



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

**DECLARATION OF CONFORMITY TEST REPORT**

**FOR**

**WIRELESS USB MODEM**

**MODEL NUMBER: USB 598**

**FCC ID: N7NU598**

**IC: 2417C-U598**

**REPORT NUMBER: 08U11927-2**

**ISSUE DATE: JULY 22, 2008**

*Prepared for*  
**SIERRA WIRELESS INC.  
2290 COSMOS CT.  
CARLSBAD, CA 92010, U.S.A.**

*Prepared by*  
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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>
---	07/22/08	Initial Issue	T. Chan

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# 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SIERRA WIRELESS  
2290 COSMOS CT.  
CARLSBAD, CA, 92010 U.S.A.

**EUT DESCRIPTION:** WIRELESS USB MODEM

**MODEL:** USB 598

**SERIAL NUMBER:** FCC2-F2B

**DATE TESTED:** JULY 15, 2008

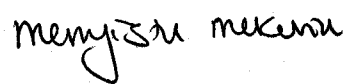
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART B	PASS
ICES-003 ISSUE 4, 2004-02	PASS

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:

Tested By:



THU CHEN  
EMC SUPERVISOR  
COMPLIANCE CERTIFICATION SERVICES

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 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.

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 a dual band 800/1900MHz PCA, EVDO REV. A, USB CDMA Modem, and manufactured by Sierra Wireless, Inc.

#### GENERAL INFORMATION

CHASSIS MATERIAL	PLASTIC
ENCLOSURE MATERIAL	PLASTIC
POWER REQUIREMENTS	5VDC from USB port
POWERLINE FILTER MANUFACTURER AND MODEL	N/A
LIST OF ALL OSCILLATOR FREQUENCIES GREATER THAN OR EQUAL TO 9 kHz	32.768 kHz, 48 MHz.

### 5.2. WORST CASE CONFIGURATIONS

Based on past experience, the worst-case configuration was determined to be EUT connected via USB cable. Then all tests have done with this configuration, i.e. EUT connected to a laptop via USB cable.

### 5.3. MODE(S) OF OPERATION

Mode	Description
Receiving & EMCTest	The EUT was in a receiving mode, while all the I/O ports active to transfer data between the laptop and other peripherals.

### 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	Dell	LATITUDE D620	(01)07898349890528	DoC
Laptop AC Adapter	Dell	LA65NS0-00	CN-0DF263-71615-66C-2E23	DoC
Printer	Microline 186	D22300A	AE5A048148A0	DoC
Modem	ACEEX	1414	9013538	IFAXDM1414
Modem AC Adapter	POWDEC	WP10120N	1927	N/A
Mouse	Dell	0YH958	HC7030G04KT	DoC

