

*FCC PART 15, SUBPART B and C
TEST REPORT**for***RFID READER****MODEL: AVID 1034I**

Prepared for

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NORCO, CALIFORNIA 92860

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DATE: DECEMBER 20, 2008

	REPORT BODY	APPENDICES					TOTAL
		A	B	C	D	E	
PAGES	13	2	2	2	11	4	34

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TABLE OF CONTENTS

Section / Title	PAGE
GENERAL REPORT SUMMARY	4
SUMMARY OF TEST RESULTS	4
1. PURPOSE	5
2. ADMINISTRATIVE DATA	6
2.1 Location of Testing	6
2.2 Traceability Statement	6
2.3 Cognizant Personnel	6
2.4 Date Test Sample was Received	6
2.5 Disposition of the Test Sample	6
2.6 Abbreviations and Acronyms	6
3. APPLICABLE DOCUMENTS	7
4. DESCRIPTION OF TEST CONFIGURATION	8
4.1 Description of Test Configuration - EMI	8
4.1.1 Cable Construction and Termination	8
5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT	9
5.1 EUT and Accessory List	9
5.2 EMI Test Equipment	10
6. TEST SITE DESCRIPTION	11
6.1 Test Facility Description	11
6.2 EUT Mounting, Bonding and Grounding	11
7. TEST PROCEDURES	12
7.1 RF Emissions	12
7.1.1 Radiated Emissions (Spurious, Fundamental, and Harmonics) Test	12
8. CONCLUSIONS	13

LIST OF APPENDICES

APPENDIX	TITLE
A	Laboratory Recognitions
B	Modifications to the EUT
C	Additional Models Covered Under This Report
D	Diagrams, Charts, and Photos <ul style="list-style-type: none">• Test Setup Diagrams• Radiated Emissions Photos• Antenna and Effective Gain Factors
E	Data Sheets

LIST OF FIGURES

FIGURE	TITLE
1	Plot Map And Layout of 3 Meter Radiated Test Site
2	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: **RFID Reader**
 Model: Avid1034I
 S/N: N/A

Product Description: See Expository Statement.

Modifications: The EUT was not modified in order to meet the specifications.

Manufacturer: **AVID Identification Systems, Inc.**
 3185 Hamner Avenue
 Norco, California 92860

Test Dates: November 7, 2008

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**

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	This test was not performed, as the EUT is a battery-operated device that does not connect to the AC public mains.
2	Radiated RF Emissions, 9 kHz - 1000 MHz	Complies with the Class B limits of CFR Title 47, Part 15, Subpart B; and Subpart C Sections 15.205 and 15.209 . <small>Highest Reading in Relation to Spec Limit: 44.78 dBμV @ 257.727 MHz (*U_c = 1.78 dB)</small>

1. PURPOSE

This document is a qualification test report based on the Electromagnetic Interference (EMI) tests performed on the RFID Reader, Model: Avid 1034I. The EMI measurements were performed according to the measurement procedure described in ANSI C63.4. 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 B** 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.

Kyle Fujimoto
Michael Christensen

2.4 Date Test Sample was Received

The test sample was received prior to the initial test date of November 07, 2008.

2.5 Disposition of the Test Sample

The test sample has not been returned to Avid ID Systems, Inc. as of the date of this report.

2.6 Abbreviations and Acronyms

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

FCC	Federal Communications Commission
RF	Radio Frequency
EMI	Electromagnetic Interference
EUT	Equipment Under Test
S/N	Serial Number
ITE	Information Technology Equipment
CML	Corrected Meter Limit
LISN	Line Impedance Stabilization Network
NVLAP	National Voluntary Laboratory Accreditation Program
CFR	Code of Federal Regulations
N/A	Not Applicable
PC	Personal Computer
Co.	Company
Inc.	Incorporated
Tx	Transmit or Transmitter
LLC	Limited Liability Company
DoC	Declaration of Conformity
HP	Hewlett Packard
ID	Identification

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 Standard 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 RFID Reader, Model: Avid 1034I (EUT) is a battery-operated only device and is a stand-alone unit. The EUT contained a PCB (internally) mounted coiled antenna. The EUT was placed on the center of the non-conductive tests table during radiated emissions tests. The EUT was tested in three orthogonal axis. During the tests, the EUT was set to continuously transmit.

Note: Since the unit is a battery-operated only device, no conducted emissions tests were performed.

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.

4.1.1 Cable Construction and Termination

The EUT contained no cables.

