FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 7, ANNEX 2
INDUSTRY CANADA RSS-GEN ISSUE 2

CERTIFICATION TEST REPORT

FOR

Contactless Card Reader

MODEL NUMBER: ViVOpay Kiosk - II

FCC ID: Q55VIVOPAYKIOSKII
IC ID: 5141A-VPKIOSKII

REPORT NUMBER: 08U12182-1

ISSUE DATE: NOVEMBER 13, 2008

Prepared for
ViVOtech, Inc.
451 EL CAMINO REAL
SANTA CLARA, CA 95050, U.S.A.

Prepared by
COMPLIANCE CERTIFICATION SERVICES
47173 BENICIA STREET
FREMONT, CA 94538, U.S.A.
TEL: (510) 771-1000
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	11/13/08	Initial Issue	Frank Ibrahim

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: ViVOtech, Inc.
451 EL CAMINO REAL
SANTA CLARA, CA 95050, U.S.A.

EUT DESCRIPTION: ISO/IEC 14443 CONTACTLESS PROXIMITY COUPLING DEVICE WITH APPLICATION EMBEDDED IN A STAND-ALONE INTELLIGENT CONTACTLESS READER CARD.

MODEL: ViVOpay Kiosk - II

SERIAL NUMBER: 02218

DATE TESTED: October 25 & 28, 2008

APPLICABLE STANDARDS	
STANDARD	**TEST RESULTS**
CFR 47 Part 15 Subpart C	Passed
RSS-210 Issue 7 Annex 2 and RSS-GEN Issue 2	Passed
RSS-GEN ISSUE 2	Passed

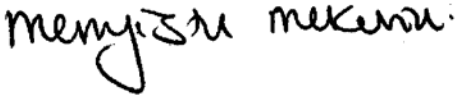
Compliance Certification Services, Inc. (CCS) tested the above equipment in accordance with the requirements set forth in the above standards. All indications of Pass/Fail in this report are opinions expressed by CCS based on interpretations and/or observations of test results. The test results show 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 CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by CCS 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:

FRANK IBRAHIM
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:



MENGISTU MEKURIA
EMC ENGINEER
COMPLIANCE CERTIFICATION SERVICES

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, RSS-GEN Issue 2, and RSS-210 Issue 7 Annex 2.

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

ISO/IEC14443 Contactless Proximity Coupling device with Application (PCDA) embedded in a stand-alone intelligent contactless card reader.

5.2. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a permanently attached underground loop antenna. Antenna is manufactured by ViVOtech, Inc.

5.3. SOFTWARE AND FIRMWARE

EC8_GR1.1.0

5.4. WORST-CASE CONFIGURATION

The EUT was laid out and oriented as in normal operation.

5.5. MODIFICATIONS

Ferrite used is Fair Rite part#: 0431167281 as follows:

1. Coaxial and data cable (ViVO part# 220-2457-00) were inserted in a heat shrinking tube:
    a) A ferrite was clipped onto this cable near the base unit
2. USB cable:
    a) A ferrite was clipped onto the cable near the base unit
    b) It was terminated at a lab top computer, Dell
3. Desk top PSU by Global Power Corp (ViVO part# 140-2035-01):
    a) A ferrite was used with one-loop of wire through it near the base unit

