



**FCC CFR47 PART 15 SUBPART C  
CERTIFICATION TEST REPORT  
FOR  
ALVH DESKTOP CARD READER**

**MODEL NUMBER: DWMS-VDCR01**

**FCC ID: VBU-DWMS-VDCR01**

**REPORT NUMBER: 08J11606-1A**

**ISSUE DATE: FEBRUARY 13, 2008**

*Prepared for*

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**NVLAP LAB CODE 200065-0**

Revision History

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Rev.	Issue Date	Revisions	Revised By
--	02/11/08	Initial Issue	F. Ibrahim
A	02/13/08	Revised the set up diagram.	F. Ibrahim

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** MIWA LOCK., LTD  
3-1-12, SHIBA, MINATO-KU  
TOKYO 105-8510  
JAPAN

**EUT DESCRIPTION:** ALVH DESKTOP CARD READER

**MODEL:** DWMS-VDCR01

**SERIAL NUMBER:** FTS01

**DATE TESTED:** FEBRUARY 04 – 07, 2008

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
CFR 47 Part 15 Subpart C	No Non-Compliance Noted

Compliance Certification Services, Inc. tested the above equipment in accordance with the requirements set forth in the above standards. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.

**Note:** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. This document may not be altered or revised in any way unless done so by Compliance Certification Services and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by Compliance Certification Services will constitute fraud and shall nullify the document. No part of this report may be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any government agency.

Approved & Released For CCS By:

Tested By:



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FRANK IBRAHIM  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

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VIEN TRAN  
EMC ENGINEER  
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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003, FCC CFR 47 Part 2, FCC CFR 47 Part 15.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

CCS is accredited by NVLAP, Laboratory Code 200065-0. The full scope of accreditation can be viewed at <http://www.ccsemc.com>.

## 4. CALIBRATION AND UNCERTAINTY

### 4.1. MEASURING INSTRUMENT CALIBRATION

The measuring equipment utilized to perform the tests documented in this report has been calibrated in accordance with the manufacturer's recommendations, and is traceable to recognized national standards.

### 4.2. MEASUREMENT UNCERTAINTY

Where relevant, the following measurement uncertainty levels have been estimated for tests performed on the apparatus:

PARAMETER	UNCERTAINTY
Radiated Emission, 30 to 200 MHz	+/- 3.3 dB
Radiated Emission, 200 to 1000 MHz	+4.5 / -2.9 dB
Radiated Emission, 1000 to 2000 MHz	+4.5 / -2.9 dB
Power Line Conducted Emission	+/- 2.9 dB

Uncertainty figures are valid to a confidence level of 95%.

## **5. EQUIPMENT UNDER TEST**

### **5.1. DESCRIPTION OF EUT**

ALVH Desktop Card Reader unit is a printed circuit board for incorporation into equipment conforming to ISO14443A MIFARE.

VDCR provides contactless access function to MIFARE card.

VDCR is a desktop MIFARE reader/writer that connects to a PC server via RS-232C communication.

VDCR is mainly used to read and to write a card for Door lock device and Elevator access reader device.

### **5.2. DESCRIPTION OF AVAILABLE ANTENNAS**

The radio utilizes an embedded antenna.

### **5.3. SOFTWARE AND FIRMWARE**

The test utility software installed in the EUT during testing was ALVH Test SW, Version 1.0.0.1

### **5.4. WORST-CASE CONFIGURATION**

The EUT was tested as desktop unit since this is the normal orientation of the EUT. The EUT was connected to a laptop PC via serial cable, and a test utility software was used to exercise and control the EUT.

### **5.5. MODIFICATIONS**

Ferrites with 1 turn were added by client at:

- \_ EUT's DC power cable
- \_ both ends of RS-323C cable

The ferrites are manufactured by SEIWA ELECTRIC MFG. CO. LTD., model E04SR241336A.

## 5.6. DESCRIPTION OF TEST SETUP

### SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop PC	IBM	Lenovo T61	L3-A1589	DoC
AC Adapter	Lenovo	PA-1650-171	N/A	N/A
AC Adapter	Map Electronics	3A-161-DA05	N/A	N/A
RFID Card	MIWA	N/A	N/A	N/A