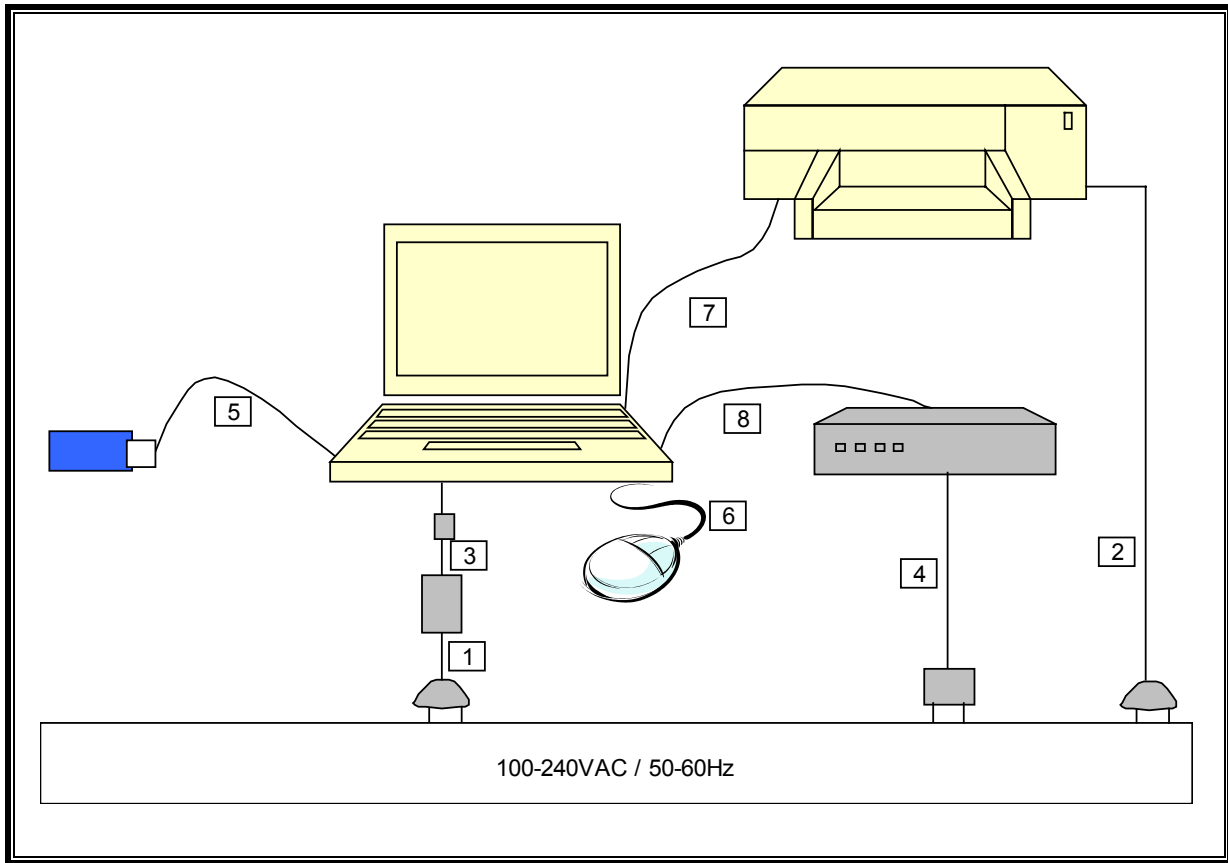
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC Input	1	3-Prong	Un-Shielded	2.0 m	N/A
2	AC Input	1	2-Prong	Un-Shielded	2.0 m	N/A
3	DC Input	1	Mini-Jack	Un-Shielded	2.0 m	Ferrites on Cradle and PC Ends
4	DC Input	1	Mini-Jack	Un-Shielded	2.0 m	N/A
5	USB	1	USB	Un-Shielded	1.0 m	N/A
6	USB	1	USB	Shielded	2.0 m	N/A
7	USB	1	USB	Shielded	2.0 m	N/A
8	Serial	1	DB9	Shielded	1.0 m	N/A

### TEST SETUP

The EUT is installed into a laptop via USB cable, and 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	Serial Number	Cal Due
LISN, 10 kHz ~ 30 MHz	FCC	LISN-50/250-25-2	7/15/1905	10/25/2008
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	8379443	10/25/2008
EMI Test Receiver	R & S	ESHS 20	827129/006	8/6/2009
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	9/19/2009
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	9/20/2009
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	US42070220	5/30/2009
Preamplifier	HP	8447D	1937A02062	3/31/2009
Preamplifier, 1 ~ 26.5 GHz	HP	8449B	3008A00369	9/27/2008
Antenna, Horn 1 ~ 18 GHz	EMCO	3115	2238	4/22/2009
Antenna, Bilog 30MHz ~ 2Ghz	Sunol Sciences	JB1	A121003	9/28/2008

## 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 20 GHz.

#### LIMIT

§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

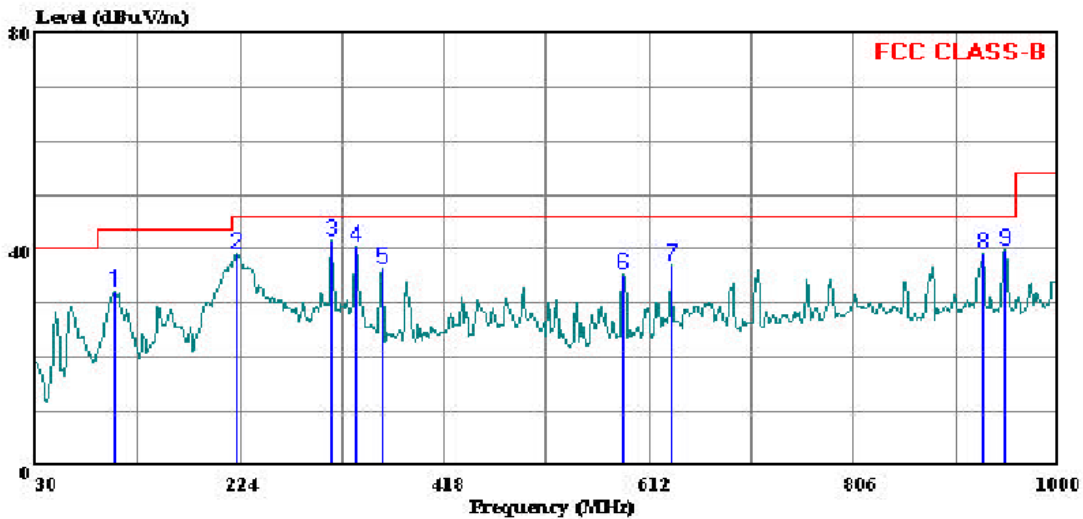
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, HORIZONTAL)**

