

Shenzhen Motion Control Technology Co., Ltd.

Motion Control Card

Model Number: MCT 8000

Prepared for : Shenzhen Motion Control Technology Co., Ltd.
1806 Rm Highway Hub Management and
Control Centre, Zhuzilin, Shennan Rd,
Futian, Shenzhen, Guangdong, China.

Prepared By : Audix Technology (Shenzhen) Co., Ltd.
No. 6, Ke Feng Rd., 52 Block,
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Report Number • ACS-20F149
Date of Test • Nov. 15 ~ 28, 2000
Date of Report • Dec. 14, 2000

TABLE OF CONTENTS

Description	Page
Test Report Declaration	
1. GENERAL INFORMATION.....	1-3
1.1. Description of Device (EUT).....	2-1
1.2. Tested System Details.....	2-1
1.3. Test Facility	2-4
1.4. Test Uncertainty	2-4
2. POWER LINE CONDUCTED EMISSION TEST.....	3-1
2.1. Test Equipment.....	3-1
2.2. Block Diagram of Test Setup.....	3-1
2.3. Power Line Conducted Emission Test Limits	3-1
2.4. Configuration of EUT on Test.....	3-2
2.5. Operating Condition of EUT	3-2
2.6. Test Procedure	3-2
2.7. Power Line Conducted Emission Test Results.....	3-3
3. RADIATED EMISSION TEST.....	4-1
3.1. Test Equipment.....	4-1
3.2. Block Diagram of Test Setup.....	4-1
3.3. Radiated Emission Limit.....	4-2
3.4. EUT Configuration on Test.....	4-2
3.5. Operating Condition of EUT	4-3
3.6. Test Procedure	4-3
3.7. Radiated Emission Test Result.....	4-4
APPENDIX I (3 pages)	
APPENDIX II (3 pages)	

TEST REPORT DECLARATION

Applicant • Shenzhen Motion Control Technology Co., Ltd.
Manufacturer • Shenzhen Motion Control Technology Co., Ltd.
EUT Description • Motion Control Card
(A) MODEL NO. : MCT 8000
(B) SERIAL NO. : F2000121401
(C) POWER SUPPLY : DC 5V/12V

Test 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 test results are contained in this test report and AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. is assumed full responsibility for the accuracy and completeness of these tests. 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 : Nov. 15~ 28, 2000

Prepared by : Annie Cheng 12/15. 2000
Annie Cheng / Assistant

Reviewer : Alex Deng
Alex Deng / Assistant Manager

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

Approved & Authorized Signer : [Signature]
SmartAuthorizedSignature(s)

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

Description	:	Motion Control Card
Model Number	:	MCT 8000
Data Cable	:	Unshielded Detachable, 1.2m
Applicant	:	Shenzhen Motion Control Technology Co.,Ltd. 1806 Rm Highway Hub Management and Control Centre, Zhuzilin, Shennan Rd, Futian, Shenzhen, Guangdong, China.
Manufacturer	:	Shenzhen Motion Control Technology Co.,Ltd. 1806 Rm Highway Hub Management and Control Centre, Zhuzilin, Shennan Rd, Futian, Shenzhen, Guangdong, China.
Date of Test	:	Nov.15 - 28, 2000

2.2. Tested System Details

2.2.1. PERSONAL COMPUTER

Main Board	• Model Number: P5A • Manufacturer: ASUS
VGA Card	• Manufacturer: NVIDIA • Model: NVIDIA RIVA TNT2
CPU	• Manufacture: AMD • Model: AMD-K6-2/300
Floppy Driver	• Manufacture: SONY • Model: MPF920-E
Hard Disk Driver	• Manufacture: SEAGATE
Power Cord	• Model: ST38410A
SPS	• Manufacture: SPARKLE

2.2.2. Monitor

Model Number	• KS-M1421
Serial Number	• 120954
Manufacturer	• Ksai Electronics CO.,Ltd.
Data Cable	• Shielded, Detachable, 1.2m
Power Cable	• Noshielded, Undetachable, 1.2m
FCC ID	• KVCKS-M1421

2.2.3. KEYBOARD#2(USB)

Model Number	• KU-8933
Serial Number	• 8H17800116
Manufacturer	• Chicony Electronics Co., Ltd.
Data Cable	• Shielded, Detachable, 1.9m

