



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

CERTIFICATION TEST REPORT

FOR

PCI-PED v2.1 & ISO/IEC14443 Contactless Reader

MODEL NUMBER: ViVOpay 8800

**FCC ID: Q55VIVOPAY8800
IC: 5141A-VP8800**

REPORT NUMBER: 09U12613-1, Revision B

ISSUE DATE: OCTOBER 28, 2009

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
FAX: (510) 661-0888

NVLAP[®]

NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	10/09/09	Initial Issue	F. Ibrahim
A	10/15/09	Added a note in section 5.2 explaining the declared maximum electric field strength.	F. Ibrahim
B	10/28/09	Revised the declared maximum electric field strength in section 5.2. Revised Description of EUT. Revised radiated emissions data sheet for frequencies below 30 MHz. Revised test procedure reference for frequency stability test item	F. Ibrahim

TABLE OF CONTENTS

1. ATTESTATION OF TEST RESULTS.....	4
2. TEST METHODOLOGY	5
3. FACILITIES AND ACCREDITATION.....	5
4. CALIBRATION AND UNCERTAINTY	5
4.1. <i>MEASURING INSTRUMENT CALIBRATION.....</i>	5
4.2. <i>SAMPLE CALCULATION.....</i>	5
4.3. <i>MEASUREMENT UNCERTAINTY.....</i>	5
5. EQUIPMENT UNDER TEST	6
5.1. <i>DESCRIPTION OF EUT.....</i>	6
5.2. <i>MAXIMUM OUTPUT POWER.....</i>	6
5.3. <i>DESCRIPTION OF AVAILABLE ANTENNAS.....</i>	7
5.4. <i>SOFTWARE AND FIRMWARE.....</i>	7
5.5. <i>WORST-CASE CONFIGURATION AND MODE</i>	7
5.6. <i>MODIFICATIONS.....</i>	7
5.7. <i>DESCRIPTION OF TEST SETUP.....</i>	9
6. TEST AND MEASUREMENT EQUIPMENT	11
7. RADIATED EMISSION TEST RESULTS.....	12
7.1. <i>LIMITS AND PROCEDURE</i>	12
7.1.1. <i>FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz)</i>	14
7.1.2. <i>TX/RX SPURIOUS EMISSION 30 TO 1000 MHz (DIGITAL).....</i>	15
7.1.3. <i>TX/RX SPURIOUS EMISSION 30 TO 1000 MHz (RADIO)</i>	18
8. AC MAINS LINE CONDUCTED EMISSIONS.....	19
9. FREQUENCY STABILITY.....	23
10. 99% BANDWIDTH.....	24
11. SETUP PHOTOS	26

1. ATTESTATION OF TEST RESULTS

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

EUT DESCRIPTION: PCI-PED v2.1 & ISO/IEC14443 Contactless Reader

MODEL: ViVOpay 8800

SERIAL NUMBER: 9

DATE TESTED: SEPTEMBER 10 TO 11, 2009

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	Pass
FCC PART 15 SUBPART B	Pass
INDUSTRY CANADA RSS-210 Issue 7, Annex 2	Pass
INDUSTRY CANADA RSS-GEN Issue 2	Pass

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. Measurement Uncertainties were not taken into account and are published for informational purposes only. 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. This report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, any agency of the Federal Government, or any agency of any government.

Approved & Released For CCS By:



FRANK IBRAHIM
EMC SUPERVISOR
COMPLIANCE CERTIFICATION SERVICES

Tested By:



TOM CHEN
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.

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. SAMPLE CALCULATION

Where relevant, the following sample calculation is provided:

$$\begin{aligned} \text{Field Strength (dBuV/m)} &= \text{Measured Voltage (dBuV)} + \text{Antenna Factor (dB/m)} + \\ &\text{Cable Loss (dB)} - \text{Preamp Gain (dB)} \\ 36.5 \text{ dBuV} + 18.7 \text{ dB/m} + 0.6 \text{ dB} - 26.9 \text{ dB} &= 28.9 \text{ dBuV/m} \end{aligned}$$

4.3. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Conducted Disturbance, 0.15 to 30 MHz	3.52 dB
Radiated Disturbance, 30 to 1000 MHz	4.94 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT



VP8800 is a PCI-PED v2.1 & ISO/IEC14443 Contactless Reader. It operates at 13.56 MHz.

Clock frequencies are as follows:

RFID carrier frequency: 13.56 MHz

FPGA LCD controller: 25 MHz

SD_RAM system clock: 90 MHz

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum E field as follows:

Frequency (MHz)	Mode	Fundamental E field @ 30m distance (dBuV/m)
13.56	Normal TX mode	28.91

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The 13.56MHz antenna is integrated inside the product, around the LCD area invisible to the user

5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was HG1-AR1.1.0.

5.5. WORST-CASE CONFIGURATION AND MODE

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

5.6. MODIFICATIONS

The following modification was implemented for the EUT to pass radiated emissions:

	Original Value	New Value Updated
R24	0 Ω	470 Ω Ferrite P/N : BLM21B471SB
R59	22Ω	180 Ω

For more details see below:



October 5th, 2009

Federal Communications Commission
Equipment Authorization branch
7435 Oakland Mills Road
Columbia, MD 21046

Re: Attestation to the modification made to FCC ID : **Q55VIVOPAY8800**

Gentlemen:

The following modifications were implemented in order to pass radiated emissions during the digital device tests:

	Original Value	New Value Updated
R24	0 Ω	470 Ω Ferrite P/N : BLM21B471SB
R59	22Ω	180 Ω

Sincerely,

A blue ink signature of the name "Tony Phan".

