

APPLICATION FOR CERTIFICATION
On Behalf of
Action Technology (Shenzhen) Co., Ltd.

Car Adaptor

Model Number: FM-402

Prepared for : Action Technology (Shenzhen) Co., Ltd.
Baosheng Industrial Building., Laodong Cun,
Xixiang, Bao`an District, Shen Zhen

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

Tel: (0755) 26639496

Report Number : ACS-F04123
Date of Test : May.12, 2004
Date of Report : May.17, 2004

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APPENDIX I

(9 pages)

TEST REPORT DECLARATION

Applicant : Action Technology (Shenzhen) Co., Ltd.
Manufacturer : Action Technology (Shenzhen) Co., Ltd.
EUT Description : Car Adaptor
(A) MODEL NO. : FM-402
(B) SERIAL NO. : F2004051701
(C) Power Supply : DC 12V

Test Procedure Used:

FCC Rules and Regulations Part 15 Subpart C Aug, 2003.

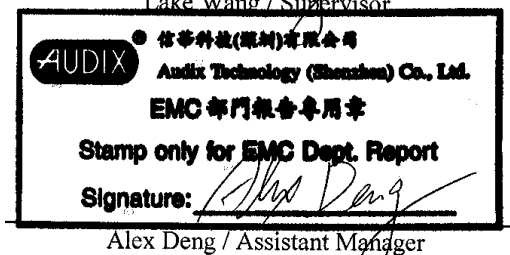
The device described above is tested by Audix Technology (Shenzhen) Co., Ltd. to determine the maximum emission levels emanating from the device. The maximum emission levels are compared to the FCC Part 15 Subpart C limits for radiated and conducted emissions. The test results are contained in this test report and Audix Technology (Shenzhen) Co., Ltd. is assumed full responsibility for the accuracy and completeness of tests. Also, this report shows that EUT is technically compliant with 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 : May.12, 2004

Prepared by : Jane Dai
Jane Dai / Assistant

Reviewer : Lake Wang / Supervisor



Approved & Authorized Signer :

Name of the Representative of the Responsible Party : _____

Signature : _____

1. GENERAL INFORMATION

1.1. Description of Device (EUT)

Description	:	Car Adaptor
Model Number	:	FM-402
Applicant	:	Action Technology (Shenzhen) Co., Ltd. Baosheng Industrial Building., Laodong Cun, Xixiang, Bao'an District, Shen Zhen
Manufacturer	:	Action Technology (Shenzhen) Co., Ltd. Baosheng Industrial Building., Laodong Cun, Xixiang, Bao'an District, Shen Zhen
Audio Cable	:	Unshielded, Undetachable, 1.5m
Date of Test	:	May.12, 2004

1.2. Tested Supporting System Details

Battery	:	Manufacturer: Panasonic Model Number: LC-X1228CH
Tape Recorder	:	Manufacturer: SOGAO Model Number: SG-907

1.3. Test Facility

Site Description

3m & 10m Anechoic Chamber	:	Certificated by FCC, USA Mar. 15, 2004
3m Anechoic Chamber	:	Certificated by FCC, USA Aug. 15, 2003
EMC Lab.	:	Certificated by DATech, German Feb. 02, 2004
		Certificated by NVLAP, USA NVLAP Code: 200372-0 Mar. 31, 2004
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

1.4. Test Uncertainty

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

2. POWER LINE CONDUCTED EMISSION TEST

According to Paragraph (f) of FCC Part 15 section 15.107, Tests to demonstrate compliance with the conducted limits are not required for devices which only employ battery power for operation and which do not operate from the AC power lines or contain provisions for operation while connected to the AC power lines.

3. RADIATED EMISSION TEST

3.1. Test Equipment

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

3.1.1. For Anechoic Chamber

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Spectrum	HP	85422E	3625A00181	May.31, 03	1 Year
2.	Test Receiver	Rohde & Schwarz	ESVS10	832699/004	Apr.25, 04	1 Year
3.	Amplifier	HP	8447D	2944A06252	Dec.01, 03	1/2 Year
4.	Biconical Antenna	Schaffner	UPA6109	1096	Feb.11, 04	1 Year
5.	Log-period Antenna	Schaffner	VBA6106A	1311	Feb.11, 04	1 Year
6.	PC	ASUS	P4SGX-MX	N/A	N/A	N/A
7.	Printer	HP	Laserjet1300	N/A	N/A	N/A
8.	RF Cable	MIYAZAKI	8D-FB	10m Chamber No.1	Feb.11, 04	1/2 Year
9.	RF Cable	MIYAZAKI	8D-FB	10m Chamber No.2	Feb.11, 04	1/2 Year
10.	RF Cable	MIYAZAKI	8D-FB	10m Chamber No.3	Feb.11, 04	1/2 Year
11.	RF Cable	MIYAZAKI	8D-FB	10m Chamber No.4	Feb.11, 04	1/2 Year
12.	Coaxial Switch	Anritsu	MP59B	M74389	Nov.28, 03	1/2 Year

