



**FCC CFR47 PART 15 SUBPART C
INDUSTRY CANADA RSS-210 ISSUE 7**

CERTIFICATION TEST REPORT

FOR

RFID MODULE INSIDE LAPTOP PC

MODEL NUMBER: P02G

**FCC ID: E2K5880-27
IC: 1514B-588027**

REPORT NUMBER: 09U12341-1

ISSUE DATE: MARCH19, 2009

Prepared for
**AUGMENTIX CORPORATION
4030 W BRAKER LANE, BUILDING 2-100
AUSTIN,
TX, 78759, U.S.A**

Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
--	03/19/09	Initial Issue	F. Ibrahim

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: AUGMENTIX CORPORATION
4030 W. BRAKER LANE, BUILDING 2-100
AUSTIN, TX, 78759, U.S.A

EUT DESCRIPTION: RFID MODULE INSIDE LAPTOP PC

MODEL: P02G

SERIAL NUMBER: 0004

DATE TESTED: FEBRUARY 9-10, 2009

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART C	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. 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:



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. MEASUREMENT UNCERTAINTY

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

PARAMETER	UNCERTAINTY
Power Line Conducted Emission	+/- 2.3 dB
Radiated Emission	+/- 3.4 dB

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

5. EQUIPMENT UNDER TEST

5.1. DESCRIPTION OF EUT

The EUT is an RFID module inside a laptop PC.

5.2. MAXIMUM OUTPUT POWER

The transmitter has a maximum QP radiated electric field strength at 30m as follows:

Frequency Range (MHz)	Mode	E field strength (dBuV/m)
13.56	TX	21.17

5.3. DESCRIPTION OF AVAILABLE ANTENNAS

The radio utilizes a loop antenna.

5.4. SOFTWARE AND FIRMWARE

The test utility software used during testing was Broadcom USH diagnostics V1.0.0.36.

5.5. WORST-CASE CONFIGURATION AND MODE

EUT is installed inside a host Laptop PC, test utility software was used to exercise and activate the EUT.

5.6. MODIFICATIONS

No modifications were made during testing.

5.7. DESCRIPTION OF TEST SETUP

SUPPORT EQUIPMENT

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
AC Adapter	DELL	DA90PE0-00	48661-86N-09K8	DoC
Laptop	DELL	PP27L	0004	E2K5880-27

