

Measurement/Technical Report
Cardio Theater, Inc., LCS-TX, Rev. E

FCC ID: M4D

February 24, 2000

This report concerns (check one):	Original Grant <u>√</u>	Class II Change _____
Equipment Type: <u>Intentional Radiator</u>		
Deferred grant requested per 47 CFR 0.457 (d)(1)(ii)?		
	yes _____	no <u>X</u>
	If yes, defer until: _____	
		N/A date
<u>Cardio Theater</u> agrees to notify the Commission by:		
		N/A date
of the intended date of announcement of the product so that the grant can be issued on that date.		
Transition Rules Request per 15.37:		
	yes _____	no <u>X</u>
If no, assumed Part 15, Subpart B for unintentional radiators - new 47 CFR [10-1-92] provision.		
Report prepared by:	Northwest EMC, Inc. 22975 NW Evergreen Parkway, Suite 400 Hillsboro, OR 97124 (503) 844-4066 fax: (503) 844-3826	
Report No. CARD0023		

Table of Contents

Section	Description	Page
1.0	General Information	3
1.1	Product Description	3
1.2	Related Submittals/Grants	4
1.3	Tested System Details	4
1.4	Test Methodology	5
1.5	Test Facility	5
2.0	System Test Configuration	6
2.1	Justification	6
2.2	EUT Exercise Software	6
2.3	Special Accessories	6
2.4	Equipment Modifications	6
Figure 2.1	Configuration of Tested System	7
3.0	Conducted Emissions Data	8
4.0	Radiated Emissions Data	10
4.2	Field Strength Calculations	12
4.3	Measurement Bandwidths	12
5.0	Measurement Equipment	13
Appendix I	Measurement Procedures	14

1.0 General Information

1.1 Product Description

Manufactured By Cardio Theater, Inc.

Address 21420 NW Nicholas Court, Hillsboro, OR 97124

Test Requested By: Rick Hoagland

Model LCS-TX, Rev. E

FCC ID M4D

Serial Number(s) N/A

Date of Test February 24, 2000

Job Number..... CARD0023

The Equipment Under Test (EUT) is the Cardio Theater LCS-TX, Rev. E. The EUT is a four channel stereo FM transmitter operating in 903.6 – 926.2 MHz frequency band. A microcontroller controls all of the functions – reading the keypad, setting the volume (modulation depth), loading the synthesizers and displaying the channel number, volume settings and audio signal levels.

Hardware Description:

- Clocks/Oscillators Frequencies: 38 kHz, 4 MHz, 903.6-926.2 MHz
- Ports: (4) Audio/Stereo Inputs, Antenna Input, Power Input
- Antenna: Quarter-Wavelength Monopole, 3 dBi gain, Antenna World, Model BAS87ultra15F

1.2 Related Submittals/Grants

None.

1.3 Tested System Details

EUT and Peripherals

Item	FCC ID	Description and Serial No.
EUT	M4D	Cardio Theater, LCS-TX, Rev. E, Low Power Transmitter, Serial No. None.
CD Player		Sony model D-171, S/N: 8010567
CD Player		Magnavox model AZ6820, N/A: 22947140
Tape Player		Sony, model WM-EX102, S/N: 1.88541e+006
Tape Player		Sony, model WM-EX122, S/N: 767859

Cables:

Item	Description
Audio Input	1.0 meters in length. Shielded and no ferrite beads. Plastic connector. Connected from the EUT to the CD Player.
Audio Input	1.0 meters in length. Shielded and no ferrite beads. Plastic connector. Connected from the EUT to the CD Player.
Audio Input	1.0 meters in length. Shielded and no ferrite beads. Plastic connector. Connected from the EUT to the Tape Player.
Audio Input	1.0 meters in length. Shielded and no ferrite beads. Plastic connector. Connected from the EUT to the Tape Player.
Power Input	2.0 meters in length. Not shielded and no ferrite beads. AC connector. Connected from the EUT to the AC Mains.
Antenna	2.0 meters in length. Shielded and no ferrite beads. Metal connector. Connected from the EUT to the Antenna.

1.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in ANSI C63.4 (1992). Radiated testing was performed at an antenna to EUT distance of 3 meters. Please reference Appendix I for further detail on Test Methodology.

