FCC PART 15, SUBPART B and C
TEST REPORT

for

WAND READER

MODEL: AVID1041

Prepared for

AVID IDENTIFICATION SYSTEMS, INC.
3179 HAMNER AVENUE
NORCO, CALIFORNIA 92860-9972

Prepared by: _____

KYLE FUJIMOTO

Approved by: _____

MICHAEL CHRISTENSEN

COMPATIBLE ELECTRONICS INC.
114 OLINDA DRIVE
BREA, CALIFORNIA 92823
(714) 579-0500

DATE: APRIL 29, 2004

	REPORT BODY	APPENDICES					TOTAL
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FIGURE	TITLE
1	Plot Map And Layout of 10 Meter Radiated Test Site

GENERAL REPORT SUMMARY

This electromagnetic emission test report is generated by Compatible Electronics Inc., which is an independent testing and consulting firm. The test report is based on testing performed by Compatible Electronics personnel according to the measurement procedures described in the test specifications given below and in the "Test Procedures" section of this report.

The measurement data and conclusions appearing herein relate only to the sample tested and this report may not be reproduced without the written permission of Compatible Electronics, unless done so in full.

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

Device Tested: Wand Reader
Model: AVID1041
S/N: N/A

Product Description: See Expository Statement.

Modifications: The EUT was modified in order to meet the specifications. Please see the list located in Appendix B.

Manufacturer: AVID Identification Systems, Inc.
3179 Hamner Avenue
Norco, California 92860-9972

Test Date: April 29, 2004

Test Specifications: EMI requirements
CFR Title 47, Part 15 Subpart B; and Subpart C, Sections 15.205 and 15.209

Test Procedure: ANSI C63.4: 2001

Test Deviations: The test procedure was not deviated from during the testing.

SUMMARY OF TEST RESULTS

TEST	DESCRIPTION	RESULTS
1	Conducted RF Emissions, 150 kHz - 30 MHz	The EUT is powered by a nine volt battery only and cannot be plugged into the AC public mains.
2	Radiated RF Emissions, 10 kHz - 1000 MHz	Complies with the **Class A** limits of CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205 and 15.209. Highest Reading in Relation to Spec Limit: 42.97 dBµV @ 147.529 MHz (*U$_c$ = 1.57dB)

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the Wand Reader Model: AVID1041. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4: 2001. The tests were performed in order to determine whether the electromagnetic emissions from the equipment under test, referred to as EUT hereafter, are within the **Class A** specification limits defined by CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205 and 15.209.

2. ADMINISTRATIVE DATA

2.1 Location of Testing

The EMI tests described herein were performed at the test facility of Compatible Electronics, 114 Olinda Drive, Brea, California 92823.

2.2 Traceability Statement

The calibration certificates of all test equipment used during the test are on file at the location of the test. The calibration is traceable to the National Institute of Standards and Technology (NIST).

2.3 Cognizant Personnel

AVID Identification Systems, Inc.

Michael F Cruz Director of Engineering

Compatible Electronics, Inc.

Kirit Ramani	Test Engineer
Kyle Fujimoto	Test Engineer
Michael Christensen	Senior Test Engineer

2.4 Date Test Sample was Received

The test sample was received on April 28, 2004.

2.5 Disposition of the Test Sample

The sample has not been returned to AVID Identification Systems, Inc. as of April 29, 2004.

2.6 Abbreviations and Acronyms

The following abbreviations and acronyms may be used in this document.

RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
P/N	Part Number
S/N	Serial Number
HP	Hewlett Packard
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network

3. APPLICABLE DOCUMENTS

The following documents are referenced or used in the preparation of this EMI Test Report.

SPEC	TITLE
CFR Title 47, Part 15	FCC Rules – Radio frequency devices (including digital devices)
ANSI C63.4 2001	American National Standards for Methods of measurement of radio-noise emissions from low-voltage electrical and electronic equipment in the range of 9 kHz to 40 GHz

4. DESCRIPTION OF TEST CONFIGURATION

4.1 Description of Test Configuration - EMI

Setup and operation of the equipment under test.

Specifics of the EUT:

The Wand Reader Model: AVID1041 (EUT) was connected to the antenna. The EUT was continuously transmitting. The EUT was tested in three orthogonal axis.

