

JING MOLD ENTERPRISE CO., LTD.

Keyboard

EXHIBIT 4

Test Report

Test Report

ACS-F98029

APPLICATION FOR CERTIFICATION
On Behalf of
JING MOLD ENTERPRISE CO., LTD.
Keyboard

Model : FPW JME-8231A

Prepared for : JING MOLD ENTERPRISE CO., LTD.
No. 6-7, I-Huo Rd., Ta-Ya Chiang,
Taichung Hsien, Taiwan. R.O.C.

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
No. 6 Ke Feng Rd., 52 Block,
Shenzhen Science & Industrial Park,
Nantou, Shenzhen, Guangdong, China

Tel: (0755)663-9496

Report Number : ACS-F98029
Date of Test : Sep. 09 / 10, 1998
Date of Report : Sep. 14, 1998

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70K98-F061

TEST REPORT CERTIFICATION

Applicant : JING MOLD ENTERPRISE CO., LTD.
Manufacturer : JING MOLD PLASTIC ELECTRONICS (SHENZHEN) CO., LTD.
EUT Description : Keyboard
(A) MODEL NO. : FPW JME-8231A
(B) SERIAL NO. : N/A
(C) POWER SUPPLY : +5V DC

Measurement Procedure Used:

FCC Rules and Regulations Part 15 Subpart B Class B October 1997 & 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.

Date of Test : Sep. 09 / 10. 1998

Prepared by : Mabel Liu 17/9
(ASSISTANT: MABEL LIU)Reviewer : Martin Lu 18/9
(SUPERVISOR: MARTIN LU)

For and on behalf of
AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

Approve & Authorized Signer : Leon Liu Sep. 29, 1998
Authorized Signature(s)
(MANAGER: LEON LIU)

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Keyboard
Model Number	:	FPW JME-8231A
Applicant	:	JING MOLD ENTERPRISE CO., LTD. No. 6-7, I-Huo Rd., Ta-Ya Chiang, Taichung Hsien, Taiwan, R.O.C.
Manufacturer	:	JING MOLD PLASTIC ELECTRONICS (SHENZHEN) CO., LTD. Xin Qiao 3rd Industrial Estate, Sha Jing, Pao An, Shen Zhen, China.
Data Cable	:	Shielded, Nondetachable, 1.5m
Date of Test	:	Sep. 09 / 10, 1998

1.2. Tested System Details

1.2.1. PERSONAL COMPUTER

Model Number	:	P2L97
Serial Number	:	No. 1
Manufacturer	:	Asus Computer International Co.
Switching Power	:	Model FSP300-60GT
Supply	:	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
FCC Certification	:	DoC

1.2.2. MONITOR

Model Number	:	CM752ET
Serial Number	:	T8D003257
Manufacturer	:	HITACHI
Data Cable	:	Shielded, Detachable, 1.5m
Power Cord	:	Unshielded, Detachable, 1.8m
FCC Certification	:	DoC

1.2.3. PRINTER

Model Number	:	2225C+
Serial Number	:	2937S56660
FCC ID	:	DS16XU2225
Manufacturer	:	Hewlett Packard
Power Adapter	:	Hewlett Packard, Model 82241A
Power Cord	:	Unshielded, Nondetachable, 1.8m
Data Cable	:	Shielded, Detachable, 1.5m

1.2.4. MODEM # 1

Model Number	:	1200AT
Serial Number	:	AT 112153
FCC ID	:	EF56A5 1200AT
Manufacturer	:	Team Technology, Inc.
Data Cable	:	Shielded, Detachable, 1.5m
Power Adapter	:	Team, Model DV-1215A
		Nonshielded, Undetachable, 1.8m

1.2.5. MODEM # 2

Model Number	:	1200AT
Serial Number	:	AT 122257
FCC ID	:	EF56A5 1200AT
Manufacturer	:	Team Technology, Inc.
Data Cable	:	Shielded, Detachable, 1.5m
Power Adapter	:	Kaming, Model AD-09
Power Cord	:	Unshielded, Nondetachable, 1.8m

1.2.6. MOUSE

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

1.3. Measurement Uncertainty

Radiation Uncertainty	:	Ur = $\pm$ 4.26 dB
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Conduction Uncertainty	:	Uc = $\pm$ 2.66 dB
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1.4. Description of Test Facility

Site Description :

3m Anechoic Chamber : Certificated by FCC, U.S.A.
Aug. 18, 1997

3m & 10m Open Site : Certificated by FCC, U.S.A,
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