5. LISTS OF EUT, ACCESSORIES AND TEST EQUIPMENT**5.1 EUT and Accessory List**

EQUIPMENT	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	FCC ID
RFID READER (EUT)	AVID ID SYSTEMS, INC.	AVID1034I	N/A	IOL-134-AV1034I



5.2 EMI Test Equipment

EQUIPMENT TYPE	MANUFACTURER	MODEL NUMBER	SERIAL NUMBER	CALIBRATION DATE	CALIBRATION DUE DATE
GENERAL TEST EQUIPMENT USED FOR ALL RF EMISSIONS TESTS					
Computer	Hewlett Packard	4530	US91912319	N/A	N/A
Spectrum Analyzer – Main Section	Hewlett Packard	8566B	3638A08768	August 22, 2008	August 22, 2009
Spectrum Analyzer – Display Section	Hewlett Packard	85662A	3701A22262	August 22, 2008	August 22, 2009
Quasi-Peak Adapter	Hewlett Packard	85650A	2811A01363	August 22, 2008	August 22, 2009
Monitor	Hewlett Packard	D5258A	TW74500641	N/A	N/A
RF RADIATED EMISSIONS TEST EQUIPMENT					
Preamplifier	Com Power	PA-102	1017	January 11, 2008	Jan. 11, 2009
Biconical Antenna	Com Power	AB-900	15226	February 28, 2008	Feb. 28, 2009
Log Periodic Antenna	Com Power	AL-100	16060	June 27, 2008	June 27, 2009
Loop Antenna	Com Power	AL-130	17089	September 29, 2008	Sept. 29, 2009
Antenna Mast	Com Power	AM-100	N/A	N/A	N/A

6. TEST SITE DESCRIPTION

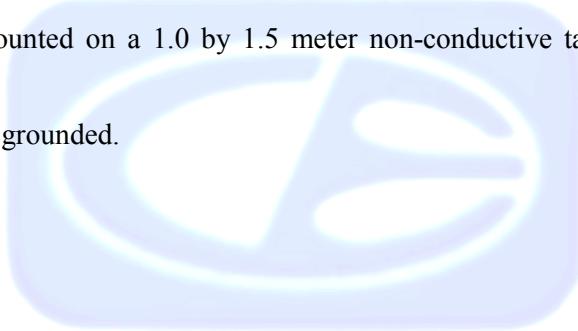
6.1 Test Facility Description

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 (Spurious, Fundamental, 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. 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 3 meter test distance to obtain the final test data for the spurious emissions. The EUT was tested at a 10 meter test distance to obtain the final test data for the fundamental and the harmonic emissions. The final qualification data sheets are located in Appendix E.

8. CONCLUSIONS

The RFID Reader, Model: Avid 1034I (EUT), as tested, meets all of the **Class B** 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

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 B 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.

No modifications were made to the EUT during testing.



APPENDIX C

***ADDITIONAL MODELS COVERED
UNDER THIS REPORT***

ADDITIONAL MODELS COVERED UNDER THIS REPORT

USED FOR THE PRIMARY TEST

RFID Reader
Model: Avid 1034I
S/N: N/A

There were no additional models covered under this report.

