



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

**VERIFICATION TEST REPORT**

**FOR**

**PCA, EVDO MINI-PCI EXPRESS CARD CDMA MODEM**

**MODEL NUMBERS: MC5728V**

**REPORT NUMBER: 08U12326-2**

**ISSUE DATE: JANUARY 28, 2009**

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

Revision History

Rev.	Issue Date	Revisions	Revised By
---	01/28/09	Initial Issue	T. Chan

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## 1. ATTESTATION OF TEST RESULTS

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

**EUT DESCRIPTION:** PCA, EVDO MINI-PCI EXPRESS CARD CDMA MODEM

**MODELS:** MC5728V

**SERIAL NUMBER:** P8929580124A2-10

**DATE TESTED:** JANUARY 18-20, 2009

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 CHAN  
EMC MANAGER  
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.

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 Mini-PCI Express Card CDMA Wireless Modem intended for use in wireless networking applications, which manufactured by Sierra Wireless.

#### GENERAL INFORMATION

CHASSIS MATERIAL	METAL
ENCLOSURE MATERIAL	METAL
POWER REQUIREMENTS	100-240 VAC / 50-60 Hz
POWERLINE FILTER MANUFACTURER AND MODEL	None
LIST OF ALL OSCILLATOR FREQUENCIES GREATER THAN OR EQUAL TO 9 kHz	CPU: 1.83 GHz 48 MHz, 32.765 kHz

### 5.2. PRELIMINARY TEST CONFIGURATIONS

The following configurations were investigated during preliminary testing:

EUT Configuration	Description
Normal	EUT is interfaced to host Laptop via USB, and The Laptop connected with peripherals.

### 5.3. MODE(S) OF OPERATION

Mode	Description
Normal	The support Laptop that connected to the EUT transfers data (H-patterns) to 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	PP18L	838441929	DoC
AC adapter	Dell	LA65NS0-00	CN-F263-71615-66C-2E21	DoC
Mouse	Made in China	MUSXUB	NA	DoC
EUT AC Adapter	ELPAC	FW1805	32692	NA
Modem AC Adapter	US Robotics	TEAC	41-091-000U	NA
Printer	Microline 186	D22300A	AE5A048148A0	DoC

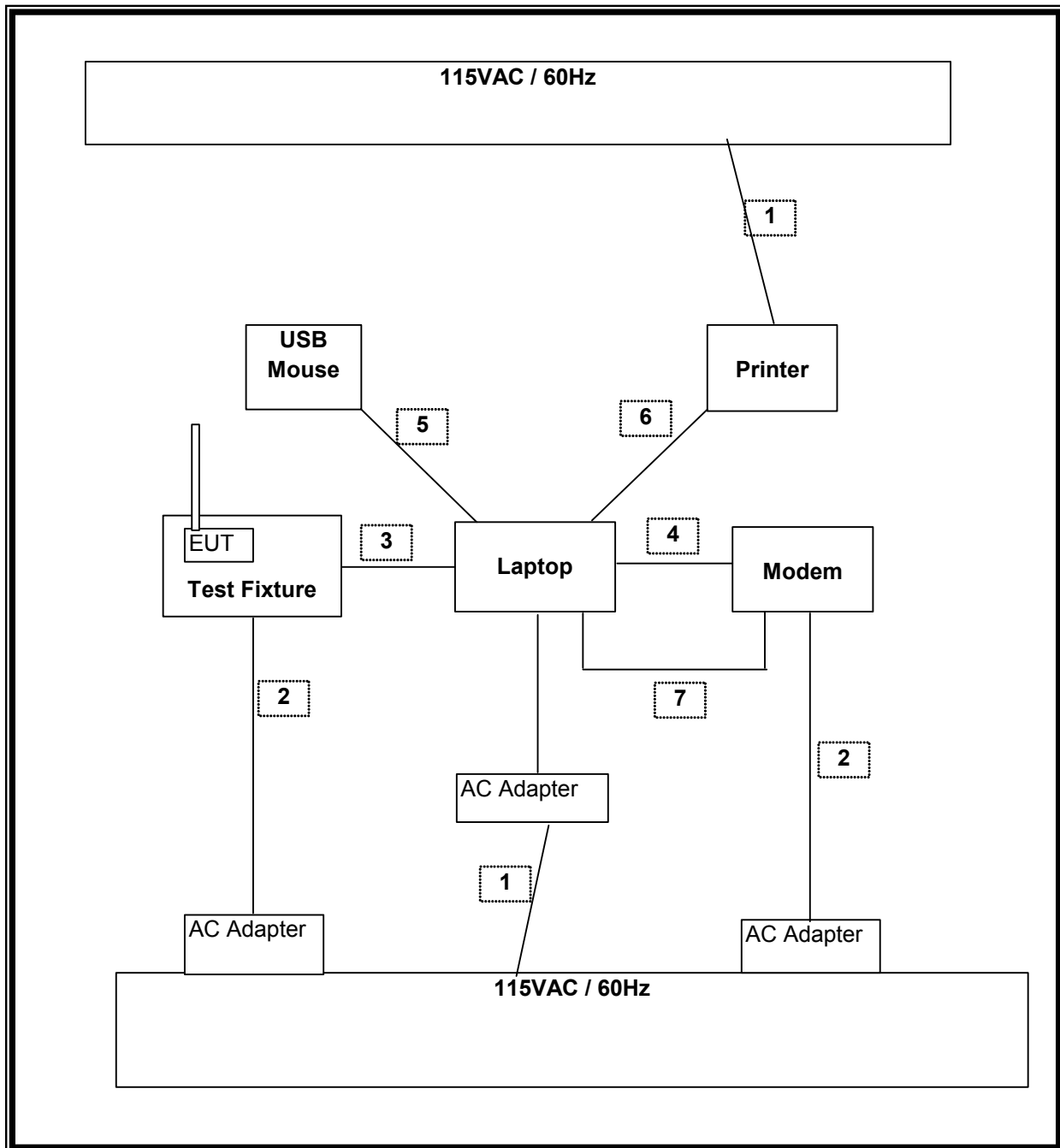
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	2	US 115V	Un-shielded	2m	NA
2	DC	3	US 115V	Un-shielded	2m	NA
3	USB	1	Test Fixture	Un-shielded	2m	NA
4	Serial	1	Modem	Un-shielded	2m	NA
5	USB	1	Mouse	Un-shielded	2m	NA
6	USB	1	Printer	Shielded	1m	NA
7	Rj11	1	Modem	Shielded	1m	NA