3.2. Block Diagram of Test Setup

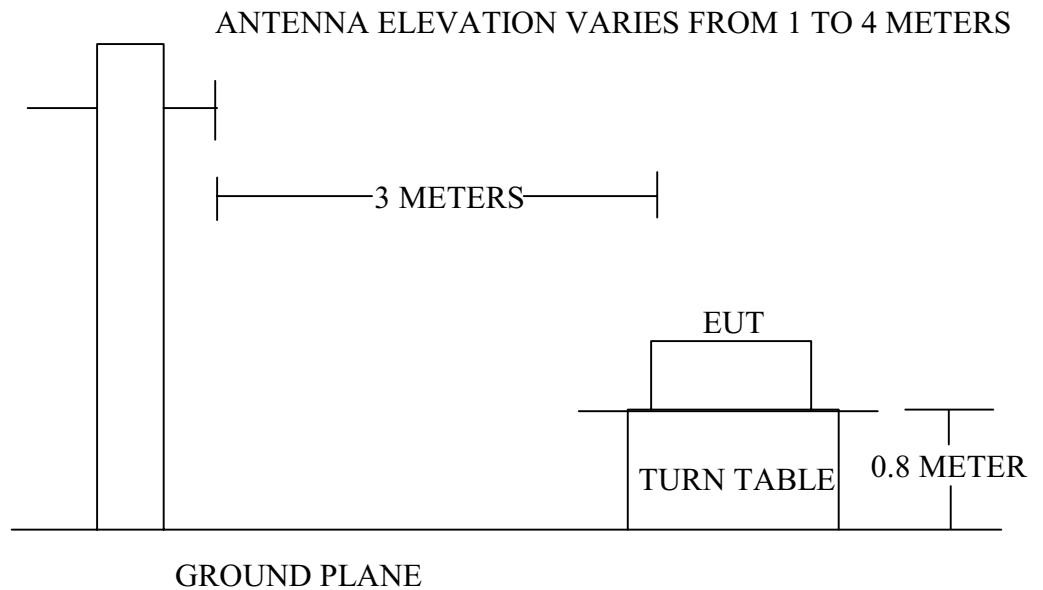
3.2.1. Block Diagram of connection between EUT and simulators



(EUT: Car Adaptor)

3.2.2. Anechoic Chamber Setup Diagram

ANTENNA TOWER



3.3. Radiated Emission Limit

FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		$\mu\text{V}/\text{m}$	$\text{dB}(\mu\text{V})/\text{m}$
30 ~ 88	3	100	40.0
88 ~ 216	3	150	43.5
216 ~ 960	3	200	46.0
960 ~ 1000	3	500	54.0
Fundamental (88.1/88.3/88.5/88.7)	3	48.0 $\text{dB}(\mu\text{V})/\text{m}$ (Average)	

- Remark :
- (1) Emission level $\text{dB}\mu\text{V} = 20 \log$ Emission level $\mu\text{V}/\text{m}$
 - (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 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.

3.4.1. Car Adaptor (EUT)

Model Number	:	FM-402
Serial Number	:	F2004051701
Manufacturer	:	Action Technology (Shenzhen) Co., Ltd.

3.5. Operating Condition of EUT

3.5.1. Setup the EUT as shown in Section 3.2..

3.5.2. Let the EUT work in test modes (FM 88.1MHz/FM 88.3MHz/FM 88.5MHz/FM 88.7MHz) and test it.

3.6. Test Procedure

The 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. The 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 is set on Test. In order to find the maximum emission levels, all of the interface cables must be manipulated according to ANSI C63.4-2001 on radiated emission Test.

The bandwidth of the EMI test receiver (R&S ESVS20) is set at 120KHz.

The frequency range from 30MHz to 1000MHz and above 1000MHz are checked.

The test modes (FM 88.1MHz/FM 88.3MHz/FM 88.5MHz/FM 88.7MHz) is tested in Anechoic Chamber and all the scanning waveforms are attached in Appendix I.

3.7. Radiated Emission Test Results

PASS.

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

Date of Test :	May.12, 2004	Temperature :	25.4°C
EUT :	Car Adaptor	Humidity :	55%
Model No. :	FM-402	Test Mode :	FM 88.3MHz
Test Engineer:	Pebble		

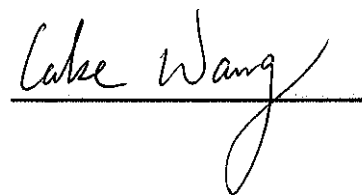
Frequency MHz	Antenna Factor dB/m	Cable Loss dB	Meter Reading Horizontal dBμV	Emission Level Horizontal dBμV/m	Over Limits dBμV/m	Limits dBμV/m	Remark
88.30	9.46	1.67	25.67	36.80	-11.20	48.00	Average
176.63	9.84	2.54	19.52	31.90	-11.60	43.50	QP
264.91	13.38	2.94	11.92	28.24	-17.76	46.00	QP
353.20	15.48	3.68	14.66	33.82	-12.18	46.00	QP
441.52	16.78	4.02	13.22	34.02	-11.98	46.00	QP

Remark: 1. All readings are Average and QP values.
2. Emission Level = Antenna Factor + Meter Reading+Cable Loss
3.The bandwidth of the RBW is set at 120KHz and VBW is set at 300KHz.

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	Remark
88.30	9.41	1.67	21.23	32.30	-15.70	48.00	Average
176.60	8.25	2.54	15.81	26.60	-16.90	43.50	QP
353.21	14.39	3.68	10.80	28.87	-17.13	46.00	QP

Remark: 1. All readings are Average and QP values.
2. Emission Level = Antenna Factor + Meter Reading+Cable Loss
3.The bandwidth of the RBW is set at 120KHz and VBW is set at 300KHz.