5.6. DESCRIPTION OF TEST SETUP

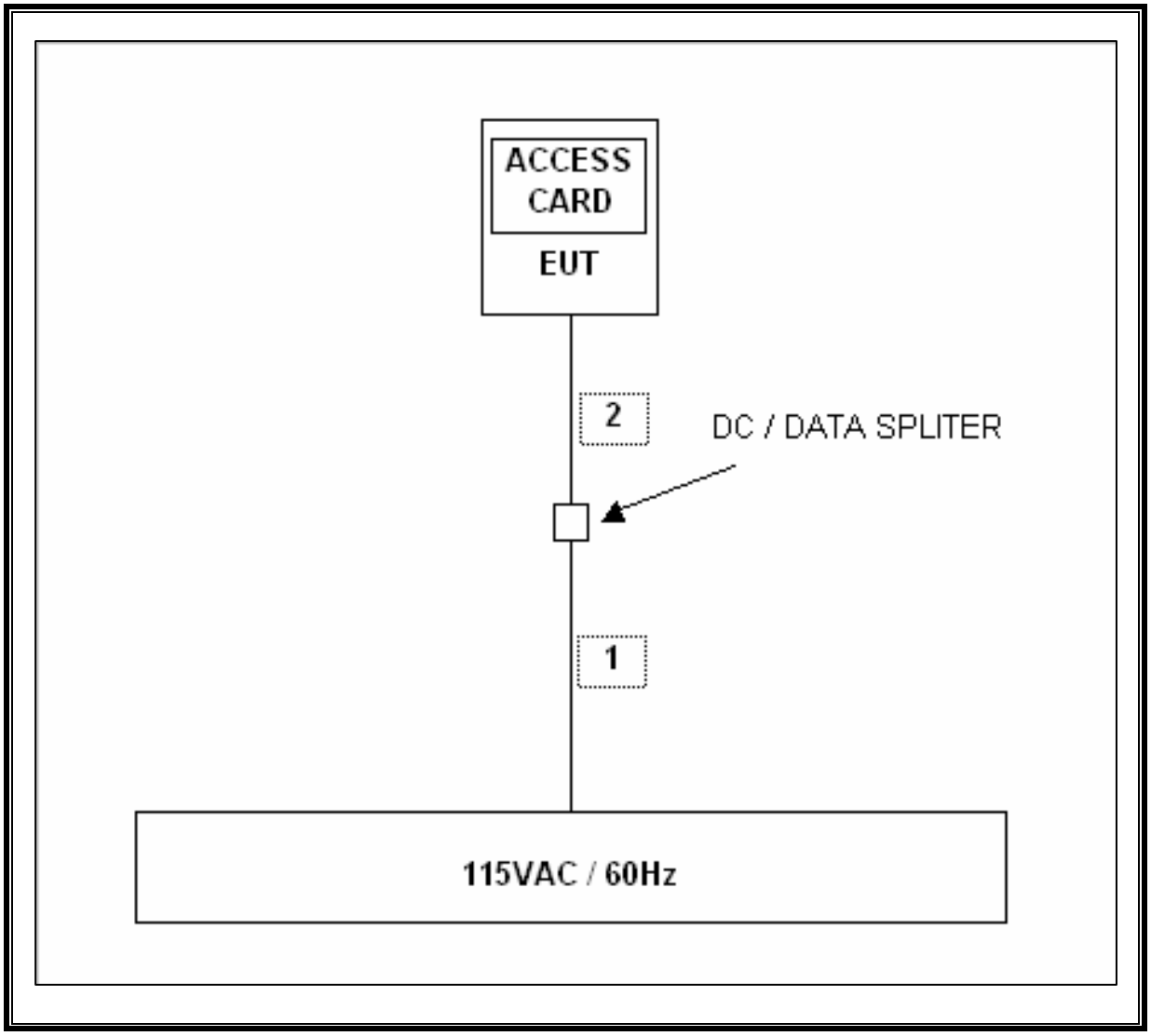
SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacturer**	**Model**	**Serial Number**	**FCC ID**
AC/DC	GLOBAL POWER	3A-161WP09	GPWAC-15-09-VT	N/A

I/O CABLES

I/O CABLE LIST						
Cable No.	**Port**	**# of Identical Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	DC	1	DC	UN-SHIELDED	2.0 m	FERRITE AT ONE END
2	MINI USB	1	USB	UN-SHIELDED	0.8 m	DC/ DATA SPLITER AT ONE END

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**	**S/N**	**Cal Due**
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	09/19/09
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/29/09
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/06/09
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	09/19/09
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	03/31/09
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	02/11/09
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	10/29/09
Antenna, Conical Log Spiral	EMCO	3102	N/A	05/12/09
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	05/13/09
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4407B	C01101	01/22/09

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

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

TRANSCEIVER SPURIOUS EMISSIONS BELOW 30 MHz

FCC Part 15, Subpart B & C **10 Meter Distance Measurement At Open Field**

Company: ViVOtech, Inc.
Project #: 08U12182
Model #: ViVOpay Kiosk-II
Tester: CAN CHUNG
Date: 10/25/2008