Tony Phan
Director, Certification and Test Engineering
ViVOtech, Inc.

451 EL CAMINO REAL, SUITE 200, SANTA CLARA, CA 95050
PH: (408) 248-7001 FAX: (408) 248-7002

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Dell	Latitude D610	CN-0U8082-48643-5CE-5546	DoC
AC/DC	GLOBAL POWER	3A-161WP09	GPWAC-15-09-2-VT	N/A
AC/DC	Dell	HA65NS1-0	CN-OHN662-47890-79I-C03L	DoC

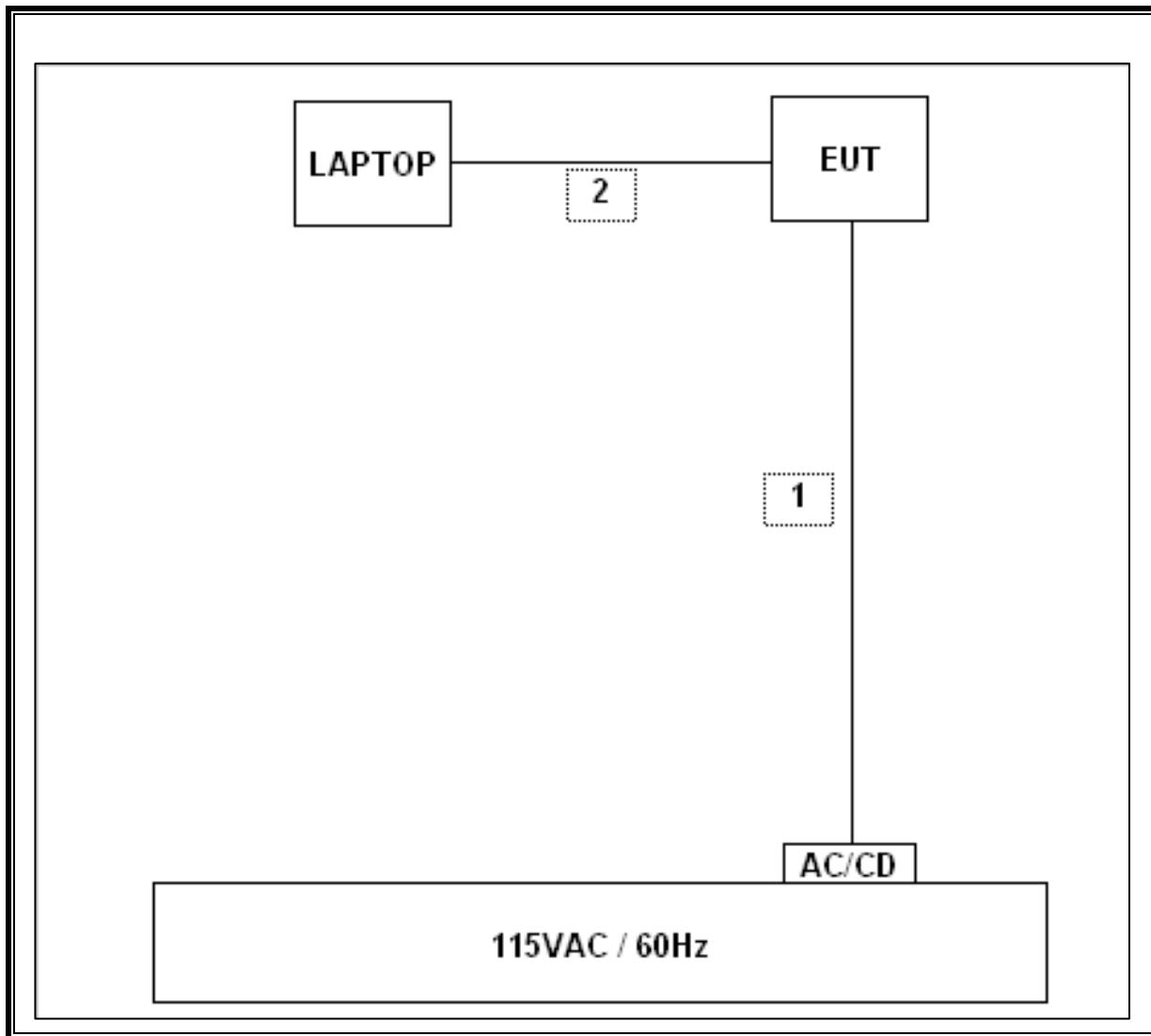
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	DC	1	DC	Un-Shielded	1.0 m	Ferrite at one End

TEST SETUP

The EUT is stand-alone unit. Its Ethernet port terminated to the laptop. 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	
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	12/16/08	12/16/09	
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	01/14/09	01/14/10	
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01176	08/24/09	08/24/10	
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/29/08	10/29/09	
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/06/09	05/06/11	
Temperature / Humidity Chamber	Thermotron	SE 600-10-10	C00930	04/06/09	04/06/10	
Antenna, Loop, 30 MHz	EMCO	6502	C00593	09/16/08	09/16/10	

7. RADIATED EMISSION TEST RESULTS

7.1. LIMITS AND PROCEDURE

LIMIT

§15.225

IC RSS-210, Section 2.6 (Transmitter)
IC RSS-GEN, Section 6 (Receiver)

(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 (μ V/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 field 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.