Reviewer:

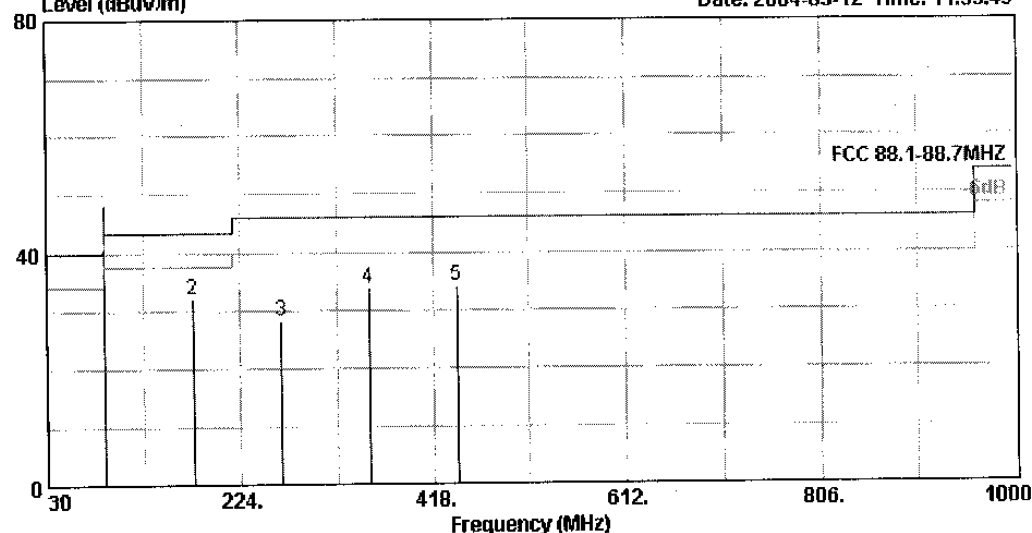




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Postcode: 518057

Data: 147 File: D:\E3 Test Data\A\Action.EMI (155)

Date: 2004-05-12 Time: 11:33:49



Site : 10m Chamber
Condition : FCC 88.1-88.7MHz 3m 2768 FACTOR(3M) HORIZONTAL
EUT : CAR ADAPTOR
M/N : EM-402
Power : DC 12V
Test Mode : EM 88.3MHz
Test Engineer: Pebble
Memo : Temp: 25.4' Humi: 55%
: K: 1.6m Deg: 305'

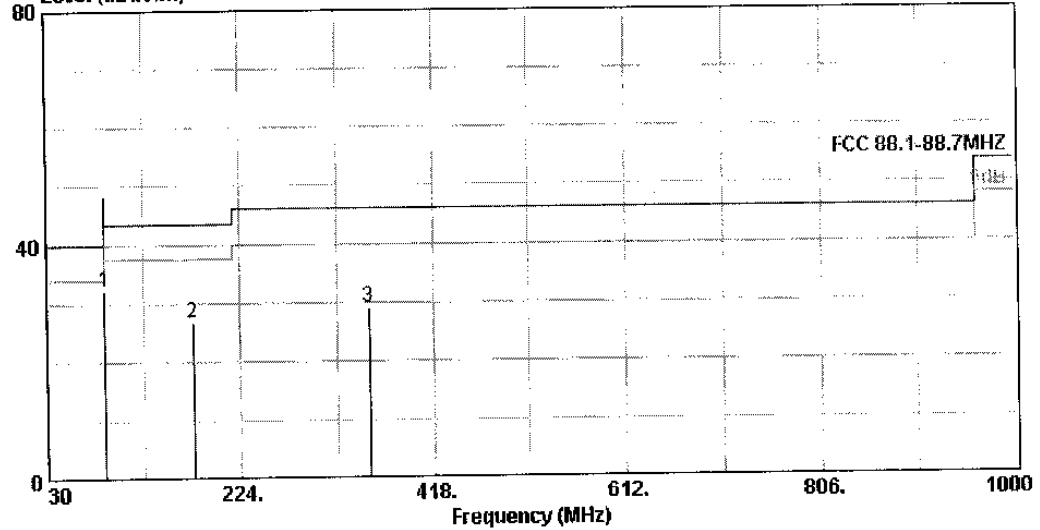
	Freq	Limit		Read		Over		CableAntenna		Remark
		Line	Level	Level	Limit	Loss	Factor	dB	dB/m	
	MHz		dBuV/m	dBuV/m	dBuV	dB		dB	dB/m	
1 @	88.30	48.00	36.80	25.67	-11.20	1.67	9.46			Average
2	176.63	43.50	31.90	19.52	-11.60	2.54	9.84			QP
3	264.91	46.00	28.24	11.92	-17.76	2.94	13.38			QP
4	353.20	46.00	33.82	14.66	-12.18	3.68	15.48			QP
5	441.52	46.00	34.02	13.22	-11.98	4.02	16.78			QP



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Data: 145 File: D:\E3 Test Data\W\Action.EMI (155)
Level (dBuV/m)

Date: 2004-05-12 Time: 11:21:56



Site : 10m Chamber
Condition : FCC 88.1-88.7MHz 3m 2768 FACTOR(3M) VERTICAL
EUT : CAR ADAPTOR
M/N : EM-402
Power : DC 12V
Test Mode : EM 88.3MHz
Test Engineer: Pebble
Memo : Temp: 25.4' Humi: 55%
: N: 1m Deg: 60'

	Limit			Read	Over	CableAntenna		
Freq	Line	Level		Level	Limit	Loss	Factor	Remark
MHz		dBuV/m	dBuV/m	dBuV	dB	dB	dB/m	
1 @ 88.30	48.00	32.38	21.23	-15.70	1.67	9.41	Average	
2 176.60	43.50	26.60	15.81	-16.90	2.54	8.25	QP	
3 353.21	46.00	28.87	10.80	-17.13	3.68	14.39	QP	

4. BANDWIDTH TEST

4.1. Test Equipment

The following test equipments are used during the bandwidth test:

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Spectrum	Agilent	E4407B	MY41440292	Jun 22, 03	1 Y
2.	Antenna	EMCO	3115	9607-4877	Dec 02, 02	1.5 Y
3.	Print				N/A	N/A

4.2. Test Standard

The test completeness FCC 15C (239).