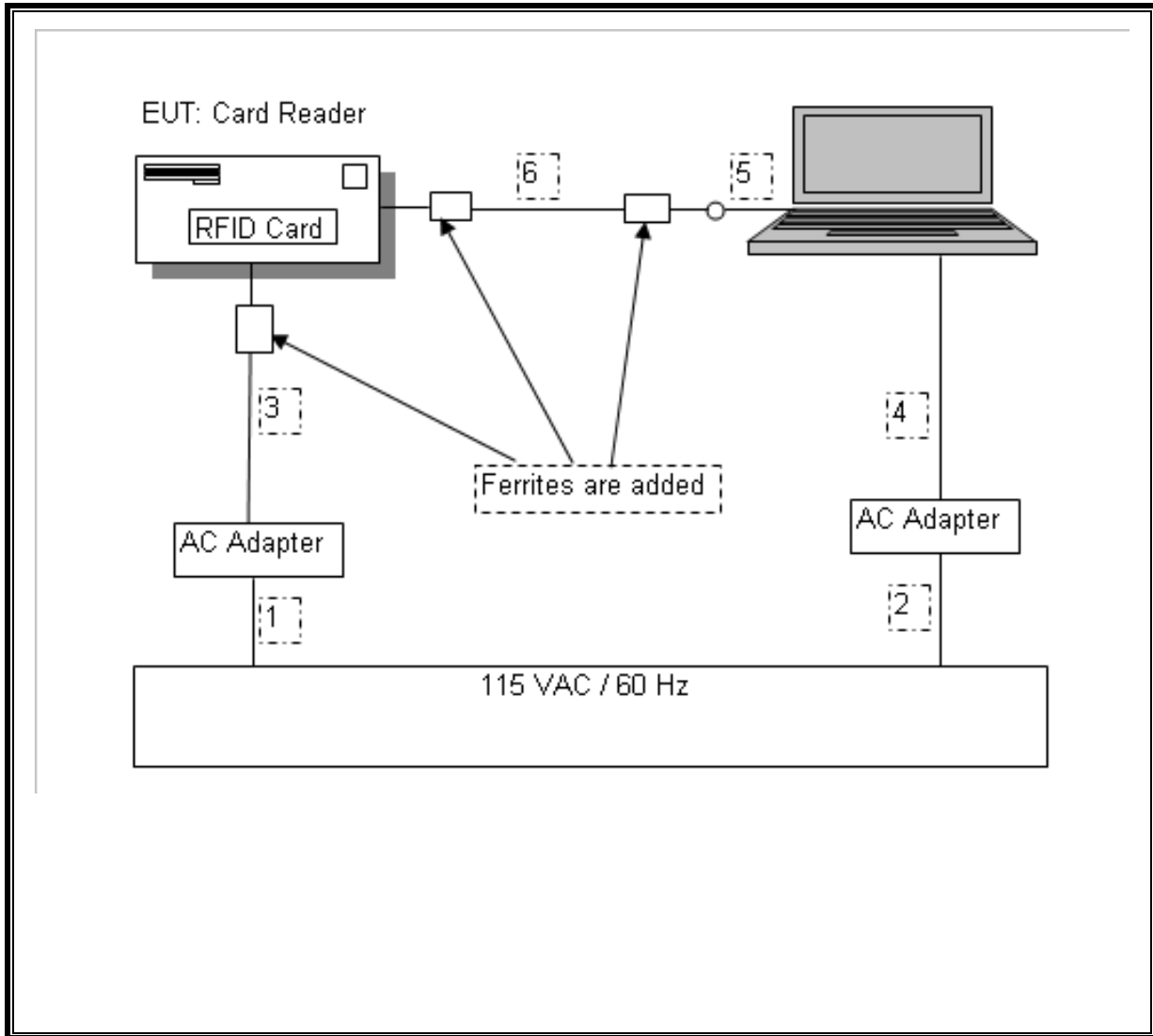
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	1	US115	Un-shielded	1m	For EUT
2	AC	1	US115	Un-shielded	1m	For laptop
3	DC	1	DC	Un-shielded	1.8m	For EUT
4	DC	1	DC	Shielded	1.8m	For laptop, ferrite with 1 turn at laptop
5	USB	1	USB/RS-232C	Shielded	0.5m	For laptop, USB/RS-232C adapter
6	RS-232C	1	DB9	Shielded	3m	For EUT, 2 ferrites with 1 turn at both

### TEST SETUP

The EUT is stand-alone device. Test software exercised the radio card.

**SETUP DIAGRAM FOR TESTS**





## 6. TEST AND MEASUREMENT EQUIPMENT

The following test and measurement equipment was utilized for the tests documented in this report:

TEST EQUIPMENT LIST					
Description	Manufacturer	Model	Asset	Cal Date	Cal Due
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	04/16/07	04/16/08
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	02/06/07	06/12/08
Antenna, Bilog, 2 GHz	Schaffner	CCN-1000-1	C01017	05/30/06	10/30/08
Preamplifier, 1300 MHz	Agilent / HP	8447D	C01018	05/09/07	05/09/08
Antenna, Loop, 30 MHz	EMCO	6502	C00593	10/24/06	10/24/08
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	09/15/07	09/15/08
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	09/15/07	09/15/08
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	05/02/06	08/07/08

## 7. APPLICABLE LIMITS AND TEST RESULTS

### 7.1. RADIATED EMISSION

#### TEST PROCEDURE

ANSI C63.4

The highest clock frequency generated or used in the EUT is 13.56 MHz; therefore the frequency range was investigated from 9 kHz to 1000 MHz.

#### LIMIT

§15.225:

(a) The field strength of any emissions within the band 13.553–13.567 MHz shall not exceed 15,848 microvolts/ meter at 30 meters.

(b) Within the bands 13.410–13.553 MHz and 13.567–13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.

(c) Within the bands 13.110–13.410 MHz and 13.710–14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

(d) The field strength of any emissions appearing outside of the 13.110– 14.010 MHz and shall not exceed the general radiated emission limits in § 15.209 as follows:

§15.209 (a) Except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
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

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz,

174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

§15.209 (b) In the emission table above, the tighter limit applies at the band edges.

Formula for converting the filed strength from uV/m to dBuV/m is:

Limit (dBuV/m) = 20 log limit (uV/m)

In addition:

§15.209 (d) The emission limits shown the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz. Radiated emissions limits in these three bands are based on measurements employing an average detector.

§15.209 (d) The provisions in §§ 15.225, measuring emissions at distances other than the distances specified in the above table, determining the frequency range over which radiated emissions are to be measured, and limiting peak emissions apply to all devices operated under this part.