1.5 Test Facility

The Open Area Test Site and conducted measurement facility used to collect the radiated and conducted data is located at

Northwest EMC, Inc.
22975 NW Evergreen Parkway, Suite 400
Hillsboro, OR 97124
(503) 844-4066
Fax: 844-3826

The Open Area Test Site, and conducted measurement facility used to collect this data is located at the address shown above. This site has been fully described in a report filed and accepted by the FCC. (31040/SIT)(1300B3). It is also recognized under the National Voluntary Laboratory Accreditation Program (NVLAP Lab Code: 200059-0) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations.

Northwest EMC, Inc. is recognized under the United States Department of Commerce, National Institute of Standards and Technology, National Voluntary Laboratory Accreditation Program (NVLAP) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. These criteria encompass the requirements of ISO/IEC Guide 25 and the relevant requirements of ISO 9002 (ANSI/ASQC Q92-1987) as suppliers of calibration or test results. NVLAP Lab Code: 200059-0.

2.0 System Test Configuration

2.1 Justification

The EUT was configured to simulate typical use. Cables were attached to each of the available I/O Ports. Radio attached to Stereo Input. The mode of operation utilized for testing was selected in order to best simulate typical EUT use. The measurements were made with the EUT transmitting at Low, Mid and High frequencies in an authorized band.

2.2 EUT Exercise Software

Since there is no external data connection available, no external software can be used.

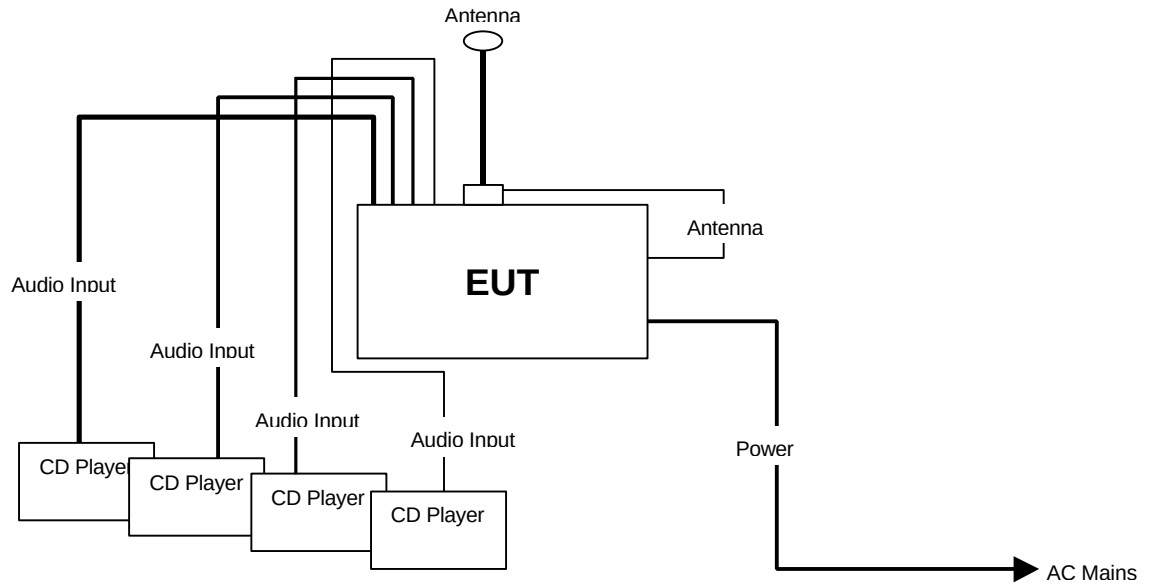
2.3 Special Accessories

No special accessories are sold with the EUT.

2.4 Equipment Modifications

The modification made to achieve compliance is:

- Changed resistor R1230 from 300 to 100 ohm (output amp match with SAW filter).

Figure 2.1: Configuration of Tested System

3.0 Conducted Emissions Data

3.1 The initial step in collecting conducted data is a spectrum analyzer, peak scan of the entire measurement range. All signals with less than 3 dB margin are then measured using a quasi-peak detector. Complete graphs and data sheets may be referenced on the following page. Minimum margins are listed below:

FCC Part 15 Class B Specification Limits (Peak data)

High-band

Frequency (MHz)	Measured Level (dBuV)	Limit (dBuV)	Margin (dB)*	Lead
29.583	29.9	48.0	18.1	High
29.593	29.9	48.0	18.1	High
15.940	29.6	48.0	18.4	High
17.769	29.3	48.0	18.7	High
7.384	29.3	48.0	18.7	High
Frequency (MHz)	Measured Level (dBuV)	Limit (dBuV)	Margin (dB)*	Lead
25.431	29.9	48.0	18.1	Low
24.355	29.8	48.0	18.2	Low
22.183	29.7	48.0	18.3	Low
24.548	29.3	48.0	18.7	Low
12.392	29.3	48.0	18.7	Low

Judgment: Passed, minimum margin of 18.1 dB.