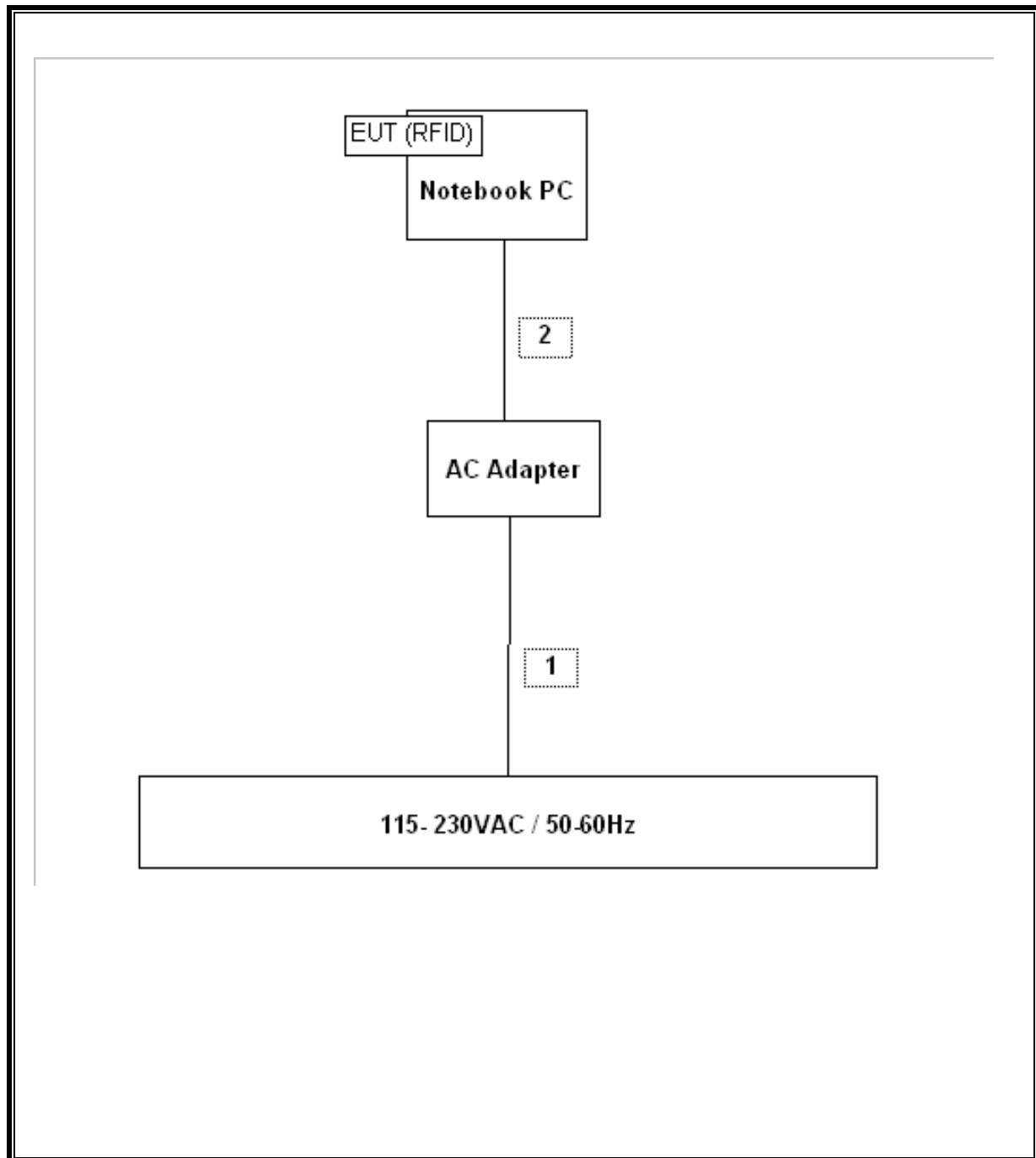
I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC Input	1	IEC-320	Un-Shielded	1m	
2	DC	1	DC	Un-Shielded	1.5m	

TEST SETUP

The EUT is installed in a host laptop computer during the tests. 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	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	12/16/09
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	01/14/10
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	10/29/09
Loop Antenna	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	02/07/10

7. 99% BANDWIDTH

LIMITS

None; for reporting purposes only.