## **RESULTS**

No non-compliance noted:

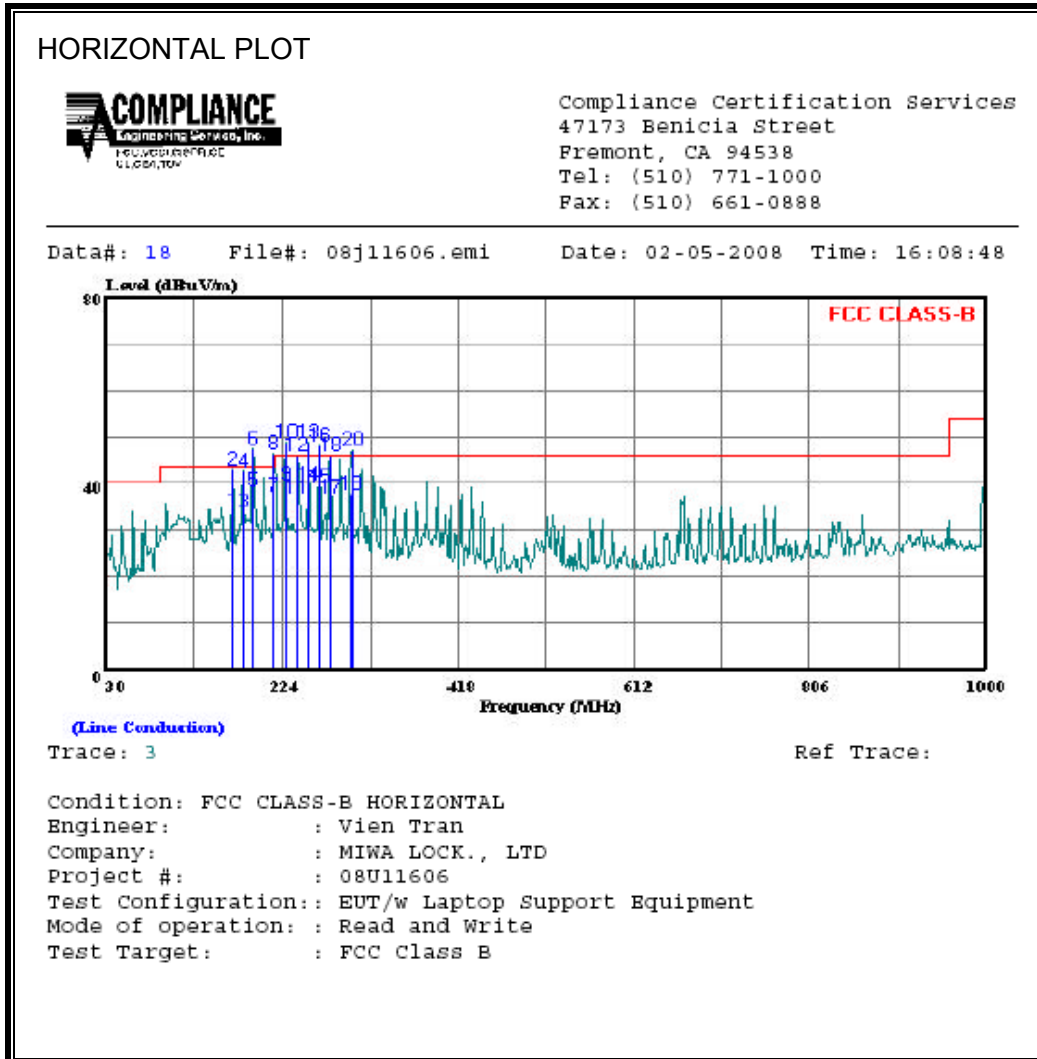
### 7.1.1. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz)

#### TRANSCIVER SPURIOUS EMISSIONS BELOW 30 MHz

FCC Part 15, Subpart B & C												10 Meter Distance Measurement At Open Field	
Company:		MIWA LOCK., LTD											
Project #:		08J11606											
Date:		02/04/08											
Test Engineer:		Vien Tran											
Configuration:		EUT with support laptop											
Mode:		Read and Write											
Frequency (MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	AF (dB/m)	Distance Correction (dB)	PK Corrected Reading (dBuV/m)	AV Corrected Reading (dBuV/m)	QP Limit (dBuV/m)	AV Limit (dBuV/m)	PK Margin (dB)	AV Margin (dB)	Notes	
<b>Loop Antenna Face ON:</b>													
13.560	43.02		N/A	10.56	-19.08	34.49	N/A	84.00	N/A	-49.5	N/A	Fundamental @ 10m Dist	
13.410	14.56		N/A	10.54	-19.08	6.02	N/A	50.48	N/A	-44.5	N/A	13.41-13.563MHz Spurious @ 10m	
13.553	31.83		N/A	10.56	-19.08	23.10	N/A	50.48	N/A	-27.4	N/A	13.41-13.553MHz Spurious @ 10m	
13.567	31.12		N/A	10.56	-19.08	22.59	N/A	50.48	N/A	-27.9	N/A	13.567-13.710MHz Spurious @ 10m	
13.710	17.02		N/A	10.57	-19.08	8.51	N/A	50.48	N/A	-42.0	N/A	13.567-13.710MHz Spurious @ 10m	
13.110	16.92		N/A	10.51	-19.08	8.35	N/A	40.51	N/A	-32.2	N/A	13.110-13.410MHz Spurious @ 10m	
13.410	14.56		N/A	10.54	-19.08	6.02	N/A	40.51	N/A	-34.5	N/A	13.110-13.410MHz Spurious @ 10m	
13.710	17.02		N/A	10.57	-19.08	8.51	N/A	40.51	N/A	-32.0	N/A	13.710-14.010MHz Spurious @ 10m	
14.010	13.32		N/A	10.60	-19.08	4.84	N/A	40.51	N/A	-35.7	N/A	13.710-14.010MHz Spurious @ 10m	
<b>Loop Antenna Face OFF:</b>													
13.560	55.42		N/A	10.56	-19.08	46.89	N/A	84.00	N/A	-37.1	N/A	Fundamental @ 10m Dist	
13.410	31.72		N/A	10.54	-19.08	23.18	N/A	50.48	N/A	-27.3	N/A	13.41-13.553MHz Spurious @ 10m	
13.553	49.22		N/A	10.56	-19.08	40.69	N/A	50.48	N/A	-9.8	N/A	13.41-13.553MHz Spurious @ 10m	
13.567	51.12		N/A	10.56	-19.08	42.59	N/A	50.48	N/A	-7.9	N/A	13.567-13.710MHz Spurious @ 10m	
13.710	32.32		N/A	10.57	-19.08	23.81	N/A	50.48	N/A	-26.7	N/A	13.567-13.710MHz Spurious @ 10m	
13.110	18.02		N/A	10.51	-19.08	9.45	N/A	40.51	N/A	-31.1	N/A	13.110-13.410MHz Spurious @ 10m	
13.410	31.72		N/A	10.54	-19.08	23.18	N/A	40.51	N/A	-17.3	N/A	13.110-13.410MHz Spurious @ 10m	
13.710	32.32		N/A	10.57	-19.08	23.81	N/A	40.51	N/A	-16.7	N/A	13.710-14.010MHz Spurious @ 10m	
14.010	17.42		N/A	10.60	-19.08	8.94	N/A	40.51	N/A	-31.6	N/A	13.710-14.010MHz Spurious @ 10m	
* No more emissions were found between 13.110 – 14.010 MHz band.													
<p>Note: The emission limits are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 10000MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.</p> <p>P.K. = Peak                      Q.P. = Quasi Peak Reading                      A.F. = Antenna factor</p>													