TEST PROCEDURE

ANSI C63.4

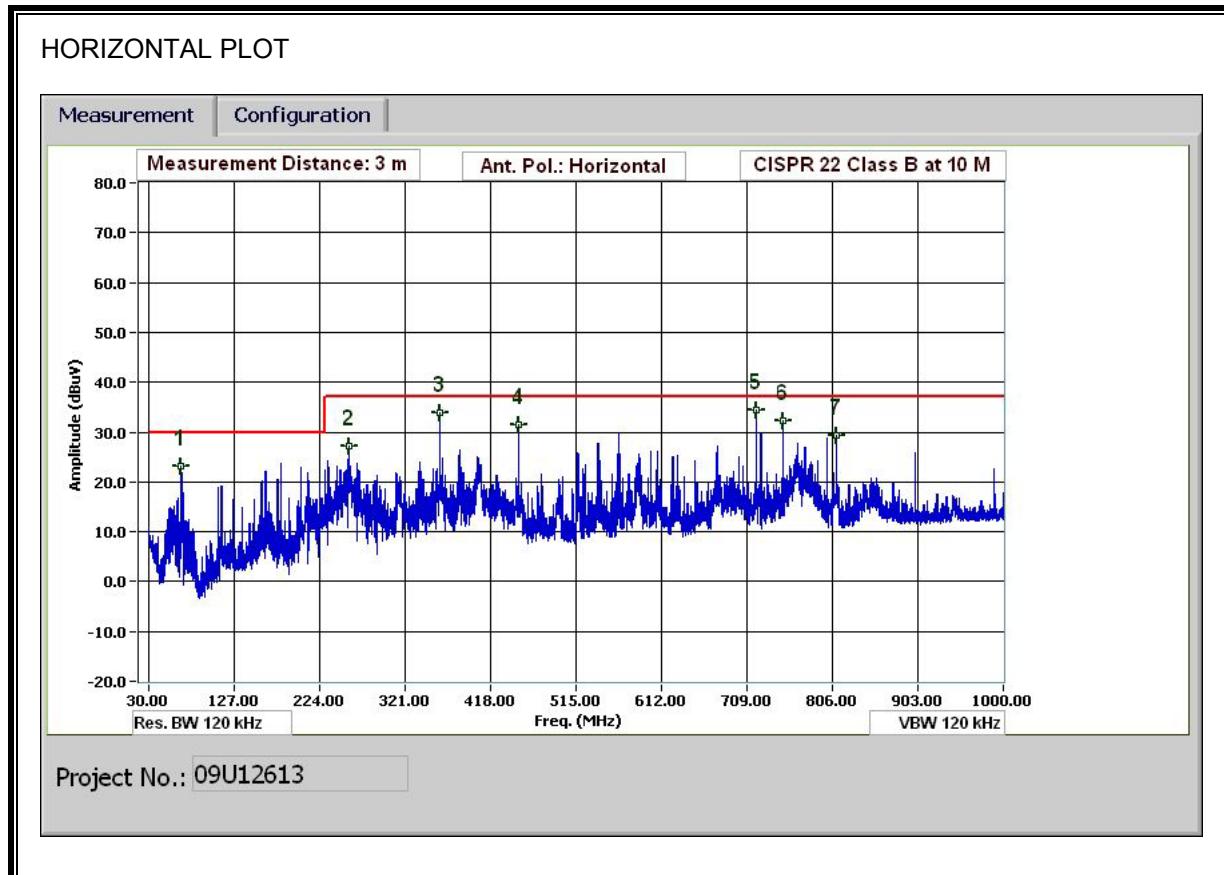
The EUT is an intentional radiator that incorporates a digital device, the highest fundamental frequency generated or used in the device is 90 MHz; therefore, the frequency range was investigated from 30 MHz to 1000 MHz.