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
Loop Antenna Face On:												
13.56	35.98		N/A	10.56	-19.08	27.45	N/A	84.00	N/A	-56.5	N/A	Fundamental @ 10m Dist
27.12	19.85		N/A	9.046	-19.08	9.81	N/A	29.54	N/A	-19.7	N/A	0.15-30MHz Spurious @ 10m
Loop Antenna Face Off:												
13.56	38.63		N/A	10.56	-19.08	30.10	N/A	84.00	N/A	-53.9	N/A	Fundamental @ 10m Dist
27.12	19.49		N/A	9.046	-19.08	9.45	N/A	29.54	N/A	-20.1	N/A	0.15-30MHz Spurious @ 10m

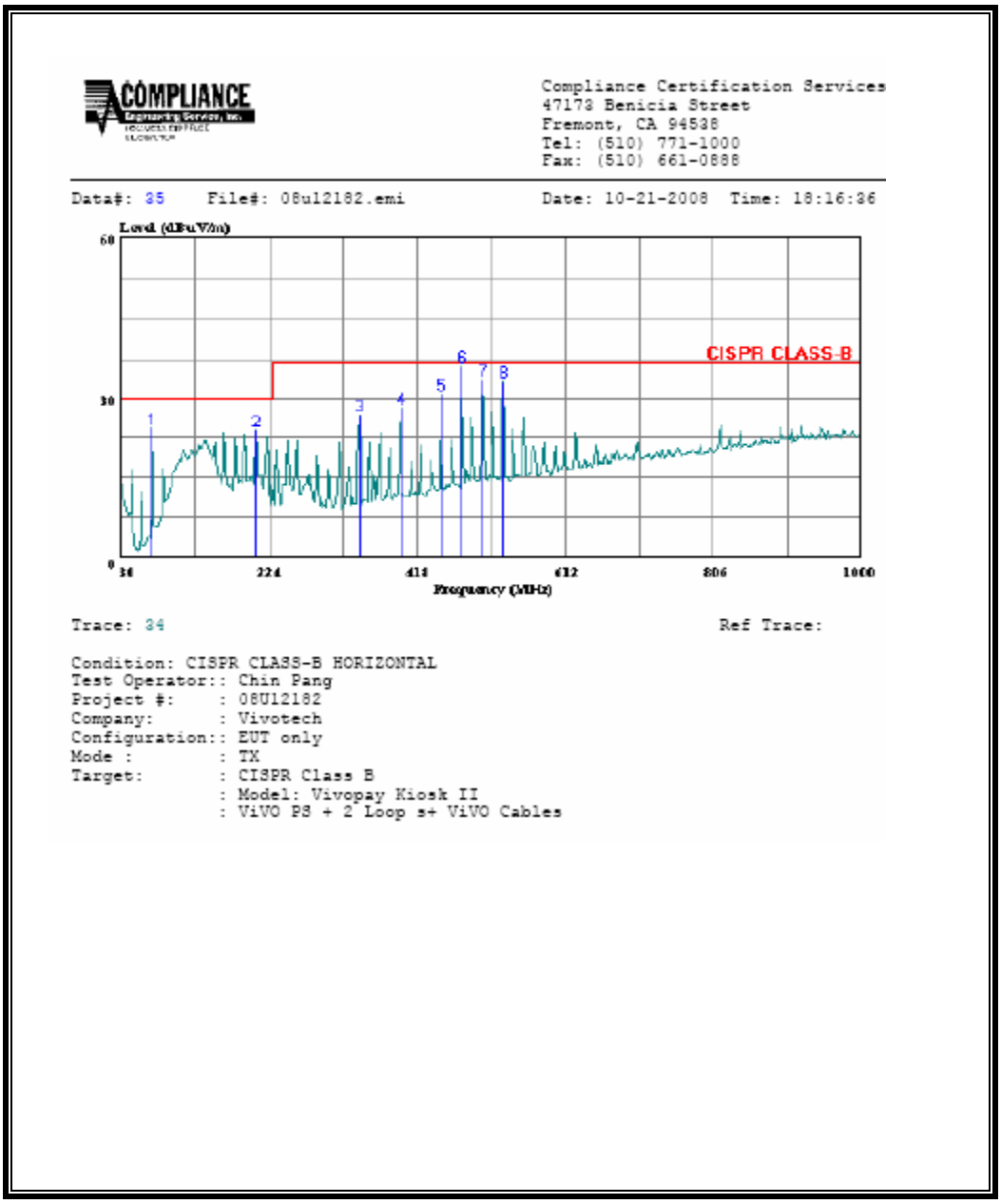
* No more emissions were found up to 30MHz