HORIZONTAL PLOT



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

Data#: 3 File#: 08U11927 EMI.EMI Date: 07-15-2008 Time: 15:28:23



Trace: 2

Ref Trace:

Condition: FCC CLASS-B HORIZONTAL  
Test Operator:: Mengistu Mekuria  
Project #: : 08U11927  
Company: : Sierra Wireless Inc.  
Configuration:: EUT with Minimum Configuration  
Mode : : Normal  
Target: : FCC Class B

HORIZONTAL DATA							
	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	104.690	52.10	-19.85	32.25	43.50	-11.25	Peak
2	221.090	56.64	-17.51	39.13	46.00	-6.87	Peak
3	310.330	56.75	-15.25	41.50	46.00	-4.50	Peak
4	334.580	55.02	-14.56	40.46	46.00	-5.54	Peak
5	358.830	50.20	-13.83	36.37	46.00	-9.63	Peak
6	586.780	44.03	-8.71	35.32	46.00	-10.68	Peak
7	633.340	44.77	-7.82	36.95	46.00	-9.05	Peak
8	929.190	40.66	-1.64	39.02	46.00	-6.98	Peak
9	950.530	41.07	-1.30	39.77	46.00	-6.23	Peak

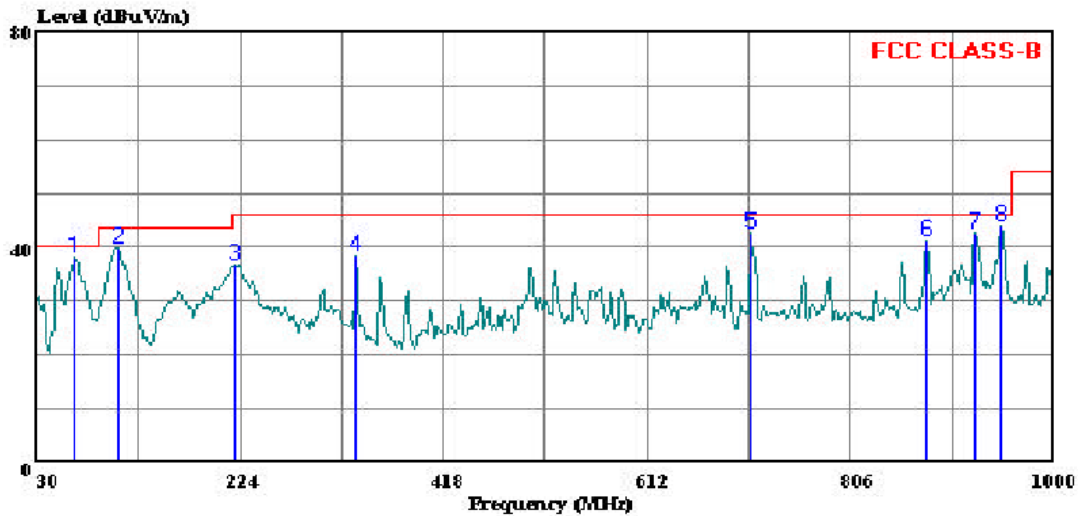
**SPURIOUS EMISSIONS 30 TO 1000 MHz (WORST-CASE CONFIGURATION, VERTICAL)**

VERTICAL PLOT



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

Data#: 5 File#: 08U11927 EMI.EMI Date: 07-15-2008 Time: 15:43:24



Trace: 4

Ref Trace:

Condition: FCC CLASS-B VERTICAL  
Test Operator:: Mengistu Mekuria  
Project #: : 08U11927  
Company: : Sierra Wireless Inc.  
Configuration:: BUT with Minimum Configuration  
Mode : : Normal  
Target: : FCC Class B

VERTICAL DATA

	Freq	Read Level	Factor	Level	Limit Line	Over Limit	Remark
	MHz	dBuV	dB	dBuV/m	dBuV/m	dB	
1	65.890	61.76	-23.70	38.06	40.00	-1.94	Peak
2	106.630	59.43	-19.49	39.94	43.50	-3.56	Peak
3	218.180	54.28	-17.51	36.77	46.00	-9.23	Peak
4	334.580	52.92	-14.56	38.36	46.00	-7.64	Peak
5	710.940	48.69	-6.12	42.57	46.00	-3.43	Peak
6	877.780	43.95	-2.81	41.14	46.00	-4.86	Peak
7	924.340	44.24	-1.72	42.52	46.00	-3.48	Peak
8	950.530	45.37	-1.30	44.07	46.00	-1.93	Peak

