



**FCC CFR47 PART 15 SUBPART C  
ICES-003 ISSUE 4, 2004-02**

**TEST REPORT**

**FOR**

**WIRELESS MODEM**

**MODEL NUMBER: AIRCARD 880U**

**REPORT NUMBER: 07U11062-1**

**ISSUE DATE: JULY 12, 2007**

*Prepared for*  
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**NVLAP LAB CODE 200065-0**

Revision History

<u>Rev.</u>	<u>Issue Date</u>	<u>Revisions</u>	<u>Revised By</u>
--	07/12/07	Initial Issue	T. Chan

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SIERRA WIRELESS  
13811 WIRELESS WAY  
RICHMOND, BC V6V 3A4 CANADA

**EUT DESCRIPTION:** WIRELESS MODEM

**MODEL:** AIRCARD 880U

**SERIAL NUMBER:** MODEM: CS01960, CRADLE: CS 01962

**DATE TESTED:** MAY 18, 2007

APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART B	NO NON-COMPLIANCE NOTED
ICES-003 ISSUE 4, 2004-02	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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THU CHAN  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

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## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2003 and ICES-003 ISSUE 4, 2004-02.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA. The sites are constructed in conformance with the requirements of ANSI C63.4, ANSI C63.7 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

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
Radiated Emission, above 2000MHz	+/- 4.3 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

The EUT is an 850/900/1800/1900/2100 MHz multi-band Wireless Modem and is manufactured by Sierra Wireless, Inc.

#### GENERAL INFORMATION

CHASSIS MATERIAL	METAL
ENCLOSURE MATERIAL	METAL
POWER REQUIREMENTS	100-240 VAC / 50-60 Hz
LIST OF ALL OSCILLATOR FREQUENCIES GREATER THAN OR EQUAL TO 9 kHz	3.9796 GHZ CPU

### 5.2. PRELIMINARY TEST CONFIGURATIONS

The following configurations were investigated during preliminary testing:

EUT Configuration	Description
Normal	EUT with basic peripheral support equipment

The worst-case configuration was determined to be EUT-with cradle.

### 5.3. MODE(S) OF OPERATION

Mode	Description
Normal	EUT is in received mode and EMCTest

### 5.4. SOFTWARE AND FIRMWARE

The test software used during the test was EMCTest software.

## 5.5. MODIFICATIONS

No modifications were made during testing.

## 5.6. DETAILS OF TESTED SYSTEM

### SUPPORT EQUIPMENT & PERIPHERALS

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
Laptop	Toshiba	Satellite	10853	DoC
AC Adapter	AcBel	AP13ADO1	B0220345131925	DoC
Cradle	Sierra Wireless	N/A	NA	N/A
Modem	ACEEX	1414	9013538	IFAXDM1414
Printer	HP	2225C	2541S41679	BS46XU2225C