It was determined that the emissions were at their highest level when the EUT was operating in the above configuration with the EUT placed in the Z Axis. The cable was moved to maximize the emissions. The final radiated data was taken in this mode of operation. All initial investigations were performed with the spectrum analyzer in manual mode scanning the frequency range continuously. The cable was bundled and routed as shown in the photographs in Appendix D.

4.1.1 Cable Construction and Termination

Cable 1

This is a 1 meter unshielded cable connecting the EUT to the antenna. It is hard wired at each end.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT

5.1 EUT and Accessory List

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIALNUMBER	FCC ID
WAND READER (EUT)	AVID IDENTIFICATION SYSTEMS, INC.	AVID1041	N/A	**IOL-125-AV1041**
ANTENNA (EUT)	AVID IDENTIFICATION SYSTEMS, INC.	P/N: AVID110A021	N/A	**N/A**

5.2 EMI Test Equipment

EQUIPMENT TYPE	MANU-FACTURER	MODEL NUMBER	SERIAL NUMBER	CAL. DATE	CAL. DUE DATE
Radiate Emissions Data Capture Program	Compatible Electronics	2.0	N/A	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	3638A08784	June 20, 2003	1 Year
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	3701A22279	June 20, 2003	1 Year
Quasi-Peak Adapter	Hewlett Packard	85650A	2430A00424	June 20, 2003	1 Year
Preamplifier	Com Power	PA-103	1582	March 11, 2004	1 Year
Biconical Antenna	Com Power	AB-900	15226	April 21, 2004	1 Year
Log Periodic Antenna	Com Power	AL-100	16202	February 18, 2004	1 Year
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A
Turntable	Com Power	TT-100	N/A	N/A	N/A
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
Monitor	Hewlett Packard	D5258A	TW74500641	N/A	N/A
Loop Antenna	Com-Power	AL-130	17070	July 8, 2003	1 Year

6. TEST SITE DESCRIPTION

6.1 Test Facility Description

Please refer to section 2.1 and 7.1 of this report for EMI test location.

6.2 EUT Mounting, Bonding and Grounding

The EUT was mounted on a 1.0 by 1.5 meter non-conductive table 0.8 meters above the ground plane.

The EUT was not grounded.

7. TEST PROCEDURES

The following sections describe the test methods and the specifications for the tests. Test results are also included in this section.

7.1 RF Emissions

7.1.1 Radiated Emissions (Fundamental, Spurious, and Harmonics) Test

The spectrum analyzer was used as a measuring meter along with the quasi-peak adapter. A preamplifier was used to increase the sensitivity of the instrument. The spectrum analyzer was used in the peak detect mode with the "Max Hold" feature activated. In this mode, the spectrum analyzer records the highest measured reading over all the sweeps.

The measurement bandwidths and transducers used for the radiated emissions test were:

FREQUENCY RANGE	EFFECTIVE MEASUREMENT BANDWIDTH	TRANSDUCER
9 kHz to 150 kHz	200 Hz	Active Loop Antenna
150 kHz to 30 MHz	9 kHz	Active Loop Antenna
30 MHz to 300 MHz	120 kHz	Biconical Antenna
300 MHz to 1 GHz	120 kHz	Log Periodic Antenna

The open field test site of Compatible Electronics, Inc. was used for radiated emission testing. This test site is set up according to ANSI C63.4: 2001. Please see section 6.2 of this report for mounting, bonding and grounding of the EUT. The turntable supporting the EUT is remote controlled using a motor. The turntable permits EUT rotation of 360 degrees in order to maximize emissions. Also, the antenna mast allows height variation of the antenna from 1 meter to 4 meters. Data was collected in the worst case (highest emission) configuration of the EUT. At each reading, the EUT was rotated 360 degrees and the antenna height was varied from 1 to 4 meters (for E field radiated field strength). The loop antenna was also rotated in the horizontal and vertical axis in order to ensure accurate results.

The presence of ambient signals was verified by turning the EUT off. In case an ambient signal was detected, the measurement bandwidth was reduced temporarily and verification was made that an additional adjacent peak did not exist. This ensures that the ambient signal does not hide any emissions from the EUT. The EUT was tested at a 10 meter test distance to obtain the final test data. The final qualification data sheets are located in Appendix E.

8. CONCLUSIONS

The Wand Reader Model: AVID1041 meets all of the **Class A** specification limits defined in CFR Title 47, Part 15, Subpart B; and Subpart C, sections 15.205 and 15.209.