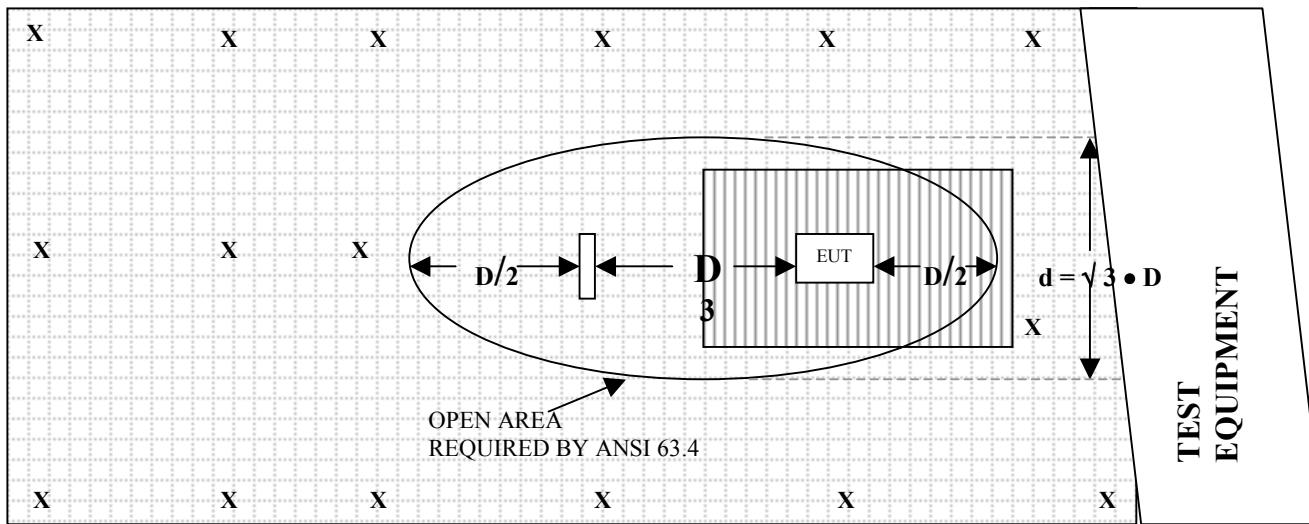


APPENDIX D

DIAGRAMS, CHARTS, AND PHOTOS

***FIGURE 1: PLOT MAP AND LAYOUT OF
3 METER RADIATED SITE***

OPEN LAND > 15 METERS

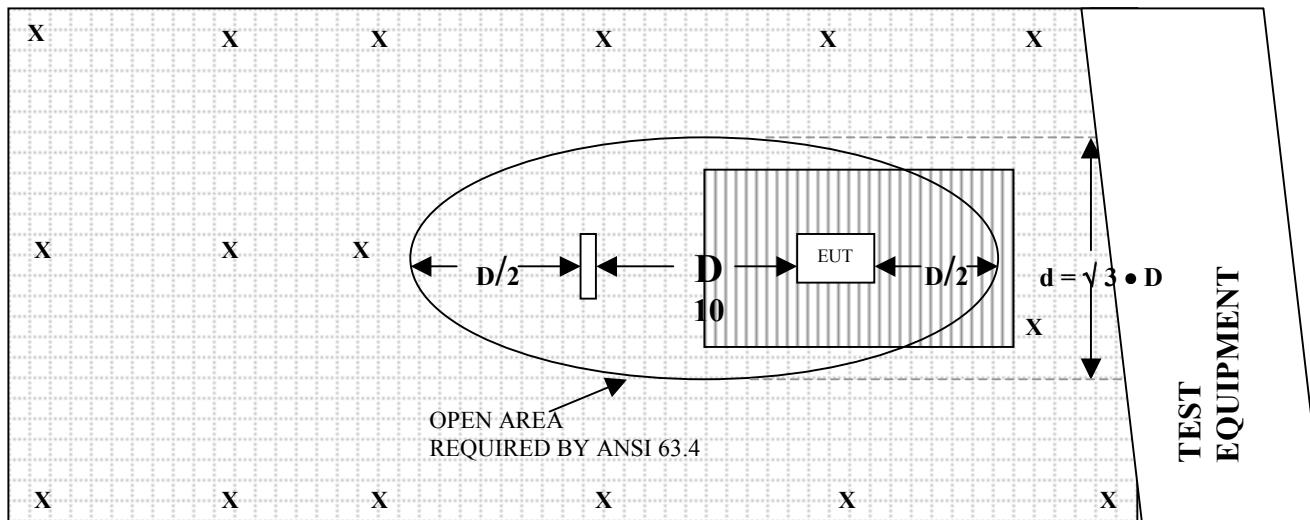


OPEN LAND > 15 METERS

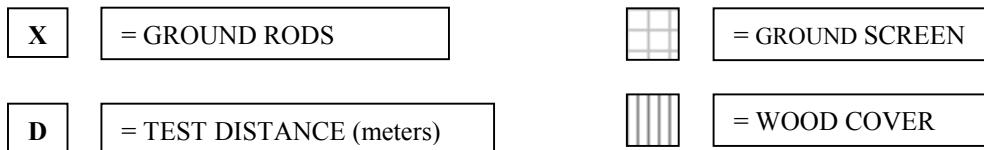
 = GROUND RODS	 = GROUND SCREEN
D = TEST DISTANCE (meters)	 = WOOD COVER

**FIGURE 2: PLOT MAP AND LAYOUT OF
10 METER RADIATED SITE**

OPEN LAND > 15 METERS



OPEN LAND > 15 METERS



COM-POWER AB-900**BICONICAL ANTENNA****S/N: 15226****CALIBRATION DATE: FEBRUARY 28, 2008**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	12.1	100	10.7
35	12.2	120	13.6
40	11.7	140	12.1
45	9.9	160	12.2
50	11.3	180	15.2
60	9.4	200	16.5
70	7.6	250	16.5
80	6.0	275	18.1
90	6.8	300	21.5

