



ELECTROMAGNETIC INTERFERENCE TEST REPORT

Report Number: 2825-1

Report Date: 2/18/09

Applicable Specification:

47 CFR Part 15, Subpart C, Section 15.225

Certification of a Class B RFID Card Reader

FCC ID: MBPSDI010MOD02

Equipment under Test: ***RFID Card Reader***
Model Number: ***SDI010 MOD***
Serial Number: ***001***

Prepared for: ***SCM Microsystems***
41470 Christy Avenue
Fremont, CA 94538

Tested by: ***Bob Cole***

Prepared by: ***Bob Cole***
EMCE Engineering, Inc.
44366 S. Grimmer Blvd.
Fremont, CA 94538
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Fax: 510-490-3441

Note:

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Disclaimer

EMCE Engineering, Inc., assumes no responsibility for the continuing validity of test data when the Equipment under Test is not under the continuous physical control of EMCE. The signature below attests to the fact that all measurements reported herein were performed by myself or were made under my supervision, and are correct to the best of my knowledge and belief as of the date specified. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Tests were conducted by qualified EMCE Engineering, Inc. personnel utilizing test equipment maintained in a “current” state of calibration with traceability to NIST.

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- *This report or certificate shall not be reproduced except in full without the written approval of the issuer.*

1.0 SCOPE

This test report describes the equipment setup, test methods employed and results obtained during electromagnetic interference (EMI) testing of a Class B RFID Card Reader as defined in Part 15, Subpart A, paragraph 15.3 (o). The tests described herein measured the RF radiated (RFI Field Strength) emissions of the equipment under test (EUT) as installed in a typical “Host” environment. The tests conformed to the measurement and test site requirements of ANSI C63.4-2003.

1.1 Objective

The tests described herein were performed to establish that the EUT is capable of compliance with the requirements of Part 15, Subpart B, Section 15.225 for Intentional Radiators (a Class B RFID Card Reader).

1.2 Description of EUT

*The EUT is a **RFID Card Reader Model Number: SDI010 MOD Serial Number: 001**, manufactured by SCM Microsystems. The EUT contained the following options: No Options.*

1.3 Results/Modifications

The EUT passed FCC Class B conducted and radiated emissions tests. No modification was necessary. The manufacturer may declare the EUT as complying with the FCC requirements.

1.4 Test Limits

In accordance with paragraph CFR 47, 15.207 and 15.209. emissions.

2.0 APPLICABLE DOCUMENTS

2.1 FCC Documents

Document

Title

Title 47 CFR

TELECOMMUNICATION

Part 2

*Frequency Allocations and Radio Treaty Matters;
General Rules and Regulations.*

Part 15

Radio Frequency Devices.

2.2 Other Documents

ANSI C63.4-2003

*American National Standards for Methods of
Measurement of Radio-Noise Emissions From
Low-Voltage Electrical and Electronic Equipment
In the Range of 9kHz to 40GHz.*

CISPR 22: 2006

*Information technology equipment – Radio disturbance
characteristics – Limits and methods of measurement.
By the International Electrotechnical Commission
(IEC).*

3.0 GENERAL SETUP AND TEST CONDITIONS

3.1 Test Facility

The tests described herein were performed at:

*EMCE Engineering, Inc.
44366 S. Grimmer Blvd.
Fremont, CA 94538*

This laboratory has one semi-anechoic chamber, one electromagnetic shielded enclosure and a 3-meter and 10-meter Open Area Test Site (OATS). A computer controlled spectrum analyzer with quasi-peak adapter, and printer were used for gathering and recording test data. Figure 1 shows the test site layout for conducted and radiated measurements.

3.2 Description of Open Area Test Site (OATS)

The 3 and 10 meter site is located out-of-doors in an open field whose size is 212 feet long by 206 feet wide. The dimensions of the test area are 66 feet wide by 59 feet long (20m x 18m). The description of the 3 and 10-meter site is on file with the FCC according to the requirements of Part 2.948.

3.3 Site Attenuation

The site attenuation for radiated measurements has been determined for this test site using the method described in ANSI C63.4 Paragraph 5.4.6 and sub paragraphs. The site attenuation is measured annually. Site attenuation was last measured and reported to the FCC 12/15/06.

3.4 Ground Plane (Ground Screen)

The site has a 3900 square foot (20m x 18m) floor area of poured reinforced concrete, 6 to 8 inches thick. A 20m x 18m (66ft x 59ft) solid 24 gauge galvanized sheet steel ground plane is centered on the test area with its long dimension along the major axis of the test site. The antenna mast and turntable are located 3 meters apart on the centerline of the major axis so that each is greater than 3 meters from the edges of the