Mid-band

Frequency (MHz)	Measured Level (dBuV)	Limit (dBuV)	Margin (dB)*	Lead
28.913	29.5	48.0	18.5	High
18.834	29.5	48.0	18.5	High
12.221	29.4	48.0	18.6	High
4.027	29.3	48.0	18.7	High
14.070	29.2	48.0	18.8	High
Frequency (MHz)	Measured Level (dBuV)	Limit (dBuV)	Margin (dB)*	Lead
22.934	30.2	48.0	17.8	Low
8.923	30.0	48.0	18.0	Low
21.787	29.7	48.0	18.3	Low
26.711	29.6	48.0	18.4	Low
21.006	29.4	48.0	18.6	Low

Judgment: Passed, minimum margin of 17.8 dB.

3.1 Conducted Emissions Data (continued)

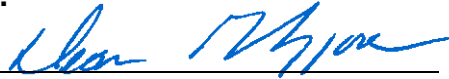
Low-band

Frequency (MHz)	Measured Level (dBuV)	Limit (dBuV)	Margin (dB)*	Lead
27.320	29.6	48.0	18.4	High
19.819	29.5	48.0	18.5	High
15.015	29.4	48.0	18.6	High
26.223	29.4	48.0	18.6	High
19.970	29.2	48.0	18.8	High
Frequency (MHz)	Measured Level (dBuV)	Limit (dBuV)	Margin (dB)*	Lead
8.986	29.9	48.0	18.1	Low
11.739	29.8	48.0	18.2	Low
29.979	29.7	48.0	18.3	Low
14.643	29.5	48.0	18.5	Low
11.176	29.3	48.0	18.7	Low

Judgment: Passed, minimum margin of 18.1 dB.

All readings listed above are Peak, using an IF Bandwidth of 9 kHz, a video filter was not used.

Test Personnel:

Tester Signature:  Date: 02/24/00

Typed/Printed Name: Dean Ghizzone

4.0 Radiated Emissions Data

4.1 The following data lists the six most significant emission frequencies, total (corrected) levels, and specification margins. Correction factors, antenna height, table azimuth, etc., are contained in the data sheets immediately following. Explanation of the correction factors is given in paragraph 7.2 of this report. Complete graphs and data sheets may be referenced on the following pages. Minimum margins are listed below:

FCC Class B Specification Limits

Transmit – High Band

Frequency (MHz)	Detection	Total Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)*	Polarization
924.399	Quasi-Peak	87.0	94.0	7.0	Vertical
923.599	Quasi-Peak	86.7	94.0	7.3	Vertical
921.999	Quasi-Peak	85.8	94.0	8.2	Vertical
926.199	Quasi-Peak	85.0	94.0	9.0	Vertical

Judgment: Passed, minimum margin of 10.3 dB.

Transmit – Mid Band

Frequency (MHz)	Detection	Total Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)*	Polarization
919.391	Quasi-Peak	89.9	94.0	4.1	Vertical
917.401	Quasi-Peak	88.0	94.0	6.0	Vertical
917.991	Quasi-Peak	87.3	94.0	6.7	Vertical
916.189	Quasi-Peak	86.8	94.0	7.2	Vertical

Judgment: Passed, minimum margin of 6.9 dB.

Transmit – Low Band

Frequency (MHz)	Detection	Total Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)*	Polarization
905.799	Quasi-Peak	91.2	94.0	2.8	Vertical
906.994	Quasi-Peak	91.0	94.0	3.0	Vertical
904.399	Quasi-Peak	90.2	94.0	3.8	Vertical
903.599	Quasi-Peak	88.7	94.0	5.3	Vertical

Judgment: Passed, minimum margin of 2.7 dB.