RESULTS

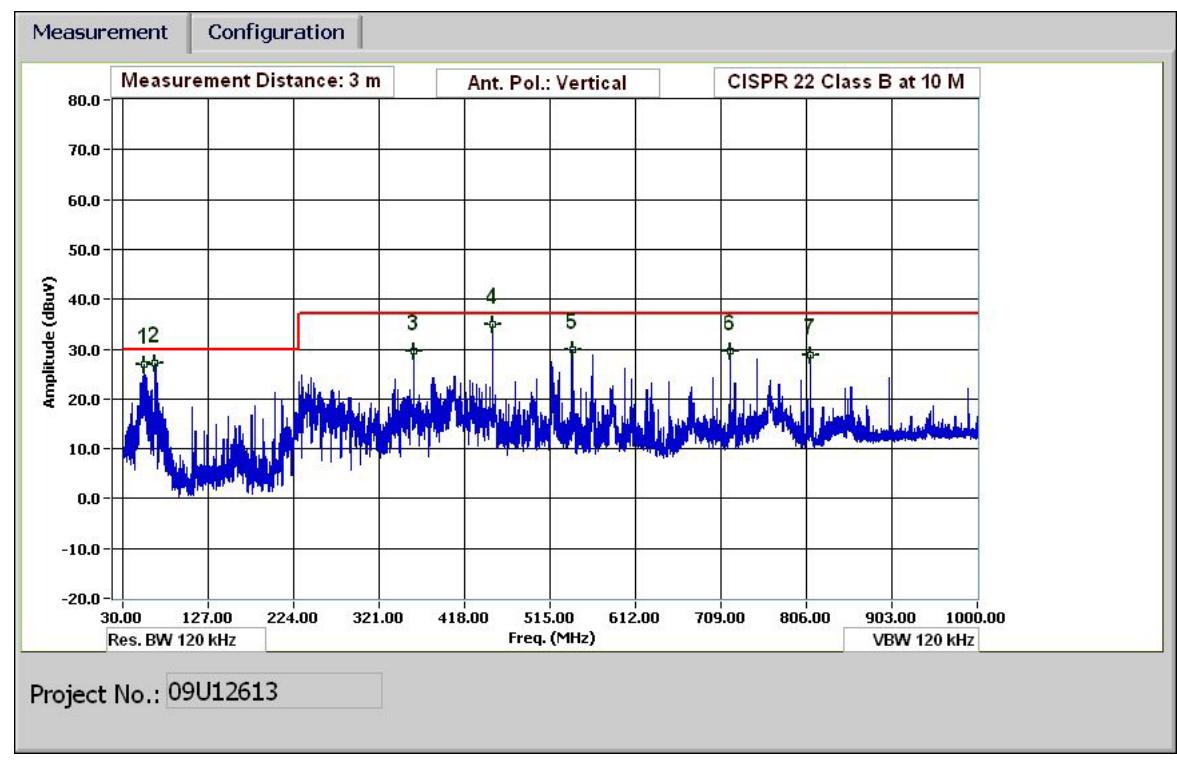
7.1.1. FUNDAMENTAL AND SPURIOUS EMISSIONS (0.15 – 30 MHz)

FCC Part 15, Subpart B & C 5 Meter Distance Measurement At Open Field												
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	48.61		N/A	10.56	-31.12	28.05	N/A	84.00	N/A	-56.0	N/A	Fundamental @5m Dist
13.41	24.10		N/A	10.54	-31.12	3.52	N/A	50.48	N/A	-47.0	N/A	13.41-13.553MHz Spurious @ 5m
13.553	43.09		N/A	10.56	-31.12	22.53	N/A	50.48	N/A	-28.0	N/A	13.41-13.553MHz Spurious @ 5m
13.567	46.30		N/A	10.56	-31.12	25.74	N/A	50.48	N/A	-24.7	N/A	13.567-13.710MHz Spurious @ 5m
13.71	27.20		N/A	10.57	-31.12	6.65	N/A	40.51	N/A	-33.9	N/A	13.567-13.710MHz Spurious @ 5m
13.11	14.20		N/A	10.51	-31.12	-6.41	N/A	40.51	N/A	-46.9	N/A	13.110-13.410MHz Spurious @ 5m
13.41	24.60		N/A	10.54	-31.12	4.02	N/A	40.51	N/A	-36.5	N/A	13.110-13.410MHz Spurious @ 5m
13.71	27.20		N/A	10.57	-31.12	6.65	N/A	40.51	N/A	-33.9	N/A	13.710-14.010MHz Spurious @ 5m
14.01	33.20		N/A	10.6	-31.12	12.68	N/A	29.54	N/A	-16.9	N/A	13.710-14.010MHz Spurious @ 5m
27.12	15.10		N/A	9.046	-31.12	-6.97	N/A	29.54	N/A	-36.5	N/A	14.010-30MHz Spurious @ 5m
Loop Antenna Face Off:												
13.56	49.47		N/A	10.56	-31.12	28.91	N/A	84.00	N/A	-55.1	N/A	Fundamental @ 5m Dist
13.41	24.90		N/A	10.54	-31.12	4.32	N/A	50.48	N/A	-46.2	N/A	13.41-13.553MHz Spurious @ 5m
13.553	43.83		N/A	10.56	-31.12	23.27	N/A	50.48	N/A	-27.2	N/A	13.41-13.553MHz Spurious @ 5m
13.567	47.05		N/A	10.56	-31.12	26.49	N/A	50.48	N/A	-24.0	N/A	13.567-13.710MHz Spurious @ 5m
13.71	24.34		N/A	10.57	-31.12	3.79	N/A	40.51	N/A	-36.7	N/A	13.567-13.710MHz Spurious @ 5m
13.11	18.00		N/A	10.51	-31.12	-2.61	N/A	40.51	N/A	-43.1	N/A	13.110-13.410MHz Spurious @ 5m
13.41	24.90		N/A	10.54	-31.12	4.32	N/A	40.51	N/A	-36.2	N/A	13.110-13.410MHz Spurious @ 5m
13.71	24.34		N/A	10.57	-31.12	3.79	N/A	40.51	N/A	-36.7	N/A	13.710-14.010MHz Spurious @ 5m
14.01	10.40		N/A	10.6	-31.12	-10.12	N/A	29.54	N/A	-39.7	N/A	13.710-14.010MHz Spurious @ 5m
27.12	14.20		N/A	9.046	-31.12	-7.87	N/A	29.54	N/A	-37.4	N/A	14.010-30MHz Spurious @ 5m
* No more emissions were found up to 30MHz												
<u>Note:</u> 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												
Rev. 10.23.09												