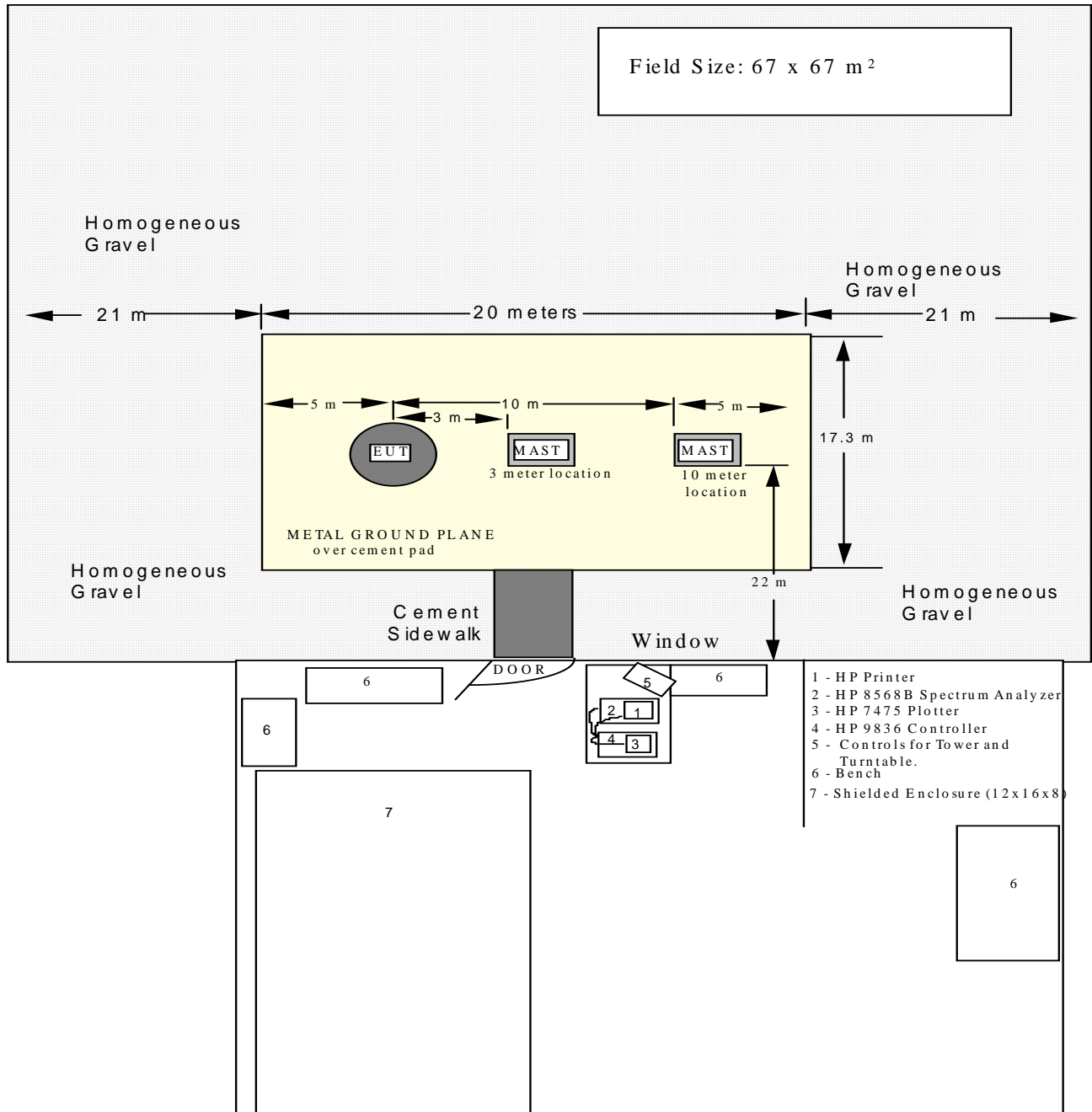


FIGURE 1. TEST SITE LAYOUT.

ground plane. The ground plane is connected to a nine-foot long earth ground rod at each corner of the ground plane.

3.5 Input Power for EUT

Electricity for the EUT is provided through buried power lines in metallic conduit with an outlet box placed near the EUT. Power for the EUT is taken from the outlet box of either of two “shielded enclosure” quality power line filters located on the ground plane near the EUT. The filters are electrically bonded to the ground plane.

3.6 Accessory Equipment Precautions

Care was taken that accessory equipment or adjacent equipment did not produce unacceptable interference so as to contaminate the final test data. The EMI receiver and its associated computer, printer and plotter were located greater than 15 meters away from the EUT during testing and were powered from a separately filtered power source.

3.7 Ambient Interference

Ambient interference from radio and television stations, vehicles, mobile radio, etc. was present at the open test site during testing. Care was taken to assure that ambient interference did not overload the measurement receiver or mask emissions from the EUT. The method of measurement used to deal with ambient noise during radiated emission testing is described in Paragraph 5.2.1.

3.8 Personnel

All testing was performed by EMCE Engineering personnel who are properly trained for the instruments and procedures used. The test data sheets have been signed-off by the attending EMCE Test Engineer.

3.9 Use of Interference Measurement Equipment

All of the emission measurements and field strength measurements were performed with a Hewlett-Packard 8566B Spectrum Analyzer System. The Spectrum Analyzer System utilizes the following basic instruments:

- 1. Toshiba Satellite Laptop Computer*
- 2. EMITest measurement software*
- 2. HP-85650A Quasi Peak Adapter*

Test results are recorded on tabular data sheets and show final corrected values compared to the specification limit. Sample calculations show how the antenna factors, cable losses, amplifier gain, etc. are combined in the automatic analyzer program to produce the final corrected values shown on the graphs and data sheets.

3.10 Calibration of Measuring Equipment

The EMI Receiver (spectrum analyzer) is calibrated by an outside calibration laboratory on a 12-month basis. The laboratory provides certification with traceability to NIST. Antenna factors are measured at 1-year interval by an ISO 17025 Accredited Antenna Calibration Facility. Cable losses as well as amplifier gains are swept at least every month to verify accurate values.

4.0 PREPARATION OF EUT FOR TEST

4.1 Identification of EUT

Equipment under Test: **RFID Card Reader**
Model Number: **SDI010 MOD**
Serial Number: **001**

4.2 Setup of EUT

Power to EUT: **120 VAC Line Voltage**
Grounding of EUT: **USB Cable**
Special Software: **None**

- Orientation of EUT: Per CFR 47, 15.31 and ANSI 63.4-2003, for all measurements the EUT was evaluated in the X, Y, and Z orthogonal axes.
- Loop Antenna was manipulated to find the worst case emission. Positions include, but not limited to parallel and perpendicular to the EUT, and parallel to the ground

4.3 Interfaces & Cabling

The following cables were connected during test:

<i>Interface</i>	<i>Source Port</i>	<i>Load Port</i>	<i>Length Cable</i>	<i>Cable Type</i>	<i>Connector Material</i>
USB	USB	EUT	0.5M	Unshielded	Plastic

4.4 Peripherals

The following peripherals were attached and operating during the tests:

<u>Nomenclature</u>	<u>Mfr & Model</u>
Laptop PC	HP dv4000

5.0 TEST PROCEDURES

5.1 Conducted Emissions, Power Leads, 150 kHz to 30 MHz

Conducted emissions were measured from 150kHz to 30MHz on the power and return leads of the EUT according to the methods defined in ANSI C63.4, Section 7.0 and the limits found in CFR 47, 15.107. The EUT was placed on a nonmetallic stand in a shielded room 0.8 meters above the ground plane and removed from the vertical ground plane by 40-cm as shown in Appendix D, Photographs of Test Setup. The interface cables and equipment positioning were varied within limits of reasonable application per Figure 9A of ANSI C63.4 to determine the position producing maximum conducted emissions.

The LISN and high pass filter were connected through 20 feet of RG-214 coaxial cable to the spectrum analyzer input. The switch on the LISN was set to the Supply Line position and the power was applied. The EUT was operated as described in Paragraph 4.0 in a mode, which was intended to produce maximum emissions for normal operation.

The switch in the LISN was then set to the Return Line position and the interference scan was repeated and an additional set of data sheets and plot charts were prepared for the return lead.