4.1 Radiated Emissions Data (continued)

Harmonics – Group 2

Frequency (MHz)	Detection	Total Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)*	Polarization
1821.068	AV	34.9	54.0	19.1	Horizontal
1821.068	AV	34.7	54.0	19.3	Vertical
2741.550	AV	36.5	54.0	17.5	Horizontal
2741.550	AV	30.5	54.0	23.5	Vertical
3645.960	AV	48.4	54.0	5.6	Horizontal
3645.960	AV	49.7	54.0	4.3	Vertical
4556.805	AV	51.0	54.0	3.0	Horizontal
4556.805	AV	50.7	54.0	3.3	Vertical

Judgment: Passed, minimum margin of 3.3 dB.

Harmonics – Group 6

Frequency (MHz)	Detection	Total Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)*	Polarization
1824.528	AV	35.3	54.0	18.7	Horizontal
1824.528	AV	33.7	54.0	20.3	Vertical
2749.820	AV	45.3	54.0	8.7	Horizontal
2749.820	AV	45.0	54.0	9.0	Vertical
3653.210	AV	48.2	54.0	5.8	Horizontal
3653.210	AV	50.5	54.0	3.5	Vertical
4583.743	AV	52.7	54.0	1.3	Horizontal
4583.743	AV	50.9	54.0	3.1	Vertical

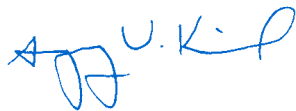
Judgment: Passed, minimum margin of 1.3 dB.

Harmonics – Group 7

Frequency (MHz)	Detection	Total Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)*	Polarization
1842.940	AV	34.3	54.0	19.7	Horizontal
1842.940	AV	37.2	54.0	16.8	Vertical
2779.000	AV	44.7	54.0	9.3	Horizontal
2779.000	AV	45.3	54.0	8.7	Vertical
3689.160	AV	48.8	54.0	5.2	Horizontal
3689.160	AV	47.4	54.0	6.6	Vertical
4629.300	AV	50.6	54.0	3.4	Horizontal
4629.300	AV	51.3	54.0	2.7	Vertical

Judgment: Passed, minimum margin of 2.7 dB.

Test Personnel:



Tester Signature: _____

Date: 02/08/99

Typed/Printed Name: Greg Kiemel

4.2 Field Strength Calculations

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured level. The basic equation with a sample calculation is as follows:

$$FS = RA + AF + CF - AG$$

where : FS = Field Strength
 RA = Measured Level
 AF = Antenna Factor
 CF = Cable Attenuation Factor
 AG = Amplifier Gain

Assume a receiver reading of 52.5 dBuV is obtained. The Antenna Factor of 7.4 and a Cable Factor of 1.1 is added. The Amplifier Gain of 29 dB is subtracted, giving a field strength of 32 dBuV/meter.

$$FS = 52.5 + 7.4 + 1.1 - 29 = 32 \text{ dBuV/meter}$$
$$\text{Level in uV/m} = \text{Common Antilogarithm } [(32 \text{ dBuV/m})/20] = 39.8 \text{ uV/m}$$

4.3 Measurement Bandwidths

Peak Data

150 kHz - 30 MHz.....	10 kHz
30 MHz - 1000 MHz.....	100 kHz
1000 MHz - 2000 MHz.....	1000 kHz

Quasi-peak Data

150 kHz - 30 MHz.....	9 kHz
30 MHz - 1000 MHz.....	120 kHz

All radiated measurements are quasi-peak unless otherwise stated. A video filter was not used.
All conducted measurements are peak unless otherwise stated. A video filter was not used.

5.0 Measurement Equipment

Instrument	Model	Serial No.	Freq. Range	Cal Due
Quasi-Peak Adapter	Hewlett-Packard	85650A	2811A01353	01/19/01
Spectrum Analyzer	Hewlett-Packard	8566B	2747A05213	01/19/01
LISN	Solar	9252-50-R-24-BNC	971623	05/05/00
Quasi-Peak Adapter	Hewlett-Packard	85650A	2811A01353	01/19/01
Spectrum Analyzer	Hewlett-Packard	8566B	2747A05213	01/19/01
Antenna, Biconilog	EMCO	3141	9906-1146	06/15/00
Antenna, Horn	EMCO	3115	9804-5441	07/10/00
Pre-Amplifier	Amplifier Research	LN1000A	25660	07/18/00

Appendix I: Measurement Procedures

Each frequency was measured in both the horizontal and vertical antenna polarizations.

The EUT position was maximized for each frequency, for both the horizontal and vertical antenna polarizations, using a remotely controlled turntable.