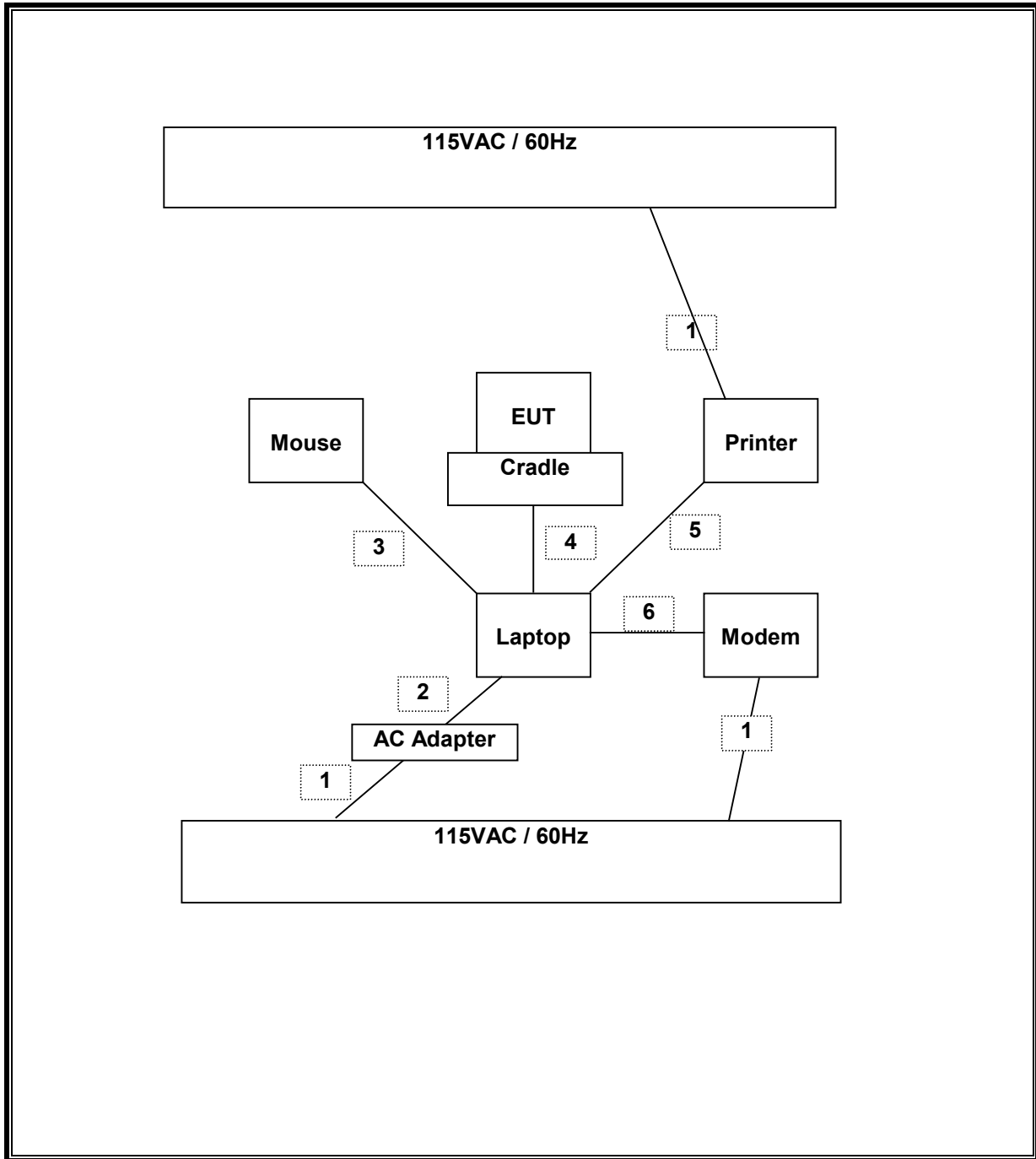
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	3	US 115V	Un-shielded	2m	N/A
2	DC	1	DC	Un-shielded	2m	N/A
3	USB	1	Mouse	Un-shielded	2m	N/A
4	USB	1	EUT	Un-shielded	2m	N/A
5	USB	1	Printer	Un-shielded	2m	N/A
6	RJ11	1	Modem	Un-shielded	2m	N/A

### TEST SETUP

The EUT is installed in a typical configuration. Test software exercised the EUT.

**TEST SETUP DIAGRAM**





## 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
SA Display Section 2	Agilent / HP	85662A	2816A16696	04/07/08
Quasi-Peak Adaptor	Agilent / HP	85650A	3145A01654	01/21/08
SA RF Section, 1.5 GHz	Agilent / HP	85680B	2814A04227	01/07/08
Antenna, Bilog 30 MHz ~ 2 GHz	Sunol Sciences	JB1	A121003	08/13/07
Preamplifier, 1300 MHz	Agilent / HP	8447D	1937A02062	05/09/08
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	MY45300064	03/18/08
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	2023	09/15/07
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	09/15/07
EMI Test Receiver	R & S	ESHS 20	827129/006	01/27/08
Spectrum Analyzer 3 Hz ~ 44 GHz	Agilent / HP	E4446A	MY43360112	05/07/08
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	9001-3245	04/15/08
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	6717	04/15/08
Preamplifier, 1 ~ 26.5 GHz	Agilent / HP	8449B	3008A00931	08/01/07

## 7. APPLICABLE LIMITS AND TEST RESULTS

### 7.1. RADIATED EMISSIONS

#### TEST PROCEDURE

ANSI C63.4

The highest clock frequency generated or used in the EUT is 3.9796 GHz, therefore the frequency range was investigated from 30 MHz to 20GHz.