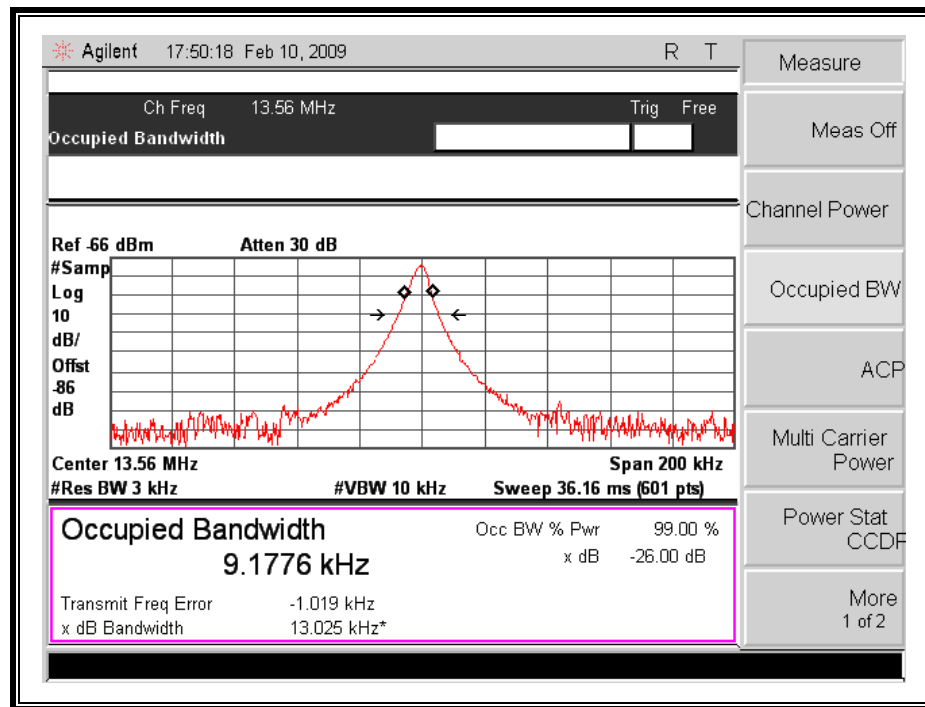
TEST PROCEDURE

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	9.1766

99% BANDWIDTH



8. RADIATED EMISSION TEST RESULTS

8.1. 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 (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.

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 13.56 MHz; therefore, the frequency range was investigated from 30 MHz to the 10th harmonic of the highest fundamental frequency, or 1000 MHz, whichever is greater (135.6 MHz).

RESULTS

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

FCC Part 15, Subpart B & C												10 Meter Distance Measurement At Open Field
Company: Augmentix Corporation												
Project #: 09U12341												
Tester: Tom Chen												
Date: 2/9/2009												
Frequency (MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	AF (dB/m)	Distance Correction (dB)	PK Corrected Reading (dBuV/m)	AV Corrected Reading (dBuV/m)	OP Limit (dBuV/m)	AV Limit (dBuV/m)	PK Margin (dB)	AV Margin (dB)	Notes
Loop Antenna Face On:												
13.56	34.6	29.7	N/A	10.56	-19.08	21.17	N/A	84.00	N/A	-62.8	N/A	Fundamental @ 10m Dist
13.41	11.6	11.2	N/A	10.54	-19.08	2.66	N/A	50.48	N/A	-47.8	N/A	13.41-13.553MHz Spurious @ 10m
13.553	29.67	27.4	N/A	10.56	-19.08	18.87	N/A	50.48	N/A	-31.6	N/A	13.41-13.553MHz Spurious @ 10m
13.567	29.8	27.6	N/A	10.56	-19.08	19.07	N/A	50.48	N/A	-31.4	N/A	13.567-13.710MHz Spurious @ 10m
13.71	15.2	12.1	N/A	10.57	-19.08	3.59	N/A	50.48	N/A	-46.9	N/A	13.567-13.710MHz Spurious @ 10m
13.11	10.5	10.1	N/A	10.51	-19.08	1.53	N/A	40.51	N/A	-39.0	N/A	13.110-13.410MHz Spurious @ 10m
13.41	11.6	11.3	N/A	10.54	-19.08	2.76	N/A	40.51	N/A	-37.8	N/A	13.110-13.410MHz Spurious @ 10m
13.71	15.2	12.7	N/A	10.57	-19.08	4.19	N/A	40.51	N/A	-36.3	N/A	13.710-14.010MHz Spurious @ 10m
14.01	11.8	11.5	N/A	10.6	-19.08	3.02	N/A	40.51	N/A	-37.5	N/A	13.710-14.010MHz Spurious @ 10m
27.12	15.7		N/A	9.046	-19.08	5.66	N/A	29.54	N/A	-23.9	N/A	0.15-30MHz Spurious @ 10m
Loop Antenna Face Off:												
13.56	34.7	29.5	N/A	10.56	-19.08	20.97	N/A	84.00	N/A	-63.0	N/A	Fundamental @ 10m Dist
13.41	10.6	10.4	N/A	10.54	-19.08	1.86	N/A	50.48	N/A	-48.6	N/A	13.41-13.553MHz Spurious @ 10m
13.553	28.9	26.9	N/A	10.56	-19.08	18.37	N/A	50.48	N/A	-32.1	N/A	13.41-13.553MHz Spurious @ 10m
13.567	28.9	26.8	N/A	10.56	-19.08	18.27	N/A	50.48	N/A	-32.2	N/A	13.567-13.710MHz Spurious @ 10m
13.71	13.18	12.7	N/A	10.57	-19.08	4.19	N/A	50.48	N/A	-46.3	N/A	13.567-13.710MHz Spurious @ 10m
13.11	10.1	10.1	N/A	10.51	-19.08	1.53	N/A	40.51	N/A	-39.0	N/A	13.110-13.410MHz Spurious @ 10m
13.41	10.6	10.4	N/A	10.54	-19.08	1.86	N/A	40.51	N/A	-38.7	N/A	13.110-13.410MHz Spurious @ 10m
13.71	13.18	12.7	N/A	10.57	-19.08	4.19	N/A	40.51	N/A	-36.3	N/A	13.710-14.010MHz Spurious @ 10m
14.01	12.6	12.1	N/A	10.6	-19.08	3.62	N/A	40.51	N/A	-36.9	N/A	13.710-14.010MHz Spurious @ 10m
27.12	15.3		N/A	9.046	-19.08	5.26	N/A	29.54	N/A	-24.3	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 Readings												
A.F. = Antenna factor												