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

2. POWER LINE CONDUCTED MEASUREMENT

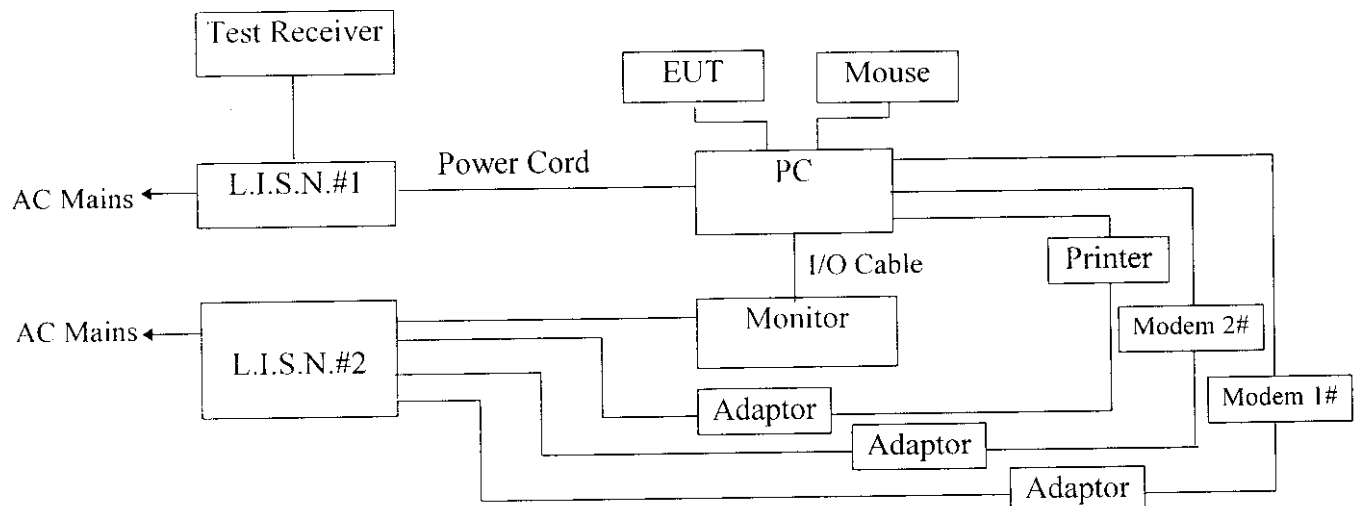
2.1. Test Equipment

The following test equipments are used during the power line conducted measurement:

Item	Type	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESHS20	836600/006	Jun. 07, 98	1 Year
2.	L.I.S.N. # 1	Kyoritsu	KNW-407	8-541-4	Jun. 07, 98	1 Year
3.	L.I.S.N. # 2	EMCO	3825/2	9006-1660	Jun. 07, 98	1 Year
4.	Coaxial Switch	Anritsu	MP59B	M29242	N/A	N/A

2.2. Block Diagram of Test Setup

2.2.1. Block diagram of connection between the EUT and simulators



(EUT: Keyboard)

2.3. Conducted Power Line Emission Limit

Frequency MHz	Maximum RF Line Voltage	
	μV	$\text{dB}(\mu\text{V})$
0.45 ~ 30.00	250	48

Remarks: $\text{RF LINE VOLTAGE (dB}(\mu\text{V})) = 20 \log \text{RF LINE VOLTAGE } (\mu\text{V})$

2.4. EUT Configuration on Measurement

The following equipments are installed on RF LINE VOLTAGE 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	:	FPW JME-8231A
Serial Number	:	N/A
Manufacturer	:	JING MOLD PLASTIC ELECTRONICS (SHENZHEN) CO., LTD.
Data Cable	:	Shielded, Undetachable, 1.5m

2.4.2. Support Equipments

As in Section 1.2. Test System Details

2.5. Operating Condition of EUT

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

2.5.2. Turn on the power of all equipments.

2.5.3. Personal Computer reads data from hard disk.

2.5.4. Personal Computer sends "H" character to Keyboard (EUT) and the screen will display and full with "H" pattern.

2.5.5. Personal Computer reads "H" character to printer, the printer will print "H" pattern on paper.

2.5.6. Personal Computer reads data from floppy disk and then writes data into floppy disk.

2.5.7. Personal Computer reads data from modem.

2.6. Test Procedure

The EUT is put on table which is 0.8m above the ground and away from other metallic surface at least 0.4m. 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 testing equipments. Please reference the block diagram of the test setup and photographs. Both sides of AC line(VA & VB) are checked for maximum conducted interference. In order to find the maximum emission levels, the relative positions of equipments and all of the interface cables must be changed according to FCC ANSI C63.4-1992 on conducted measurement.

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

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

The disturbance voltage from the EUT are investigated and the data is reported in Section 2.7.. Please reference to Appendix I.

2.7. Line Conducted RF Voltage 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 : Sep. 09, 1998 Temperature : 27 °C
 EUT : Keyboard Humidity : 52 %
 Model No. : FPW JME-8231A Working Condition : Running
 Test Engineer : Bright Xie

Frequency MHz	Reading		Limit dB(μV)
	Phase VA dB(μV)	Phase VB dB(μV)	
0.479	23.8	23.7	48
0.604	20.6	21.1	48
12.285	24.1	24.8	48
14.443	25.1	21.0	48
19.529	27.3	27.6	48
28.037	25.8	28.9	48

Remark : 1. All readings are Quasi-Peak values.
 2. The worst emission is detected at 28.037 MHz with corrected signal level of 28.9 dB(μV) (limit is 48 dB(μV)) when the VB side of the EUT is connected to L.I.S.N.