#### LIMITO

§15.109 (a) Except for Class A digital devices, the field strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

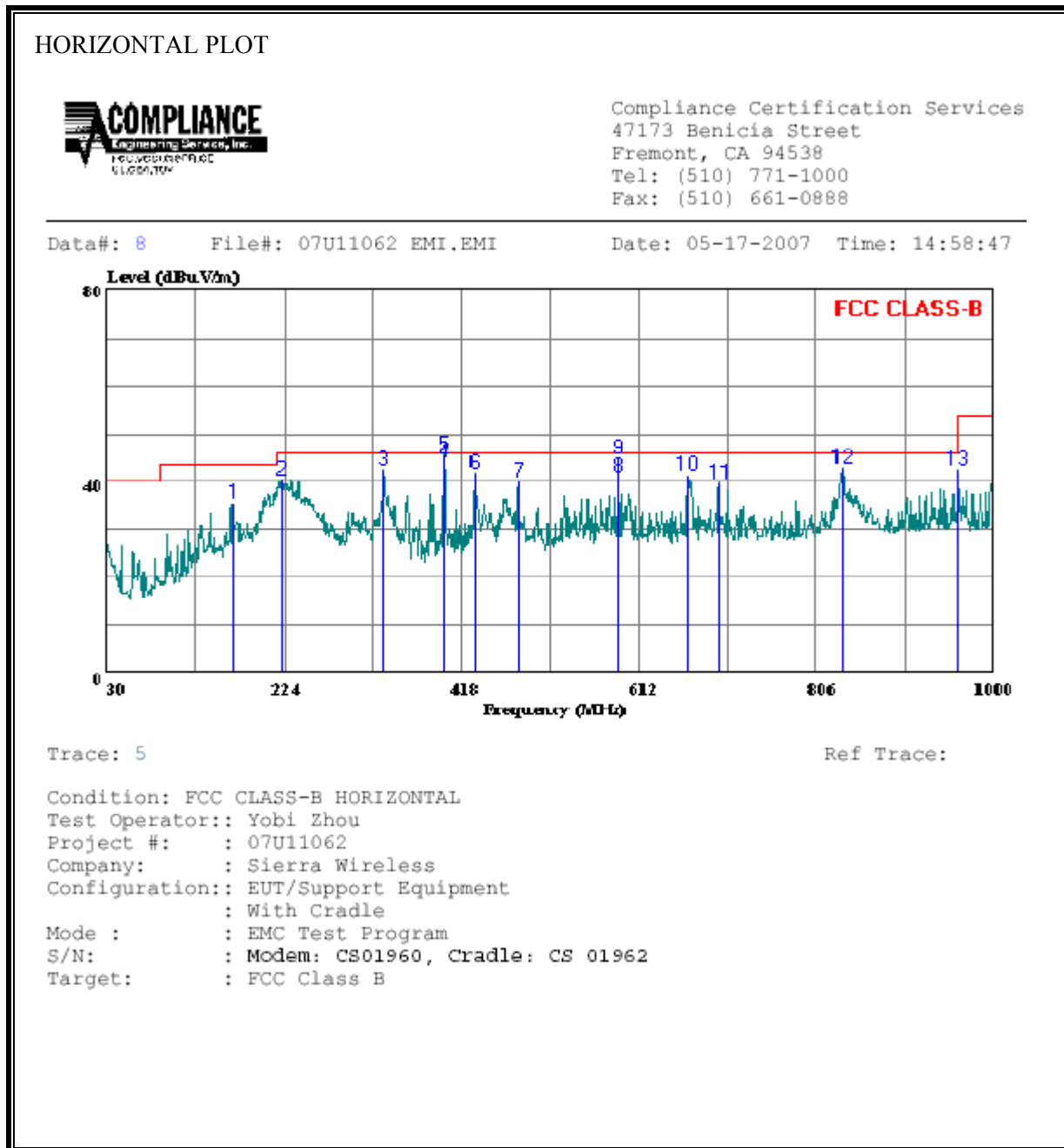
Limits for radiated disturbance of Class B ITE at measuring distance of 3 m	
Frequency range (MHz)	Quasi-peak limits (dB $\mu$ V/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960 MHz	54

Note: The lower limit shall apply at the transition frequency.

#### RESULTS

No non-compliance noted:

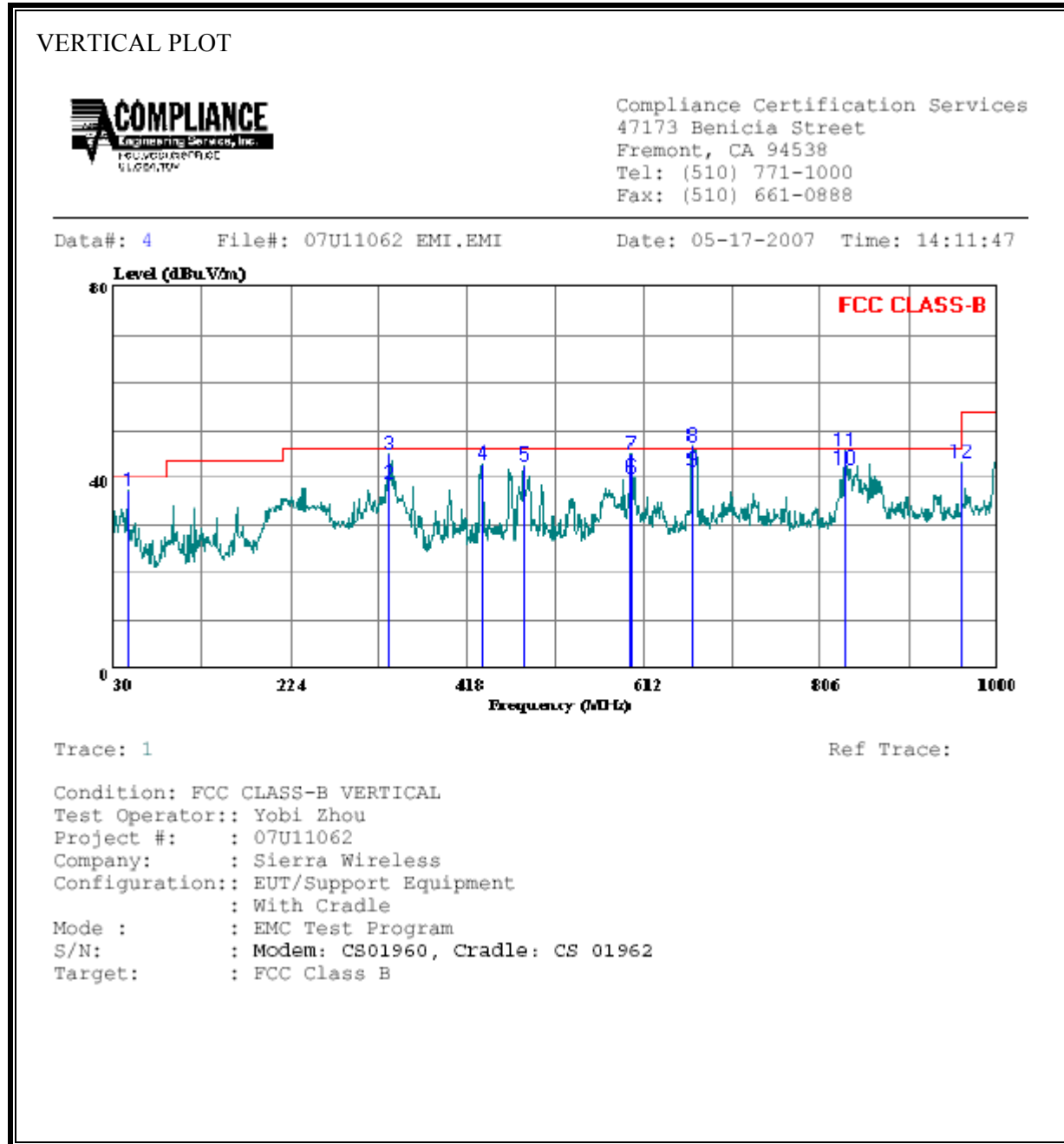
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)**



HORIZONTAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	168.710	50.20	-14.58	35.62	43.50	-7.88	Peak
2	220.120	55.60	-15.17	40.43	46.00	-5.57	Peak
3	330.700	54.20	-11.49	42.71	46.00	-3.29	Peak
4	398.600	54.10	-9.93	44.17	46.00	-1.83	QP
5	398.600	55.60	-9.93	45.67	46.00	-0.33	Peak
6	431.580	50.80	-9.06	41.74	46.00	-4.26	Peak
7	480.080	47.90	-7.81	40.09	46.00	-5.91	Peak
8	588.720	46.70	-5.62	41.08	46.00	-4.92	QP
9	588.720	50.70	-5.62	45.08	46.00	-0.92	Peak
10	664.380	45.70	-4.15	41.55	46.00	-4.45	Peak
11	700.270	43.50	-3.51	39.99	46.00	-6.01	Peak
12	835.100	44.70	-1.74	42.96	46.00	-3.04	Peak
13	960.230	43.30	-0.67	42.63	54.00	-11.37	Peak