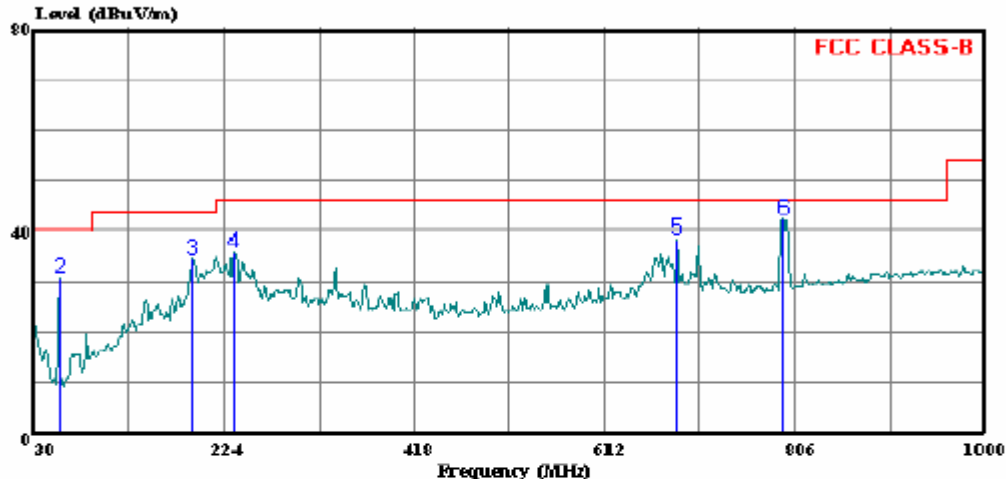
8.1.2. TX SPURIOUS EMISSION 30 TO 1000 MHz (HORIZONTAL)

HORIZONTAL PLOT



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

Data#: 11 File#: 09U12341.EMI Date: 02-09-2009 Time: 17:25:53



(Fremont)
Trace: 10

Ref Trace:

Condition: FCC CLASS-B 3m HORIZONTAL
Test Operator:: Tom Chen
Project #: 09U12341
Company: Augmentix Corporation
Mode of oper.: RFID active
Configuration: BUT installed inside laptop PC
Target: FCC 15.225

Page: 1

	Freq	Read		Limit	Over	
	MHz	Level	Factor	Level	Line	Limit Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB
1	30.000	33.61	-7.41	26.20	40.00	-13.80 Peak
2	56.190	50.37	-19.63	30.74	40.00	-9.26 Peak
3	191.990	47.44	-12.64	34.80	43.50	-8.70 Peak
4	232.730	49.24	-13.10	36.14	46.00	-9.86 Peak
5	686.690	39.13	-0.82	38.31	46.00	-7.69 Peak
6	795.330	41.73	0.69	42.42	46.00	-3.58 Peak