Reviewer : *Martin Lu 18/9*

3. RADIATED EMISSION MEASUREMENT

3.1. Test Equipment

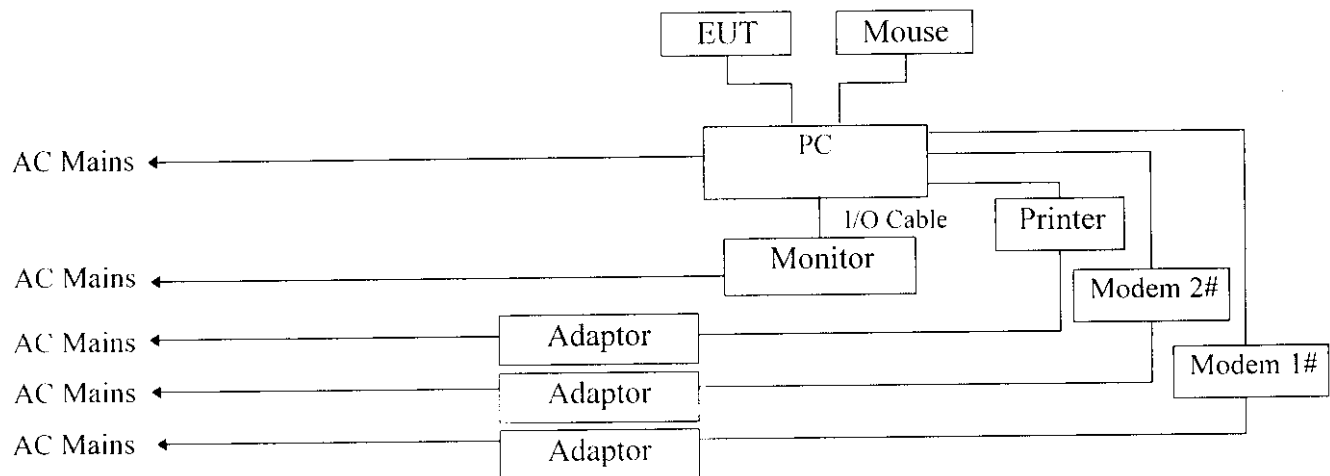
The following test equipments are used during the radiated emission measurement:

3.1.1. In Chamber # 3

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	HP	85422E	3625A00181	Jun. 07, 98	1 Year
2.	Amplifier	HP	8447D	2944A07794	Jun. 07, 98	1/2 Year
3.	Bilog Antenna	Chase	CBL6112A	2176	Sep. 26, 97	1 Year
4.	Computer	N/A	N/A	N/A	N/A	N/A
5.	Printer	NEC	P3800	568101448	N/A	N/A

3.2. Block Diagram of Test Setup

3.2.1. Block diagram of connection between the EUT and simulators

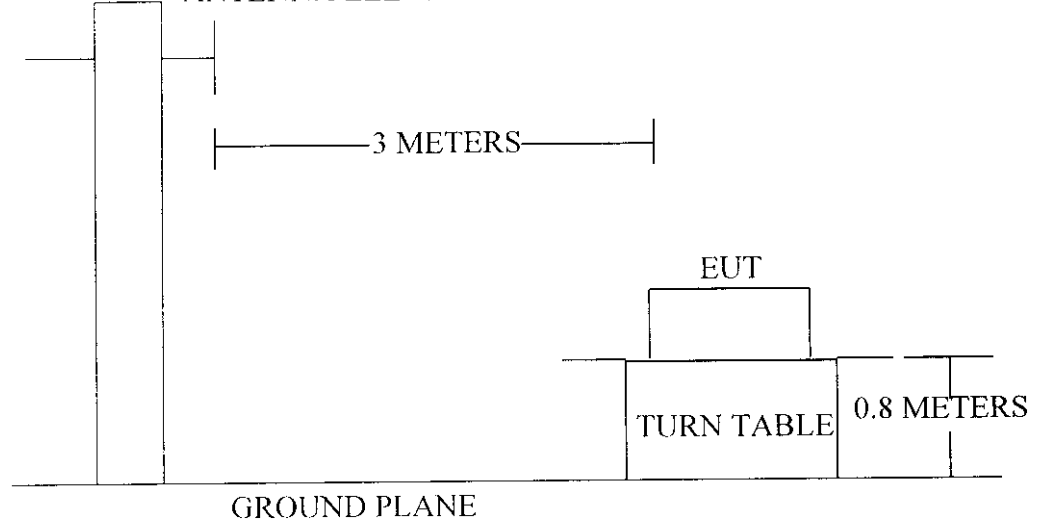


(EUT: Keyboard)

3.2.2. Chamber # 3 Test Setup Diagram

ANTENNA TOWER

ANTENNA ELEVATION VARIES FROM 1 TO 4 METERS



3.3. Radiation Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMITS dB(μ V)/m
30 ~ 88	3	40.0
88 ~ 216	3	43.5
216 ~ 960	3	46.0
960 ~ 1000	3	54.0

- Remark :
- (1) Emission level (dB(μ V)/m) = 20 log Emission level (μ V/m)
 - (2) The smaller limit shall apply at the cross point between two frequency bands.
 - (3) Distance refers to the distance in meters between the measuring instrument, antenna and the closed point of any part of the device or system.