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.K. = Peak
Q.P. = Quasi Peak Reading
A.F. = Antenna factor

7.1.2. SPURIOUS EMISSIONS (30 - 1000 MHz)

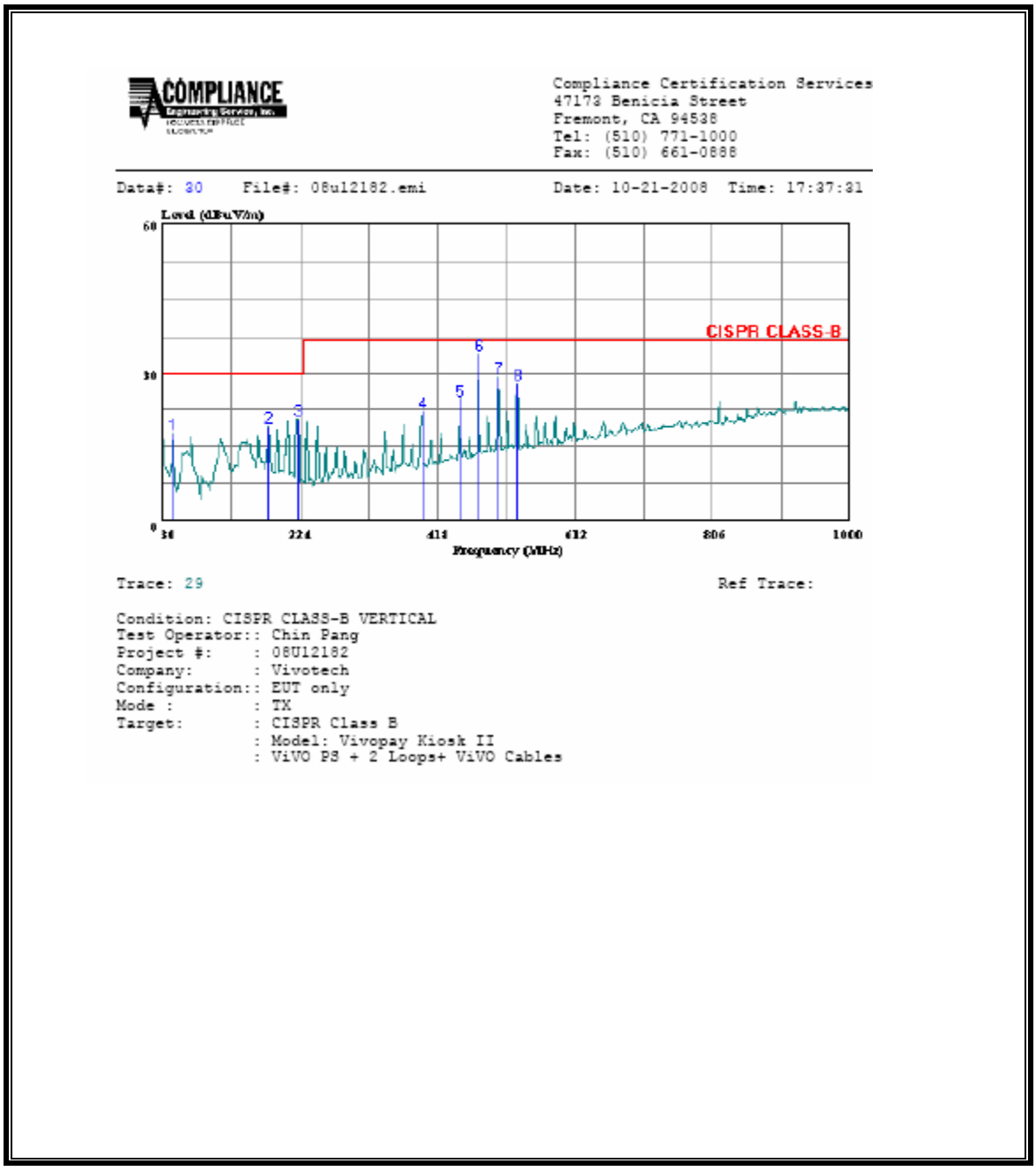
SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)