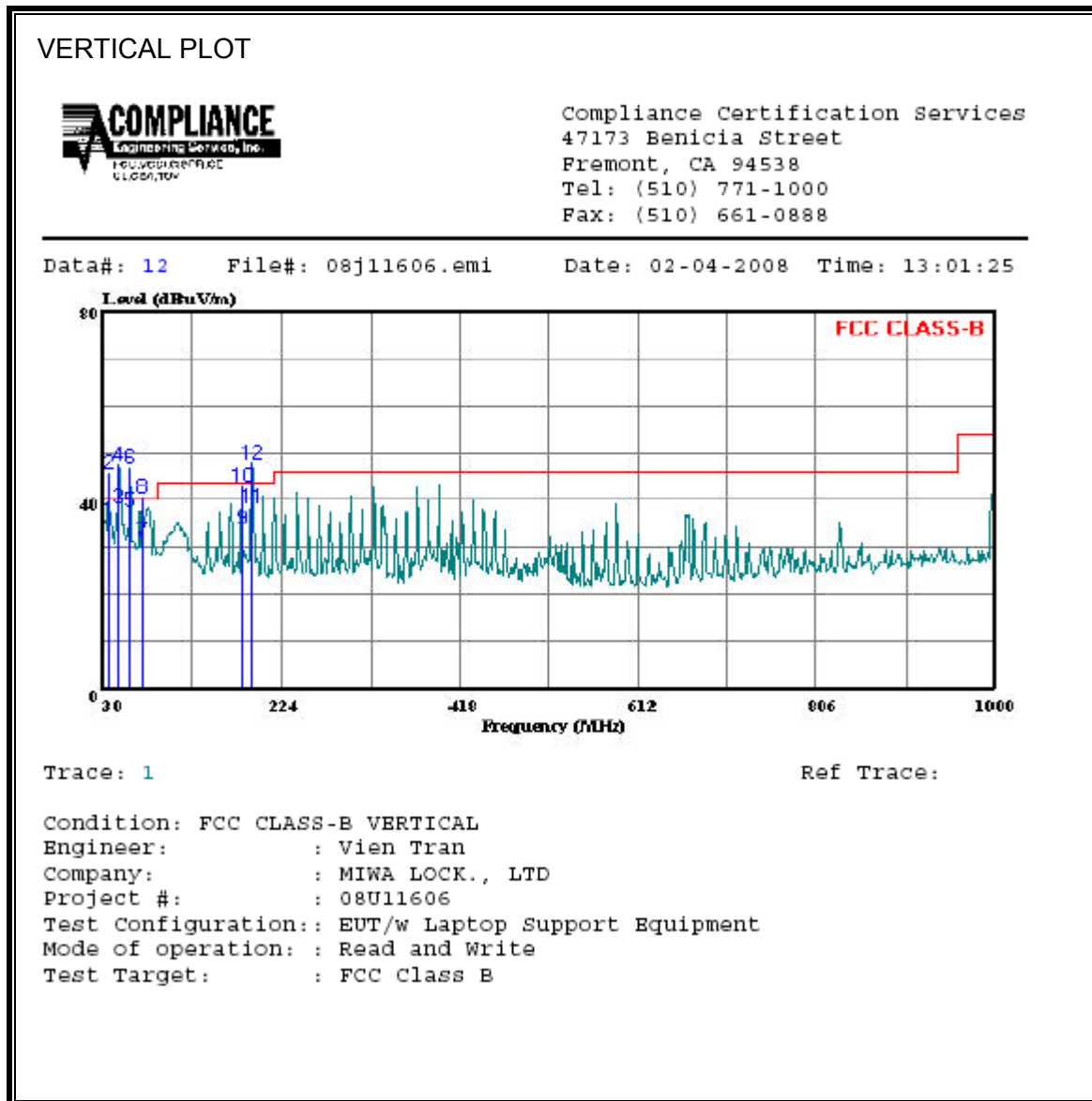
### 7.1.2. SPURIOUS EMISSIONS (30 - 1000 MHz)

#### SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



HORIZONTAL DATA							
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	168.710	48.60	-14.58	34.02	43.50	-9.48	QP
2	168.710	57.50	-14.58	42.92	43.50	-0.58	Peak
3	180.350	48.98	-14.98	34.00	43.50	-9.50	QP
4	180.350	57.50	-14.98	42.52	43.50	-0.98	Peak
5	191.020	53.07	-14.59	38.48	43.50	-5.02	QP
6 *	191.020	62.17	-14.59	47.58	43.50	4.08	Peak
7	215.270	52.57	-15.31	37.26	43.50	-6.24	QP
8 *	215.270	61.67	-15.31	46.36	43.50	2.86	Peak
9	228.850	54.57	-14.91	39.66	46.00	-6.34	QP
10 *	228.850	63.67	-14.91	48.76	46.00	2.76	Peak
11	239.520	51.47	-14.53	36.94	46.00	-9.06	QP
12 *	239.520	60.67	-14.53	46.13	46.00	0.13	Peak
13 *	253.100	63.00	-14.07	48.93	46.00	2.93	Peak
14	253.100	54.00	-14.11	39.89	46.00	-6.11	QP
15	263.770	52.63	-13.63	39.00	46.00	-7.00	QP
16 *	263.770	61.83	-13.63	48.20	46.00	2.20	Peak
17	277.350	50.07	-13.11	36.96	46.00	-9.04	QP
18 *	277.350	59.17	-13.11	46.06	46.00	0.06	Peak
19	301.060	50.03	-12.26	37.77	46.00	-8.23	QP
20 *	301.600	59.33	-12.24	47.10	46.00	1.10	Peak

**SPURIOUS EMISSIONS 30 TO 230 MHz (WORST-CASE CONFIGURATION, VERTICAL)**



VERTICAL DATA							
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	35.820	44.48	-8.76	35.72	40.00	-4.28	QP
2 *	35.820	54.34	-8.76	45.58	40.00	5.58	Peak
3	47.460	55.63	-17.35	38.28	40.00	-1.72	QP
4 *	47.460	64.83	-17.35	47.49	40.00	7.49	Peak
5	60.070	57.30	-19.72	37.58	40.00	-2.42	QP
6 *	60.070	66.50	-19.72	46.78	40.00	6.78	Peak
7	71.710	50.62	-19.14	31.48	40.00	-8.52	QP
8 *	71.710	59.83	-19.15	40.68	40.00	0.68	Peak
9	180.350	49.00	-14.98	34.02	43.50	-9.48	QP
10	180.350	58.00	-14.98	43.02	43.50	-0.48	Peak
11	191.020	53.03	-14.59	38.44	43.50	-5.06	QP
12 *	191.020	62.33	-14.59	47.74	43.50	4.24	Peak



## 7.2. AC MAINS LINE CONDUCTED EMISSIONS

### TEST PROCEDURE

ANSI C63.4

### LIMIT

§15.207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the band edges.

Frequency range (MHz)	Limits (dBµV)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56	56 to 46
0.50 to 5	56	46
5 to 30	60	50

Notes:

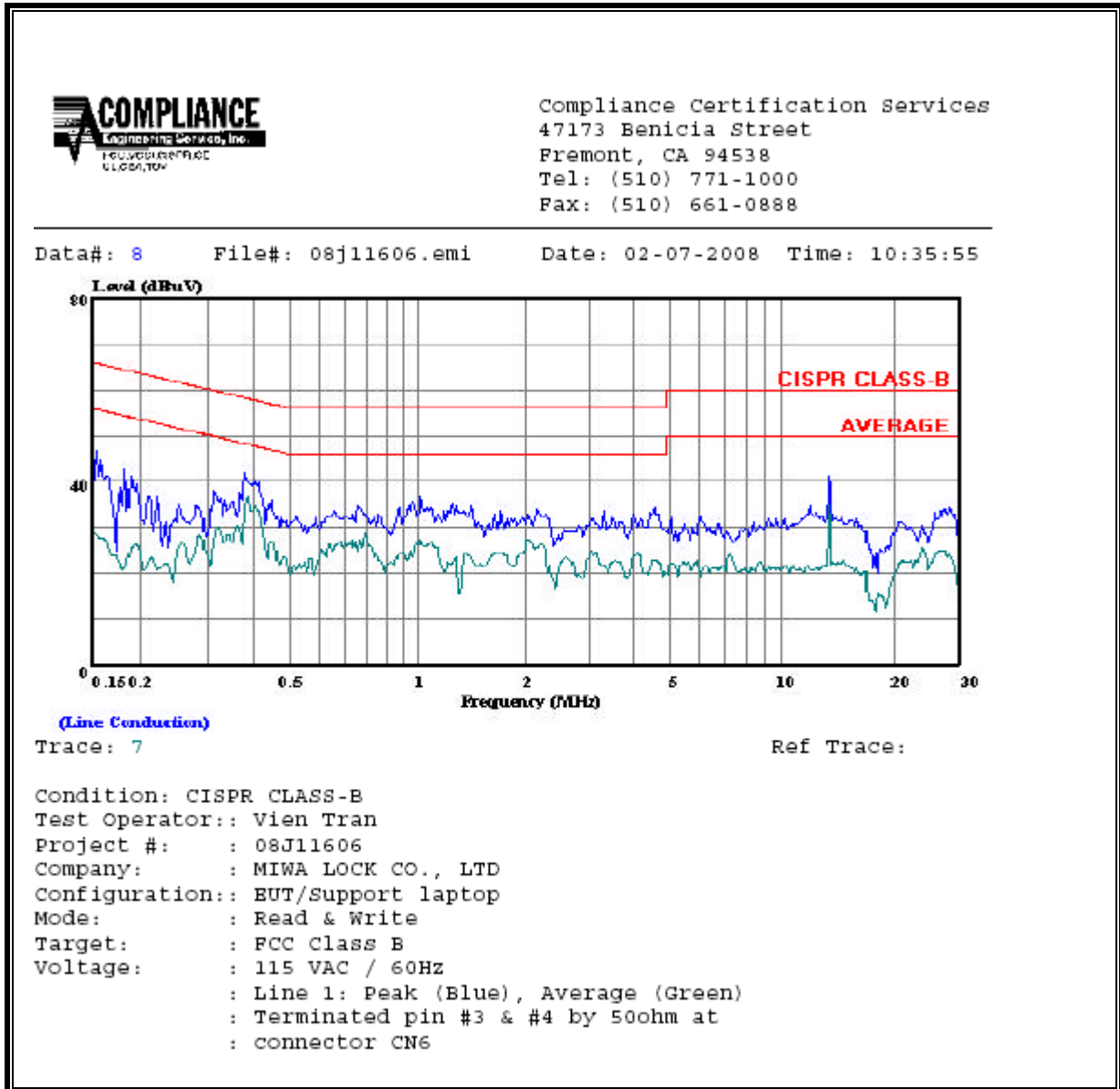
1. The lower limit shall apply at the transition frequencies
2. The limit decreases linearly with the logarithm of the frequency in the range 0.15 MHz to 0.50 MHz.