**SPURIOUS EMISSIONS 30 TO 1000 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	46.490	53.73	-16.27	37.46	40.00	-2.54	Peak
2	331.670	50.40	-11.46	38.94	46.00	-7.06	QP
3	331.670	56.40	-11.46	44.94	46.00	-1.06	Peak
4	433.520	51.80	-8.98	42.82	46.00	-3.18	Peak
5	480.080	50.50	-7.81	42.69	46.00	-3.31	Peak
6	598.420	45.60	-5.45	40.15	46.00	-5.85	QP
7	598.420	50.30	-5.45	44.85	46.00	-1.15	Peak
8 *	664.380	50.80	-4.15	46.65	46.00	0.65	Peak
9	664.380	45.80	-4.15	41.65	46.00	-4.35	QP
10	832.190	43.50	-1.74	41.76	46.00	-4.24	QP
11	832.190	47.50	-1.74	45.76	46.00	-0.24	Peak
12	960.230	43.80	-0.67	43.13	54.00	-10.87	Peak

**SPURIOUS EMISSIONS 1 TO 20 GHz (WORST-CASE CONFIGURATION)**

**High Frequency Measurement**  
 Compliance Certification Services, Fremont 5m Chamber

Company: Sierra Wireless  
 Project #: 07U11062  
 Date: 05/17/07  
 Test Engineer: Frank Ibrahim  
 Configuration: EUT with peripherals  
 Mode: EMC test program  
 S/N: Modem: CS01960, Cradle: CS 01962

**Test Equipment:**

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T59; S/N: 3245 @3m	T144 Miteq 3008A00931			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
		A.5m Chamber		

Peak Measurements  
 REW=VBW=1MHz  
 Average Measurements  
 RBW=1MHz ; VBW=10Hz

f GHz	Dist (m)	Read Pk dBuV	Read Avg. dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Ftr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.015	3.0	67.64	46.27	24.0	3.0	-39.5	0.0	0.0	55.19	33.82	74	54	-18.81	-20.18	V
1.407	3.0	69.13	46.00	25.5	3.5	-38.9	0.0	0.0	59.28	36.15	74	54	-14.72	-17.85	V
1.672	3.0	63.24	42.12	26.6	3.9	-38.5	0.0	0.0	55.14	34.02	74	54	-18.86	-19.98	V
3.196	3.0	53.71	31.53	30.6	5.5	-37.2	0.0	0.0	52.60	30.42	74	54	-21.40	-23.58	V
1.021	3.0	66.57	46.63	24.0	3.0	-39.5	0.0	0.0	54.16	34.22	74	54	-19.84	-19.78	H
1.412	3.0	69.12	48.72	25.5	3.5	-38.9	0.0	0.0	59.30	38.90	74	54	-14.70	-15.10	H
1.600	3.0	59.04	43.21	26.3	3.8	-38.6	0.0	0.0	50.47	34.64	74	54	-23.53	-19.36	H
1.671	3.0	60.11	38.81	26.6	3.9	-38.5	0.0	0.0	52.01	30.71	74	54	-21.99	-23.29	H
1.919	3.0	51.41	47.78	27.5	4.2	-38.2	0.0	0.0	44.95	41.32	74	54	-29.05	-12.68	H
2.336	3.0	51.29	34.33	28.4	4.7	-37.6	0.0	0.0	46.83	29.87	74	54	-27.17	-24.13	H
3.192	3.0	54.33	30.60	30.6	5.5	-37.2	0.0	0.0	53.21	29.48	74	54	-20.79	-24.52	H

f	Measurement Frequency	Amp	Preamp Gain	Avg Lim	Average Field Strength Limit
Dist	Distance to Antenna	D Corr	Distance Correct to 3 meters	Pk Lim	Peak Field Strength Limit
Read	Analyzer Reading	Avg	Average Field Strength @ 3 m	Avg Mar	Margin vs. Average Limit
AF	Antenna Factor	Peak	Calculated Peak Field Strength	Pk Mar	Margin vs. Peak Limit
CL	Cable Loss	HPF	High Pass Filter		

**Note:** EUT was scanned from 1 GHz to 18 GHz, no other emissions from EUT were detected above the system noise floor.

## 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 50  $\mu$ 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 boundary between the frequency ranges.

Frequency range (MHz)	Limits (dB $\mu$ 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

\* Decreases with the logarithm of the frequency.