Page: 1

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	70.740	43.50	-19.05	24.45	30.00	-5.55	Peak
2	206.540	36.99	-13.03	23.96	30.00	-6.04	Peak
3	342.340	36.83	-9.84	26.99	37.00	-10.01	Peak
4	395.690	36.74	-8.32	28.42	37.00	-8.58	Peak
5	449.040	37.27	-6.49	30.78	37.00	-6.22	Peak
6	475.230	41.56	-5.56	36.00	37.00	-1.00	Peak
7	504.330	38.10	-4.70	33.40	37.00	-3.60	Peak
8	531.490	37.40	-4.18	33.22	37.00	-3.78	Peak

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



	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	43.580	34.07	-16.36	17.71	30.00	-12.29	Peak
2	179.380	33.06	-14.22	18.84	30.00	-11.16	Peak
3	221.090	33.65	-13.09	20.56	30.00	-9.44	Peak
4	395.690	30.31	-8.32	21.99	37.00	-15.01	Peak
5	449.040	31.13	-6.49	24.64	37.00	-12.36	Peak
6	475.230	39.71	-5.56	34.15	37.00	-2.85	Peak
7	504.330	34.08	-4.70	29.38	37.00	-7.62	Peak
8	531.490	32.29	-4.18	28.11	37.00	-8.89	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:

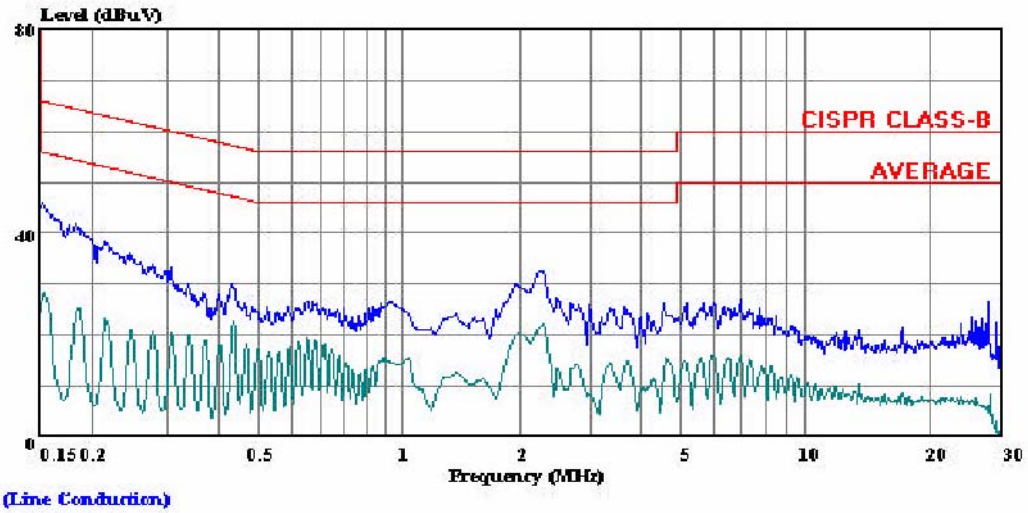
6 WORST EMISSIONS

Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.15	45.96	--	27.96	0.00	65.89	55.89	-19.93	-27.93	L1
2.33	32.63	--	22.11	0.00	56.00	46.00	-23.37	-23.89	L1
27.56	26.67	--	8.34	0.00	60.00	50.00	-33.33	-41.66	L1
0.26	53.80		13.16	0.00	61.56	51.56	-61.56	-38.40	L2
2.57	29.84	--	14.51	0.00	56.00	46.00	-26.16	-31.49	L2
5.74	27.61	--	16.68	0.00	60.00	50.00	-32.39	-33.32	L2
6 Worst Data									