**SPURIOUS EMISSIONS ABOVE 1000 MHz (WORST-CASE CONFIGURATION)**

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

Company: SIERRA WIRELESS INC.  
 Project #: 08u11927  
 Date: 7/15/2008  
 Test Engineer: MENGISTU MEKURIA  
 Configuration: EUT WITH MINIMUM CONFIGURATIONS  
 Mode: NORMAL

**Test Equipment:**

Horn 1-18GHz	Pre-amplifier 1-26GHz	Pre-amplifier 26-40GHz	Horn > 18GHz	Limit
T73; S/N: 6717 @3m	T34 HP 8449B			FCC 15.209

Hi Frequency Cables

2 foot cable	3 foot cable	12 foot cable	HPF	Reject Filter
		B-5m Chamber		

**Peak Measurements**  
 RBW=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	Fldr dB	Peak dBuV/m	Avg dBuV/m	Pk Lim dBuV/m	Avg Lim dBuV/m	Pk Mar dB	Avg Mar dB	Notes (V/H)
1.205	3.0	53.8	35.6	26.3	3.5	-38.0	0.0	0.0	45.6	27.4	74	54	-28.4	-26.6	V
1.333	3.0	54.3	37.2	26.6	3.7	-37.8	0.0	0.0	46.8	29.7	74	54	-27.2	-24.3	V
1.427	3.0	61.5	38.5	26.9	3.8	-37.7	0.0	0.0	54.5	31.5	74	54	-19.5	-22.5	V
1.470	3.0	58.9	37.0	27.0	3.8	-37.6	0.0	0.0	52.1	30.2	74	54	-21.9	-23.8	V
1.650	3.0	58.1	36.4	27.5	4.1	-37.4	0.0	0.0	52.3	30.6	74	54	-21.7	-23.4	V
1.825	3.0	57.6	33.8	27.9	4.3	-37.1	0.0	0.0	52.7	28.9	74	54	-21.3	-25.1	V
1.205	3.0	54.4	36.6	26.3	3.5	-38.0	0.0	0.0	46.2	28.4	74	54	-27.8	-25.6	H
1.246	3.0	52.2	35.9	26.4	3.5	-37.9	0.0	0.0	44.2	27.9	74	54	-29.8	-26.1	H
1.333	3.0	54.1	37.6	26.6	3.7	-37.8	0.0	0.0	46.5	30.0	74	54	-27.5	-24.0	H
1.427	3.0	54.1	34.7	26.9	3.8	-37.7	0.0	0.0	47.0	27.6	74	54	-27.0	-26.4	H
1.470	3.0	56.6	36.3	27.0	3.8	-37.6	0.0	0.0	49.8	29.5	74	54	-24.2	-24.5	H
1.650	3.0	56.0	34.9	27.5	4.1	-37.4	0.0	0.0	50.2	29.1	74	54	-23.8	-24.9	H
1.825	3.0	56.7	33.1	27.9	4.3	-37.1	0.0	0.0	51.8	28.2	74	54	-22.2	-25.8	H

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

Rev. 4.12.7

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		

## 7.2. AC MAINS LINE CONDUCTED EMISSIONS

### TEST PROCEDURE

ANSI C63.4

### LIMIT

§15.107 (a) Except for Class A digital devices, for equipment 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 band edges.