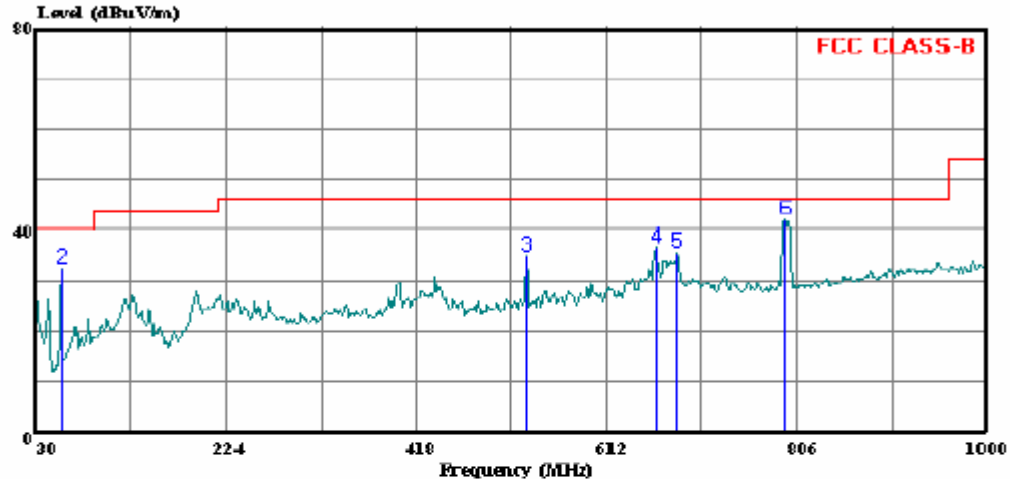
8.1.3. TX SPURIOUS EMISSION 30 TO 1000 MHz (VERTICAL)

VERTICAL PLOT



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

Data#: 9 File#: 09U12341.EMI Date: 02-09-2009 Time: 17:15:45



(Fremont)

Trace: 8

Ref Trace:

Condition: FCC CLASS-B 3m VERTICAL
Test Operator : Tom Chen
Project # : 09U12341
Company : Augmentix Corporation
Mode of oper. : RFID active
Configuration : EUT installed inside a host laptop PC
Target : FCC 15.225

Page: 1

	Freq	Read Level	Factor	Level	Limit	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	30.000	44.29	-7.41	36.88	40.00	-3.12	Peak
2	56.190	52.16	-19.63	32.53	40.00	-7.47	Peak
3	531.490	38.99	-4.16	34.83	46.00	-11.17	Peak
4	662.440	38.26	-1.38	36.88	46.00	-9.12	Peak
5	683.780	36.66	-0.86	35.80	46.00	-10.20	Peak
6	795.330	41.19	0.69	41.88	46.00	-4.12	Peak