4.3. Bandwidth Limit

200KHz wide centered on the operation frequency.

4.4. Test Procedure

PASS.

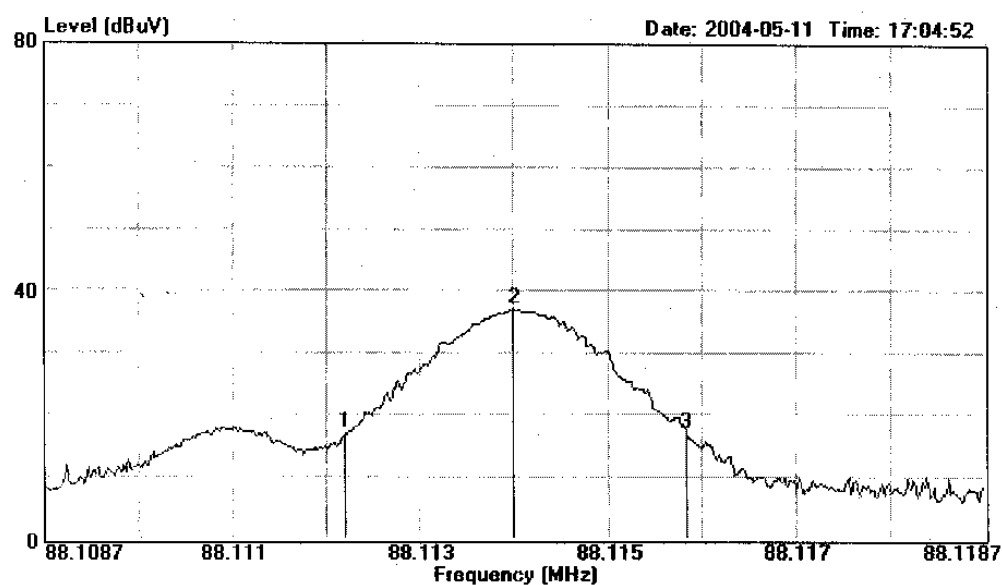


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Data#: 87 File#: C:\EMI TEST DATA\A\Action.EMI



Site : 1# Chamber
Condition :
EUT : CAR ADAPTOR
M/N : FM-402
Power : DC 12V
Test Engineer : Pebble
Test Mode : FM 88.1MHz
Memo : Temp:25°C Humi:50%

	Freq	Level	Over Limit	Limit Line	Read Level
	MHz	dBuV	dB	dBuV	dBuV
1	88.112	17.42	-----	-----	17.42
2	88.114	37.42	-----	-----	37.42
3	88.116	17.42	-----	-----	17.42

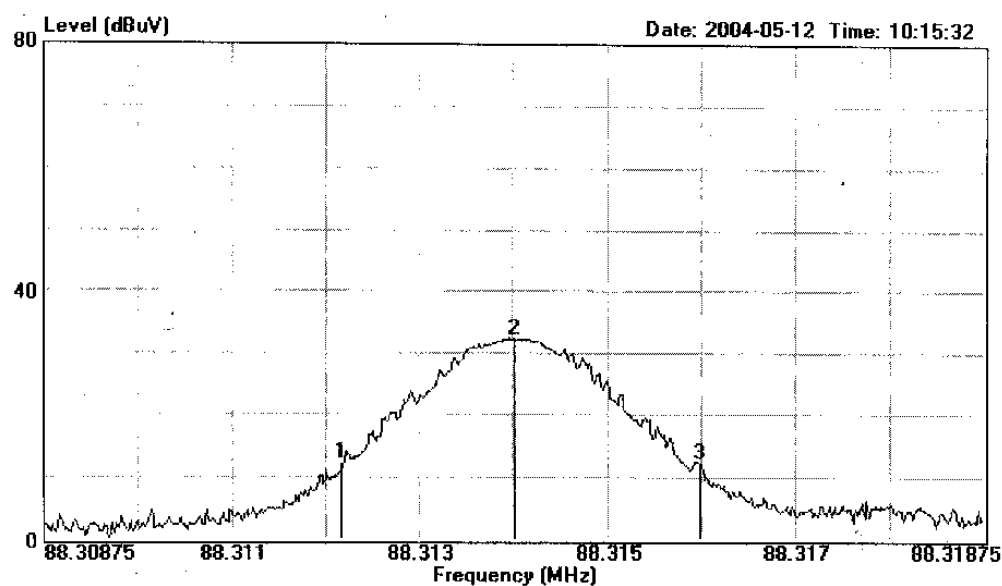


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Data#: 88 File#: C:\EMI TEST DATA\A\Action.EMI



Site : 1# Chamber
Condition :
EUT : CAR ADAPTOR
M/N : FM-402
Power : DC 12V
Test Engineer : Pebble
Test Mode : FM 88.3MHz
Memo : Temp:25'C Humi:50%

	Freq	Level	Over Limit	Limit Line	Read Level
	MHz	dBuV	dB	dBuV	dBuV
1	88.312	12.40	-----	-----	12.40
2	88.314	32.44	-----	-----	32.44
3	88.316	12.43	-----	-----	12.43