APPENDIX A

LABORATORY RECOGNITIONS

LABORATORY RECOGNITIONS

Compatible Electronics has the following agency accreditations:

National Voluntary Laboratory Accreditation Program - Lab Code: 200528-0

Voluntary Control Council for Interference - Registration Numbers: R-983, C-1026, R-984 and C-1027

Bureau of Standards and Metrology Inspection - Reference Number: SL2-IN-E-1031

Conformity Assessment Body for the EMC Directive Under the US/EU MRA Appointed by NIST

Compatible Electronics is recognized or on file with the following agencies:

Federal Communications Commission

Industry Canada

Radio-Frequency Technologies (Competent Body)

APPENDIX B

MODIFICATIONS TO THE EUT

MODIFICATIONS TO THE EUT

The modifications listed below were made to the EUT to pass FCC 15.209 or FCC Class A specifications.

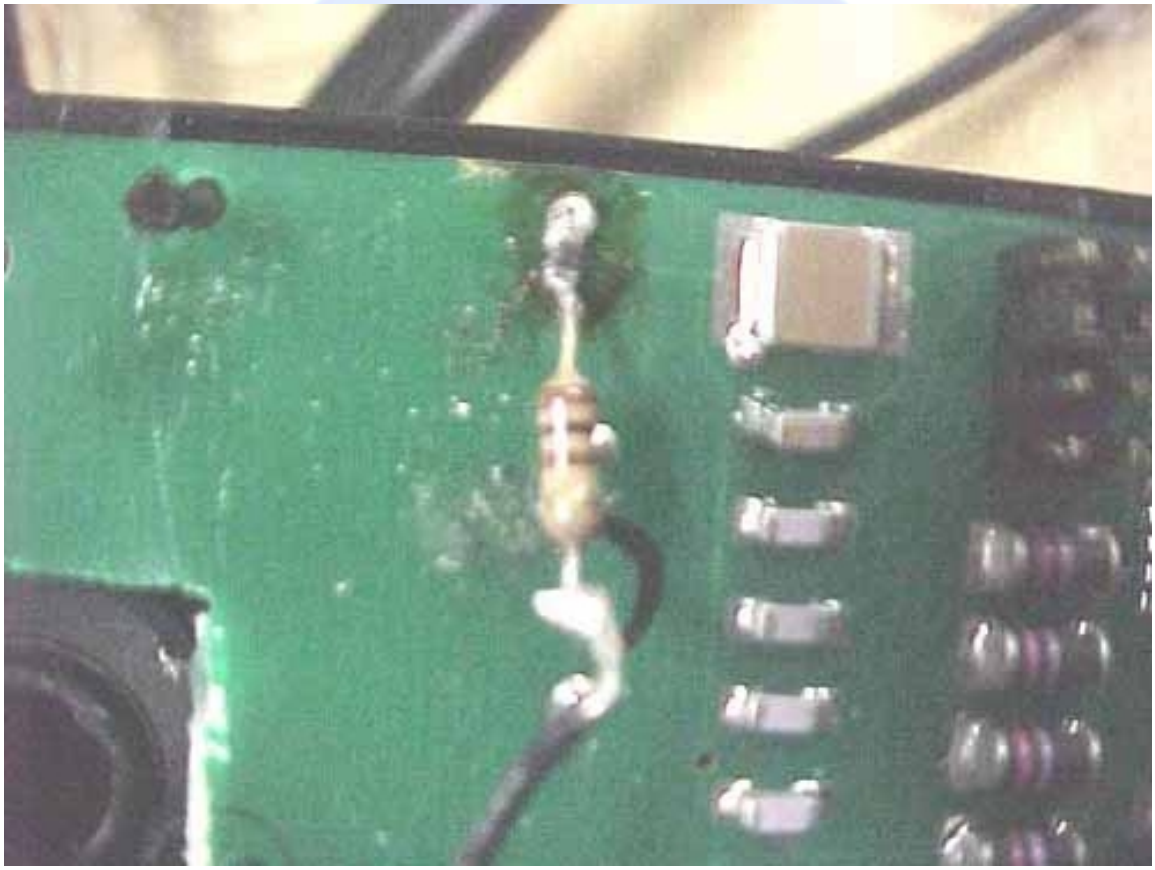
All the rework described below was implemented during the test in a method that could be reproduced in all the units by the manufacturer.