### RESULTS

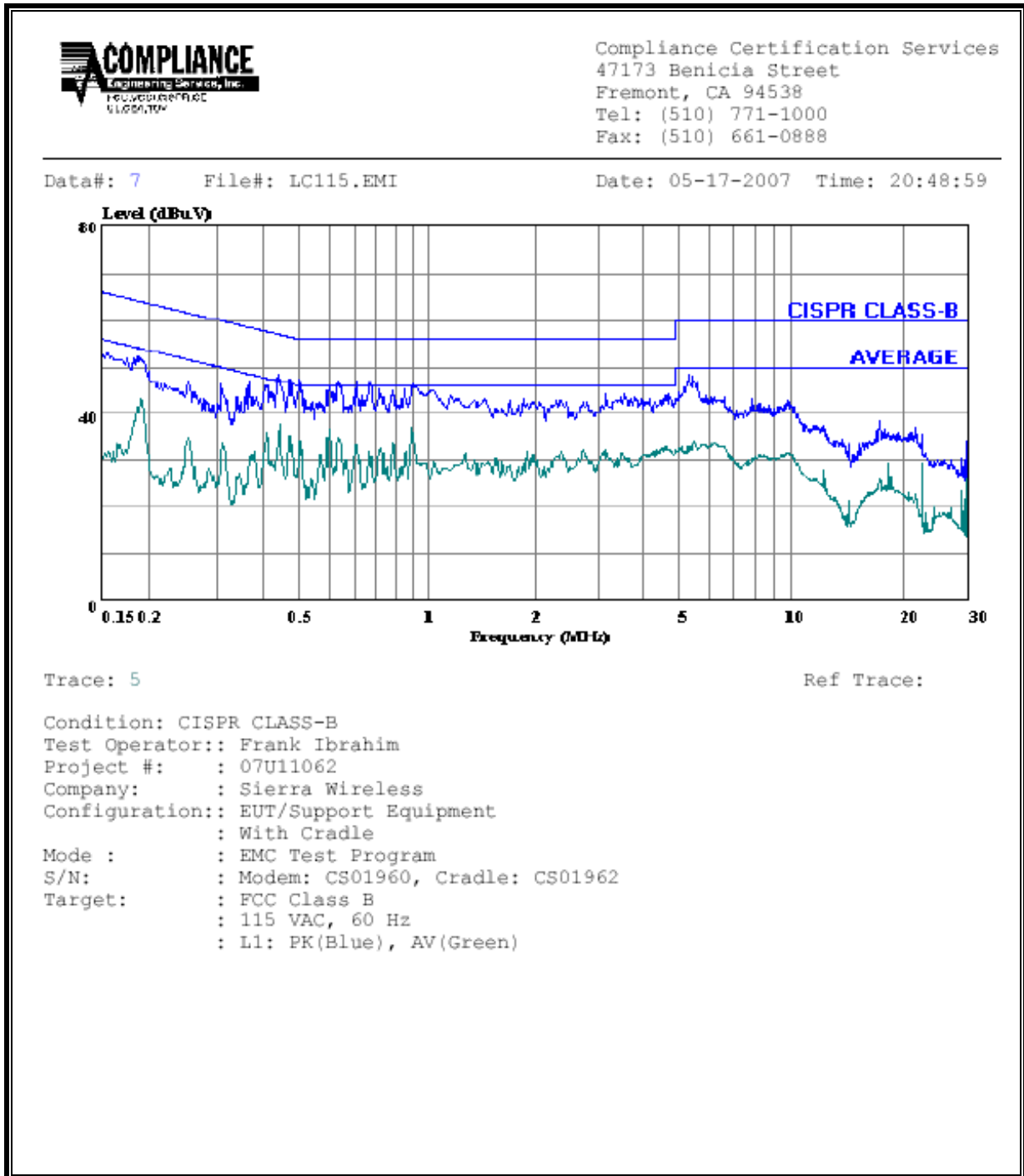
No non-compliance noted:



**6 WORST EMISSIONS**

CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Class (dB)	Limit QP	EN B AV	Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.44	48.40	--	37.84	0.00	57.12	47.12	-8.72	-9.28	L1
0.47	47.57	--	35.42	0.00	56.44	46.44	-8.87	-11.02	L1
0.50	47.33	--	34.35	0.00	56.02	46.02	-8.69	-11.67	L1
0.44	48.08	--	36.55	0.00	56.99	46.99	-8.91	-10.44	L2
0.46	47.89	--	33.79	0.00	56.77	46.77	-8.88	-12.98	L2
0.78	48.01	--	35.64	0.00	56.00	46.00	-7.99	-10.36	L2
6 Worst Data									

**LINE 1 RESULTS**



**LINE 2 RESULTS**