9. 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

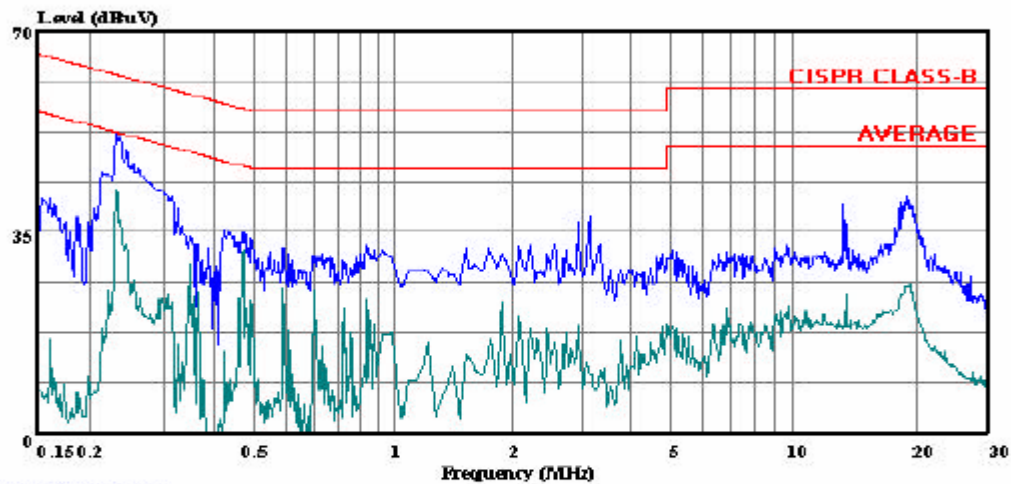
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.23	52.00	--	42.53	0.00	62.38	52.38	-10.38	-9.85	L1
3.24	37.92	--	10.19	0.00	56.00	46.00	-18.08	-35.81	L1
18.92	41.31	--	25.57	0.00	60.00	50.00	-18.69	-24.43	L1
0.22	50.24	--	24.91	0.00	62.71	52.71	-12.47	-27.80	L2
0.26	48.46	--	37.64	0.00	61.56	51.56	-13.10	-13.92	L2
0.33	41.71	--	17.60	0.00	59.35	49.35	-17.64	-31.75	L2
6 Worst Data									

LINE 1 RESULTS



Compliance Certification Services
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Fax: (510) 661-0888

Data#: 21 File#: 09U12341 LC.EMI Date: 02-09-2009 Time: 15:06:43



(Line Conduction)

Trace: 19

Ref Trace:

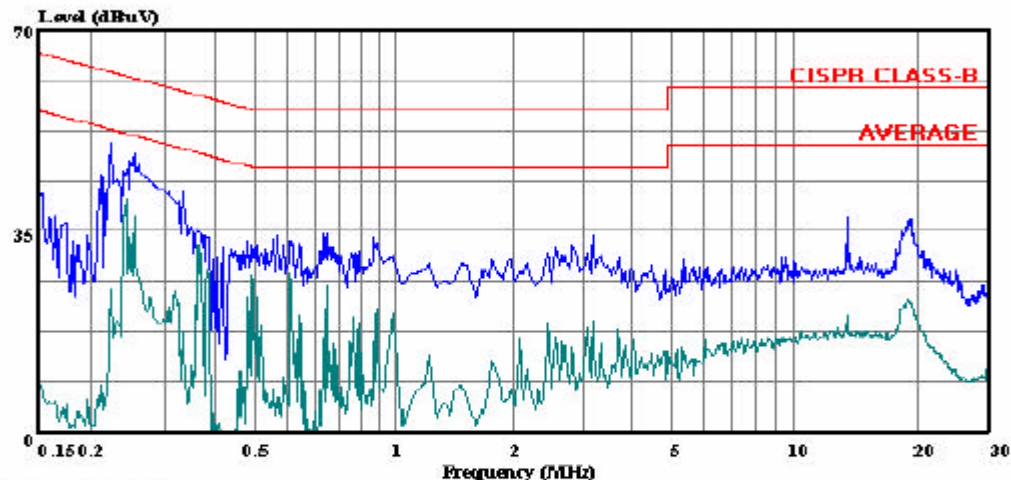
Condition: CISPR CLASS-B
Test Operator:: Tom Chen
Project #: : 09U12341
Company: : Augmentix
Configuration: EUT only
Mode: : Enable RFID
Target: : FCC Class B
Voltage: : 115VAC / 60Hz
: L1: Peak (Blue), Average (Green)

LINE 2 RESULTS



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

Data#: 28 File#: 09U12341 LC.EMI Date: 02-09-2009 Time: 15:24:40



(Line Conduction)

Trace: 26

Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Tom Chen
Project #: 09U12341
Company: Augmentix
Configuration: EUT only
Mode: Enable RFID
Target: FCC Class B
Voltage: 115VAC / 60Hz
L2: Peak (Blue), Average (Green)