Modifications:

1) Added a P/N: HCB-805 surface mount ferrite from the left antenna wire to the PCB. (See picture on Page B3)

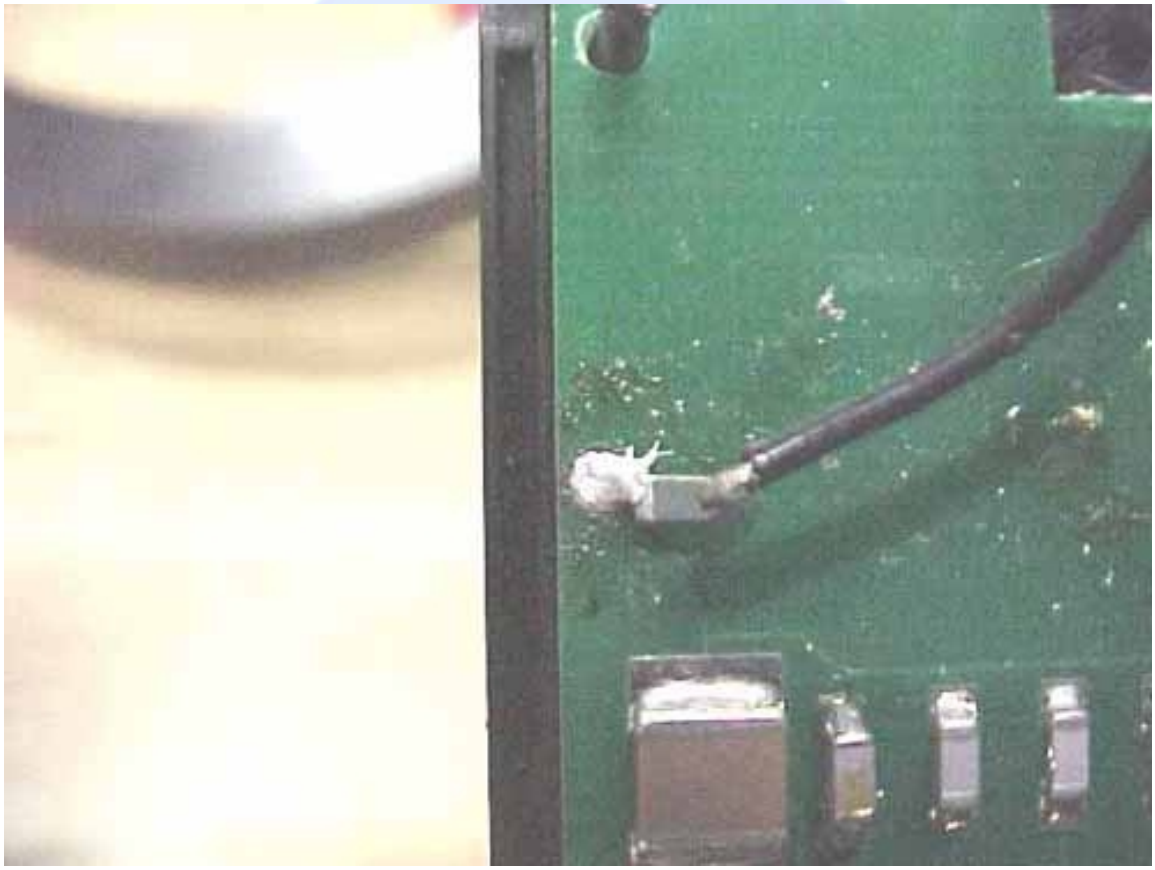
2) Added a P/N: LCB-1206 surface mount ferrite from the right antenna wire to the PCB (See picture on Page B4)

Note: The manufacturer of the surface mount ferrites is Associated Components Technology