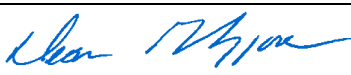
The antenna height was varied from 1 – 4 meters at each frequency, for both the horizontal and vertical positions to maximize the emission level.

The cable and peripheral positions were manipulated to ensure maximum levels at each frequency for both horizontal and vertical antenna polarizations.

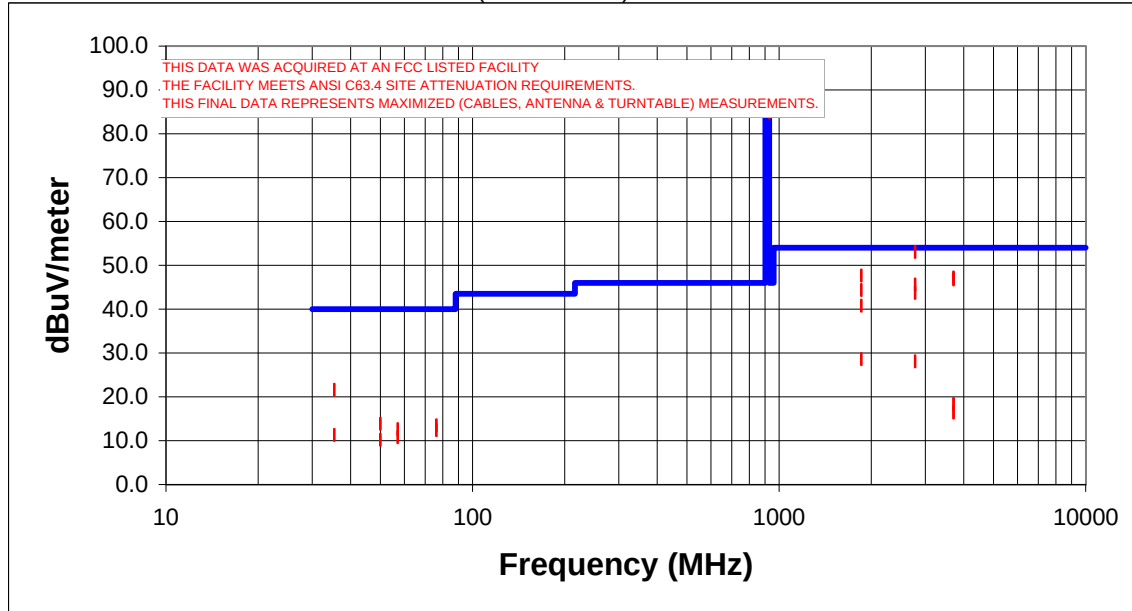
All measurements with less than 3 dB margin, as measured with a broadband antenna (Biconical/Log Periodic), were then measured with a tuned dipole antenna.

30 MHz – 1000 MHz measurements are made at an antenna to EUT distance of 10 meters.

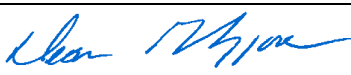
1000 – 10000 MHz measurements are made at an antenna to EUT distance of 3 meters.

Northwest EMC, Inc., Radiated and Conducted Emissions Data Sheets				Rev 3.3 10/09/99
EUT: LCS-TX, Rev. E		Serial Number: None	Job Number: CARD0023	Date: 02/24/00
Manufacturer: Cardio Theatre		Test Engineer: Dean Ghizzone	Job Site: EV01	
Customer Reference Number:		Software:	Power:	
Comments: High Band, Audio Inputs connected				
			Temperature (°C): 70	% Humidity: 35
Test System				
EUT		CD Player (4)		Antenna
Test Equipment				
AQF	AAL	AXE	AHA	APS