### RESULTS:

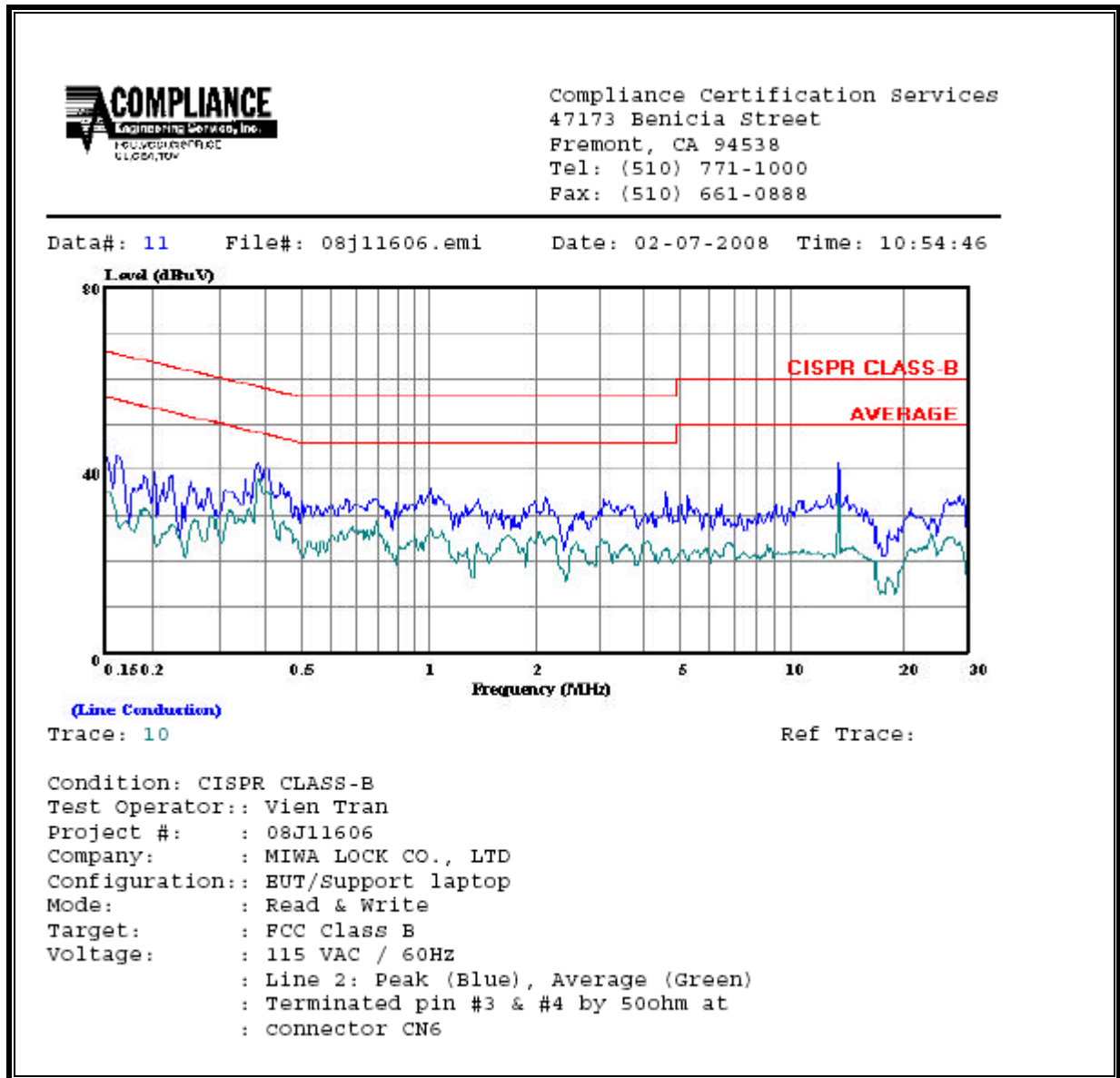
**6 WORST EMISSIONS**

CONDUCTED EMISSIONS DATA (115VAC 60Hz)										
Freq. (MHz)	Reading			Class (dB)	Limit QP	FCC B		Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)			AV	QP (dB)	AV (dB)		
0.15	46.96	--	28.51	0.00	65.84	55.84	-18.88	-27.33	L1	
0.39	41.83	--	36.55	0.00	58.13	48.13	-16.30	-11.58	L1	
13.56	41.10	--	38.32	0.00	60.00	50.00	-18.90	-11.68	L1	
0.15	44.81	--	35.42	0.00	65.84	55.84	-21.03	-20.42	L2	
0.39	40.84	--	38.07	0.00	58.13	48.13	-17.29	-10.06	L2	
13.56	41.55	--	38.58	0.00	60.00	50.00	-18.45	-11.42	L2	
6 Worst Data										

**LINE 1 RESULTS**



**LINE 2 RESULTS**



### 7.3. FREQUENCY STABILITY

#### LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within  $\pm 0.01\%$  of the operating frequency, over a temperature variation of -20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

#### TEST PROCEDURE

ANSI / TIA / EIA 603 Clauses 2.3.1 and 2.3.2

#### RESULTS

No non-compliance noted.