AVID IDENTIFICATION SYSTEMS, INC.
WAND READER
MODEL: AVID1041

PHOTOGRAPH SHOWING MODIFICATION #1



AVID IDENTIFICATION SYSTEMS, INC.
WAND READER
MODEL: AVID1041

PHOTOGRAPH SHOWING MODIFICATION #2

APPENDIX C

ADDITIONAL MODELS COVERED UNDER THIS REPORT

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

Wand Reader
Model: AVID1041
S/N: N/A

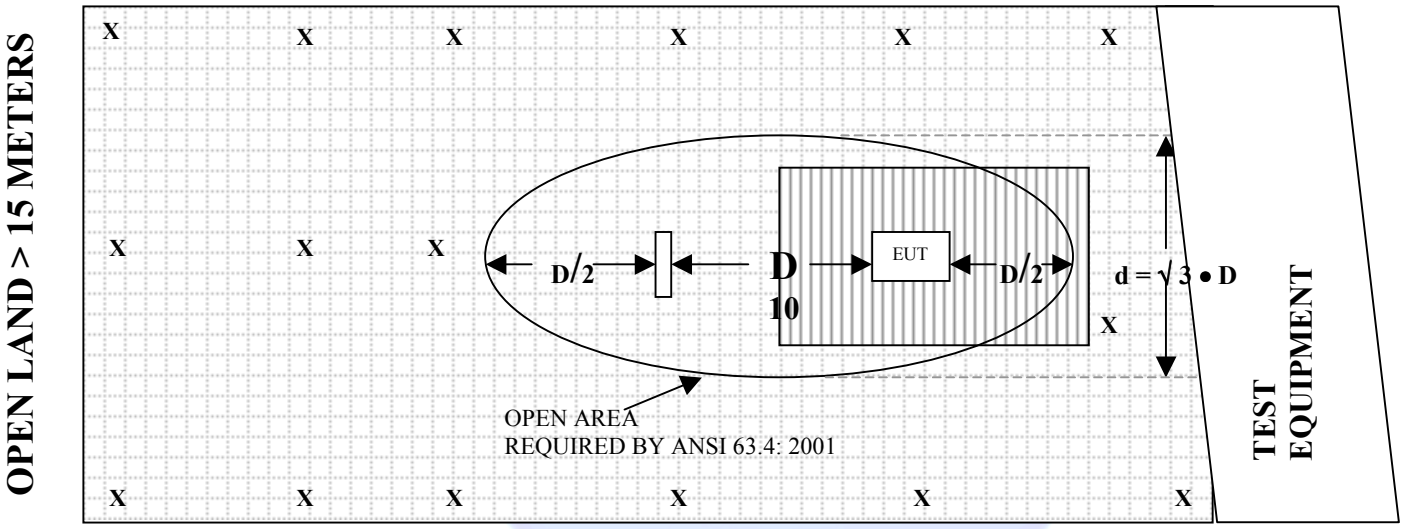
There were no additional models covered under this report.

APPENDIX D

DIAGRAMS, CHARTS, AND PHOTOS

FIGURE 1: PLOT MAP AND LAYOUT OF 10 METER RADIATED SITE

OPEN LAND > 15 METERS



OPEN LAND > 15 METERS

X	= GROUND RODS
	= GROUND SCREEN
D	= TEST DISTANCE (meters)
	= WOOD COVER

COM-POWER AB-900

BICONICAL ANTENNA

S/N: 15226

CALIBRATION DATE: APRIL 21, 2004

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	11.00	120	13.20
35	10.80	125	13.30
40	11.20	140	12.50
45	9.00	150	12.10
50	11.40	160	12.80
60	10.30	175	15.60
70	8.10	180	15.70
80	5.80	200	16.40
90	7.80	250	14.90
100	11.10	300	24.60

COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 16202

CALIBRATION DATE: FEBRUARY 18, 2004

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	12.90	700	19.60
400	14.40	800	21.80
500	17.40	900	20.50
600	18.90	1000	22.70

COM-POWER PA-103

PREAMPLIFIER

S/N: 1582

CALIBRATION DATE: MARCH 11, 2004

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	32.4	300	32.3
40	32.4	350	32.2
50	32.4	400	32.2
60	32.5	450	32.0
70	32.4	500	32.0
80	32.3	550	31.8
90	32.3	600	31.7
100	32.3	650	31.7
125	32.4	700	31.7
150	32.2	750	31.9
175	32.4	800	31.4
200	33.4	850	31.4
225	32.5	900	31.0
250	32.3	950	31.4
275	32.1	1000	31.4

COM-POWER AL-130

LOOP ANTENNA

S/N: 17070

CALIBRATION DATE: JULY 08, 2003

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-40.0	11.5
0.01	-40.1	11.4
0.02	-41.3	10.2
0.05	-39.9	11.6
0.07	-41.3	10.2
0.1	-41.5	10
0.2	-43.8	7.7
0.3	-41.4	10.1
0.5	-41.3	10.2
0.7	-41.2	10.3
1	-40.8	10.7
2	-40.3	11.2
3	-40.6	10.9
4	-40.7	10.8
5	-40.1	11.4
10	-40.5	11.0
15	-41.3	10.2
20	-41.1	10.4
25	-41.7	9.8
30	-43.1	8.4