3.4. EUT Configuration on Measurement

The configuration of EUT and its simulators are same as those used in conducted measurement. Please refer to Section 2.4.

3.5. Operating Condition of EUT

Same as conducted measurement which is listed in Section 2.5.

3.6. Test Procedure

The EUT and its simulators are placed on a turn table which is 0.8 meter above ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on a antenna tower. The antenna can move up and down between 1 meter and 4 meters to find out the maximum emission level. Broadband antenna (calibrated biconical and log periodical antenna) and dipole antenna are used as receiving antenna. Both horizontal and vertical polarization of the antenna are set on measurement. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-1992 on radiated emission measurement.

The bandwidth of the test receiver (R & S ESVS 20) is set at 120KHz.

The frequency range from 30MHz to 1000MHz is checked.

The one test mode (Running) are measured in the Chamber #3. All the test results are listed in Section 4.7. and all the scanning waveform are attached in Appendix II.

3.7. Radiated Emission Noise Measurement Results.

PASS.

The frequency range from 30MHz to 1000MHz is investigated. All the emission levels not reported below are too low against the Limit.

Please see the attached pages.

Date of Test : Sep. 10, 1998 Temperature : 25 °C

EUT : Keyboard Humidity : 55%

Model No. : FPW JME-8231A Test Site : #3 Chamber

Display Pattern : Running Test Engineer : Bright Xie

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Horizontal dB	Emission Level Horizontal dBμV/m	Limits dBμV/m	Limits Over dBμV/m
48.090	8.35	1.17	15.20	24.72	40.00	-15.28
67.260	5.62	1.43	18.40	25.46	40.00	-14.54
74.890	7.19	1.52	16.20	24.91	40.00	-15.09
105.330	12.66	1.84	10.60	25.10	43.50	-18.40
116.130	13.00	1.90	11.50	26.39	43.50	-17.11
166.750	10.71	2.31	22.50	35.52	43.50	-7.98
211.500	9.77	2.66	14.60	27.03	43.50	-16.47
268.140	12.30	3.01	12.90	29.11	46.00	-16.89
601.500	18.61	4.69	14.30	37.60	46.00	-8.40

Calculation: Emission Level = Antenna Factor + Cable Loss + Meter Reading

Date of Test : Sep. 10, 1998 Temperature : 25 °C

EUT : Keyboard Humidity : 55%

Model No. : FPW JME-8231A Test Site : #3 Chamber

Display Pattern : Running Test Engineer : Bright Xie

Frequency MHz	Antenna Factor dB	Cable Loss dB	Meter Reading Vertical dB	Emission Level Vertical dBμV/m	Limits dBμV/m	Limits Over dBμV/m
48.630	5.18	1.18	16.60	22.96	40.00	-17.04
75.630	7.47	1.53	21.70	30.70	40.00	-9.30
121.530	12.35	1.93	9.80	24.08	43.50	-19.42
148.530	9.47	2.20	12.90	24.84	43.50	-18.66
163.700	8.69	2.27	11.60	22.56	43.50	-20.94
226.290	9.77	2.76	9.70	22.23	46.00	-23.77
601.500	17.15	4.69	15.80	37.64	46.00	-8.36

Calculation: Emission Level = Antenna Factor + Cable Loss + Meter Reading

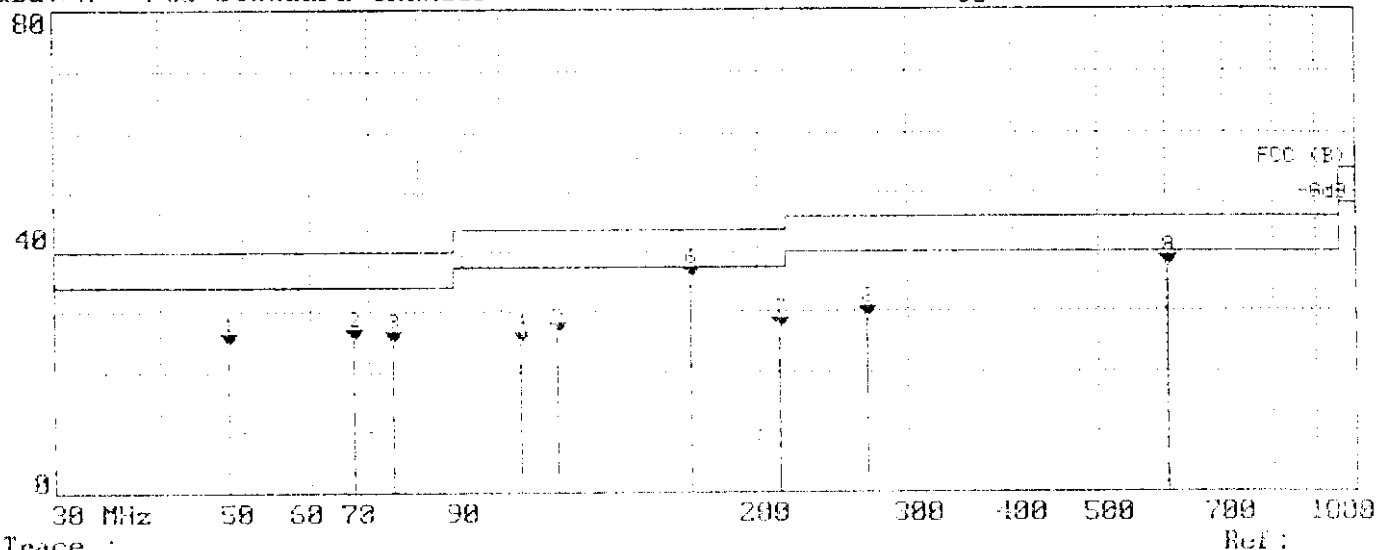
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File#: JINGMOLD.EMI