Reference Frequency: EUT Channel 13.56 MHz @ 20°C				
Limit: $\pm 100$ ppm = 135.598 kHz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	13.5598350	-0.020	$\pm 100$
115.00	40	13.5598202	-0.009	$\pm 100$
115.00	30	13.5598135	-0.004	$\pm 100$
<b>115.00</b>	<b>20</b>	<b>13.5598075</b>	<b>0.000</b>	<b><math>\pm 100</math></b>
115.00	10	13.5598100	-0.002	$\pm 100$
115.00	0	13.5598098	-0.002	$\pm 100$
115.00	-10	13.5598089	-0.001	$\pm 100$
115.00	-20	13.5598101	-0.002	$\pm 100$
97.15	20	13.5598113	-0.003	$\pm 100$
132.25	20	13.5598061	0.001	$\pm 100$

## 8. SETUP PHOTOS

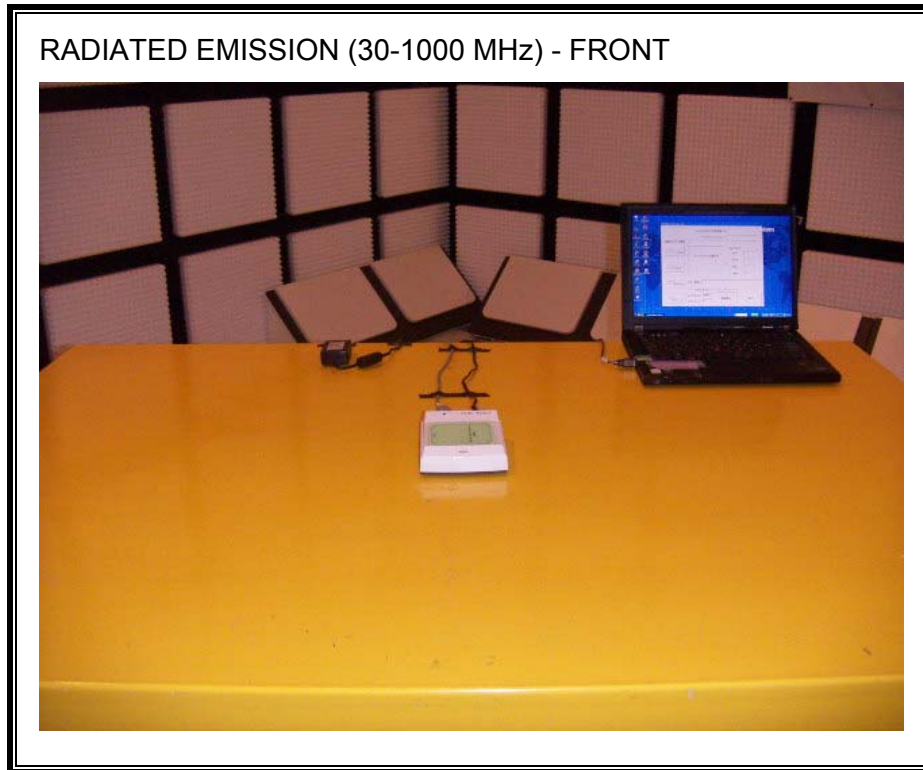
### RADIATED EMISSION (0.15-30 MHz)