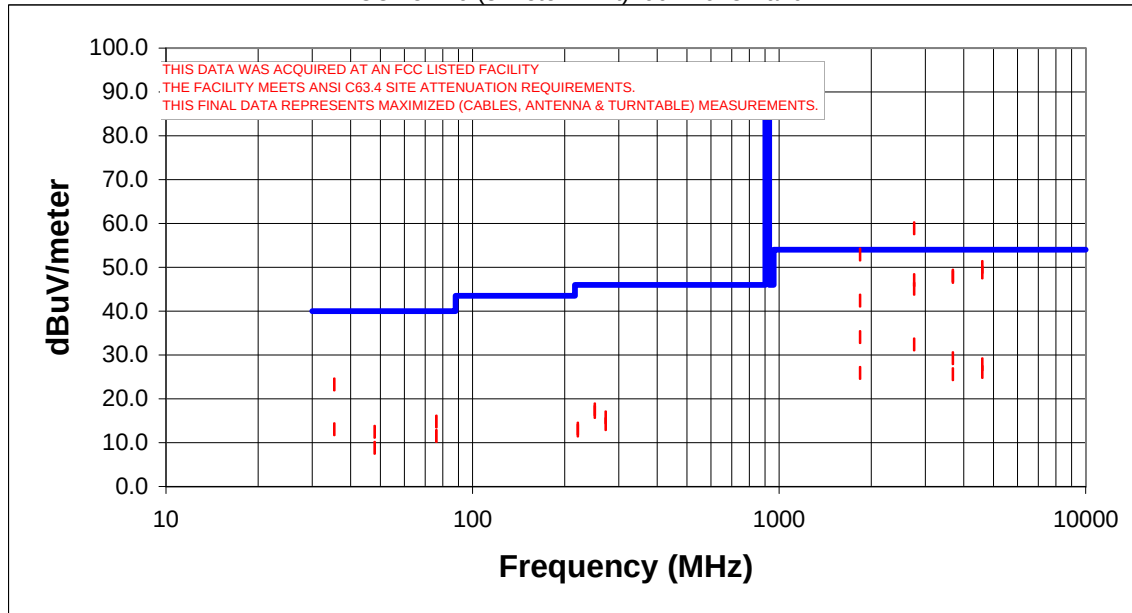
FCC 15.249 (3 Meter Limit) 902 - 928 Band



Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Polarity	Preamp Gain (dB)	Cable Loss (dB)	Table Azimuth (degrees)	Antenna Height (meters)	Adjusted Level (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
2773.000	52.0	PK	31.4	VHRN	33.4	3.1	186.0	1.2	53.1	54.0	-0.9
1848.000	49.5	PK	28.7	VHRN	32.9	2.4	194.0	1.1	47.7	54.0	-6.3
3698.000	43.8	PK	33.2	HHRN	33.5	3.7	90.0	3.0	47.2	54.0	-6.8
924.399	61.8	PK	23.5	VBIC	0.0	1.7	170.0	1.1	87.0	94.0	-7.0
3698.000	43.4	PK	33.2	HHRN	33.5	3.7	299.0	1.3	46.8	54.0	-7.2
923.599	61.5	PK	23.5	VBIC	0.0	1.7	177.0	1.1	86.7	94.0	-7.3
921.999	60.6	PK	23.5	VBIC	0.0	1.7	175.0	1.1	85.8	94.0	-8.2
2773.000	44.5	PK	31.4	HHRN	33.4	3.1	114.0	1.0	45.6	54.0	-8.4
926.199	59.8	PK	23.5	VBIC	0.0	1.7	169.0	1.1	85.0	94.0	-9.0
1848.000	46.2	PK	28.7	HHRN	32.9	2.4	183.0	1.4	44.4	54.0	-9.6
2773.000	42.6	AV	31.4	VHRN	33.4	3.1	186.0	1.3	43.7	54.0	-10.3
1848.000	42.6	AV	28.7	VHRN	32.9	2.4	259.0	1.1	40.8	54.0	-13.2
35.341	43.0	PK	9.9	VBIC	31.7	0.4	80.0	1.1	21.6	40.0	-18.4
1848.000	30.4	AV	28.7	HHRN	32.9	2.4	360.0	1.1	28.6	54.0	-25.4
2773.000	27.0	AV	31.4	HHRN	33.4	3.1	258.0	1.0	28.1	54.0	-25.9
49.886	38.4	PK	6.6	HBIC	31.6	0.5	358.0	1.6	13.9	40.0	-26.1
76.000	35.5	PK	8.9	VBIC	31.5	0.6	205.0	1.4	13.5	40.0	-26.5
56.778	36.8	PK	6.9	VBIC	31.6	0.5	310.0	1.5	12.6	40.0	-27.4
76.000	34.4	PK	8.9	VBIC	31.5	0.6	266.0	2.3	12.4	40.0	-27.6
35.341	32.7	PK	9.9	VBIC	31.7	0.4	39.0	1.0	11.3	40.0	-28.7