5.1.1 Test Results

PASS (See Appendix B)

5.1.2 Test Instrumentation

See Appendix I – 1,2,3,4,10

5.1.3 Recommendations

Due to the fact that there were no test failures, there are no recommendations.

5.2 Radiated Emissions Test, 30 MHz to 1000 MHz

Radiated emissions were measured from 30 MHz to 1000 MHz. The measurement bandwidth was 120 kHz according to the methods defined in ANSI C63.4 Section 8.0. The EUT was placed on a nonmetallic stand in the open-field site, 0.8 meters above the ground plane.

The EUT was operated as described in Paragraph 4.0, in a mode, which was intended to produce maximum emissions. Preliminary scans of the frequency range were used to determine the cable configurations and equipment positions which produce maximum emissions. These configurations were then kept intact while both angle of rotation of the EUT with respect to the antenna and antenna height were scanned for maximum readings.

5.2.3 Test Results

The EUT passed both vertical and horizontal radiated emissions tests.

5.2.4 Test Instrumentation

See Appendix I – 1-10

5.2.5 Recommendations

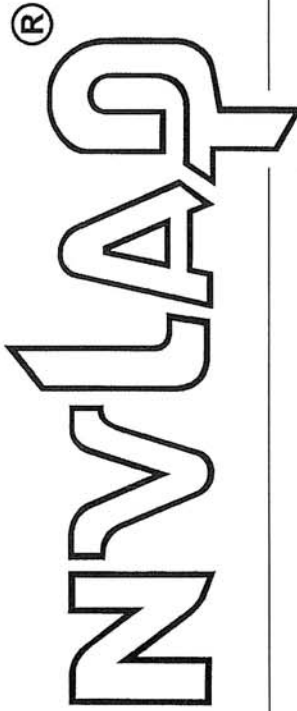
Because there were no test failures, there are no recommendations.

APPENDIX A

Certifications

EMCE NVLAP Accreditation

United States Department of Commerce
National Institute of Standards and Technology



Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200092-0

Universal Compliance Labs dba EMCE Engineering
Fremont, CA

is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated 18 June 2005).

2009-01-01 through 2009-12-31

Effective dates



Dolly S. Bruce
For the National Institute of Standards and Technology



**National Voluntary
Laboratory Accreditation Program**



SCOPE OF ACCREDITATION TO ISO/IEC 17025:2005

Universal Compliance Labs dba EMCE Engineering

44366 South Grimmer Boulevard

Fremont, CA 94538-6385

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URL: http://www.universalcompliance.com

**ELECTROMAGNETIC COMPATIBILITY
AND TELECOMMUNICATIONS**

NVLAP LAB CODE 200092-0

Scope Revised: 2009-02-24

NVLAP Code Designation / Description

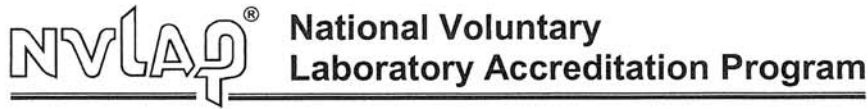
Emissions Test Methods:

12/CIS22	IEC/CISPR 22 (1997) & EN 55022 (1998) + A1(2000): Limits and methods of measurement of radio disturbance characteristics of information technology equipment
12/CIS22a	IEC/CISPR 22 (1993) and EN 55022 (1994): Limits and methods of measurement of radio disturbance characteristics of information technology equipment, Amendment 1 (1995) and Amendment 2 (1996)
12/CIS22b	CNS 13438 (1997): Limits and Methods of Measurement of Radio Interference Characteristics of Information Technology Equipment
12/FCC15b1	ANSI C63.4 (2003) with FCC Method 47 CFR Part 15, Subpart B: Unintentional Radiators
12/T51a	AS/NZS CISPR 22 (2004): Information technology equipment - Radio disturbance characteristics - Limits and methods of measurement
12/VCCId	Agreement of VCCI V-3 (2008.04): Agreement of Voluntary Control Council for Interference by Information Technology Equipment - Technical Requirements: V-3/2008.04

2009-01-01 through 2009-12-31

Effective dates

For the National Institute of Standards and Technology



**ELECTROMAGNETIC COMPATIBILITY
AND TELECOMMUNICATIONS**

NVLAP LAB CODE 200092-0

<i>NVLAP Code</i>	<i>Designation / Description</i>
12/I04	IEC 61000-4-5, Ed. 1.1 (2001-04); EN 61000-4-5: Electromagnetic compatibility (EMC) - Part 4-5: Testing and measurement techniques - Surge immunity test
12/I05	IEC 61000-4-6, Ed. 2.0 (2003-05); EN 61000-4-6: Electromagnetic compatibility (EMC) - Part 4-6: Testing and measurement techniques - Immunity to conducted disturbances, induced by radio-frequency fields
12/I06	IEC 61000-4-8, Ed. 1.1 (2001); EN 61000-4-8: Electromagnetic compatibility (EMC) - Part 4-8: Testing and measurement techniques - Power frequency magnetic field immunity test
12/I07	IEC 61000-4-11, Ed. 1.1 (2001-03); EN 61000-4-11: Voltage Dips, Short Interruptions and Voltage Variations Immunity Tests

2009-01-01 through 2009-12-31

Effective dates

A handwritten signature in cursive script, reading "Sally S. Bruce".

For the National Institute of Standards and Technology

APPENDIX B

Test Data Sheets

Conducted Emissions
Radiated Emissions

LINE CONDUCTED EMISSIONS TEST

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer: **SCM Micro**
 Specification: **EN55022 B COND [AVE]**
 Work Order #: **2825**
 Test Type: **Conducted Emissions**
 Equipment: **Contactless Card Reader**
 Manufacturer: **SCM Micro**
 Model: **SDI010 MOD**
 S/N:

Date: 2/14/2009
 Time: 2:01:31 PM
 Sequence#: 7
 Tested By: Bob Cole
 120V 60Hz

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B Spectrum Analyzer	2856A93846	08/20/2008	08/20/2009	004
HP 85650A Quasi Peak Adapter	3145A01673	08/20/2008	02/20/2009	003
HP 85685A RF Preselector	35076A01550	08/20/2008	08/20/2009	002
HP Transient Limiter	3107A02941	10/01/2008	10/01/2009	006
EMCO 3810-2 LISN	4576	10/01/2008	10/01/2009	007

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Contactless Card Reader*	SCM Micro	SDI010 MOD	

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop PC	HP	dv4000	

Test Conditions / Notes:

--

Transducer Legend:

T1=EMCO 3810-2 LISN S/N 9807-1988	T2=HP 11947A Trans. Limiter TL2
-----------------------------------	---------------------------------