2.2.4. KEYBOARD

Model Number	• DKF171M
Serial Number	• 43902222
Manufacturer	• Datacopm Electronics Co., Ltd.
Data Cable	• Shielded, Undetachable, 1.9m

2.2.5. PRINTER

Model Number	• 2225C
Serial Number	• 22937S56660
FCC ID	• BS46XU2225C
Manufacturer	• Hewlett Packard
Data Cable	• Shielded, Detachable, 1.5m

2.2.6. MODEN#1

Model Number	• Modem 1414
Serial Number	• 980013573
Manufacturer	• ACEEX
Data Cable	• Shielded, Detachable, 1.5m
FCC ID	• IFAXDM1414
AC Adapter	• M/N:SCP41-91000A

2.2.7. MODEN#1

Model Number	• Modem 1414
Serial Number	• 980013577
Manufacturer	• ACEEX
Data Cable	• Shielded, Detachable, 1.5m
FCC ID	• IFAXDM1414
AC Adapter	• M/N:SCP41-91000A

2.2.8. MOUSE#1

Model Number	• M-S34
Serial Number	• LZA81403347
FCC ID	• DZL211029
Manufacturer	• Logitech
Data Cable	• Noshielded,Undetachable, 2.5m
AC Adapter	• Model SCP41-91000A

2.2.9. MOUSE#2(USB)

Model Number	• 928S
FCC ID	• C3KKMPS
Manufacturer	• IntelliMouse
Data Cable	• Shielded,Undetachable,1.4m

2.3. Test Facility

Site Description

3m Anechoic Chamber	:	Certificated by FCC, USA Aug. 24, 2000
3m & 10m Open Site	:	Certificated by FCC, USA Feb. 13, 1998
EMC Lab.	:	Certificated by VCCI, Japan Oct. 29, 1998
		Certificated by DATech, German Feb. 02, 1999
		Certificated by NVLAP, USA until Mar. 03, 2001 NVLAP Code: 200372-0
		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

2.4. Test Uncertainty

Conducted Emission Uncertainty	=	$\pm 2.66\text{dB}$
Radiated Emission Uncertainty	=	$\pm 4.26\text{dB}$