7.1.2. TX/RX SPURIOUS EMISSION 30 TO 1000 MHz (DIGITAL)



VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

30-1000MHz Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: Tom Chen
 Date: 09/04/09
 Project #: 09U12613
 Company: Vivotech
 EUT Description: Wireless Card Reader
 EUT M/N: VP8800
 Test Target: FCC Class B
 Mode Oper: Normal

f	Measurement Frequency	Amp	Preamp Gain	Margin	Margin vs. Limit
Dist	Distance to Antenna	D	Corr	Distance Correct to 3 meters	
Read	Analyzer Reading	Filter		Filter Insert Loss	
AF	Antenna Factor	Corr.		Calculated Field Strength	
CL	Cable Loss	Limit		Field Strength Limit	

f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filter dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Ant. High cm	Table Angle Degree	Notes
Horizontal Production unit5 w/ serial cable + laptop un-grounded															
66.962	3.0	53.1	8.1	0.7	28.3	-10.5	0.0	23.1	30.0	-6.9	H	EP	100.0	0 - 360	Prescan
257.649	3.0	51.7	12.0	1.4	27.4	-10.5	0.0	27.2	37.0	-9.8	H	EP	100.0	0 - 360	Prescan
360.014	3.0	56.0	14.4	1.6	27.8	-10.5	0.0	33.8	37.0	-3.2	H	EP	100.0	0 - 360	Prescan
450.017	3.0	52.5	15.9	1.9	28.3	-10.5	0.0	31.5	37.0	-5.5	H	EP	100.0	0 - 360	Prescan
720.028	3.0	51.7	19.3	2.4	28.5	-10.5	0.0	34.5	37.0	-2.5	H	EP	100.0	0 - 360	Prescan
750.030	3.0	48.8	19.9	2.5	28.4	-10.5	0.0	32.4	37.0	-4.6	H	EP	100.0	0 - 360	Prescan
810.032	3.0	44.3	21.0	2.6	28.2	-10.5	0.0	29.2	37.0	-7.8	H	EP	100.0	0 - 360	Prescan
Vertical Production unit5 w/ serial cable + laptop un-grounded															
54.961	3.0	56.5	8.6	0.6	28.3	-10.5	0.0	27.0	30.0	-3.0	V	EP	100.0	0 - 360	Prescan
66.962	3.0	57.1	8.1	0.7	28.3	-10.5	0.0	27.2	30.0	-2.8	V	EP	100.0	0 - 360	Prescan
360.014	3.0	51.9	14.4	1.6	27.3	-10.5	0.0	29.7	37.0	-7.3	V	EP	100.0	0 - 360	Prescan
450.017	3.0	55.9	15.9	1.9	28.3	-10.5	0.0	35.0	37.0	-2.0	V	EP	100.0	0 - 360	Prescan
540.021	3.0	49.5	17.5	2.1	28.6	-10.5	0.0	30.0	37.0	-7.0	V	EP	100.0	0 - 360	Prescan
720.028	3.0	46.9	19.3	2.4	28.5	-10.5	0.0	29.7	37.0	-7.3	V	EP	100.0	0 - 360	Prescan
810.032	3.0	43.7	21.0	2.6	28.2	-10.5	0.0	28.7	37.0	-8.3	V	EP	100.0	0 - 360	Prescan

Rev. 1.27.09

Note: No other emissions were detected above the system noise floor.

7.1.3. TX/RX SPURIOUS EMISSION 30 TO 1000 MHz (RADIO)

HORIZONTAL AND VERTICAL DATA

30-1000MHz Frequency Measurement Compliance Certification Services, Fremont 5m Chamber																
Test Engr:		MENGISTU MEKURIA														
Date:		08/04/09														
Project #:		09U12613														
Company:		VIVOTECH														
EUT Description:		WIRELESS CARD READER														
EUT M/N:		VP8800														
Test Target:		FCC CLASS B														
Mode Oper:		ACTIVE TX MODE														
f		Measurement Frequency		Amp	Preamp Gain		Margin		Margin vs. Limit							
Dist		Distance to Antenna		D	Corr		Distance Correct to 3 meters									
Read		Analyzer Reading		Filter	Filter Insert Loss											
AF		Antenna Factor		Corr.	Calculated Field Strength											
CL		Cable Loss		Limit	Field Strength Limit											
f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Filter dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol V/H	Det. P/A/QP	Notes			
54.481	3.0	53.8	8.2	0.7	28.4	0.0	0.0	34.3	40.0	-5.7	H	P				
67.922	3.0	50.4	8.0	0.7	28.4	0.0	0.0	30.8	40.0	-9.2	H	P				
112.083	3.0	47.6	12.2	1.0	28.3	0.0	0.0	32.4	43.5	-11.1	H	P				
157.925	3.0	47.4	11.9	1.1	28.3	0.0	0.0	32.2	43.5	-11.3	H	P				
180.006	3.0	51.6	11.1	1.2	28.2	0.0	0.0	35.7	43.5	-7.8	H	P				
211.087	3.0	53.1	12.0	1.3	28.2	0.0	0.0	38.1	43.5	-5.4	H	P				
75.002	3.0	54.7	7.7	0.8	28.3	0.0	0.0	34.8	40.0	-5.2	V	P				
112.563	3.0	51.8	12.3	1.0	28.3	0.0	0.0	36.8	43.5	-6.7	V	P				
124.924	3.0	55.9	13.7	1.1	28.3	0.0	0.0	42.4	43.5	-1.1	V	P				
180.006	3.0	46.6	11.1	1.2	28.2	0.0	0.0	30.7	43.5	-12.8	V	P				
211.087	3.0	49.6	12.0	1.3	28.2	0.0	0.0	34.6	43.5	-8.9	V	P				
Rev. 1.27.09																
Note: No other emissions were detected above the system noise floor.																