Ext Attn: 0 dB

Measurement Data:

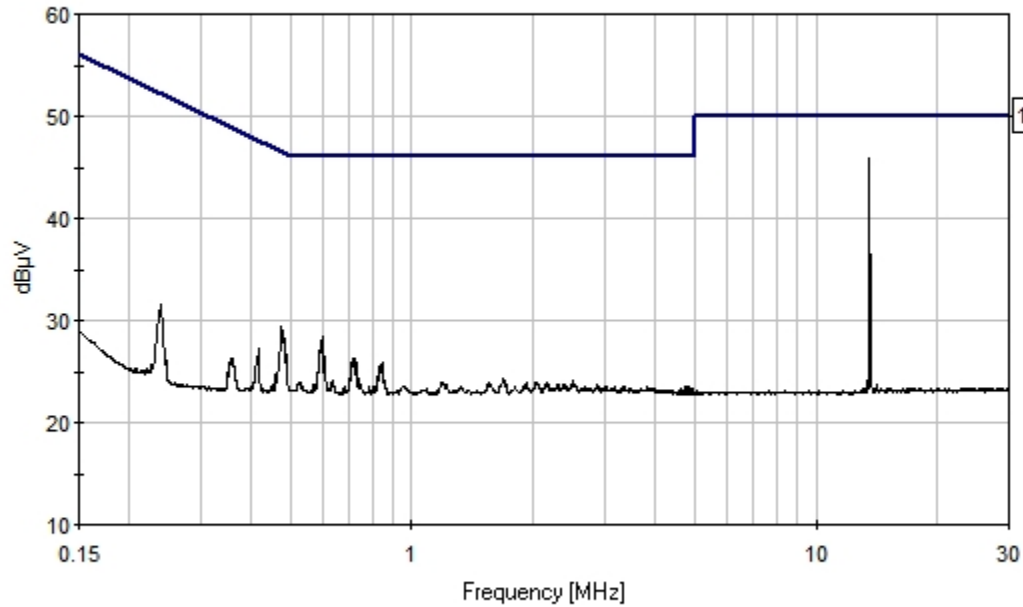
Reading listed by margin.

Test Lead: Line 1

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	dB	dB	Dist Table	Corr dB μ V	Spec dB μ V	Margin dB	Polar Ant
1	13.554M	35.1	+0.7	+10.0			+0.0	45.8	50.0	-4.2	Line 1
2	476.513k	18.7	+0.7	+10.0			+0.0	29.4	46.4	-17.0	Line 1
3	599.410k	17.8	+0.6	+10.0			+0.0	28.4	46.0	-17.6	Line 1
4	718.670k	15.7	+0.6	+10.0			+0.0	26.3	46.0	-19.7	Line 1
5	843.022k	15.3	+0.5	+10.0			+0.0	25.8	46.0	-20.2	Line 1
6	417.610k	16.5	+0.7	+10.0			+0.0	27.2	47.5	-20.3	Line 1

7	239.446k	20.7	+0.8	+10.1	+0.0	31.6	52.1	-20.5	Line 1
8	1.677M	13.8	+0.5	+10.0	+0.0	24.3	46.0	-21.7	Line 1
9	361.615k	15.6	+0.7	+10.0	+0.0	26.3	48.7	-22.4	Line 1

EMCE Engineering Date: 2/14/2009 Time: 2:01:31 PM SCM Micro WO#: 2825
 EN55022 B COND [AVE] Test Lead: Line 1 120V 60Hz Sequence#: 7



— Sweep Data — 1 - EN55022 B COND [AVE]

Test Location: EMCE Engineering •44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer: **SCM Micro**
 Specification: **EN55022 B COND [AVE]**
 Work Order #: **2825**
 Test Type: **Conducted Emissions**
 Equipment: **Contactless Card Reader**
 Manufacturer: **SCM Micro**
 Model: **SDI010 MOD**
 S/N:

Date: 2/14/2009
 Time: 2:04:34 PM
 Sequence#: 8
 Tested By: Bob Cole
 120V 60Hz

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B Spectrum Analyzer	2856A93846	08/20/2008	08/20/2009	004
HP 85650A Quasi Peak Adapter	3145A01673	08/20/2008	02/20/2009	003
HP 85685A RF Preselector	35076A01550	08/20/2008	08/20/2009	002
HP Transient Limiter	3107A02941	10/01/2008	10/01/2009	006
EMCO 3810-2 LISN	4576	10/01/2008	10/01/2009	007

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Contactless Card Reader*	SCM Micro	SDI010 MOD	

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop PC	HP	dv4000	

Test Conditions / Notes:

--

Transducer Legend:

T1=EMCO 3810-2 LISN S/N 9807-1988	T2=HP 11947A Trans. Limiter TL2
-----------------------------------	---------------------------------

Ext Attn: 0 dB

Measurement Data:

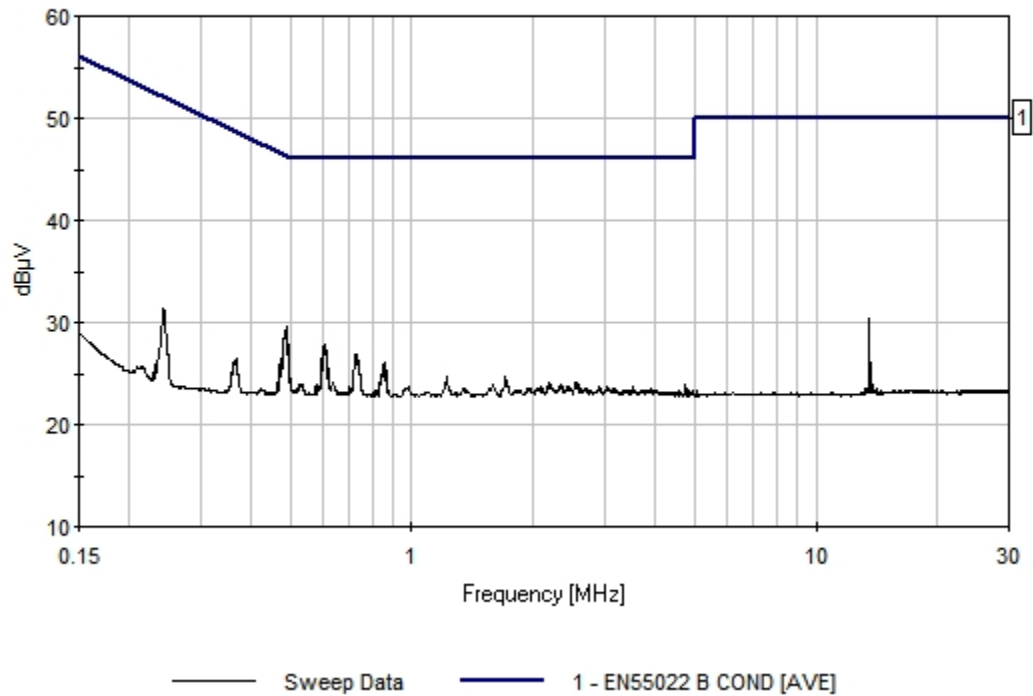
Reading listed by margin.