Date: 09-10-1998 Time: 11:12:00

dBuV/m ACS Standard Chamber

AUDIX Technology (Shenzhen) Co., Ltd.



Trace :

Ref :

Limit : FCC (B) 01

Probe : F170 HORIZONTAL

Margin: 0dB

File : Regen and M/N:EPW EXT M-11A

Power : 100W/100Hz

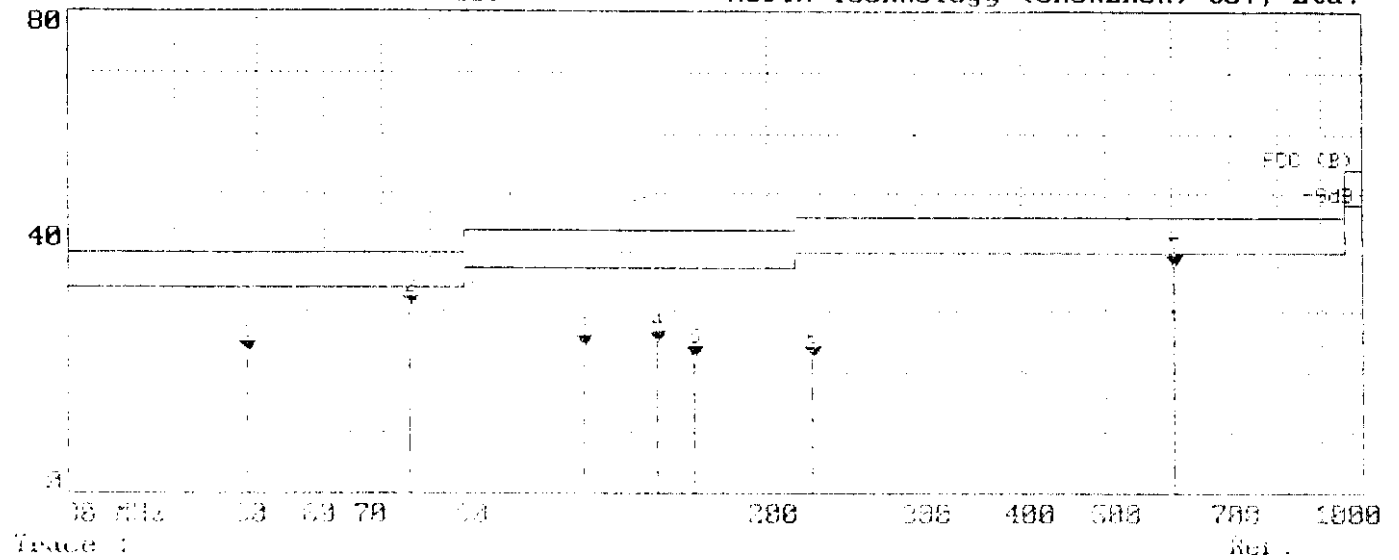
Wave : Rectified

:

:

11:11

Freq	Level	Limit		Test		Probe		Table		Remark
		dB	dB	dB	dB	dB	dB	dB	dB	
1	38.000	24.77	13.23	40.00	15.00	8.35	1.17	0.00	0P	
2	67.160	25.46	11.54	40.00	16.40	5.62	1.43	0.00	0P	
3	74.690	24.91	15.09	40.00	16.00	7.19	1.52	0.00	0P	
4	105.130	25.10	11.90	40.00	10.00	12.00	1.64	0.00	0P	
5	116.170	26.39	13.61	40.00	11.50	13.00	1.90	0.00	0P	
6	166.750	25.50	14.50	40.00	22.79	11.71	2.31	0.00	0P	
7	211.500	27.03	16.47	40.00	14.60	9.77	2.66	0.00	0P	
8	263.140	29.11	16.89	40.00	12.90	13.20	3.01	0.00	0P	
9	601.750	37.60	2.40	40.00	14.30	18.61	1.69	0.00	0P	