COM-POWER AL-100

LOG PERIODIC ANTENNA

S/N: 16060

CALIBRATION DATE: JUNE 27, 2008

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
300	12.7	700	21.2
400	15.3	800	21.7
500	17.4	900	21.8
600	19.0	1000	22.8

COM-POWER PA-102**PREAMPLIFIER****S/N: 1017****CALIBRATION DATE: JANUARY 11, 2008**

FREQUENCY (MHz)	FACTOR (dB)	FREQUENCY (MHz)	FACTOR (dB)
30	38.2	300	38.0
40	38.0	350	38.3
50	38.3	400	38.0
60	38.6	450	37.5
70	38.4	500	37.9
80	38.4	550	37.9
90	38.3	600	37.8
100	38.1	650	37.5
125	38.5	700	38.0
150	38.2	750	37.7
175	38.1	800	37.1
200	38.4	850	37.1
225	38.2	900	37.1
250	38.2	950	37.0
275	38.0	1000	36.5

COM-POWER AL-130**LOOP ANTENNA****S/N: 17089****CALIBRATION DATE: SEPTEMBER 29, 2008**

FREQUENCY (MHz)	MAGNETIC (dB/m)	ELECTRIC (dB/m)
0.009	-41.57	9.93
0.01	-42.06	9.44
0.02	-42.43	9.07
0.05	-42.50	9.00
0.07	-42.10	9.40
0.1	-42.03	9.47
0.2	-44.50	7.00
0.3	-41.93	9.57
0.5	-41.90	9.60
0.7	-41.73	9.77
1	-41.23	10.27
2	-40.90	10.60
3	-41.20	10.30
4	-41.30	10.20
5	-40.70	10.80
10	-41.10	10.40
15	-42.17	9.33
20	-42.00	9.50
25	-42.20	9.30
30	-43.10	8.40



FRONT VIEW

AVID IDENTIFICATION SYSTEMS, INC.
RFID READER
MODEL: AVID 1034I
FCC SUBPART C – RADIATED EMISSIONS – 11-07-08

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

AVID IDENTIFICATION SYSTEMS, INC.
RFID READER
MODEL: AVID 1034I
FCC SUBPART C – RADIATED EMISSIONS – 11-07-08

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



FRONT VIEW

AVID IDENTIFICATION SYSTEMS, INC.
RFID READER
MODEL: AVID 1034I
FCC SUBPART B – RADIATED EMISSIONS – 11-07-08

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**



REAR VIEW

AVID IDENTIFICATION SYSTEMS, INC.
RFID READER
MODEL: AVID 1034I
FCC SUBPART B – RADIATED EMISSIONS – 11-07-08

**PHOTOGRAPH SHOWING THE EUT CONFIGURATION
FOR MAXIMUM EMISSIONS**

APPENDIX E

DATA SHEETS

FCC 15.209

Avid ID Systems, Inc.
RFID Reader
Model: Avid 1034I

Date: 11/07/08
Lab: D
Tested By: Kyle Fujimoto

Transmit Mode

Test Distance: 10 Meters

FCC Spec Limit per FCC 15.209: 25.04 dBuV/m at 300 Meters

Corrected Spec Limit at 10 Meters = 40 Log (spec test dist./actual test dist.) + spec limit

$$\text{Spec Limit at 10 Meters} = [40 \log (300/10)] + 25.04 = 84.12$$



Test Location : Compatible Electronics **Page** : 1/2
Customer : Avid ID Systems, Inc. **Date** : 11/07/2008
Manufacturer : Avid ID Systems, Inc. **Time** : 9:02:42
Eut name : RFID Reader **Lab** : D
Model : Avid 1034I **Test Distance** : 3.0 Meters
Serial # : N/A
Specification : FCC Class B
Distance correction factor (20 * log(test/spec)) : 0.00
Test Mode : Radiated Emissions 10 kHz to 1 GHz
 Vertical and Horizontal Polarization
 Digital Portion and Non-Harmonic Emissions from the Tx
 Tested By: Kyle Fujimoto