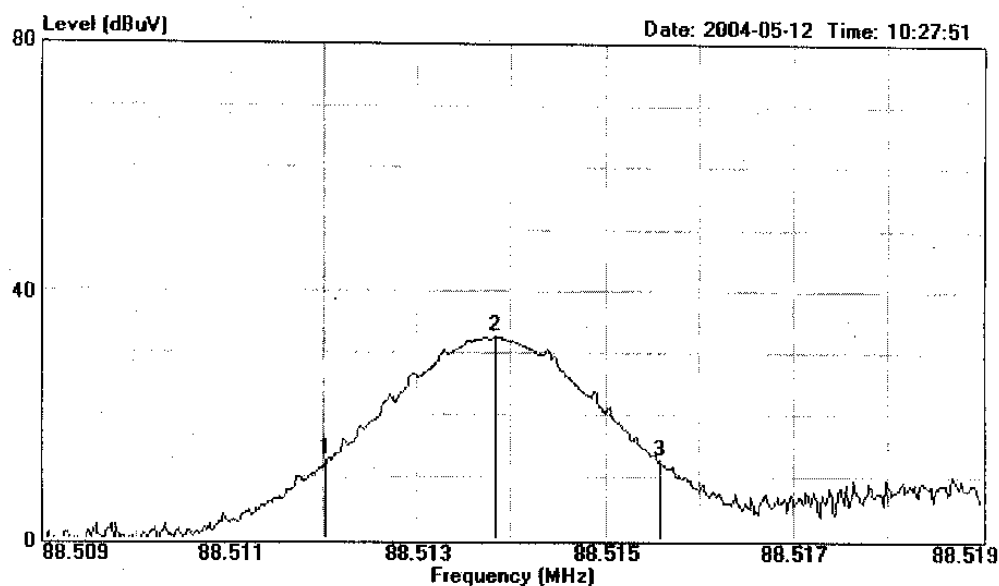


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Data#: 89 File#: C:\EMI TEST DATA\A\Action.EMI



Site : 1# Chamber
Condition :
EUT : CAR ADAPTOR
M/N : FM-402
Power : DC 12V
Test Engineer : Pebble
Test Mode : FM 88.5MHz
Memo : Temp:25°C Humi:50%

	Freq	Level	Over Limit	Limit Line	Read Level
	MHz	dBuV	dB	dBuV	dBuV
1	88.512	13.13	-----	-----	13.13
2	88.514	33.14	-----	-----	33.14
3	88.516	13.14	-----	-----	13.14

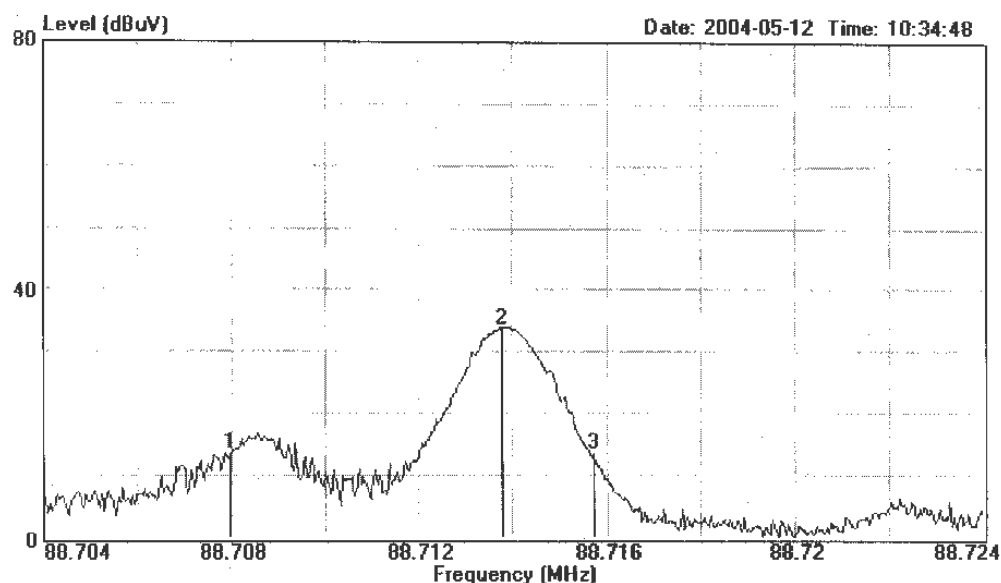


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Data#: 90 File#: C:\EMI TEST DATA\A\Action.EMI



Site : 1# Chamber
Condition :
EUT : CAR ADAPTOR
M/N : FM-402
Power : DC 12V
Test Engineer : Pebble
Test Mode : FM 88.7MHz
Memo : Temp:25°C Humi:50%

			Over	Limit	Read
	Freq	Level	Limit	Line	Level
	MHz	dBuV	dB	dBuV	dBuV
1	88.708	13.90	-----	-----	13.90
2	88.714	33.92	-----	-----	33.92
3	88.716	13.80	-----	-----	13.80

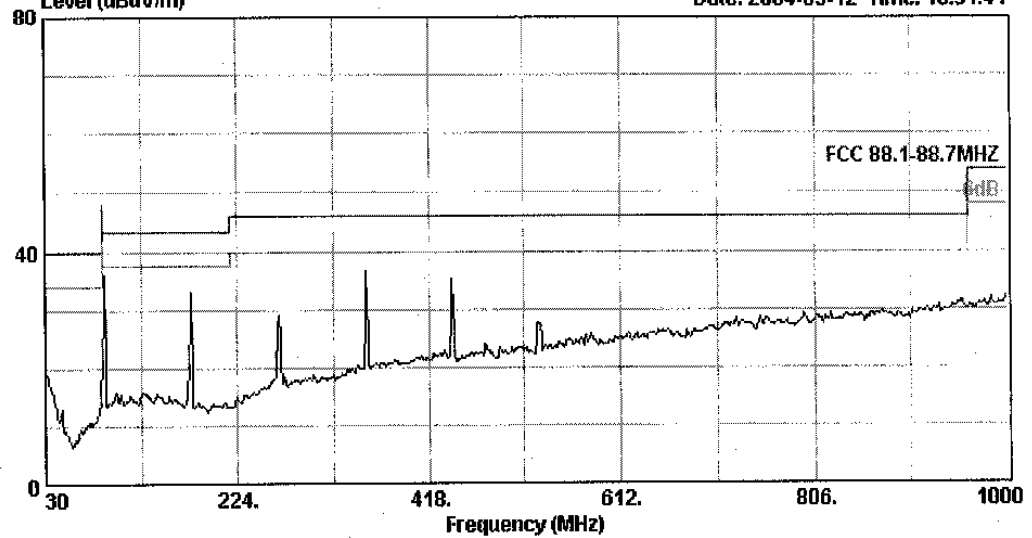
APPENDIX I



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Date: 2004-05-12 Time: 10:51:41