3. POWER LINE CONDUCTED EMISSION TEST

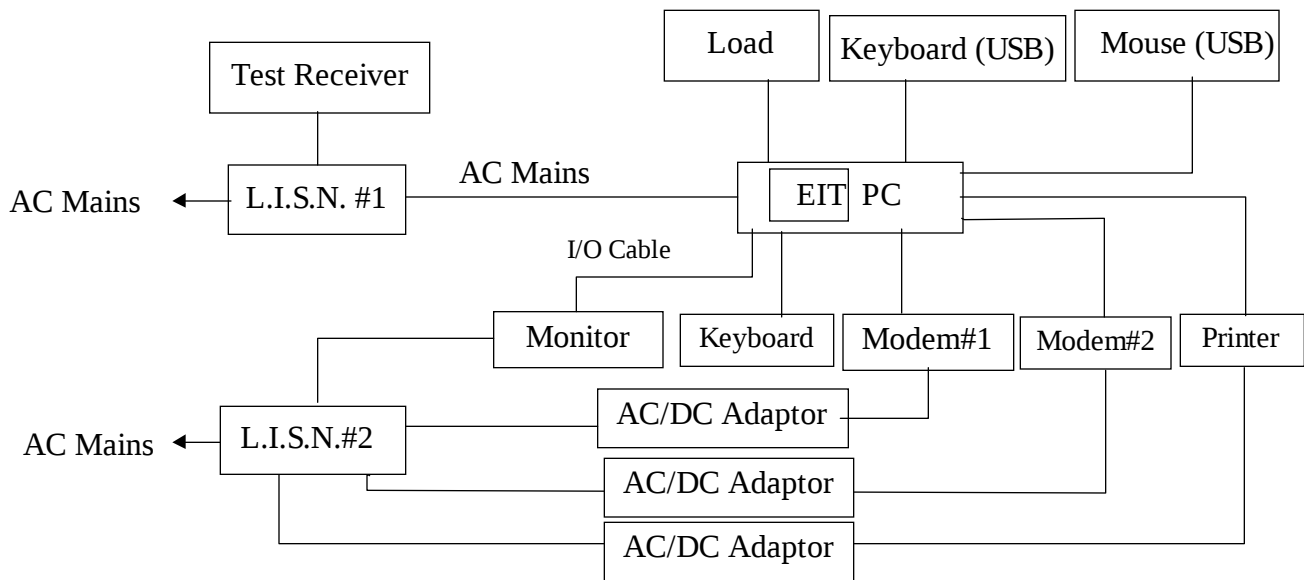
3.1. Test Equipment

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

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Test Receiver	Rohde & Schwarz	ESHS20	836600/006	Jun. 05, 00	1 Year
2.	L.I.S.N. #1	Kyoritsu	KNW-407	8-541-4	Jun. 05, 00	1 Year
3.	L.I.S.N. #2	EMCO	3825/2	9006-1660	Jun. 05, 00	1 Year
4.	Terminator	EMCO	50Ω	No. 1	Jun. 05, 00	1 Year
5.	Terminator	EMCO	50Ω	No. 2	Jun. 05, 00	1 Year
6.	RF Cable	FUJIKURA	RG-55/U	LISN Cable	Sep. 28, 00	1/2 Year
7.	Coaxial Switch	Anritsu	MP59B	M73989	Dec. 03, 00	1/2 Year

3.2. Block Diagram of Test Setup

3.2.1. Block diagram of connection between the EUT and simulators



(EUT: Motion Control Card)

3.3. Power Line Conducted Emission Test Limits

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

Remarks: RF Line Voltage (dB(μV)) = 20 log RF Line Voltage (μV)

3.4. Configuration of EUT on Test

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

3.4.1. Motion Control Card (EUT)

Model Number : MCT 8000
Serial Number : F2000121401
Manufacturer : Shenzhen Motion Control Technology Co., Ltd.

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

3.5. Operating Condition of EUT

- 3.5.1. Setup the EUT and simulator as shown as Section 2.2.
- 3.5.2. Turn on the power of all equipment.
- 3.5.3. Let the EUT work in test mode (Running) and measure it.

3.6. 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 Test.

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 Test are attached in Appendix I.

3.7. Power Line Conducted Emission Test 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 •	Nov. 28, 2000	Temperature •	27 •
EUT •	Motion Control Card	Humidity •	61 •
Model No. •	MCT 8000	Test Mode •	Running
Test Engineer •	Rees Zeng		

Frequency MHz	Reading		Limit dB(μV)
	Phase VA dB(μV)	Phase VB dB(μV)	
0.481	40.8	38.4	48.0
0.565	38.5	*	48.0
0.570	*	38.1	48.0
0.722	36.1	*	48.0
0.725	*	35.5	48.0
0.810	35.8	35.1	48.0

Remark •

1. All readings are Quasi-Peak values.
2. The worst emission is detected at 6.675MHz with corrected signal level of 40.8dB(μV) (limit is 48dB(μV)) when the VA side of the EUT is connected to L.I.S.N.

Reviewer :



4. RADIATED EMISSION TEST

4.1. Test Equipment

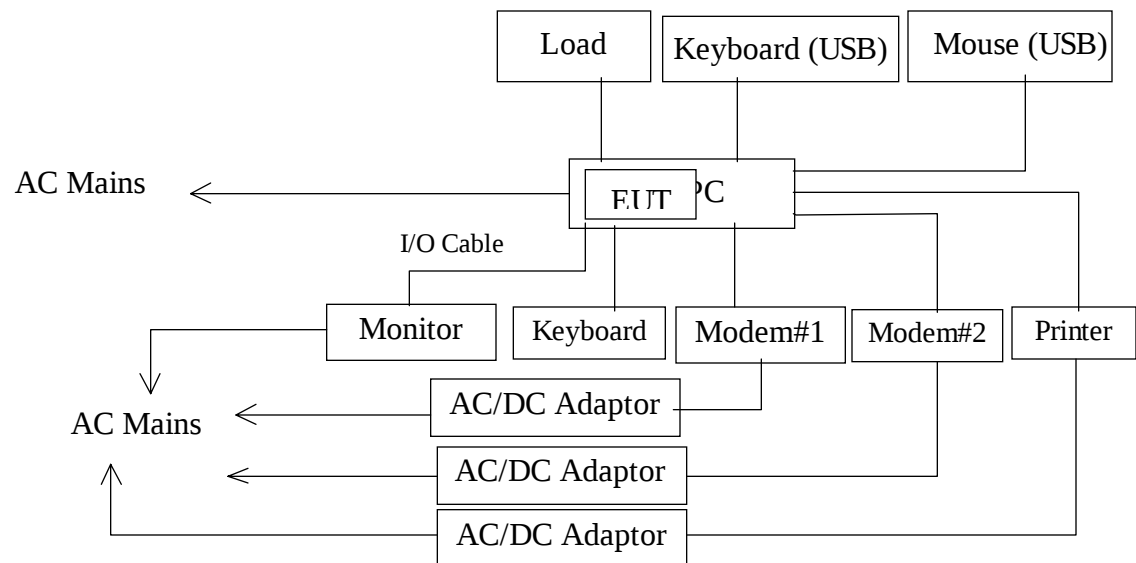
The following test equipments are used during the radiated emission test:

4.1.1. For Anechoic Chamber

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	HP	85422E	3625A00181	Jun. 05, 00	1 Year
2.	Test Receiver	Rohde & Schwarz	ESVS20	830350/005	Jun. 05, 00	1 Year
3.	Amplifier	HP	8447D	2944A07794	Dec. 04, 00	1/2 Year
4.	Bilog Antenna	Chase	CBL6112A	2176	Sep. 26, 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	Sep. 09, 00	1/2 Year
8.	FR Cable	MIYAZAKI	5D-2W	3# Chamber No.2	Sep. 09, 00	1/2 Year
9.	FR Cable	FUJIKURA	RG-55/U	3# Chamber No.3	Sep. 09, 00	1/2 Year
10.	FR Cable	FUJIKURA	RG-55/U	3# Chamber No.4	Sep. 09, 00	1/2 Year
11.	Coaxial Switch	Anritsu	MP59B	M74389	Dec. 04, 00	1/2 Year

4.2. Block Diagram of Test Setup

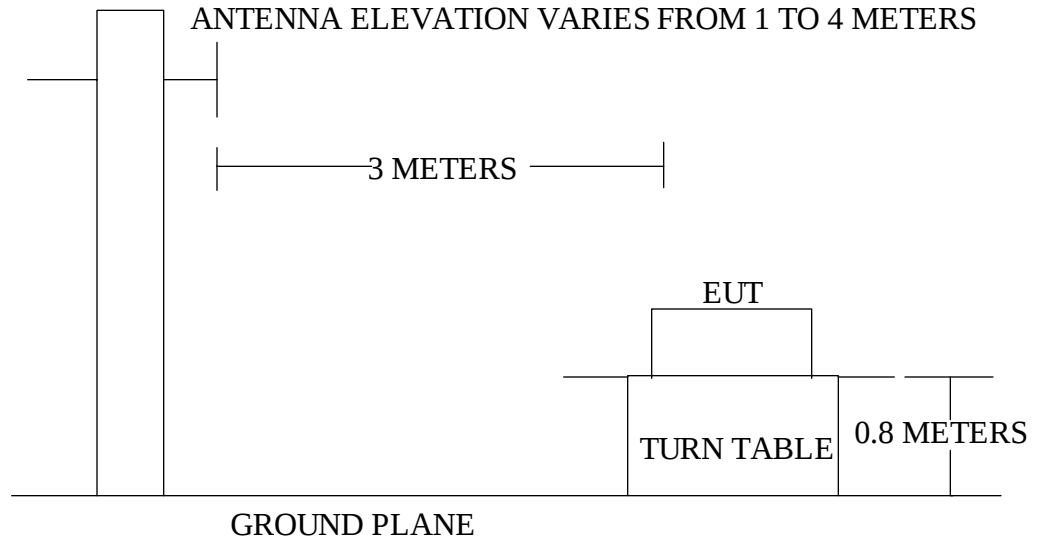
4.2.1. Block diagram of connection between the EUT and simulators



(EUT: Motion Control Card)

4.2.2. In Anechoic Chamber

ANTENNA TOWER



4.3. 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.

4.4. EUT Configuration on Test

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

4.4.1. Motion Control Card (EUT)

Model Number : MCT 8000
Serial Number : F2000121401
Manufacturer : Shenzhen Motion Control Technology Co., Ltd.