LINE 1 RESULTS

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 7 File#: 08u12182 1.EMI Date: 10-28-2008 Time: 21:28:20



(Line Conduction)

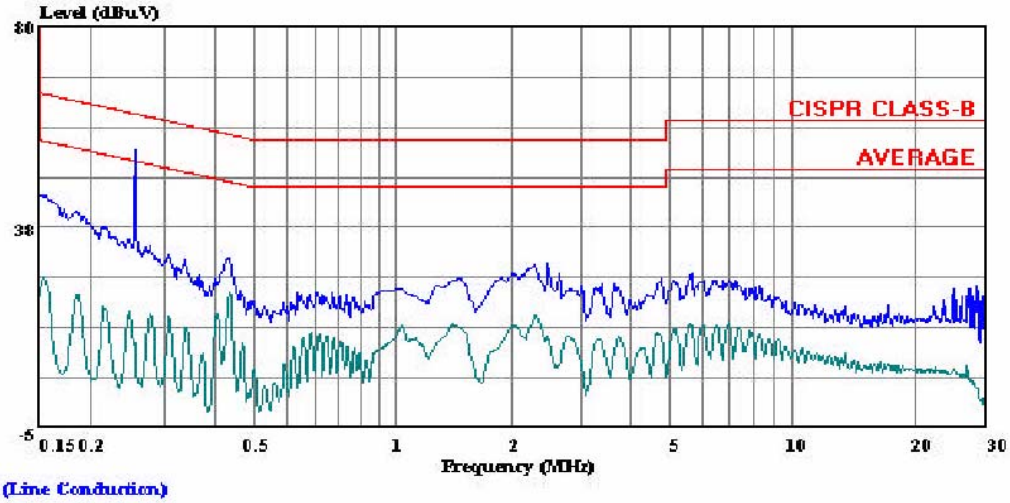
Trace: 5 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Monica Harrison
Project #: : 08J12182
Company: : VIVOtech
Configuration:: EUT only
Mode: : TX
Target: : FCC CLASS B
Voltage: : 115 VAC / 60Hz
: L1: Peak (Blue), Average (Green)

LINE 2 RESULTS

Compliance Certification Services
47173 Benicia Street
Fremont, CA 94538
Tel: (510) 771-1000
Fax: (510) 661-0888

Data#: 14 File#: 08u12182 1.EMI Date: 10-28-2008 Time: 21:33:47



Trace: 12 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Monica Harrison
Project #: : 08J12182
Company: : VIVOtech
Configuration:: EUT only
Mode: : TX
Target: : FCC CLASS B
Voltage: : 115 VAC / 60Hz
: L2: Peak (Blue), Average (Green)

7.3. FREQUENCY STABILITY

LIMIT

§15.225 (e) The frequency tolerance of the carrier signal shall be maintained within ±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 Clause 2.3.1 and 2.3.2

RESULTS

		Limit:	1.356	kHz
Power Supply	**Environment**	**Frequency Deviation Measureed with Time Elapse**		
(Vac)	**Temperature (ºC)**	**(MHz)**	**Delta (kHz)**	**Margin (kHz)**
115.00	50	13.5604654	-0.069	-1.287
115.00	40	13.5605327	-0.001	-1.355
115.00	30	13.5605420	0.008	-1.348
115.00	***20***	***13.5605342***	***0.000***	***-1.356***
115.00	10	13.5606144	0.080	-1.276
115.00	0	13.5606759	0.142	-1.214
115.00	-10	13.5607664	0.232	-1.124
115.00	-20	13.5607276	0.193	-1.163
97.15	20	13.5605308	-0.003	-1.353
132.25	20	13.5605292	-0.005	-1.351