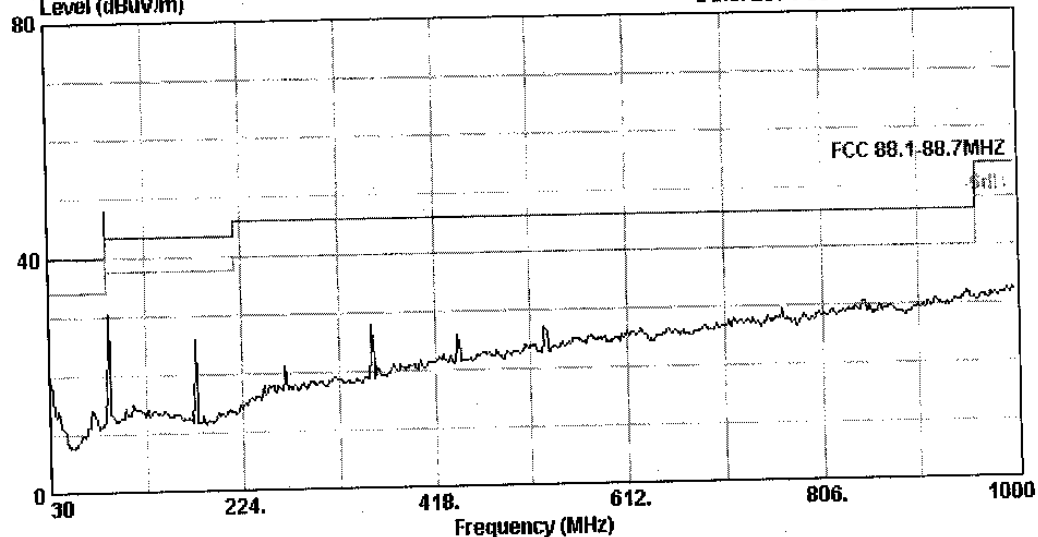
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Condition : FCC 88.1-88.7MHz 3m 2768 FACTOR(3M) HORIZONTAL
EUT : CAR ADAPTOR
M/N : FM-402
Power : DC 12V
Test Mode : FM 88.1MHz
Test Engineer: Pebble
Memo : Temp: 25.4' Humi: 55%



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Level (dBuV/m)

Date: 2004-05-12 Time: 11:03:40



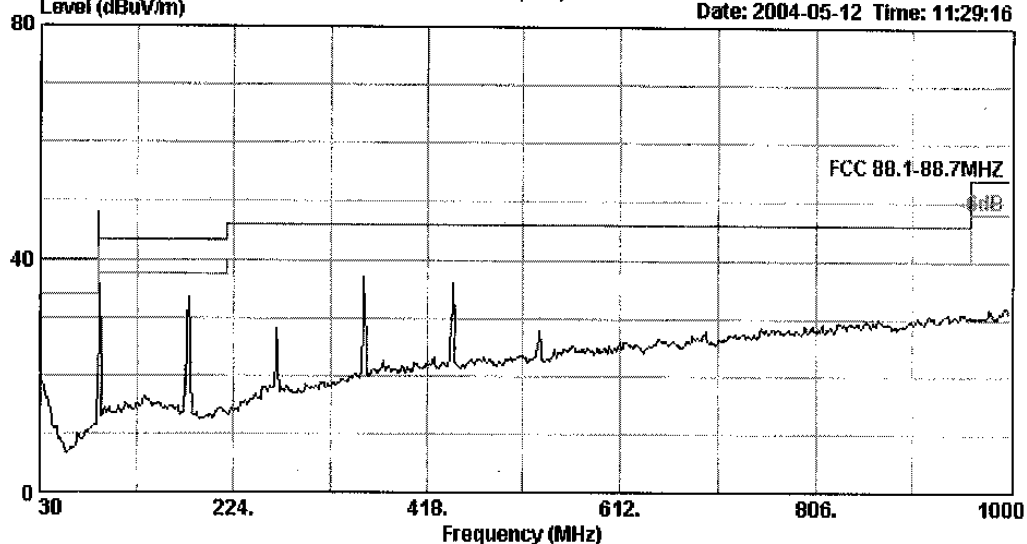
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Condition : FCC 88.1-88.7MHz 3m 2768 FACTOR(3M) VERTICAL
EUT : CAR ADAPTOR
M/N : FM-402
Power : DC 12V
Test Mode : FM 88.1MHz
Test Engineer: Pebble
Memo : Temp: 25.4° Humi: 55%



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Date: 2004-05-12 Time: 11:29:16