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

4.5. Operating Condition of EUT

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

4.6. 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 test.

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) is tested in Anechoic Chamber, and all the scanning waveforms are attached in Appendix II.

4.7. Radiated Emission Test Result

PASS.

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

Date of Test :	Nov. 28, 2000	Temperature :	26•
EUT :	Motion Control Card	Humidity :	58•
Model No. :	MCT 8000	Test Mode :	Running
Test Engineer:	Rees Zeng		

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Over Limits dBμV/m	Limits dBμV/m
239.574	19.80	3.94	15.20	35.00	-11.00	46.00
301.227	22.34	4.28	11.36	33.70	-12.30	46.00
400.876	26.61	4.72	9.19	35.80	-10.20	46.00
603.279	29.56	5.33	5.54	35.10	-10.90	46.00
720.680	30.80	5.60	4.40	35.20	-10.80	46.00

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

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

Date of Test :	Nov. 28, 2000	Temperature :	26•
EUT :	Motion Control Card	Humidity :	58•
Model No. :	MCT 8000	Test Mode :	Running
Test Engineer:	Rees Zeng		

Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Vertical dBμV	Emission Level Vertical dBμV/m	Over Limits dBμV/m	Limits dBμV/m
400.542	26.40	4.72	9.40	35.80	-10.20	46.00
466.572	27.38	4.94	10.02	37.40	-8.60	46.00
518.825	28.31	5.10	5.29	33.60	-12.40	46.00
720.643	30.78	5.60	5.32	36.10	-9.90	46.00
800.187	31.54	5.76	8.06	39.60	-6.40	46.00

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

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

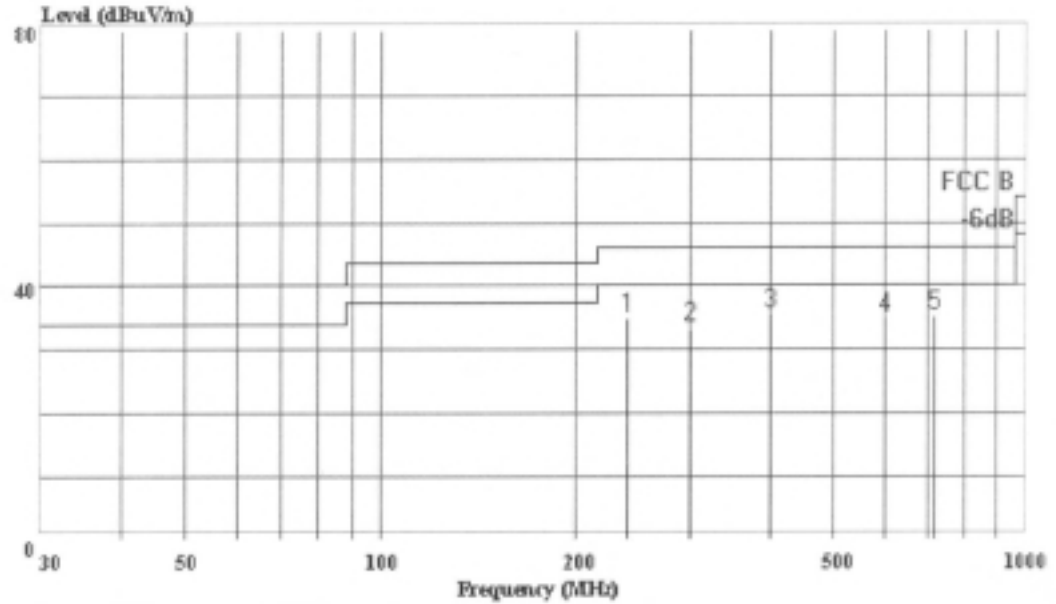
Reviewer : 



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

Shenzhen Science & Ind. Park.
Tel: 0755-6639495~7
Fax: 0755-6632877

Data#: 57 File#: Motion.emi Date: 2000-11-28 Time: 14:19:10



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (Audix ATC)

Trace:

Ref Trace:

Condition: FCC B 3m 2176FACTOR HORIZONTAL
EUT: : Motion Control Card M/N:MCT-8000
POWER : DC 5V DC12V
MEMO: : Running