7.4. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

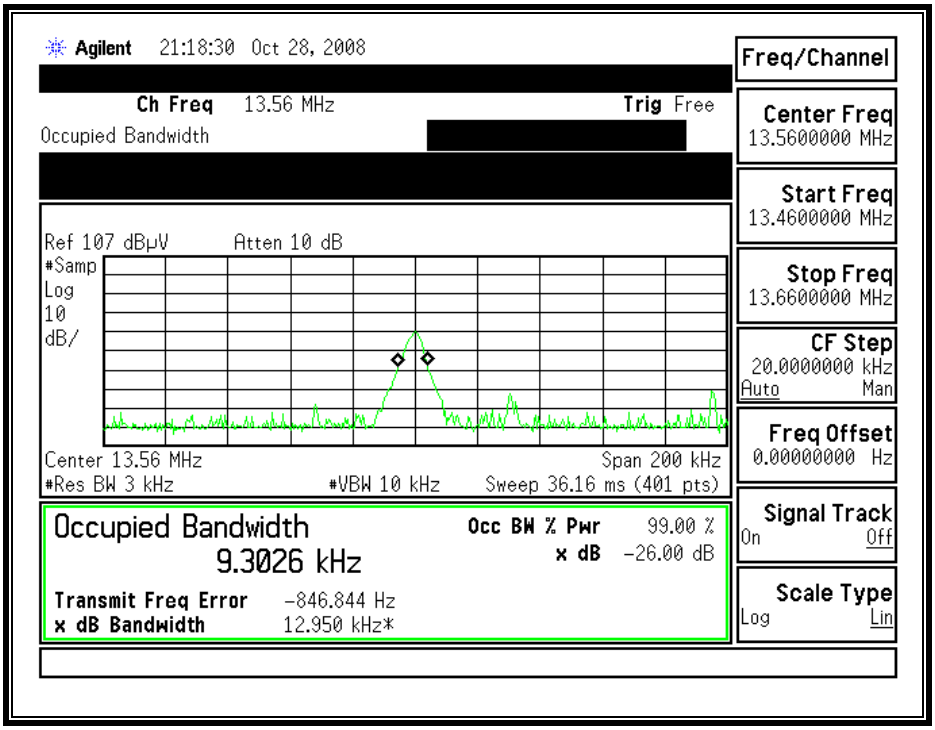
TEST PROCEDURE

The transmitter output is connected to the spectrum analyzer. The RBW is set to 1% to 3% of the 99 % bandwidth. The VBW is set to 3 times the RBW. The sweep time is coupled. The spectrum analyzer internal 99% bandwidth function is utilized.

RESULTS

Frequency (MHz)	99% Bandwidth kHz
13.56	9.3026

99% BANDWIDTH



8. SETUP PHOTOS

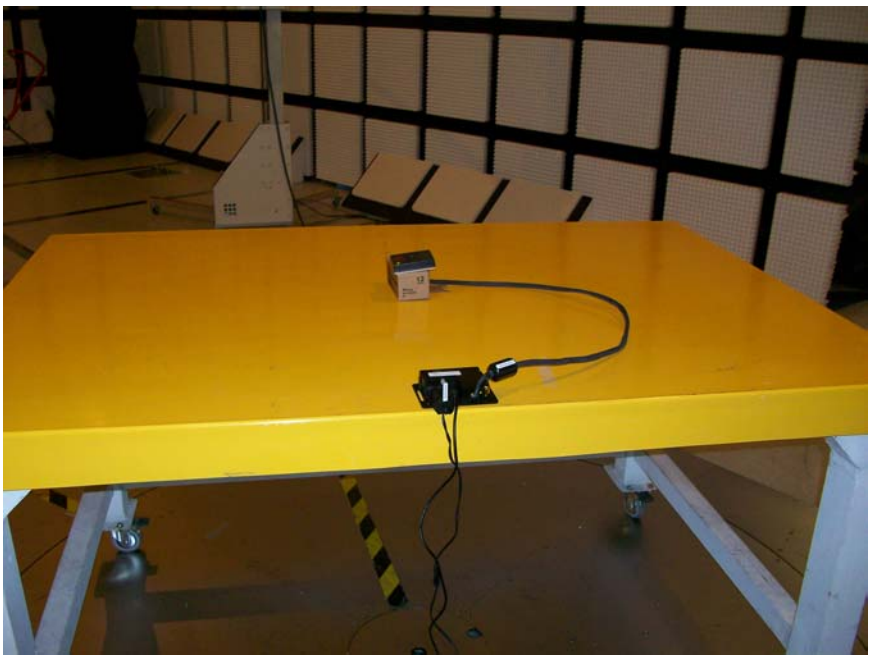
RADIATED EMISSION (0.15-30 MHz)