Model: JINGMOLD.EMI
 Measurement: dB
 Unit: dBu/m
 Power: 1000 mW
 Noise: 1000 Hz

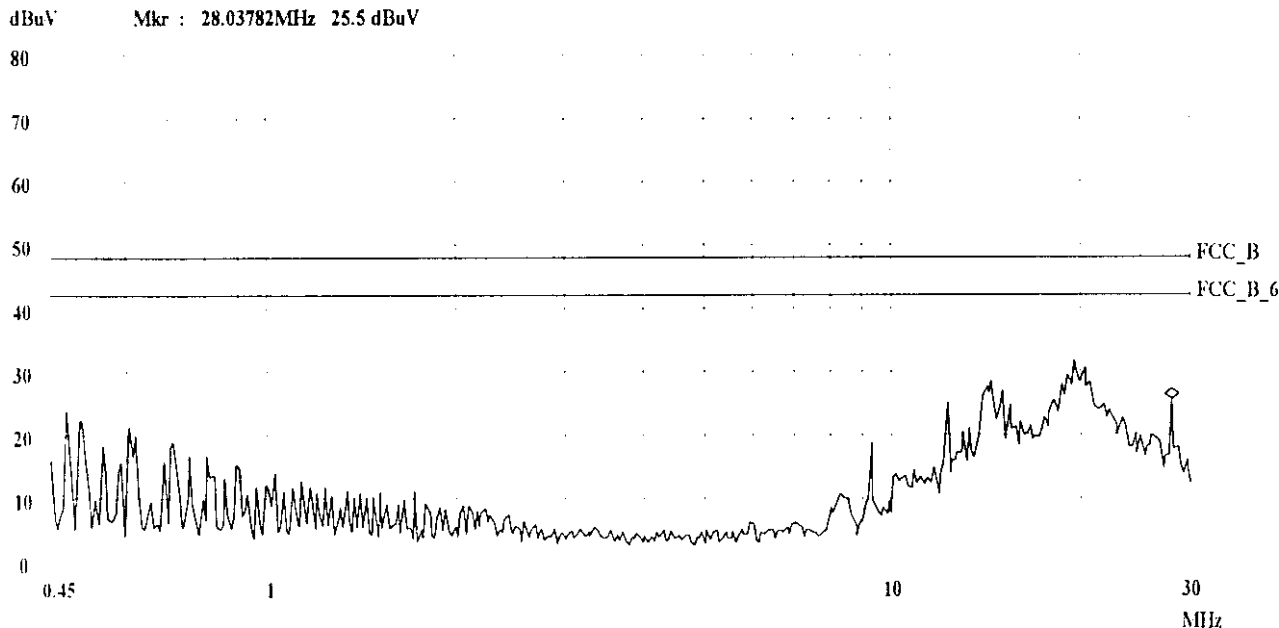
Frequency (Hz)	Measured (dB)	Reference (dB)	Deviation (dB)	Frequency (Hz)	Measured (dB)	Reference (dB)	Deviation (dB)
100	41.18	41.18	0.00	1000	16.10	16.10	0.00
125	41.70	41.70	0.00	1250	17.47	17.47	0.00
150	42.00	42.00	0.00	1500	17.35	17.35	0.00
175	42.54	42.54	0.00	1750	17.71	17.71	0.00
200	42.54	42.54	0.00	2000	17.77	17.77	0.00
250	42.54	42.54	0.00	2500	17.15	17.15	0.00
300	42.54	42.54	0.00	3000	17.15	17.15	0.00

APPENDIX I

Conduction test
FCC B

09. Sep 98 10:17

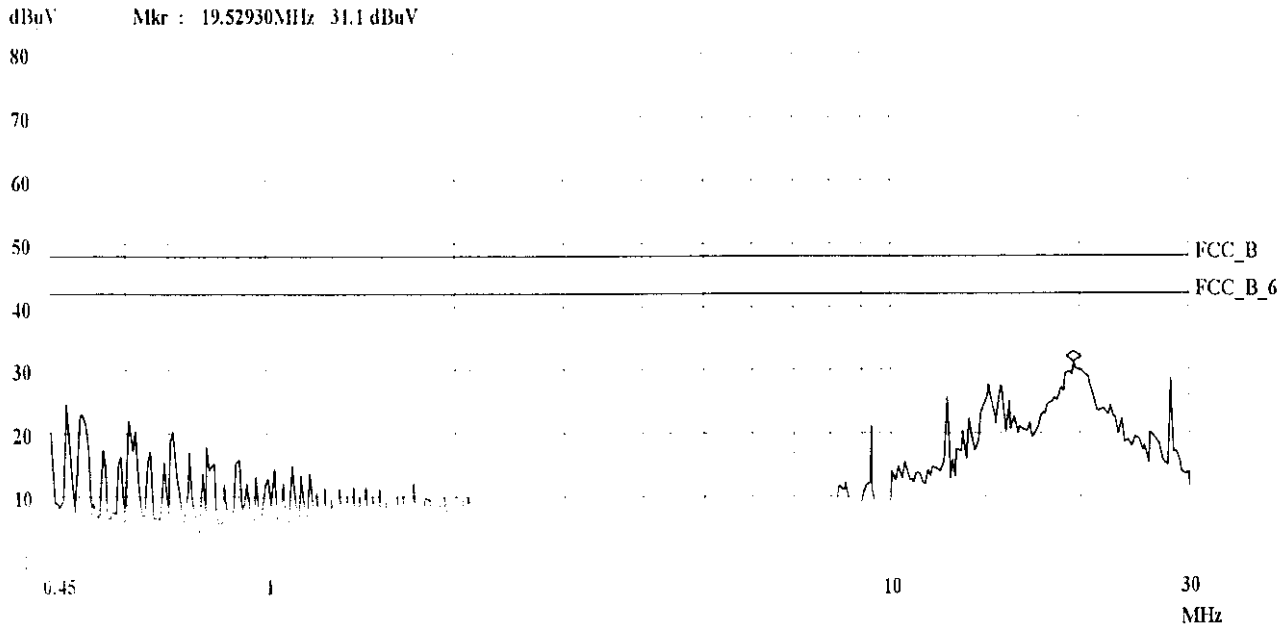
EUT: Keyboard M/N:FPW JME-8231A
Manuf: Jing Mold
Op Cond: Running
Operator: Keven
Test Spec: Va 120V/60HZ
Comment: temp:27°C
Humi:51%