Page: 1

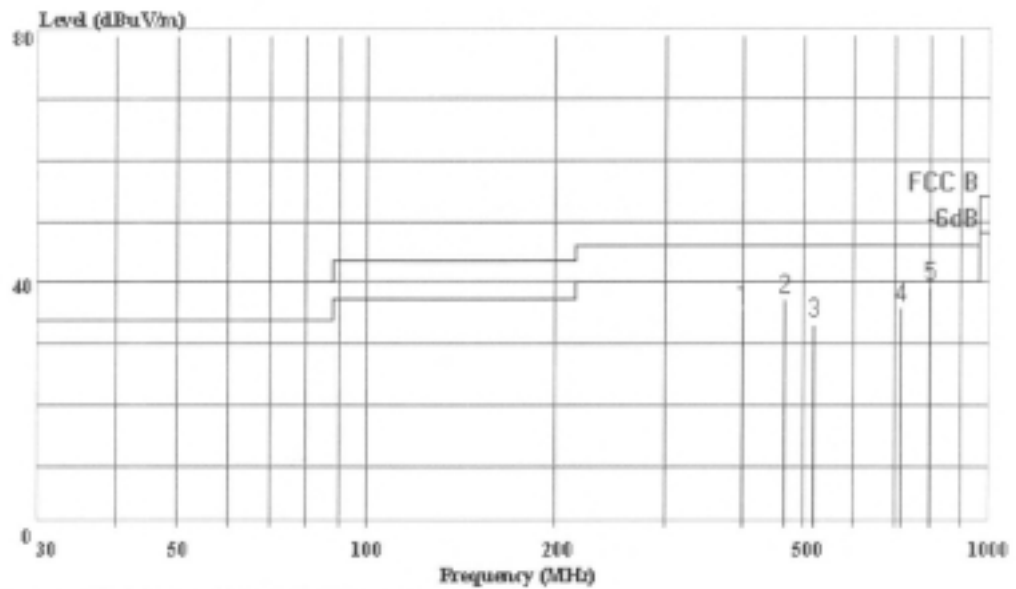
	Freq	Level	Limit	Over	Read	Cable	
	MHz	dBuV/m	Line	Limit	Level	Factor	Loss Remark
			dBuV/m	dB	dBuV	dB	dB
1	239.574	35.00	46.00	-11.00	15.20	19.80	3.94
2	301.227	33.70	46.00	-12.30	11.36	22.34	4.28
3	400.876	35.80	46.00	-10.20	9.19	26.61	4.72
4	603.279	35.10	46.00	-10.90	5.54	29.56	5.33
5	720.680	35.20	46.00	-10.80	4.40	30.80	5.60



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

Shenzhen Science & Ind. Park.
Tel: 0755-6639495~7
Fax: 0755-6632877

Data#: 56 File#: Motion.emi Date: 2000-11-28 Time: 14:16:19



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (Audix ATC)

Trace:

Ref Trace:

Condition: FCC B 3m 2176FACTOR VERTICAL
EUT: : Motion Control Card M/N:MCT-8000
POWER : DC 5V DC12V
MEMO: : Running

Page: 1

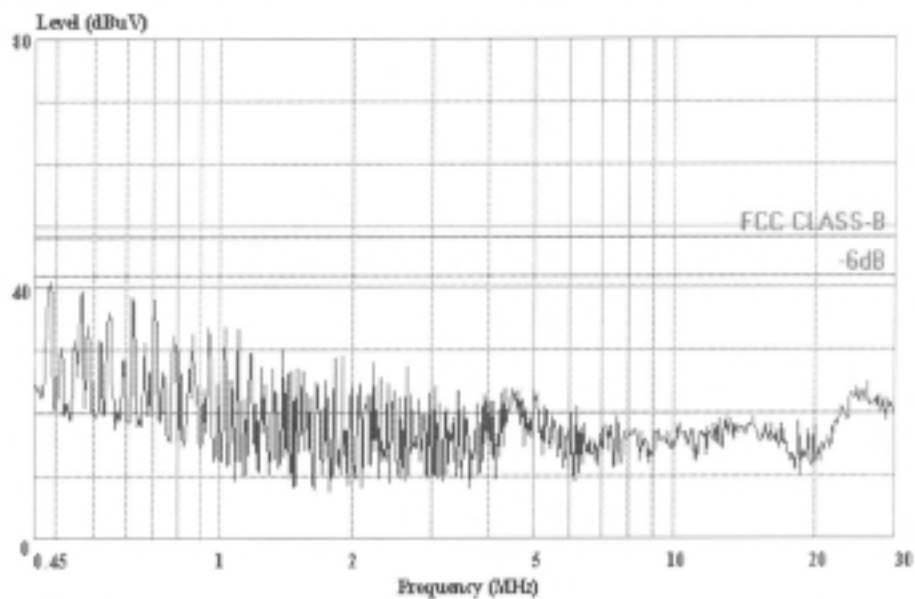
	Freq	Level	Limit	Over	Read	Cable	
	MHz	dBuV/m	Line	Limit	Level	Factor	Loss
			dBuV/m	dB	dBuV	dB	dB
1	400.542	35.80	46.00	-10.20	9.40	26.40	4.72
2	466.572	37.40	46.00	-8.60	10.02	27.38	4.94
3	518.825	33.60	46.00	-12.40	5.29	28.31	5.10
4	720.643	36.10	46.00	-9.90	5.32	30.78	5.60
5	800.187	39.60	46.00	-6.40	8.06	31.54	5.76