Test Lead: Line 2

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	489.602k	18.9	+0.7	+10.0			+0.0	29.6	46.2	-16.6	Line 2
2	612.499k	17.3	+0.6	+10.0			+0.0	27.9	46.0	-18.1	Line 2
3	726.670k	16.3	+0.6	+10.0			+0.0	26.9	46.0	-19.1	Line 2
4	13.554M	19.6	+0.7	+10.0			+0.0	30.3	50.0	-19.7	Line 2
5	853.202k	15.6	+0.5	+10.0			+0.0	26.1	46.0	-19.9	Line 2
6	241.627k	20.5	+0.8	+10.1			+0.0	31.4	52.0	-20.6	Line 2
7	1.221M	14.2	+0.5	+10.0			+0.0	24.7	46.0	-21.3	Line 2
8	1.706M	14.2	+0.5	+10.0			+0.0	24.7	46.0	-21.3	Line 2

9	367.433k	15.7	+0.7	+10.0	+0.0	26.4	48.6	-22.2	Line 2
10	150.000k	18.0	+0.9	+10.1	+0.0	29.0	56.0	-27.0	Line 2

EMCE Engineering Date: 2/14/2009 Time: 2:04:34 PM SCM Micro WO#: 2825
EN55022 B COND [AVE] Test Lead: Line 2 120V 60Hz Sequence#: 8



UNINTENTIONAL RADIATED EMISSIONS TEST

Test Location: EMCE Engineering •44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer: **SCM Micro**
 Specification: **EN55022B RADIATED 25-1000**
 Work Order #: **2825** Date: 2/14/2009
 Test Type: **Radiated Scan** Time: 14:26:15
 Equipment: **Contactless Card Reader** Sequence#: 1
 Manufacturer: **SCM Micro** Tested By: **Bob Cole**
 Model: **SDI010 MOD**
 S/N:

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B Spectrum Analyzer	2856A93846	08/20/2008	08/20/2009	004
HP 85650A Quasi Peak Adapter	3145A01673	08/20/2008	02/20/2009	003
HP 85685A RF Preselector	35076A01550	08/20/2008	08/20/2009	002
HP 8447D PreAmp	2443A03587	06/02/2008	06/02/2009	008

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Contactless Card Reader*	SCM Micro	SDI010 MOD	

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop PC	HP	dv4000	

Test Conditions / Notes:

--

Transducer Legend:

T1=25' LMR #001	T2=EMCO 3142 BiConiLog S/N: 9808-1306
T3=8447 Pre-Amp Asset 458	

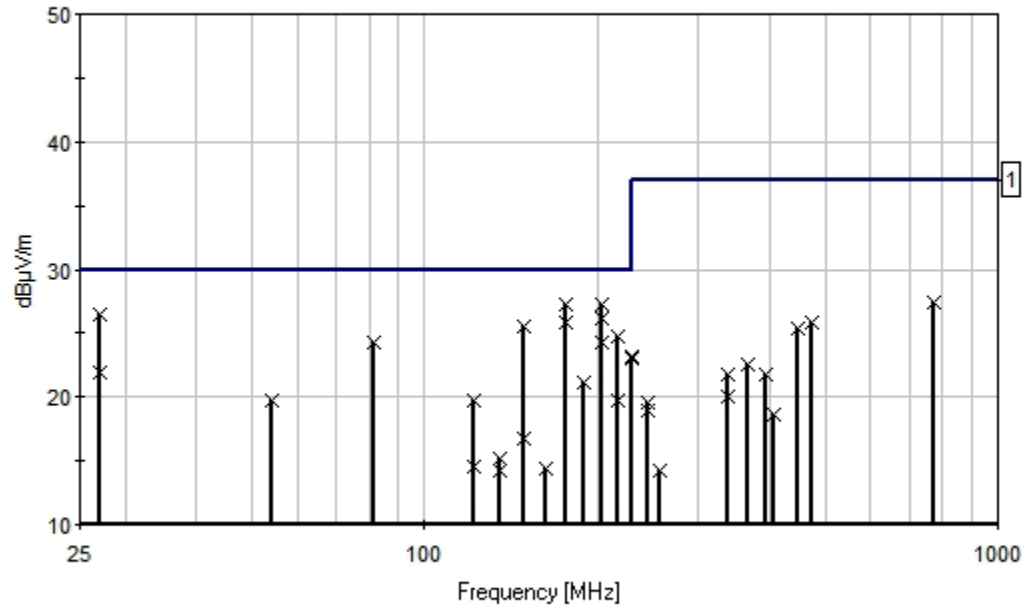
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 10 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	T/T azimuth	Antenna Height (cm)	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	176.288M	44.3	+0.0	+9.7	+26.7	010	150	27.3	30.0	-2.7	Vert
2	203.408M	43.9	+0.0	+10.1	+26.8	000	210	27.2	30.0	-2.8	Vert
3	27.128M	34.1	+0.0	+19.4	+27.1	80	120	26.4	30.0	-3.6	Vert
4	203.398M	42.8	+0.0	+10.1	+26.8	94	110	26.1	30.0	-3.9	Horiz
5	176.278M	42.9	+0.0	+9.7	+26.7	000	190	25.9	30.0	-4.1	Horiz
6	149.168M	43.8	+0.1	+8.3	+26.6	000	140	25.6	30.0	-4.4	Vert