Northwest EMC, Inc., Radiated and Conducted Emissions Data Sheets				Rev 3.3 10/09/99
EUT: LCS-TX, Rev. E		Serial Number: None		Job Number: CARD0023
Manufacturer: Cardio Theatre		Test Engineer: Dean Ghizzone		Date: 02/24/00
Customer Reference Number:		Software:		Job Site: EV01
Comments: Mid Band, Audio Inputs connected		Power:		
			Temperature (°C): 70	% Humidity: 35
Test System				
EUT		CD Player (4)		Antenna
Test Equipment				
AQF	AAL	AXE	AHA	APS

FCC 15.249 (3 Meter Limit) 902 - 928 Band



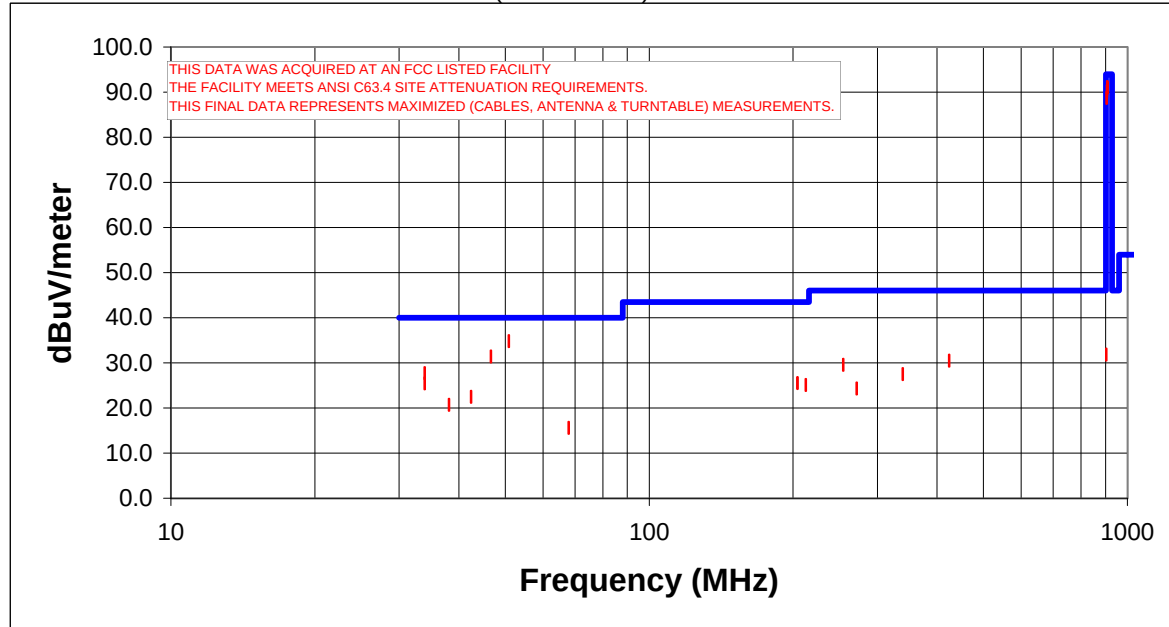
Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Polarity	Preamp Gain (dB)	Cable Loss (dB)	Table Azimuth (degrees)	Antenna Height (meters)	Adjusted Level (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
2754.000	58.0	PK	31.3	VHRN	33.4	3.0	147.0	1.0	58.9	54.0	4.9
1834.000	55.0	PK	28.6	VHRN	33.1	2.4	267.0	1.1	52.9	54.0	-1.1
4590.000	45.2	PK	34.9	VHRN	34.3	4.3	65.0	1.3	50.1	54.0	-3.9
919.391	64.7	PK	23.5	VBIC	0.0	1.7	256.0	1.0	89.9	94.0	-4.1
4590.000	43.9	PK	34.9	HHRN	34.3	4.3	92.0	1.3	48.8	54.0	-5.2
3677.000	44.8	PK	33.2	VHRN	33.5	3.6	104.0	3.2	48.1	54.0	-5.9
917.401	62.9	PK	23.4	VBIC	0.0	1.7	252.0	1.0	88.0	94.0	-6.0
3677.000	44.5	PK	33.2	HHRN	33.5	3.6	0.0	1.3	47.8	54.0	-6.2
917.991	62.2	PK	23.4	VBIC	0.0	1.7	236.0	1.1	87.3	94.0	-6.7
2754.000	46.2	AV	31.3	VHRN	33.4	3.0	201.0	1.4	47.1	54.0	-6.9
916.189	61.7	PK	23.4	VBIC	0.0	1.7	58.0	1.0	86.8	94.0	-7.2
2754.000	44.2	PK	31.3	HHRN	33.4	3.0	185.0	1.0	45.1	54.0	-8.9
1834.000	44.5	PK	28.6	HHRN	33.1	2.4	328.0	1.0	42.4	54.0	-11.6
35.360	44.7	PK	9.9	HBIC	31.7	0.4	84.0	1.2	23.3	40.0	-16.7
1834.000	36.2	AV	28.6	VHRN	33.1	2.4	191.0	1.3	34.1	54.0	-19.9
2754.000	31.5	AV	31.3	HHRN	33.4	3.0	201.0	1.4	32.4	54.0	-21.6
3677.000	26.0	AV	33.2	VHRN	33.5	3.6	194.0	1.3	29.3	54.0	-24.7
75.998	36.8	PK	8.9	HBIC	31.5	0.6	210.0	2.3	14.8	40.0	-25.2
4590.000	23.0	AV	34.9	VHRN	34.3	4.3	68.0	1.3	27.9	54.0	-26.1
35.360	34.5	PK	9.9	HBIC	31.7	0.4	51.0	1.0	13.1	40.0	-26.9