APPENDIX I

AUDIX[®]
AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

Shenzhen Science & Ind Park
Nantou, Guangdong, China
Tel: 0755-6639495-7
Fax: 0755-6632877

Data#: 3 File#: Motion.EMI Date: 2000-11-28 Time: 09:00:29



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (Audix ATC)

Trace:

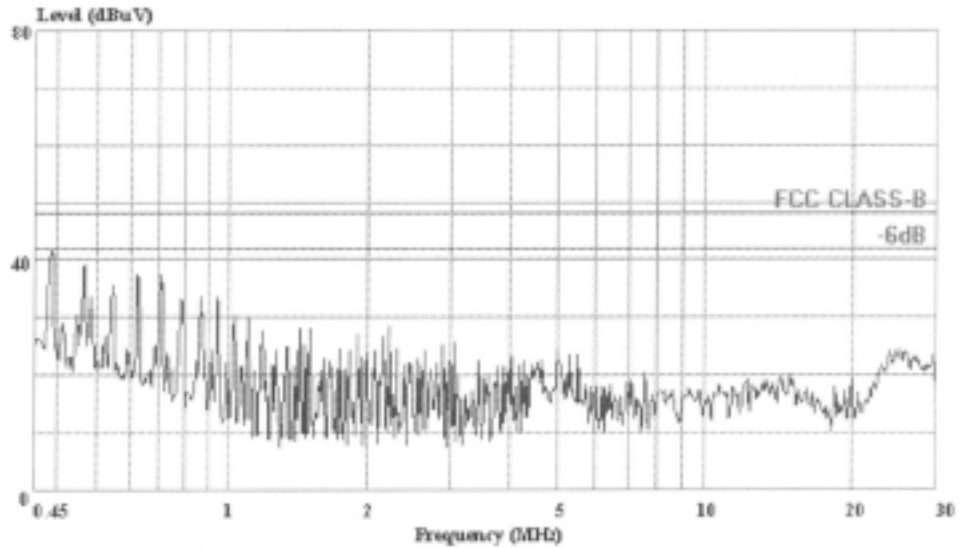
Ref Trace:

Condition: FCC CLASS-B
eut : Motion Control Card M/N:MCT-8000
power: PC Power Va 120V/60Hz
memo : Running

AUDIX®
AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

Shenzhen Science & Ind Park
Nantou, Guangdong, China
Tel: 0755-6639495-7
Fax: 0755-6632877

Data#: 4 File#: Motion.EMI Date: 2000-11-28 Time: 09:02:40



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (Audix ATC)

Trace:

Ref Trace:

Condition: FCC CLASS-B
cut : Motion Control Card M/N:MCT-8000
power: PC Power Vb 120V/60Hz
memo : Running