7	216.968M	40.9	+0.0	+10.7	+26.9	220	180	24.7	30.0	-5.3	Vert
8	81.358M	44.2	+0.0	+6.8	+26.8	190	150	24.2	30.0	-5.8	Horiz
10	27.118M	29.6	+0.0	+19.4	+27.1	020	145	21.9	30.0	-8.1	Horiz
11	189.848M	38.2	+0.0	+9.8	+26.8	000	100	21.2	30.0	-8.8	Vert
12	772.928M	31.4	+0.6	+22.5	+27.1	015	185	27.4	37.0	-9.6	Vert
13	54.238M	38.6	+0.0	+7.9	+26.7	345	140	19.8	30.0	-10.2	Horiz
14	122.048M	39.6	+0.1	+6.7	+26.6	90	225	19.8	30.0	-10.2	Vert
15	216.958M	35.9	+0.0	+10.7	+26.9	000	150	19.7	30.0	-10.3	Horiz
16	474.598M	34.3	+0.3	+18.1	+26.8	170	110	25.9	37.0	-11.1	Horiz
17	447.478M	35.3	+0.3	+16.5	+26.8	195	110	25.3	37.0	-11.7	Horiz
18	149.158M	34.9	+0.1	+8.3	+26.6	025	190	16.7	30.0	-13.3	Horiz
19	230.528M	38.7	+0.0	+11.4	+26.9	240	125	23.2	37.0	-13.8	Vert
20	230.518M	38.5	+0.0	+11.4	+26.9	290	110	23.0	37.0	-14.0	Horiz
21	366.118M	33.5	+0.1	+15.8	+26.9	000	100	22.5	37.0	-14.5	Horiz
22	135.608M	34.9	+0.1	+6.8	+26.6	000	150	15.2	30.0	-14.8	Vert
23	338.998M	33.7	+0.0	+15.0	+26.9	320	100	21.8	37.0	-15.2	Horiz
24	393.238M	32.6	+0.1	+15.9	+26.9	350	100	21.7	37.0	-15.3	Horiz
25	122.038M	34.4	+0.1	+6.7	+26.6	000	175	14.6	30.0	-15.4	Horiz
26	162.728M	32.0	+0.0	+9.1	+26.7	50	150	14.4	30.0	-15.6	Vert
27	135.598M	33.9	+0.1	+6.8	+26.6	25	150	14.2	30.0	-15.8	Horiz
28	339.008M	32.0	+0.0	+15.0	+26.9	000	110	20.1	37.0	-16.9	Vert
29	244.078M	34.6	+0.0	+12.0	+27.0	345	130	19.6	37.0	-17.4	Horiz
30	244.088M	33.9	+0.0	+12.0	+27.0	290	120	18.9	37.0	-18.1	Vert
31	406.808M	29.4	+0.1	+16.1	+26.9	025	110	18.7	37.0	-18.3	Vert
32	257.648M	28.7	+0.0	+12.5	+27.0	010	125	14.2	37.0	-22.8	Vert

EMCE Engineering Date: 2/14/2009 Time: 14:26:15 SCM Micro WO#: 2825
EN55022B RADIATED 25-1000 Test Distance: 10 Meters Sequence#: 1



— Readings — 1 - EN55022B RADIATED 25-1000 x Peak Readings

APPENDIX C

Test Data Sheets

Intentional Radiator Results

INTENTIONAL RADIATOR

Maximum allowed field strength in the frequency range of 13.553-13.567 MHz is 15,848 microvolts per meter, or 84 dBuV/M at a test distance of 30 meters. Test distance for this measurement is 1 meter. The calculation for determining the field strength limit at 3 meter is as follows:

$$\begin{aligned}\text{Correction Factor} &= 40 \log (\text{distance } 1 / \text{distance } 2) \\ \text{Correction Factor} &= 40 \log (30/3) \\ \text{Correction Factor} &= 40 \text{ dBuV/M}\end{aligned}$$

Therefore, the limit used for this measurement is 124 dBuV/M

The plot on the following page shows the peak power output of the EUT as being 48.4 dBuV/M. at 13.558 MHz, which is the fundamental transmit frequency for this device.

Test results show compliance to the limits called out in CFR 47, Section 15.225 (a), (b), (c), (d) and (e), as well as RSS-210 6.2.2(e) as follows:

TEST RESULTS

Peak Output Power

Per CFR 47, Section 15.225 and RSS-210 Issue 5, Section 6.2.2(e)

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer: **SCM Micro**
 Specification: **RFID FCC Mask 3 Meter**
 Work Order #: **2825**
 Test Type: **Radiated Scan**
 Equipment: **Contactless Card Reader**
 Manufacturer: **SCM Micro**
 Model: **Zebra**
 S/N:

Date: 2/11/2009
 Time: 3:45:41 PM
 Sequence#: 3
 Tested By: Bob Cole

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B Spectrum Analyzer	2856A93846	08/20/2008	08/20/2009	004
HP 85650A Quasi Peak Adapter	3145A01673	08/20/2008	02/20/2009	003
HP 85685A RF Preselector	35076A01550	08/20/2008	08/20/2009	002

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Contactless Card Reader*	SCM Micro	Zebra	

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop PC	HP	dv4000	

Test Conditions / Notes:

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Transducer Legend:

T1=LP-105 Loop Antenna

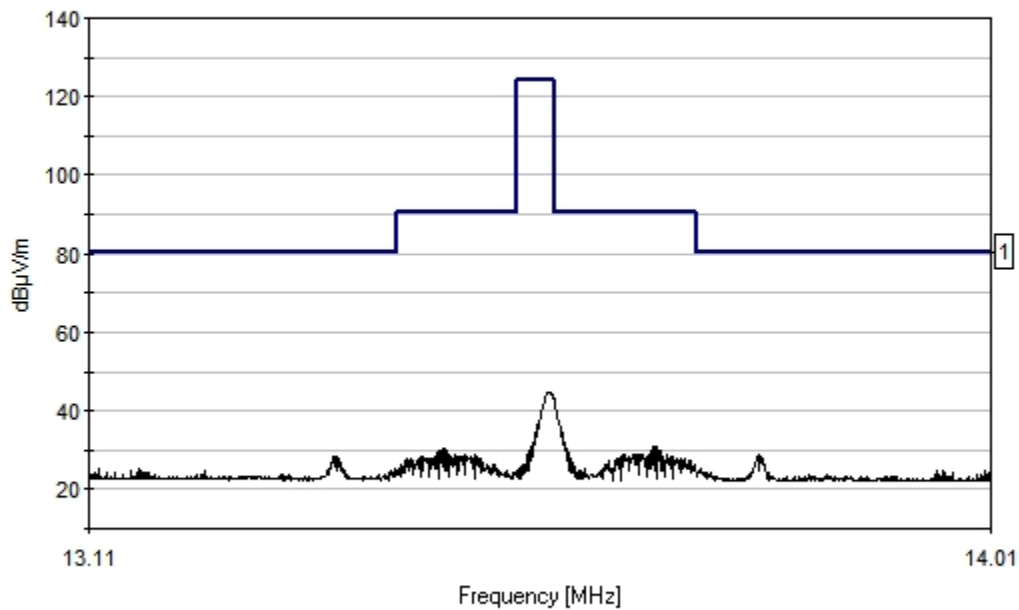
Ext Attn: 0 dB

Measurement Data: Reading listed by margin. Test Distance: 1 Meter

#	Freq MHz	Rdng dB μ V	T1 dB				Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	13.567M	41.5	+19.6				-19.0	42.1	90.5	-48.4	None
2	13.773M	28.5	+19.5				-19.0	29.0	80.5	-51.5	None
3	13.350M	27.5	+19.8				-19.0	28.3	80.5	-52.2	None
4	13.352M	27.5	+19.8				-19.0	28.3	80.5	-52.2	None
5	13.774M	27.8	+19.5				-19.0	28.3	80.5	-52.2	None
6	13.354M	26.8	+19.8				-19.0	27.6	80.5	-52.9	None
7	13.119M	24.5	+19.9				-19.0	25.4	80.5	-55.1	None

8	13.159M	24.5	+19.9	-19.0	25.4	80.5	-55.1	None
9	13.408M	24.7	+19.7	-19.0	25.4	80.5	-55.1	None
10	13.713M	24.6	+19.6	-19.0	25.2	80.5	-55.3	None
11	13.962M	24.6	+19.4	-19.0	25.0	80.5	-55.5	None
12	14.004M	24.5	+19.4	-19.0	24.9	80.5	-55.6	None
13	13.151M	23.8	+19.9	-19.0	24.7	80.5	-55.8	None
14	13.161M	23.8	+19.9	-19.0	24.7	80.5	-55.8	None
15	13.222M	23.8	+19.9	-19.0	24.7	80.5	-55.8	None
16	13.955M	24.2	+19.4	-19.0	24.6	80.5	-55.9	None
17	13.960M	24.2	+19.4	-19.0	24.6	80.5	-55.9	None
18	13.963M	24.1	+19.4	-19.0	24.5	80.5	-56.0	None
19	13.115M	23.5	+19.9	-19.0	24.4	80.5	-56.1	None
20	13.167M	23.5	+19.9	-19.0	24.4	80.5	-56.1	None

EMCE Engineering Date: 2/11/2009 Time: 3:45:41 PM SCM Micro WO#: 2825
 RFID FCC Mask 3 Meter Test Distance: 1 Meter Sequence#: 3



— Sweep Data — 1 - RFID FCC Mask 3 Meter

Frequency Stability

CFR 47, Section 15.225(e) and Sec 15.31(e), RSS-210 Sec 6.2.2(e) and 6.4

<u>Temperature (Celcius)</u>	<u>Voltage (DC)</u>	<u>Transmit Frequency (MHz)</u>	<u>Upper Limit (MHz)</u>	<u>Lower Limit (MHz)</u>	<u>Pass / Fail</u>
Ambient	102.00	13.558	13.561356	13.558644	PASS
Ambient	120.00	13.559	13.561356	13.558644	PASS
Ambient	138.00	13.561	13.561356	13.558644	PASS
+50	120.00	13.559	13.561356	13.558644	PASS
+40	120.00	13.559	13.561356	13.558644	PASS
+30	120.00	13.559	13.561356	13.558644	PASS
+20	120.00	13.560	13.561356	13.558644	PASS
+10	120.00	13.560	13.561356	13.558644	PASS
0	120.00	13.560	13.561356	13.558644	PASS
-10	120.00	13.559	13.561356	13.558644	PASS
-20	120.00	13.559	13.561356	13.558644	PASS

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B Spectrum Analyzer	2856A93846	08/20/2008	08/20/2009	004
HP 85650A Quasi Peak Adapter	3145A01673	8/20/2008	2/20/09	003
HP 85685A RF Preselector	35076A01550	08/20/2008	08/20/2009	002
HP 9447D Pre-Amp	2443A03587	10/1/08	10/1/09	008
Empire Devices LP-105 Loop Antenna	000114	12/28/08	12/28/09	011
Webber WE-4-100+200 Temperature Chamber	3-60-3.2	N/A	N/A	020
Linear Laboratories Quick Temp Non - Contact Thermometer	8432	8/20/08	8/20/09	017

Field Strength of Harmonics

CFR 47, Section 15.225(d)
Limits from CFR 47, Section 15.209
Test Distance: 10 meters

Frequency (MHz)	Measurement Field strength (microvolts/meter)	distance (meters)
0.009-0.490.....	2400/F(kHz)	300
0.490-1.705.....	24000/F(kHz)	30
1.705-30.0.....	30	30
30-88.....	100 **	3
88-216.....	150 **	3
216-960.....	200 **	3
Above 960.....	500	3

Test Location: EMCE Engineering • 44366 S. Grimmer Blvd • Fremont, CA 94538 • 510-490-4307

Customer:	SCM Micro	Date:	2/14/2009
Specification:	FCC 15.209 25-1000	Time:	14:26:15
Work Order #:	2825	Sequence#:	1
Test Type:	Radiated Scan	Tested By:	Bob Cole
Equipment:	Contactless Card Reader		
Manufacturer:	SCM Micro		
Model:	SDI010 MOD		
S/N:			

Test Equipment:

Function	S/N	Calibration Date	Cal Due Date	Asset #
HP 8566B Spectrum Analyzer	2856A93846	08/20/2008	08/20/2009	004
HP 85650A Quasi Peak Adapter	3145A01673	08/20/2008	02/20/2009	003
HP 85685A RF Preselector	35076A01550	08/20/2008	08/20/2009	002
HP 8447D PreAmp	2443A03587	06/02/2008	06/02/2009	008

Equipment Under Test (* = EUT):

Function	Manufacturer	Model #	S/N
Contactless Card Reader*	SCM Micro	SDI010 MOD	

Support Devices:

Function	Manufacturer	Model #	S/N
Laptop PC	HP	dv4000	

Test Conditions / Notes:

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Transducer Legend:

T1=25' LMR #001	T2=EMCO 3142 BiConiLog S/N: 9808-1306
T3=8447 Pre-Amp Asset 458	

Ext Attn: 0 dB

Measurement Data:

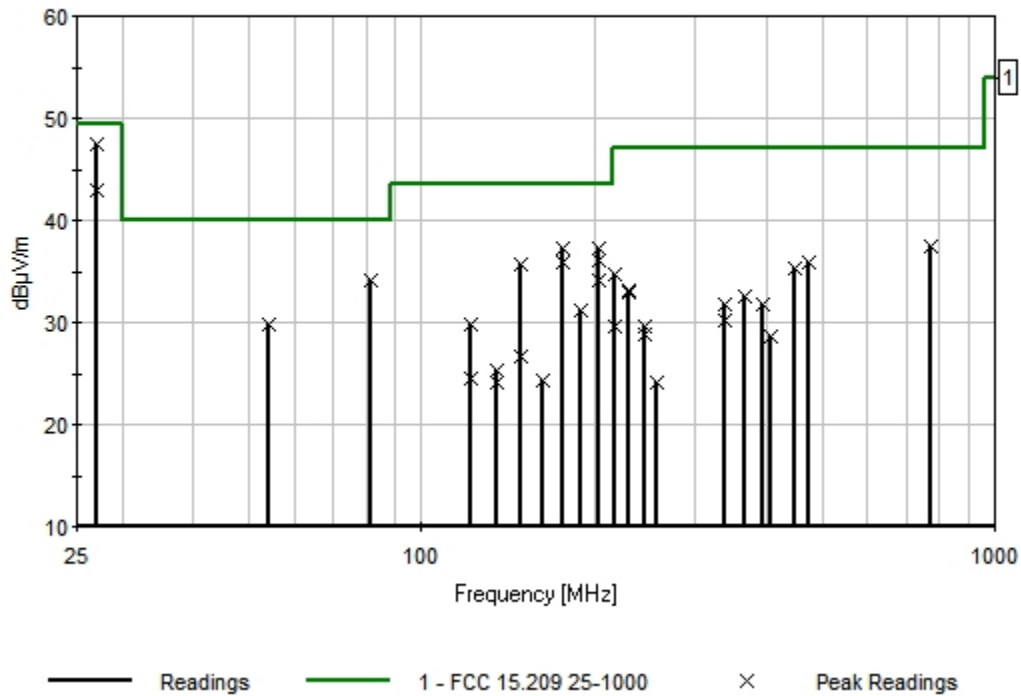
Reading listed by margin.

Test Distance: 10 Meters

#	Freq MHz	Rdng dB μ V	T1 dB	T2 dB	T3 dB	dB	Dist Table	Corr dB μ V/m	Spec dB μ V/m	Margin dB	Polar Ant
1	27.128M	34.1	+0.0	+19.4	+27.1		+21.0	47.4	49.5	-2.1	Vert
2	81.358M	44.2	+0.0	+6.8	+26.8		+10.0	34.2	40.0	-5.8	Horiz
3	176.288M	44.3	+0.0	+9.7	+26.7		+10.0	37.3	43.5	-6.2	Vert
4	203.408M	43.9	+0.0	+10.1	+26.8		+10.0	37.2	43.5	-6.3	Vert
5	27.118M	29.6	+0.0	+19.4	+27.1		+21.0	42.9	49.5	-6.6	Horiz
6	203.398M	42.8	+0.0	+10.1	+26.8		+10.0	36.1	43.5	-7.4	Horiz
7	176.278M	42.9	+0.0	+9.7	+26.7		+10.0	35.9	43.5	-7.6	Horiz
8	149.168M	43.8	+0.1	+8.3	+26.6		+10.0	35.6	43.5	-7.9	Vert
9	203.406M	40.9	+0.0	+10.1	+26.8		+10.0	34.2	43.5	-9.3	Horiz
10	772.928M	31.4	+0.6	+22.5	+27.1		+10.0	37.4	47.0	-9.6	Vert
11	54.238M	38.6	+0.0	+7.9	+26.7		+10.0	29.8	40.0	-10.2	Horiz
12	474.598M	34.3	+0.3	+18.1	+26.8		+10.0	35.9	47.0	-11.1	Horiz
13	447.478M	35.3	+0.3	+16.5	+26.8		+10.0	35.3	47.0	-11.7	Horiz
14	216.968M	40.9	+0.0	+10.7	+26.9		+10.0	34.7	47.0	-12.3	Vert
15	189.848M	38.2	+0.0	+9.8	+26.8		+10.0	31.2	43.5	-12.3	Vert
16	122.048M	39.6	+0.1	+6.7	+26.6		+10.0	29.8	43.5	-13.7	Vert
17	230.528M	38.7	+0.0	+11.4	+26.9		+10.0	33.2	47.0	-13.8	Vert
18	230.518M	38.5	+0.0	+11.4	+26.9		+10.0	33.0	47.0	-14.0	Horiz
19	366.118M	33.5	+0.1	+15.8	+26.9		+10.0	32.5	47.0	-14.5	Horiz
20	338.998M	33.7	+0.0	+15.0	+26.9		+10.0	31.8	47.0	-15.2	Horiz
21	393.238M	32.6	+0.1	+15.9	+26.9		+10.0	31.7	47.0	-15.3	Horiz
22	149.158M	34.9	+0.1	+8.3	+26.6		+10.0	26.7	43.5	-16.8	Horiz
23	339.008M	32.0	+0.0	+15.0	+26.9		+10.0	30.1	47.0	-16.9	Vert
24	216.958M	35.9	+0.0	+10.7	+26.9		+10.0	29.7	47.0	-17.3	Horiz
25	244.078M	34.6	+0.0	+12.0	+27.0		+10.0	29.6	47.0	-17.4	Horiz

26	244.088M	33.9	+0.0	+12.0	+27.0	+10.0	28.9	47.0	-18.1	Vert
27	406.808M	29.4	+0.1	+16.1	+26.9	+10.0	28.7	47.0	-18.3	Vert
28	135.608M	34.9	+0.1	+6.8	+26.6	+10.0	25.2	43.5	-18.3	Vert
29	122.038M	34.4	+0.1	+6.7	+26.6	+10.0	24.6	43.5	-18.9	Horiz
30	162.728M	32.0	+0.0	+9.1	+26.7	+10.0	24.4	43.5	-19.1	Vert
31	135.598M	33.9	+0.1	+6.8	+26.6	+10.0	24.2	43.5	-19.3	Horiz
32	257.648M	28.7	+0.0	+12.5	+27.0	+10.0	24.2	47.0	-22.8	Vert

EMCE Engineering Date: 2/14/2009 Time: 14:26:15 SCM Micro WO#: 2825
 FCC 15.209 25-1000 Test Distance: 10 Meters Sequence#: 1



APPENDIX D

EUT MODIFACTION LIST AND PHOTOS

N/A - NO modifications necessary