RADIATED EMISSION (0.15-30 MHz)

RADIATED EMISSION (0.15-30 MHz)

RADIATED EMISSION (30-1000 MHz)

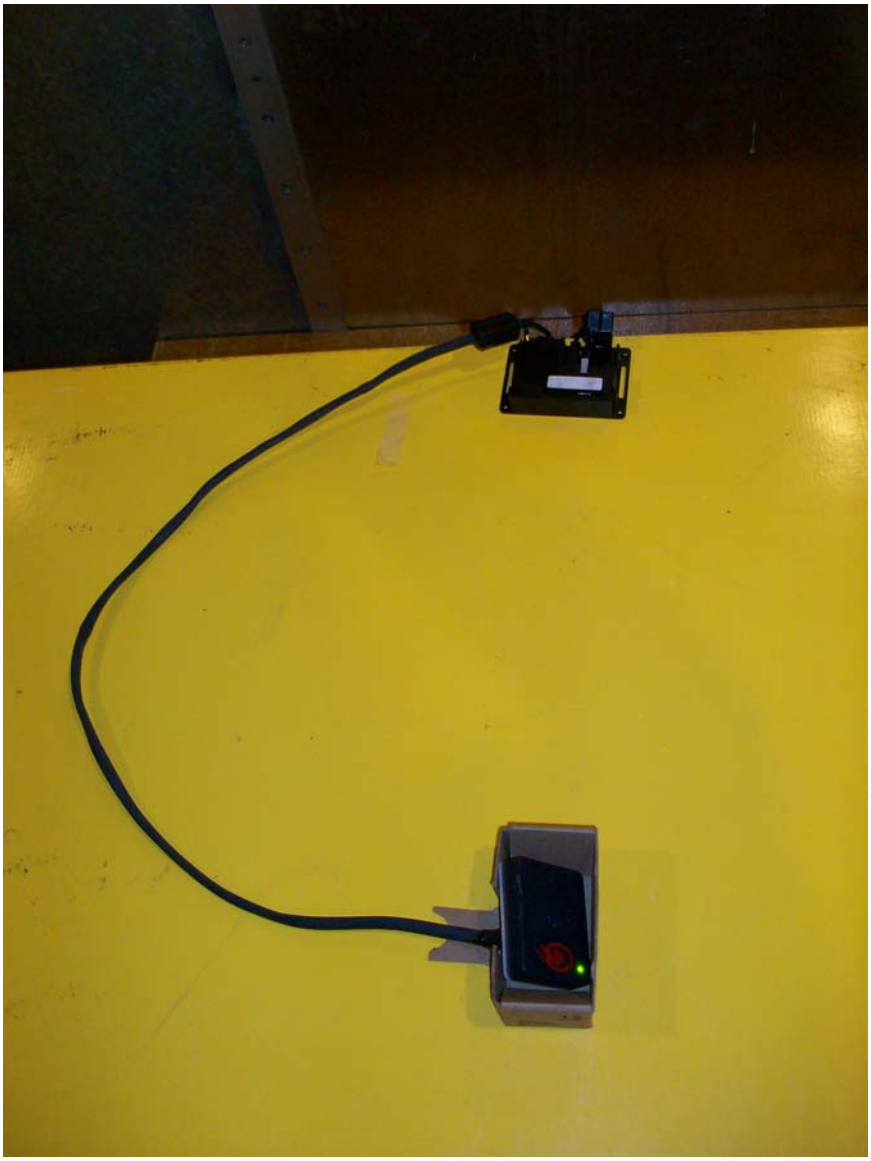
RADIATED EMISSION (30-1000 MHz) - FRONT



RADIATED EMISSION (30-1000 MHz) - BACK

AC MAINS LINE CONDUCTED EMISSION

LINE CONDUCTED EMISSION (FRONT)



LINE CONDUCTED EMISSION (BACK)

FREQUENCY TOLERANCE OVER EXTREME CONDITIONS

FREQUENCY TOLERANCE OVER EXTREME CONDITIONS

END OF REPORT