Pol	Freq MHz	Rdng dBuV	Cable loss dB	Ant factor dB	Amp gain dB	Cor'd rdg = R dBuV	Limit = L dBuV/m	Delta R-L dB
1H	51.584	42.70	0.70	10.97	38.35	16.02	40.00	-23.98
2V	51.610	52.30	0.70	10.97	38.35	25.62	40.00	-14.38
3H	116.001	47.40	1.07	13.06	38.37	23.16	43.50	-20.34
4H	128.893	51.30	1.13	12.90	38.45	26.89	43.50	-16.61
5V	128.902	48.40	1.13	12.90	38.45	23.99	43.50	-19.51
6H	141.776	56.90	1.24	12.11	38.29	31.95	43.50	-11.55
7V	141.785	43.80	1.24	12.11	38.29	18.86	43.50	-24.64
8V	154.668	51.60	1.32	12.17	38.18	26.91	43.50	-16.59
9H	167.542	62.60	1.37	13.37	38.13	39.22	43.50	-4.28
10V	167.544	47.60	1.37	13.37	38.13	24.22	43.50	-19.28
11H	180.425	57.10	1.42	15.23	38.17	35.58	43.50	-7.92
12V	180.434	44.60	1.42	15.23	38.17	23.08	43.50	-20.42
13H	193.308	60.60	1.47	16.08	38.32	39.83	43.50	-3.67
14V	206.183	49.10	1.55	16.50	38.35	28.80	43.50	-14.70
15H	206.192	62.80	1.55	16.50	38.35	42.50	43.50	-1.00
16H	206.192Qp	62.22	1.55	16.50	38.35	41.92	43.50	-1.58
17V	219.066	48.10	1.65	16.50	38.25	28.01	46.00	-17.99
18H	219.075	63.20	1.65	16.50	38.25	43.11	46.00	-2.89
19H	219.075Qp	63.08	1.65	16.50	38.25	42.99	46.00	-3.01
20V	231.949	43.80	1.70	16.50	38.20	23.80	46.00	-22.20
21H	231.958	58.80	1.70	16.50	38.20	38.80	46.00	-7.20
22V	244.832	44.80	1.70	16.50	38.20	24.80	46.00	-21.20
23H	244.841	59.70	1.70	16.50	38.20	39.70	46.00	-6.30
24V	257.715	54.20	1.73	17.01	38.20	34.74	46.00	-11.26
25H	257.727	65.10	1.73	17.01	38.20	45.64	46.00	-0.36
26H	257.727Qp	64.24	1.73	17.01	38.20	44.78	46.00	-1.22
27V	270.599	43.80	1.78	17.83	38.20	25.21	46.00	-20.79
28H	270.610	57.00	1.78	17.83	38.20	38.41	46.00	-7.59
29V	283.482	44.20	1.83	19.29	38.13	27.19	46.00	-18.81
30H	283.493	56.40	1.83	19.29	38.13	39.39	46.00	-6.61
31H	296.370	43.30	1.89	21.03	38.03	28.18	46.00	-17.82
32H	309.261	60.70	1.96	12.97	38.06	37.57	46.00	-8.43
33H	322.144	48.80	2.04	13.34	38.14	26.04	46.00	-19.96
34H	360.794	49.50	2.25	14.37	38.23	27.88	46.00	-18.12
35V	360.798	38.20	2.25	14.37	38.23	16.58	46.00	-29.42



Test Location : Compatible Electronics **Page** : 2/2
Customer : Avid ID Systems, Inc. **Date** : 11/07/2008
Manufacturer : Avid ID Systems, Inc. **Time** : 9:02:42
Eut name : RFID Reader **Lab** : D
Model : Avid 1034I **Test Distance** : 3.0 Meters
Serial # : N/A
Specification : FCC Class B
Distance correction factor (20 * log(test/spec)) : 0.00
Test Mode : Radiated Emissions 10 kHz to 1 GHz
Vertical and Horizontal Polarization
Transmit Mode
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
36H	373.677	42.00	2.30	14.68	38.15	20.83	46.00	-25.17
37H	386.560	39.10	2.35	14.99	38.08	18.36	46.00	-27.64
38H	399.443	44.60	2.40	15.29	38.00	24.28	46.00	-21.72
39H	412.330	55.30	2.43	15.59	37.87	35.44	46.00	-10.56
40H	425.214	45.80	2.45	15.88	37.74	26.39	46.00	-19.61
41H	438.097	42.70	2.48	16.16	37.61	23.72	46.00	-22.28
42V	463.863	40.70	2.56	16.69	37.62	22.34	46.00	-23.66
43H	476.746	37.30	2.61	16.95	37.72	19.14	46.00	-26.86
44H	515.396	51.00	2.76	17.67	37.90	33.53	46.00	-12.47
45V	515.396	44.60	2.76	17.67	37.90	27.13	46.00	-18.87
46H	528.279	47.30	2.82	17.88	37.90	30.10	46.00	-15.90
47H	541.162	47.50	2.87	18.09	37.90	30.56	46.00	-15.44
48H	554.046	44.00	2.91	18.30	37.89	27.32	46.00	-18.68
49H	566.929	47.00	2.93	18.50	37.87	30.57	46.00	-15.43