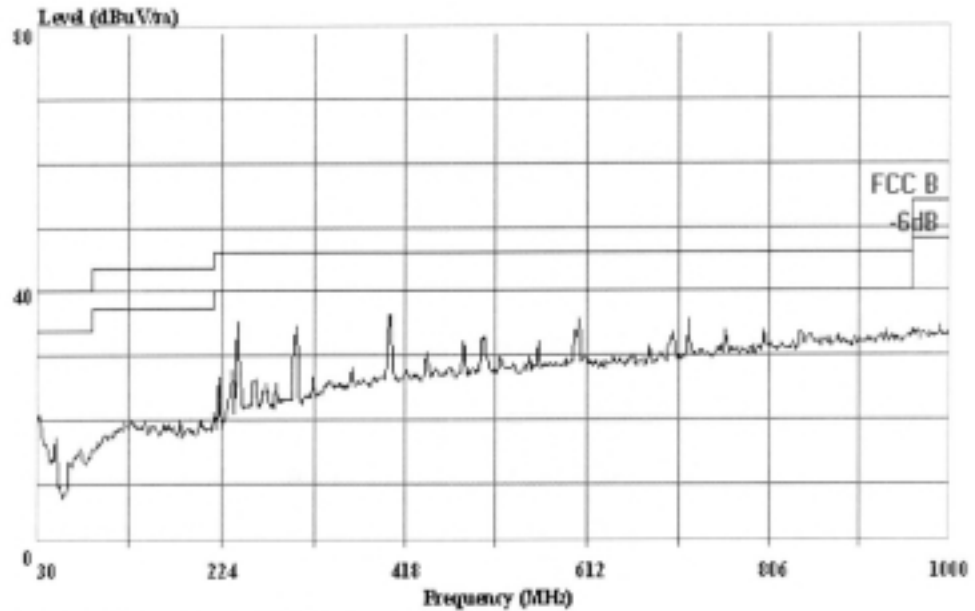
APPENDIX II



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

Shenzhen Science & Ind. Park.
Tel: 0755-6639495-7
Fax: 0755-6632877

Data#: 53 File#: Motion.emi Date: 2000-11-15 Time: 10:45:05



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (Audix ATC)

Trace:

Ref Trace:

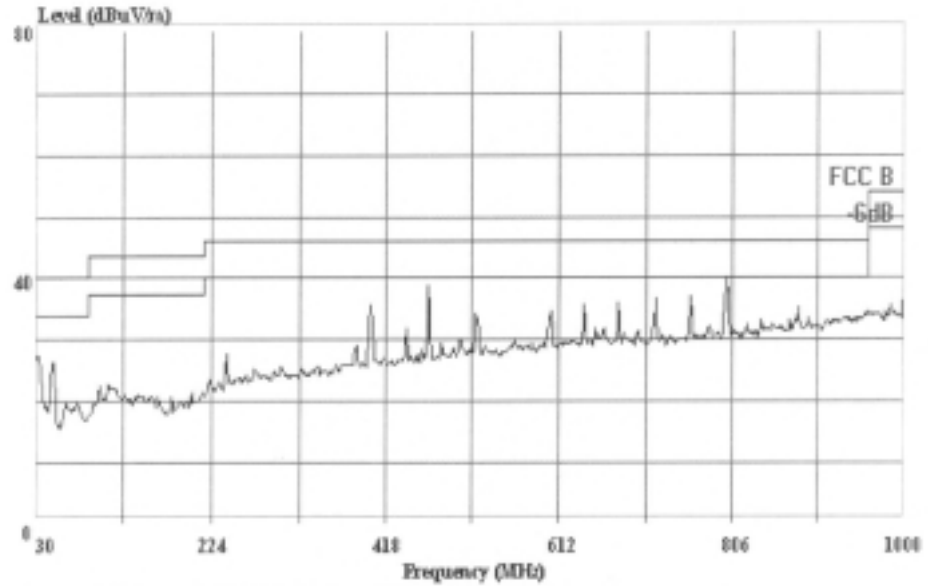
Condition: FCC B 3m 2176FACTOR HORIZONTAL
EUT: : Motion Control Card M/N:MCT-8000
POWER :: DC 5V DC12V
MEMO: : Running



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD.

Shenzhen Science & Ind. Park.
Tel: 0755-6639495-7
Fax: 0755-6632877

Data#: 52 File#: Motion.emi Date: 2000-11-15 Time: 10:40:43



AUDIX TECHNOLOGY (SHENZHEN) CO., LTD. (Audix ATC)

Trace:

Ref Trace:

Condition: FCC B 3m 2176FACTOR VERTICAL
EUT: : Motion Control Card M/N:MCT-8000
POWER :: DC 5V DC12V
MEMO: : Running