FRONT VIEW

AVID IDENTIFICATION SYSTEMS, INC.
WAND READER
MODEL: AVID1041
FCC SUBPART C – RADIATED EMISSIONS – 04-29-04

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

AVID IDENTIFICATION SYSTEMS, INC.
WAND READER
MODEL: AVID1041
FCC SUBPART C – RADIATED EMISSIONS – 04-29-04

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

FRONT VIEW

AVID IDENTIFICATION SYSTEMS, INC.
WAND READER
MODEL: AVID1041
FCC SUBPART B – RADIATED EMISSIONS – 04-29-04

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

REAR VIEW

AVID IDENTIFICATION SYSTEMS, INC.
WAND READER
MODEL: AVID1041
FCC SUBPART B – RADIATED EMISSIONS – 04-29-04

PHOTOGRAPH SHOWING THE EUT CONFIGURATION FOR MAXIMUM EMISSIONS

APPENDIX E

DATA SHEETS

RADIATED EMISSIONS

DATA SHEETS

Company Name	Avid Marketing, Inc.	DATE:	4/29/04
EUT:	Wand Reader	EUT S/N:	N/A
EUT MODEL:	AVID1041	LOCATION:	Lab A
SPECIFICATION:	FCC PART 15.209	CLASS:	A

Distance Factor	dist.	Frequency	Peak Reading	Avg or Q.P.	Azimuth	Antenna Factor	Cable Loss	Amplifier Gain	Corrected Reading	Delta	Spec Limit	Comment
	meter	MHz	dBµV	dBµV	degrees	dB	dB	dB	dBµV	dB	dBµV	
40	10	0.128	61.90		180	9.36	0.4	0	71.66	-12.89	84.54	Test with EUT in X Axis (Worst Case)
40	10	0.128	57.10		180	9.36	0.4	0	66.86	-17.69	84.54	Test with EUT in X Axis - Rotate Loop Ant.
												No Harmonics Found
												Beyond the Fundamental

COMPATIBLE ELECTRONICS

Test Location : Compatible Electronics — **Page** : 1/1
Customer : AVID Identification Systems, Inc. — **Date** : 4/29/2004
Manufacturer : AVID Identification Systems, Inc. — **Time** : 14:21:50
Eut name : Wand Reader — **Lab** : A
Model : AVID1041 — **Test Distance** : 10 Meters
Serial # : N/A
Specification : FCC Class A
Distance correction factor (20 * log(test/spec) : 0.00
Test Mode : Radiated Spurious Emissions 10 kHz to 1 GHz
Vertical and Horizontal Polarization
With P/N: HCB-805 and LCB-1206 Surface Mount Ferrites
Tested By: Kyle Fujimoto

Pol	Freq	Rdng	Cable loss	Ant factor	Amp gain	Cor'd rdg = R	Limit = L	Delta R-L
	MHz	dBuV	dB	dB	dB	dBuV	dBuV/m	dB
1V	147.529	60.80	2.78	12.20	32.22	43.56	43.50	0.06
2V	147.529Qp	60.21	2.78	12.20	32.22	42.97	43.50	-0.53
3V	172.152	49.40	2.89	15.09	32.38	35.00	43.50	-8.50
4V	110.668	55.00	2.44	12.27	32.35	37.36	43.50	-6.14
5V	135.244	53.60	2.69	12.74	32.31	36.72	43.50	-6.78
6V	122.956	54.20	2.58	13.26	32.39	37.64	43.50	-5.86
7V	159.820	50.20	2.84	12.79	32.28	33.55	43.50	-9.95
8V	184.396	47.10	2.98	15.86	32.40	33.54	43.50	-9.96
9V	196.706	46.90	3.08	16.29	32.40	33.86	43.50	-9.64
10V	208.973	46.20	3.17	16.10	32.44	33.04	43.50	-10.46
11V	276.557	45.80	3.52	18.60	32.11	35.80	46.40	-10.60
12V	196.715	46.90	3.08	16.29	32.40	33.87	43.50	-9.63
13H	331.875	45.00	4.00	13.43	32.23	30.19	46.40	-16.21
14H	442.467	38.90	4.51	15.76	32.03	27.14	46.40	-19.26
15H	516.195	21.90	5.23	17.66	31.93	12.86	46.40	-33.54
16H	516.195	21.80	5.23	17.66	31.93	12.76	46.40	-33.64