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

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**

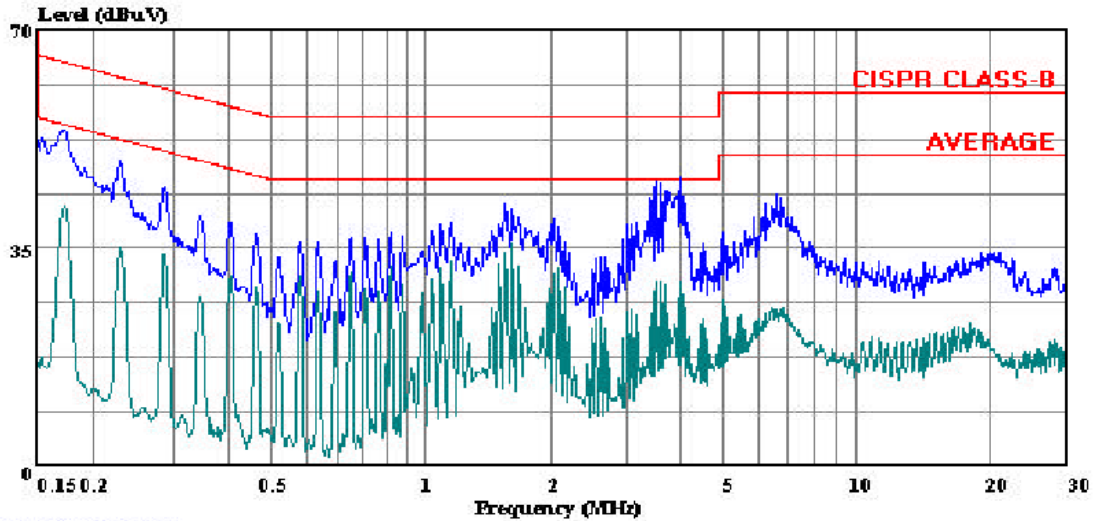
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Class	Limit	EN B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.17	54.07	--	41.85	0.00	64.91	54.91	-10.84	-13.06	L1
1.66	42.15	--	35.80	0.00	56.00	46.00	-13.85	-10.20	L1
3.62	45.65	--	29.83	0.00	56.00	46.00	-10.35	-16.17	L1
0.18	52.18	--	42.60	0.00	64.67	54.67	-12.49	-12.07	L2
1.61	41.07	--	35.10	0.00	56.00	46.00	-14.93	-10.90	L2
3.90	45.79	--	30.90	0.00	56.00	46.00	-10.21	-15.10	L2
6 Worst Data									

**LINE 1 RESULTS**



Compliance Certification Services  
47173 Benicia Street  
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Data#: 7 File#: 08U11927 LC.EMI Date: 07-15-2008 Time: 14:05:49



(Line Conduction)

Trace: 5

Ref Trace:

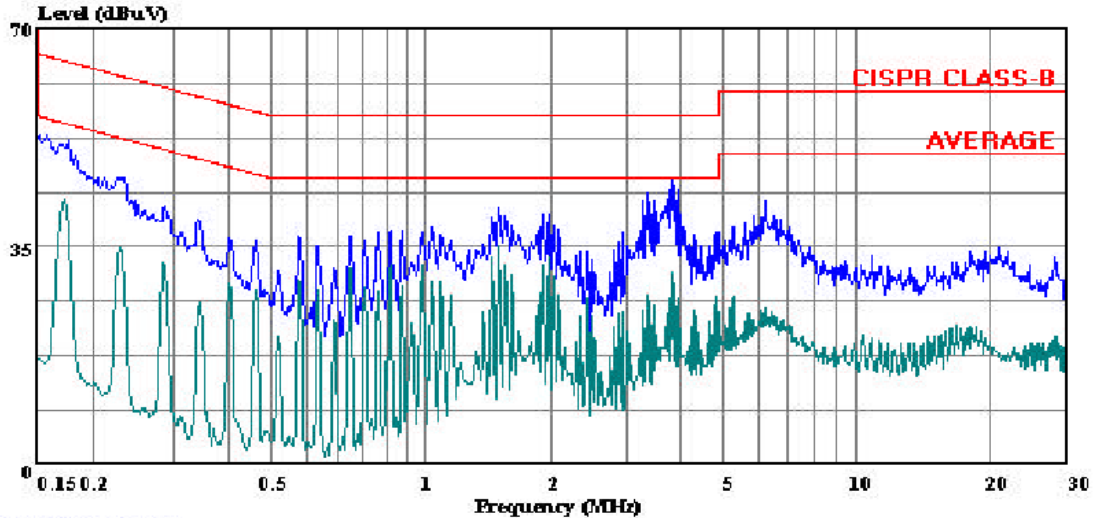
Condition: CISPR CLASS-B  
Test Operator:: Mengistu Mekuria  
Project #: : 08U11927  
Company: : Sierra Wireless Inc.  
Configuration:: EUT with Minimum Configuration  
Mode: : Normal  
Target: : FCC Class B  
Voltage: : 115VAC/60Hz  
: L1: Peak (Blue); Average (Green)

**LINE 2 RESULTS**



Compliance Certification Services  
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Data#: 14 File#: 08U11927 LC.EMI Date: 07-15-2008 Time: 14:14:48



(Line Conduction)

Trace: 12

Ref Trace:

Condition: CISPR CLASS-B  
Test Operator:: Mengistu Mekuria  
Project #: : 08U11927  
Company: : Sierra Wireless Inc.  
Configuration:: EUT with Minimum Configuration  
Mode: : Normal  
Target: : FCC Class B  
Voltage: : 115VAC/60Hz  
: L2: Peak (Blue); Average (Green)