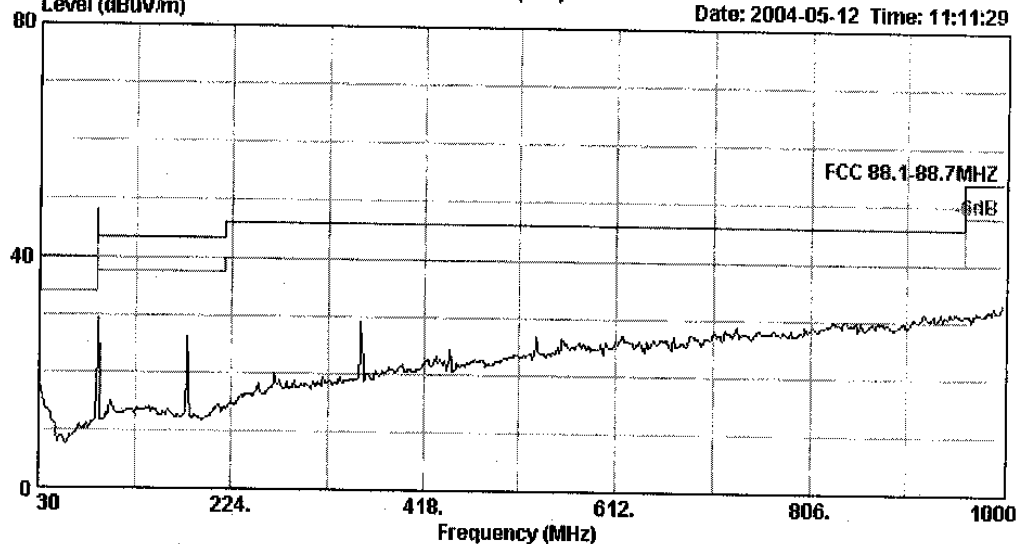
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Condition : FCC 88.1-88.7MHz 3m 2768 FACTOR(3M) HORIZONTAL
RUT : CAR ADAPTOR
M/N : FM-402
Power : DC 12V
Test Mode : FM 88.3MHz
Test Engineer: Pebble
Memo : Temp: 25.4 Humi: 55%



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Level (dBuV/m)

Date: 2004-05-12 Time: 11:11:29



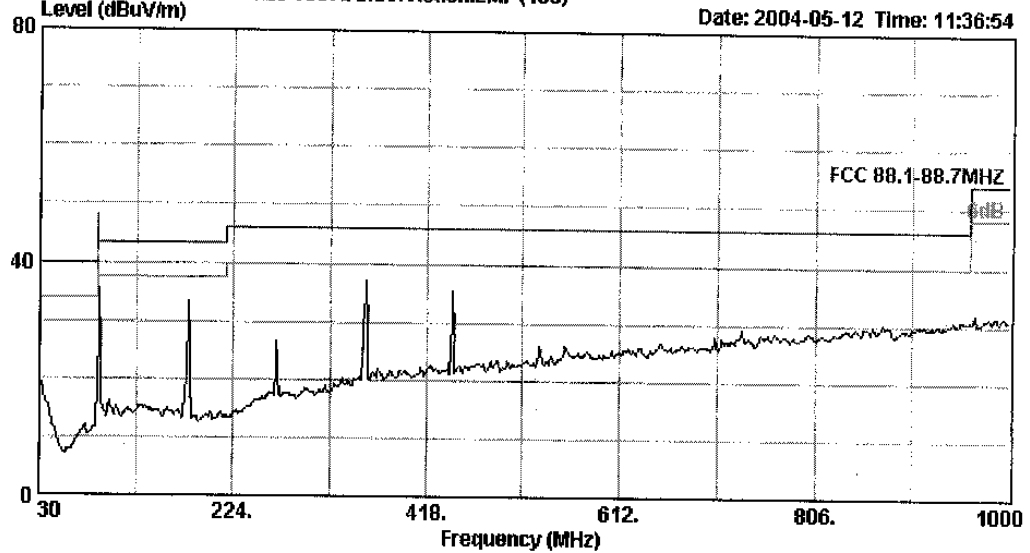
Site : 10m Chamber
Condition : FCC 88.1-88.7MHz 3m 2768 FACTOR(3M) VERTICAL
EUT : CAR ADAPTOR
M/N : FM-402
Power : DC 12V
Test Mode : FM 88.3MHz
Test Engineer: Pebble
Memo : Temp: 25.4 Humid: 55%



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Date: 2004-05-12 Time: 11:36:54



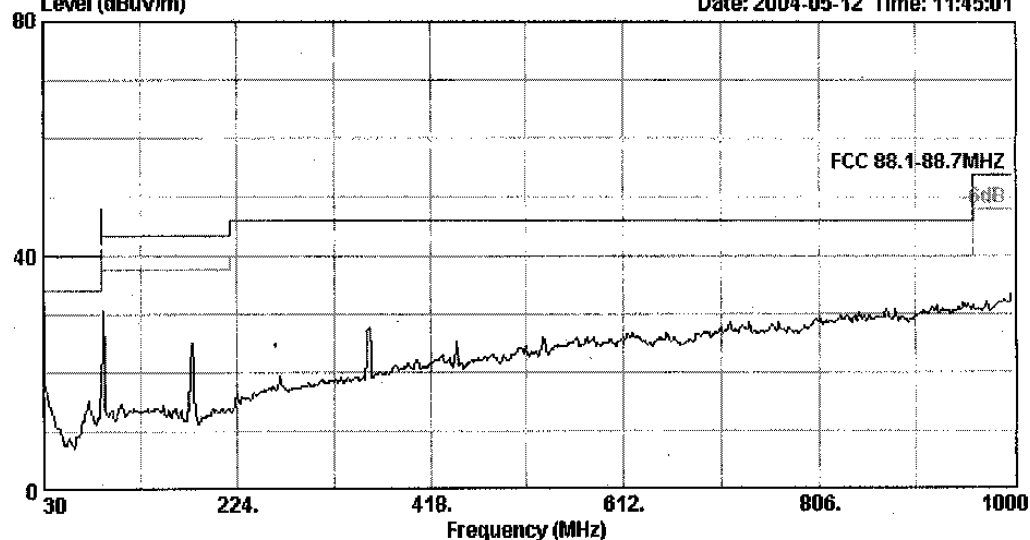
Site : 10m Chamber
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EUT : CAR ADAPTOR
M/N : FM-402
Power : DC 12V
Test Mode : FM 88.5MHz
Test Engineer: Pebble
Memo : Temp: 25.4 Humi: 55%