Northwest EMC, Inc., Radiated and Conducted Emissions Data Sheets Rev 3.3
10/09/99

EUT: LCS-TX	Serial Number:	Job Number: CARD0021	Date: 02/15/00
Manufacturer: Cardio Theater	Test Engineer: Dan Haas	Job Site: EV01	
Customer Reference Number:	Software:	Power:	
Comments: LCS-Transmitter with 4 audio inputs. TX-Low band. 120VAC/60Hz.			
		Temperature (°C): 70	% Humidity: 35

Test System					
EUT	CD Player (4)	Antenna			
Test Equipment					
AQF	AAL	AXE	AHA	APS	

FCC 15.249 (3 Meter Limit) 902 - 928 Band



Frequency (MHz)	Meter Reading (dBuV)	Detector	Antenna Factor (dB/m)	Antenna Polarity	Preamplifier Gain (dB)	Cable Loss (dB)	Table Azimuth (degrees)	Antenna Height (meters)	Adjusted Level (dBuV/m)	Spec. Limit (dBuV/m)	Margin (dB)
905.799	66.2	QP	23.3	VLPA	0.0	1.7	110.0	1.0	91.2	94.0	-2.8
906.994	65.9	QP	23.4	VLPA	0.0	1.7	269.0	1.0	91.0	94.0	-3.0
904.399	65.2	QP	23.3	VLPA	0.0	1.7	171.0	1.0	90.2	94.0	-3.8
50.818	59.3	PK	6.6	VBIC	31.6	0.5	42.0	1.1	34.8	40.0	-5.2
903.599	63.7	QP	23.3	VLPA	0.0	1.7	106.0	1.0	88.7	94.0	-5.3
46.583	55.5	PK	7.1	VBIC	31.7	0.5	81.0	1.1	31.4	40.0	-8.6
33.883	48.8	PK	10.4	VBIC	31.8	0.4	39.0	1.3	27.8	40.0	-12.2
902.000	38.9	QP	23.3	VLPA	32.1	1.7	106.0	1.0	31.8	46.0	-14.2
33.874	46.4	QP	10.5	VBIC	31.8	0.4	42.0	1.3	25.5	40.0	-14.5
423.532	44.3	PK	16.5	HLPA	31.4	1.1	186.0	1.0	30.5	46.0	-15.5
254.119	47.7	PK	12.3	HLPA	31.3	0.9	248.0	1.3	29.6	46.0	-16.4
42.353	45.9	PK	7.8	VBIC	31.7	0.5	323.0	1.7	22.5	40.0	-17.5
203.842	45.4	PK	10.6	HLPA	31.3	0.8	290.0	2.0	25.5	43.5	-18.0
212.336	44.6	PK	11.0	HLPA	31.3	0.8	286.0	1.3	25.1	43.5	-18.4
338.788	42.8	PK	15.0	HLPA	31.3	1.0	200.0	1.0	27.5	46.0	-18.5
38.114	43.1	PK	8.9	VBIC	31.7	0.4	47.0	1.3	20.7	40.0	-19.3
271.030	42.0	PK	12.7	HLPA	31.3	0.9	245.0	1.3	24.3	46.0	-21.7
67.765	38.5	PK	8.1	VBIC	31.5	0.5	55.0	2.0	15.6	40.0	-24.4