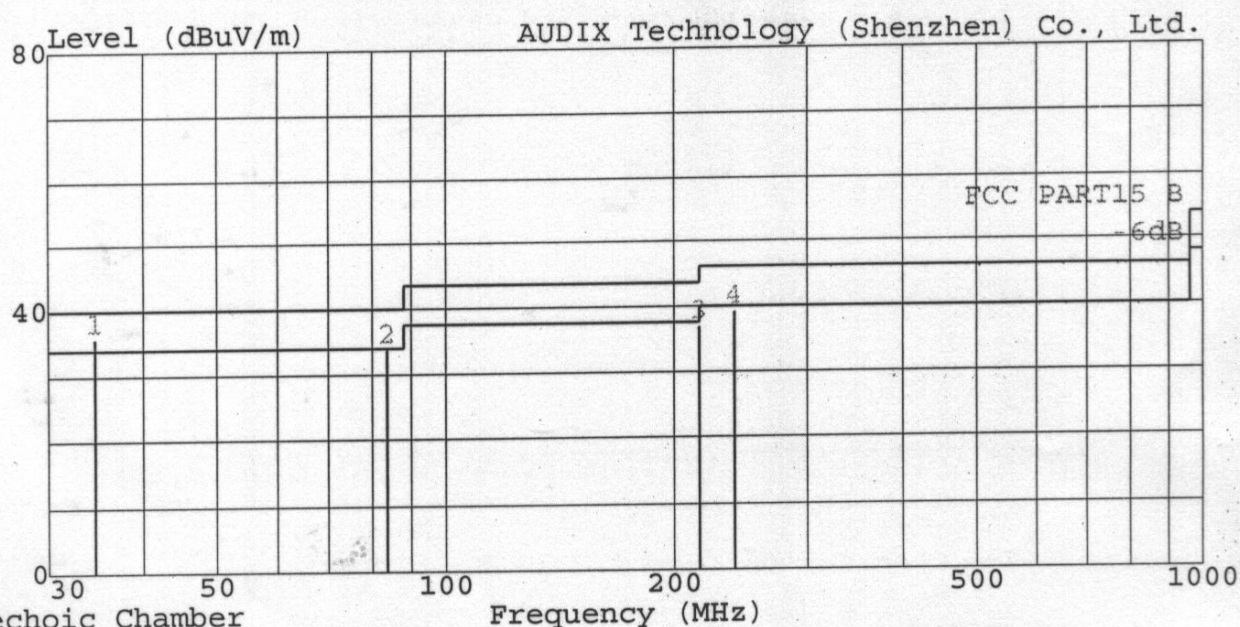
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Data#: 19 File#: SILITEK.EMI

Date: 10-30,1999 Time: 11:36:44



Anechoic Chamber

Trace :

Limit : FCC PART15 B 3m

Probe : 2176FACTOR VERTICAL

Margin: -6.0dB

EUT : Keyboard M/N:SK-1688

Power : +5V DC

Memo : Running

:
:

Ref Trace:

Page: 1

	Freq	Level	Over	Limit	Read	Probe	Cable	Preamp	
	MHz	dB	Limit	Line	Level	Factor	Loss	Factor	Remark
			dB	dB	dB	dB	dB	dB	
1 !	34.590	35.58	-4.42	40.00	16.90	17.52	1.16	0.00	
2	83.730	33.63	-6.37	40.00	17.60	13.57	2.47	0.00	
3	216.030	36.75	-9.25	46.00	16.40	16.48	3.87	0.00	
4	240.330	39.06	-6.94	46.00	17.20	17.84	4.03	0.00	

4. PHOTOGRAPH

4.1. Photos of Power Line Conducted Measurement



FRONT VIEW OF CONDUCTED MEASUREMENT



REAR VIEW OF CONDUCTED MEASUREMENT

4.2. Photos of Radiated Emission Measurement (In 3# Chamber)



FRONT VIEW OF RADIATED MEASUREMENT



REAR VIEW OF RADIATED MEASUREMENT