Conduction test
FCC B

09. Sep 98 10:21

EUT: Keyboard M/N:FPW JME-8231A
Manuf: Jing Mold
Op Cond: Running
Operator: Keven
Test Spec: Vb 120V/60HZ
Comment: temp:27°C
Humi:51%



APPENDIX II

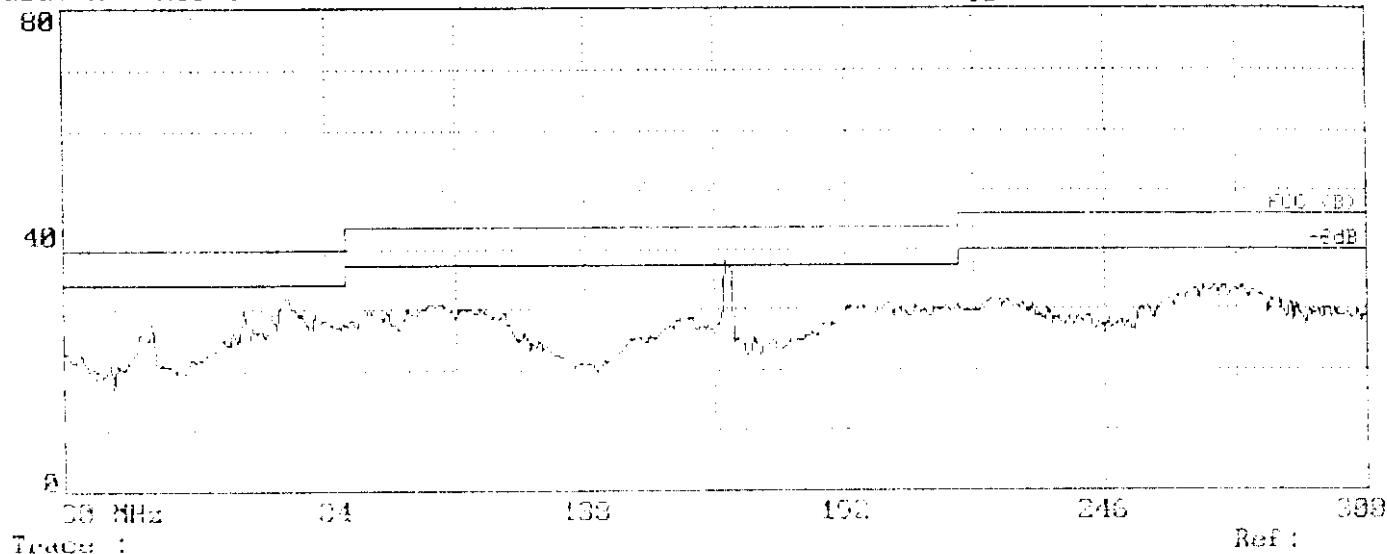
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Date: 89-09-1998 Time: 08:40:18

dBuV/m ACS Standard Chamber

AUDIX Technology (Shenzhen) Co., Ltd.