8. AC MAINS LINE CONDUCTED EMISSIONS

LIMITS

§15.207
IC RSS-GEN, Section 7.2.2

(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 50 μ H/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 (dB μ V)	
	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.

TEST PROCEDURE

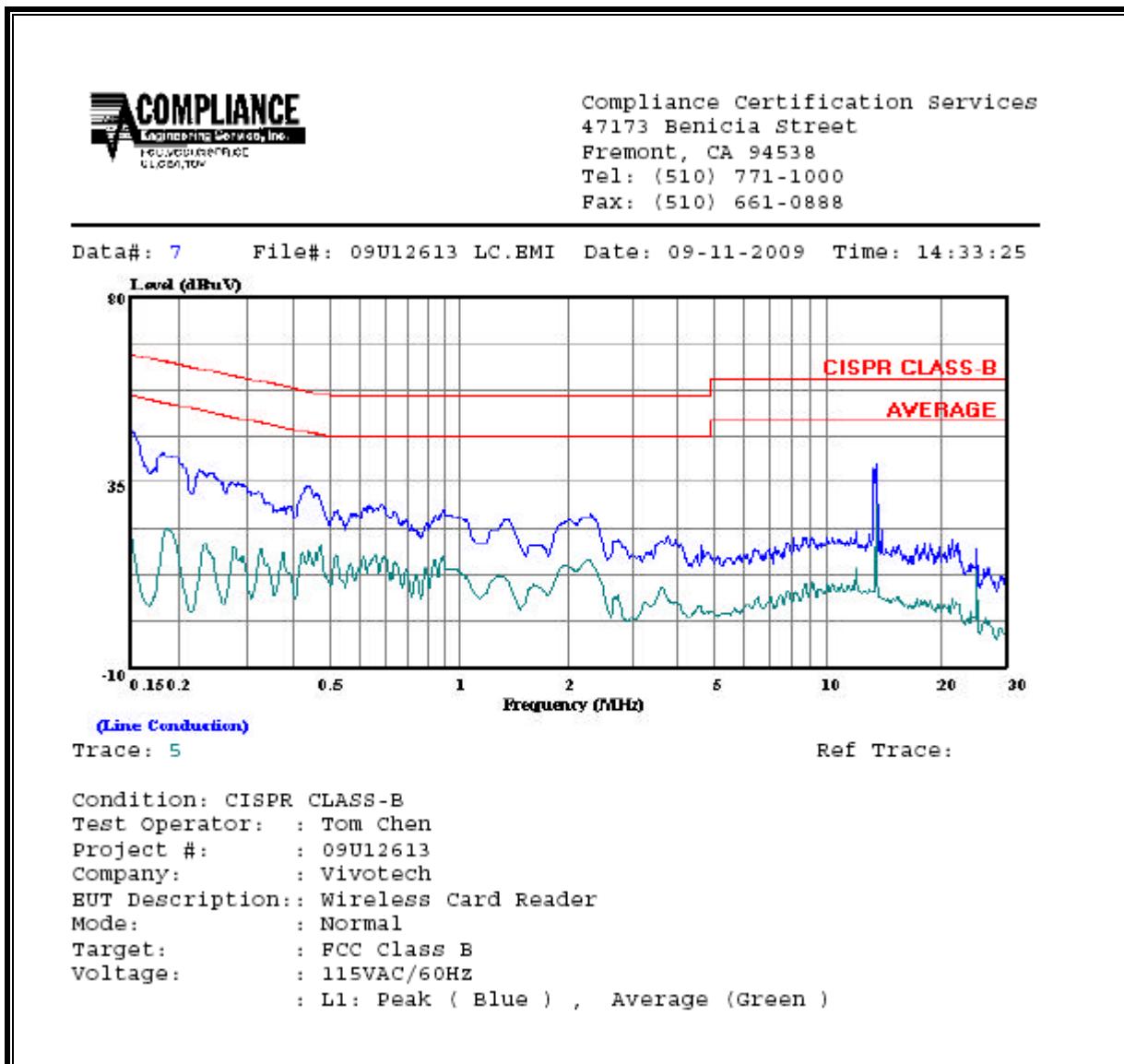
ANSI C63.4

RESULTS

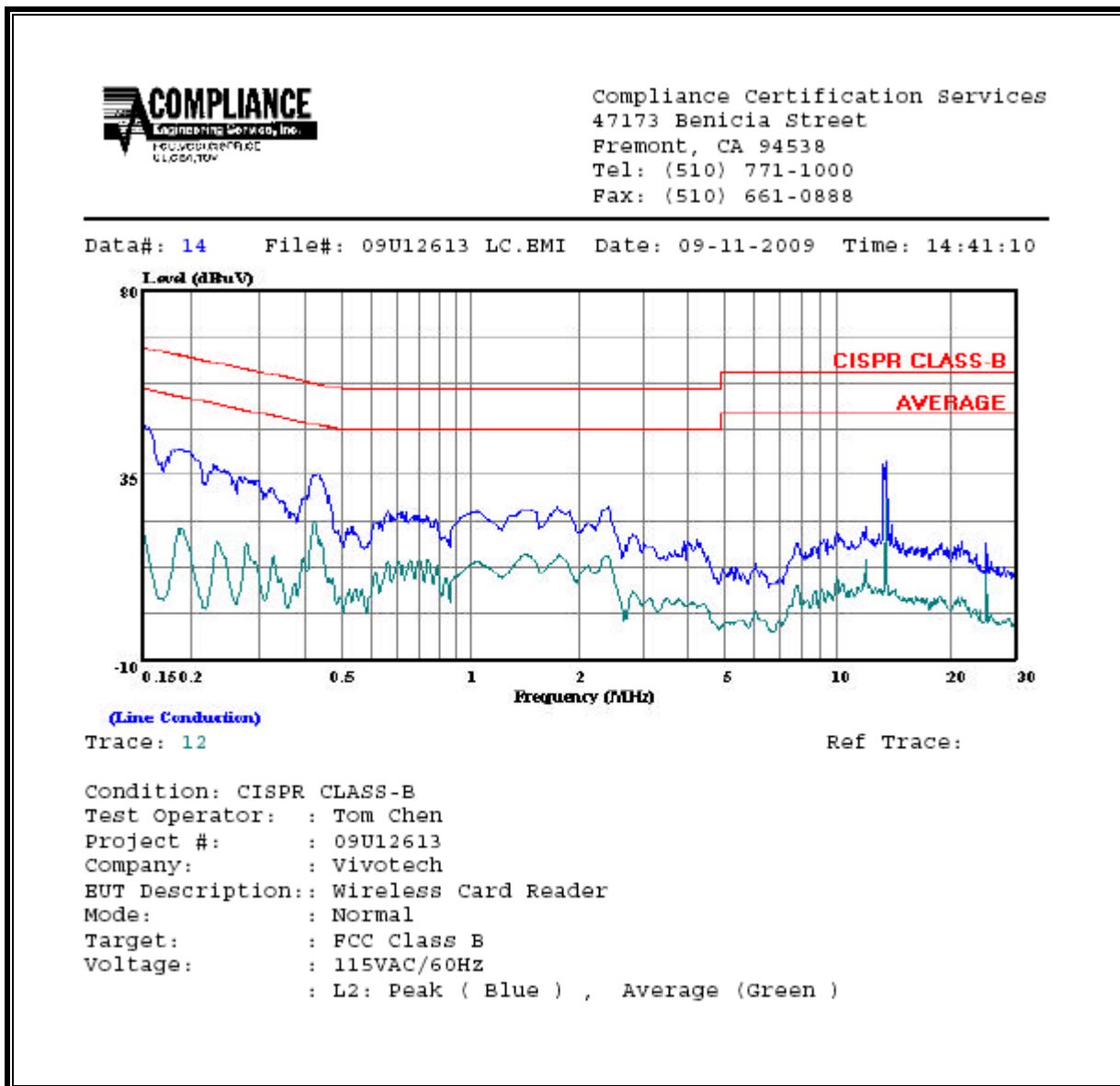
6 WORST EMISSIONS

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Closs (dB)	Limit QP	EN_B AV	Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.15	46.90	--	17.12	0.00	65.84	55.84	-18.94	-38.72	L1
0.44	34.19	--	17.49	0.00	57.06	47.06	-22.87	-29.57	L1
13.55	39.29	--	30.22	0.00	60.00	50.00	-20.71	-19.78	L1
0.15	46.21	--	17.66	0.00	65.84	55.84	-19.63	-38.18	L2
0.43	34.82	--	23.94	0.00	57.33	47.33	-22.51	-23.39	L2
13.55	38.22	--	30.93	0.00	60.00	50.00	-21.78	-19.07	L2
6 Worst Data									

LINE 1 RESULTS



LINE 2 RESULTS



9. 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 C63.4:2003
Clause 13.1.5

RESULTS

Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse			Limit = 1.356 kHz
		(MHz)	Delta (kHz)	Margin (kHz)	
115.00	50	13.5601500	0.057	-1.299	
115.00	40	13.5601190	0.026	-1.330	
115.00	30	13.5601562	0.063	-1.293	
115.00	20	13.5600930	0.000	-1.356	
115.00	10	13.5601840	0.091	-1.265	
115.00	0	13.5602546	0.162	-1.194	
115.00	-10	13.5602894	0.196	-1.160	
115.00	-20	13.5603078	0.215	-1.141	
97.15	20	13.5614400	1.347	-0.009	
132.25	20	13.5614200	1.327	-0.029	

10. 99% BANDWIDTH

LIMITS

None, for reporting purposes only.