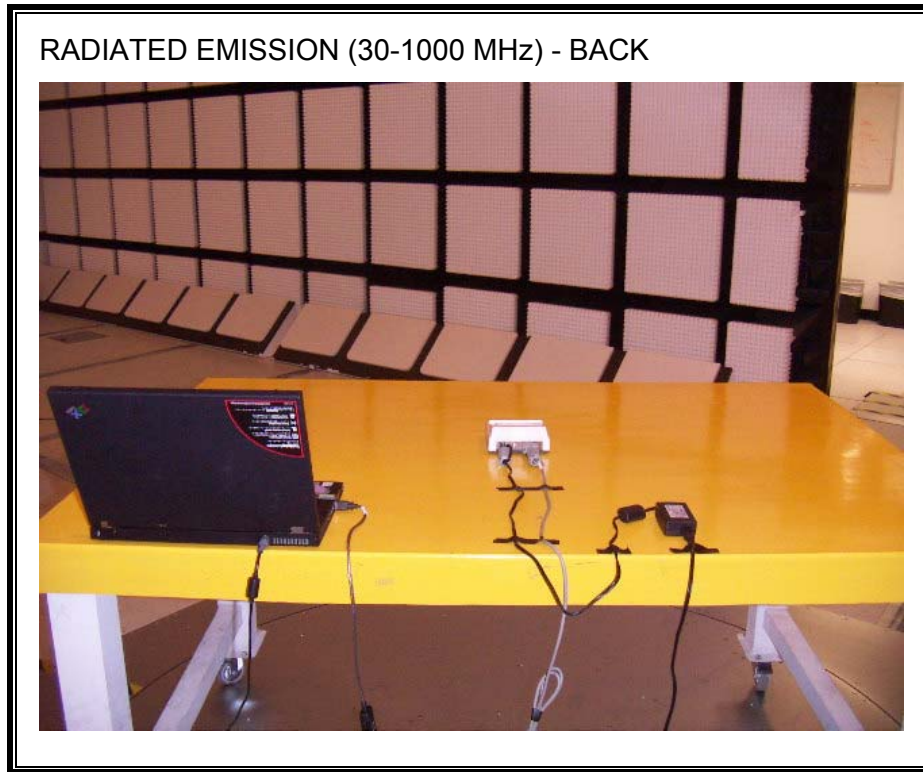
**RADIATED EMISSION (0.15-30 MHz)**



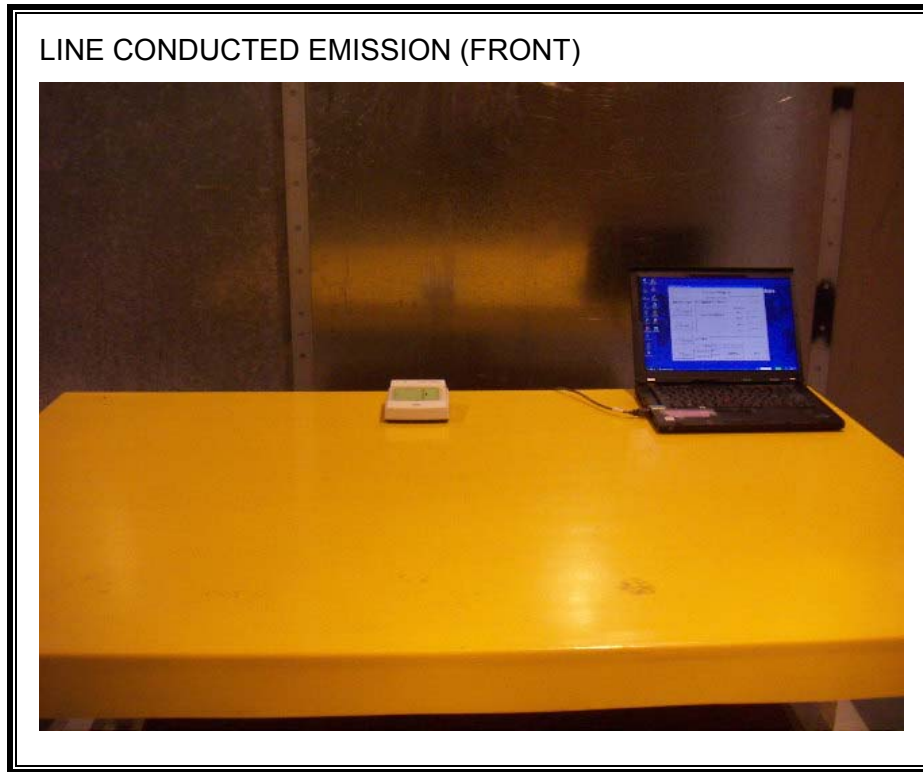
**RADIATED EMISSION (30-1000 MHz)**







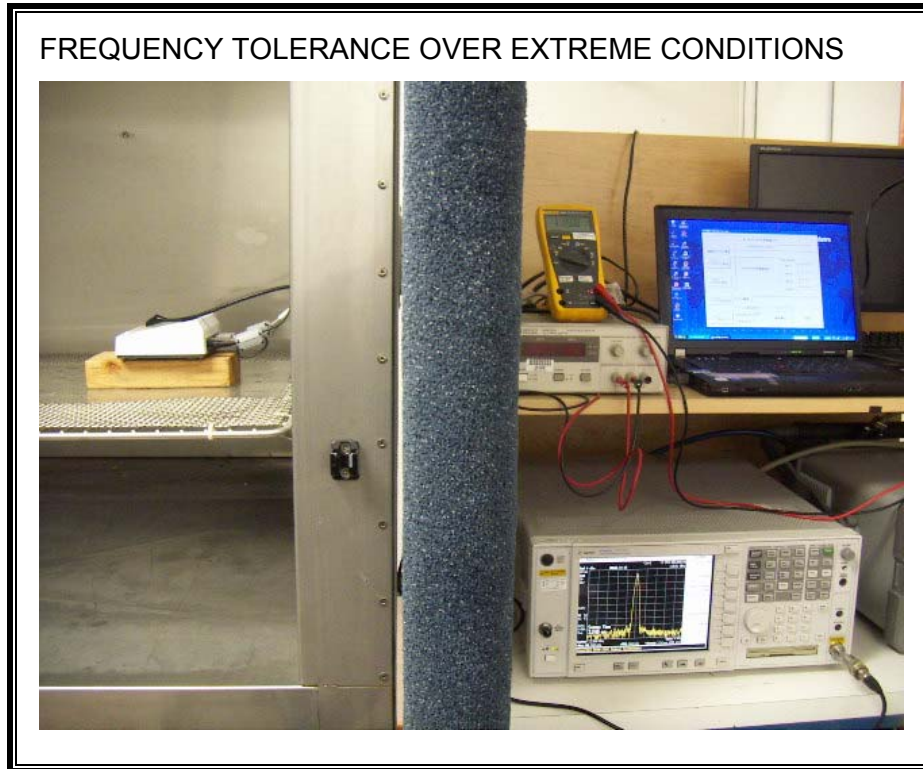
**AC MAINS LINE CONDUCTED EMISSION**



LINE CONDUCTED EMISSION (BACK)



**FREQUENCY TOLERANCE OVER EXTREME CONDITIONS**



**END OF REPORT**