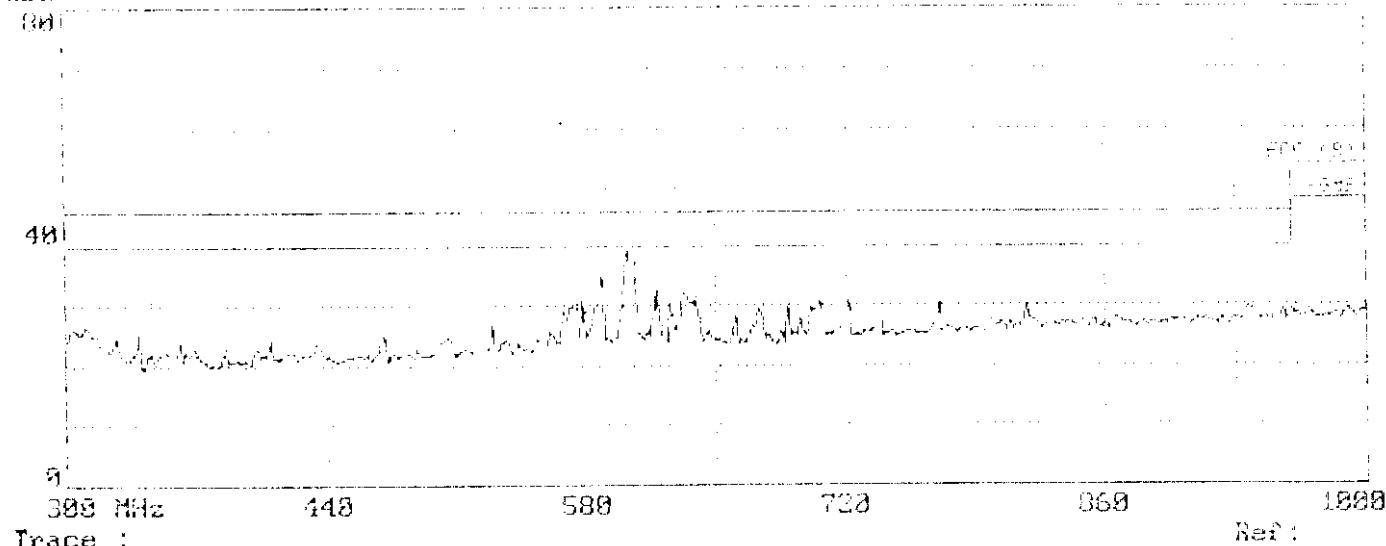
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File#: JINGMOLD.EMI

Date: 89-09-1998 Time: 08:41:15

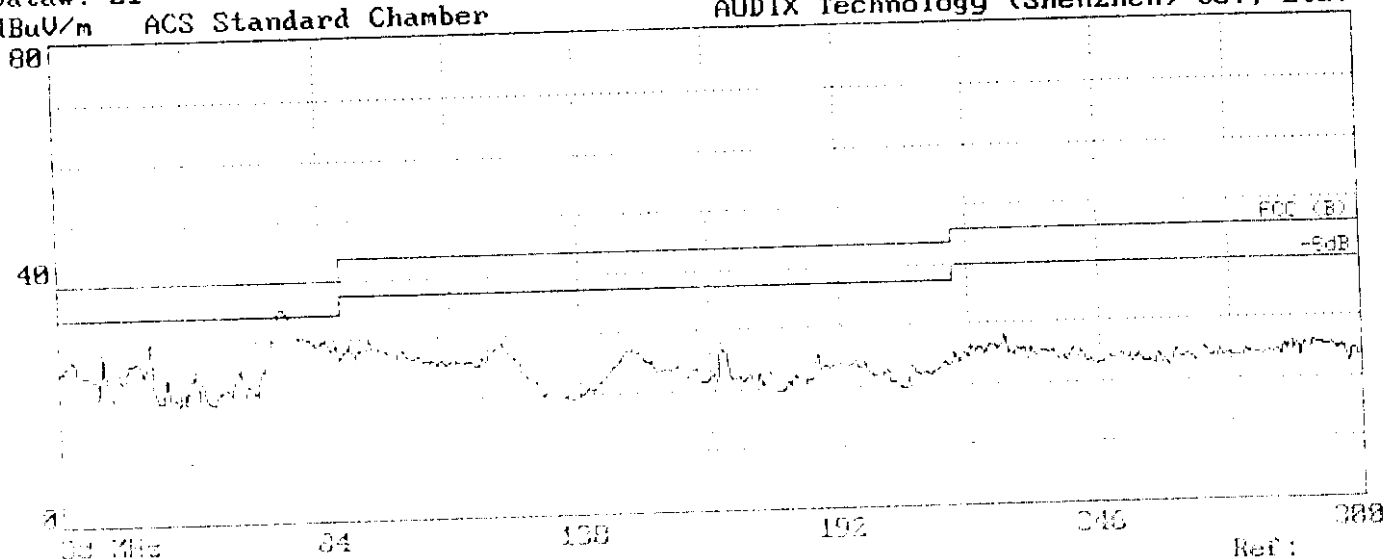
dBuV/m ACS Standard Chamber

AUDIX Technology (Shenzhen) Co., Ltd.



Data#: 21 File#: JINGMOLD.EMI
dBuV/m ACS Standard Chamber

Date: 89-09-1998 Time: 08:37:32
AUDIX Technology (Shenzhen) Co., Ltd.



Data#: 22 File#: JINGMOLD.EMI
dBuV/m ACS Standard Chamber

Date: 89-09-1998 Time: 08:38:38
AUDIX Technology (Shenzhen) Co., Ltd.