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Data: 150 File: D:\E3 Test Data\A>Action.EMI (155)
Level (dBuV/m)

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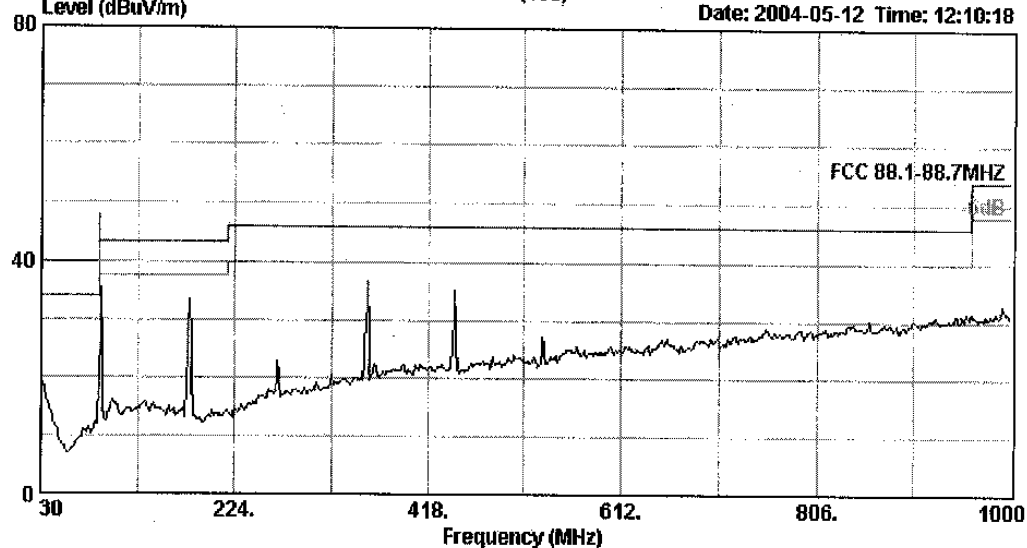
Site : 10m Chamber
Condition : FCC 88.1-88.7MHz 3m 2768 FACTOR(3M) VERTICAL
EUT : CAR ADAPTOR
M/N : EM-402
Power : DC 12V
Test Mode : FM 88.5MHz
Test Engineer: Pebble
Memo : Temp: 25.4 Humi: 55%



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Date: 2004-05-12 Time: 12:10:18



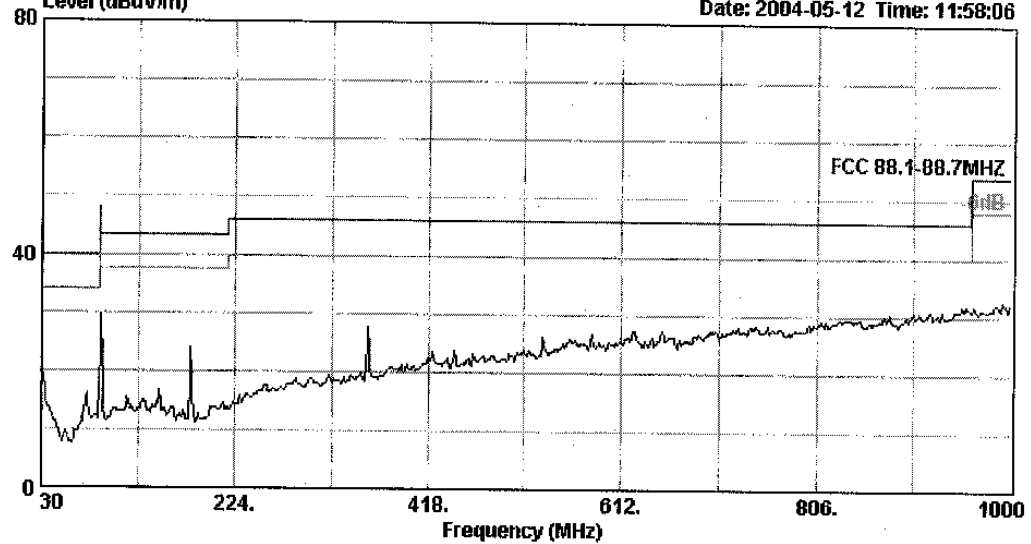
Site : 10m Chamber
Condition : FCC 88.1-88.7MHz 3m 2768 FACTOR(3M) HORIZONTAL
EUT : CAR ADAPTOR
M/N : EM-402
Power : DC 12V
Test Mode : EM 88.7MHz
Test Engineer: Pebble
Memo : Temp: 25.4 Humi: 55%



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Data: 152 File: D:\E3 Test Data\A\Action.EMI (155)
Level (dBuV/m)

Date: 2004-05-12 Time: 11:58:06



Site : 10m Chamber
Condition : FCC 88.1-88.7MHz 3m 2768 FACTOR(3M) VERTICAL
EUT : CAR ADAPTOR
M/N : FM-402
Power : DC 12V
Test Mode : FM 88.7MHz
Test Engineer : Pebble
Memo : Temp: 25.4 Humid: 55%