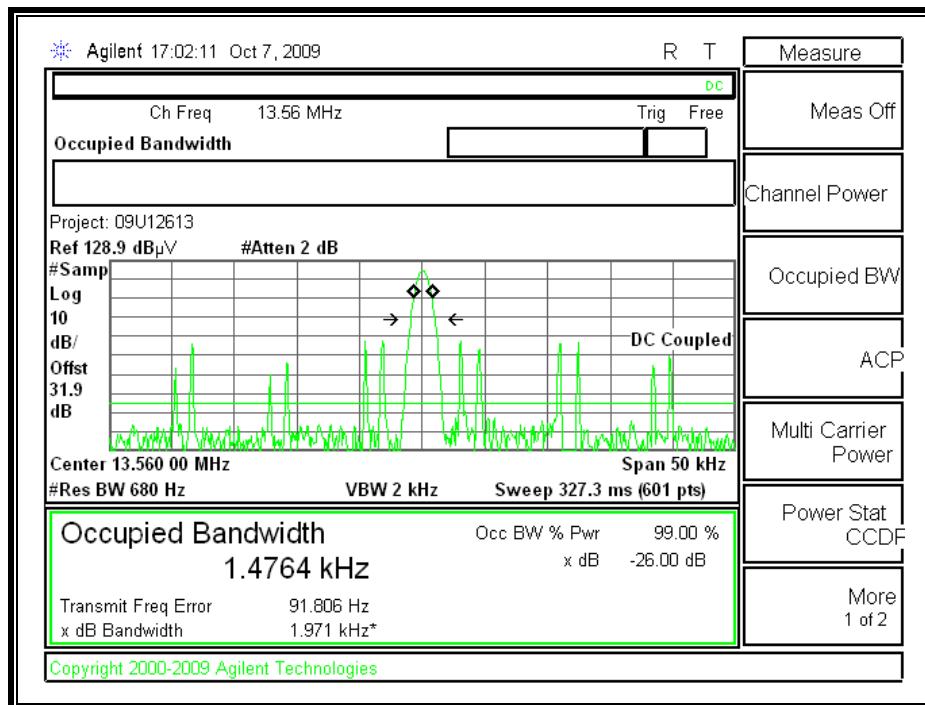
TEST PROCEDURE

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	1.4764

99% BANDWIDTH



11. SETUP PHOTOS

RADIATED EMISSION BELOW 30 MHz



RADIATED EMISSIONS BELOW 30MHz (BACK)



RADIATED EMISSION ABOVE 30 MHz



RADIATED EMISSIONS ABOVE 30 MHz (BACK)



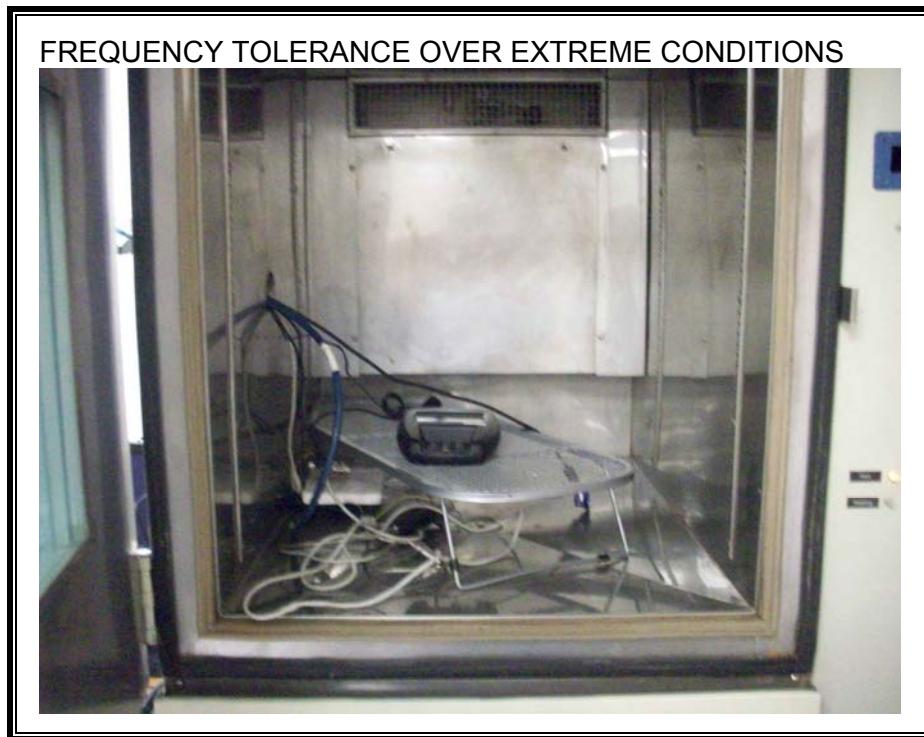
AC MAINS LINE CONDUCTED EMISSION



LINE CONDUCTED EMISSION (BACK)



FREQUENCY TOLERANCE OVER EXTREME CONDITIONS



END OF REPORT