10. 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 Clause 2.3.1 and 2.3.2

RESULTS

Reference Frequency: EUT Channel 13.560166 MHz @ 20°C Limit: ± 100 ppm = 135.602 kHz				
Power Supply (Vac)	Environment Temperature (°C)	Frequency Deviation Measured with Time Elapse		
		(MHz)	Delta (ppm)	Limit (ppm)
115.00	50	13.5600000	0.122	± 100
115.00	40	13.5600000	0.122	± 100
115.00	30	13.5598330	0.246	± 100
115.00	20	13.5601660	0.000	± 100
115.00	10	13.5600000	0.122	± 100
115.00	0	13.5598330	0.246	± 100
115.00	-10	13.5600000	0.122	± 100
115.00	-20	13.5598330	0.246	± 100
97.15	20	13.5600000	0.122	± 100
132.25	20	13.5600000	0.122	± 100

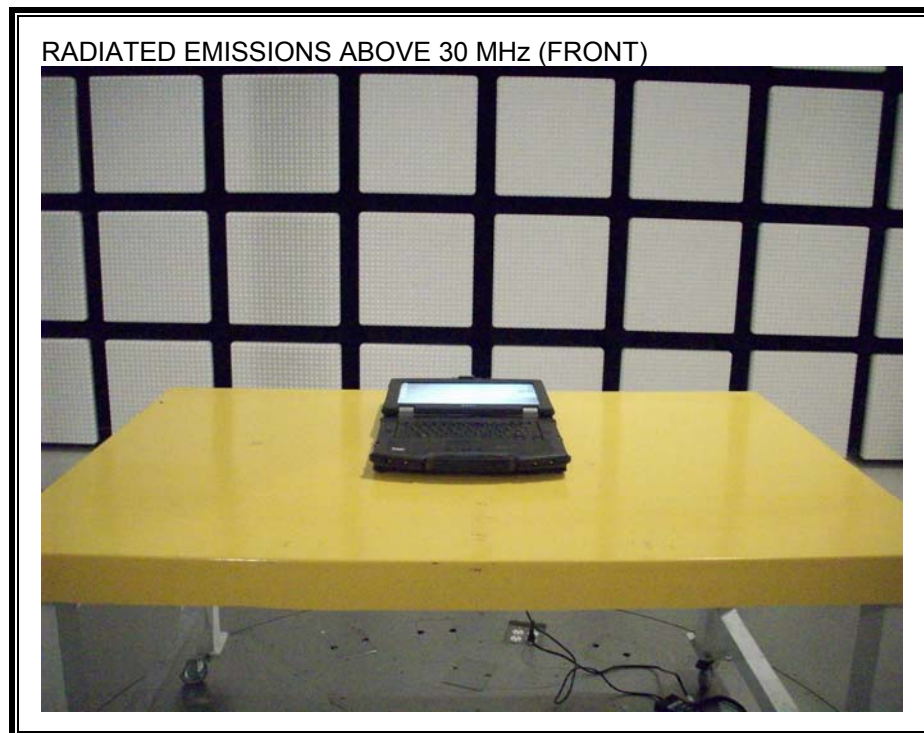
11. SETUP PHOTOS

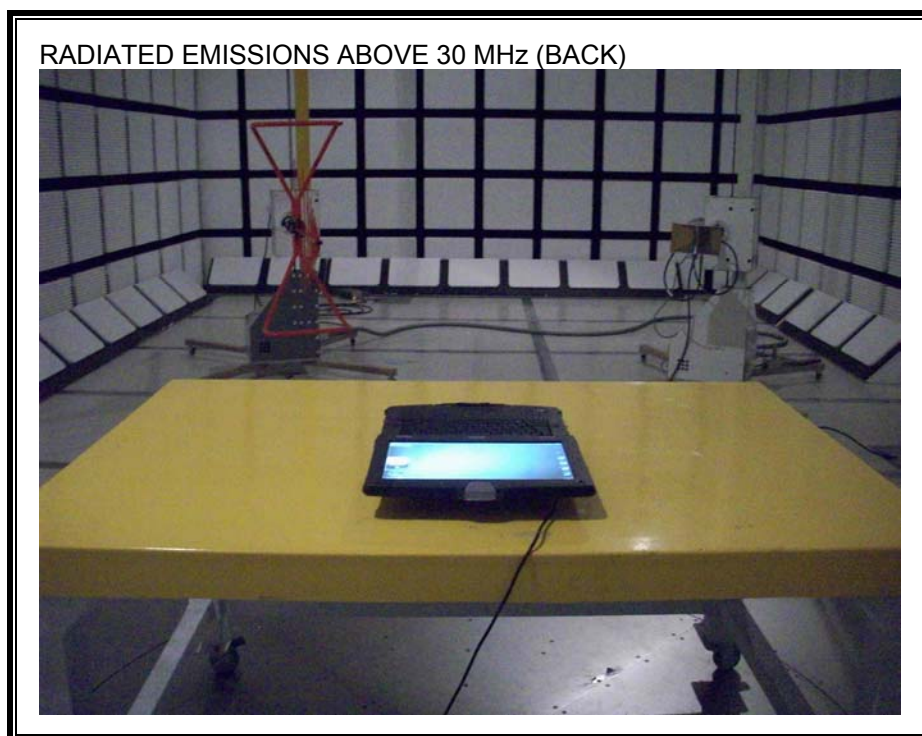
RADIATED EMISSION BELOW 30 MHz





RADIATED EMISSION ABOVE 30 MHz





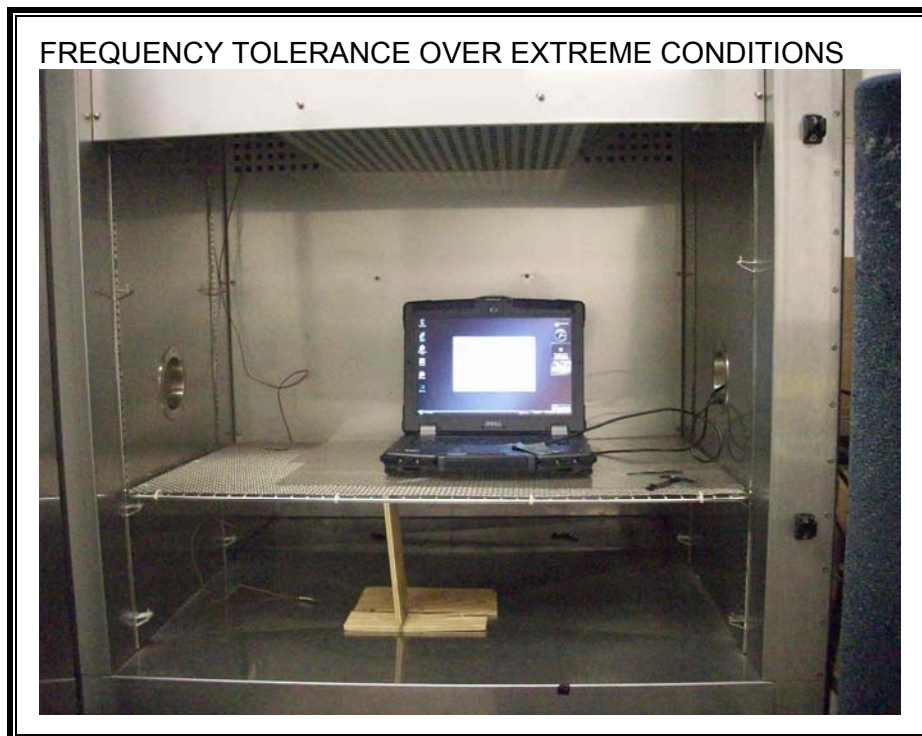
AC MAINS LINE CONDUCTED EMISSION



LINE CONDUCTED EMISSION (BACK)



FREQUENCY TOLERANCE OVER EXTREME CONDITIONS



END OF REPORT