### TEST SETUP

The EUT Is connected to the support laptop via USB cable. The laptop also connected to other peripherals that data transfer takes place in between them.

**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
Antenna, Loop, 30 MHz	EMCO	6502	C00593	09/16/10
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	10/29/09
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00885	03/31/09
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	02/11/09
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01012	03/03/09
Antenna, Horn, 18 GHz	EMCO	3115	C00872	04/22/09
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	12/01/09
EMI Receiver, 2.9 GHz	Agilent / HP	8542E	C00957	09/19/09
RF Filter Section, 2.9 GHz	Agilent / HP	85420E	C00958	09/19/09
Preamp, 1000MHz	Sonoma	310N	N02891	03/31/09
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	08/06/09

## 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 1.83GHz CPU, therefore the frequency range was investigated from 30 MHz to 10 GHz.

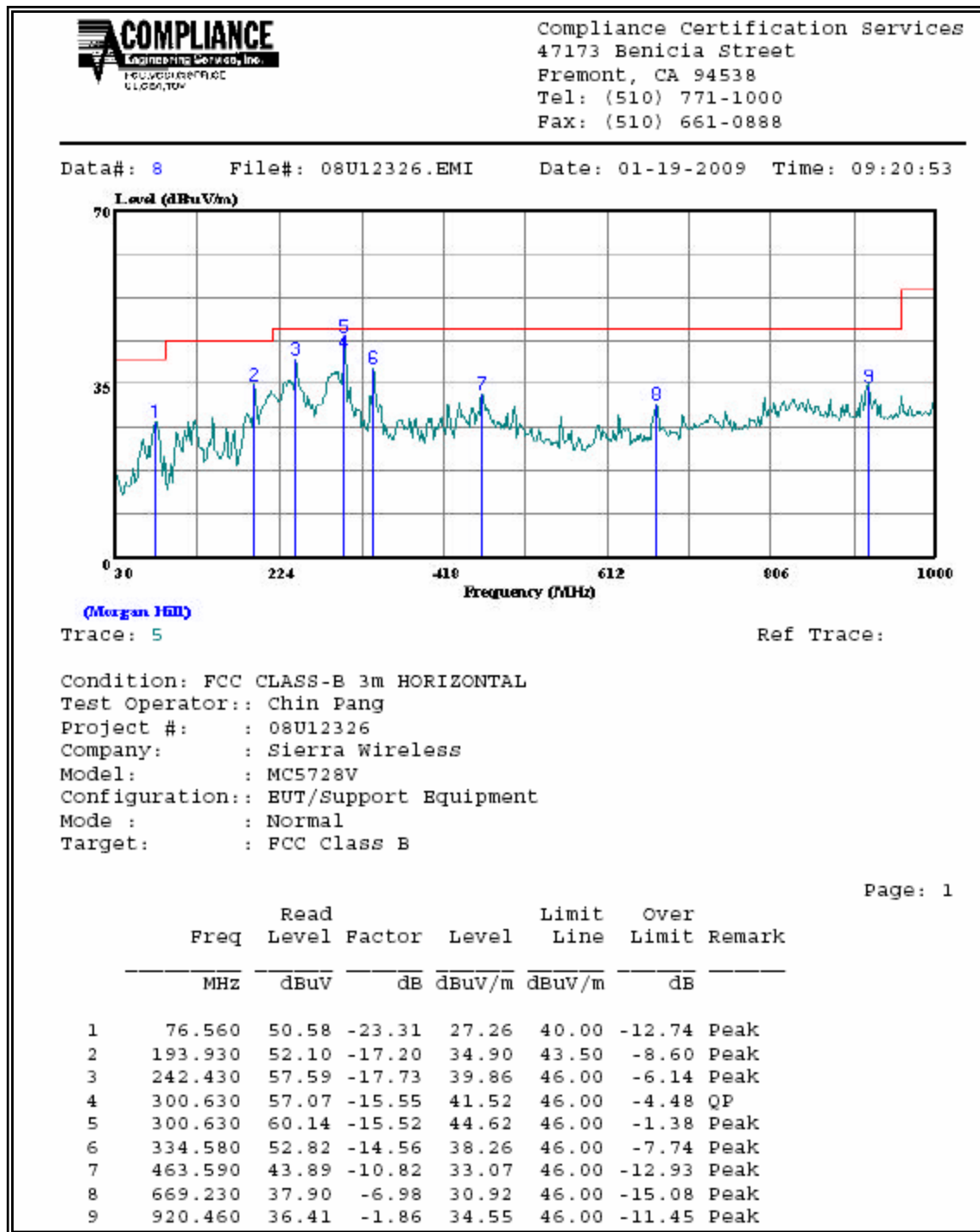
#### LIMIT

§15.109 (b) The field strength of radiated emissions from a Class A digital device, as determined at a distance of 10 meters, shall not exceed the following:

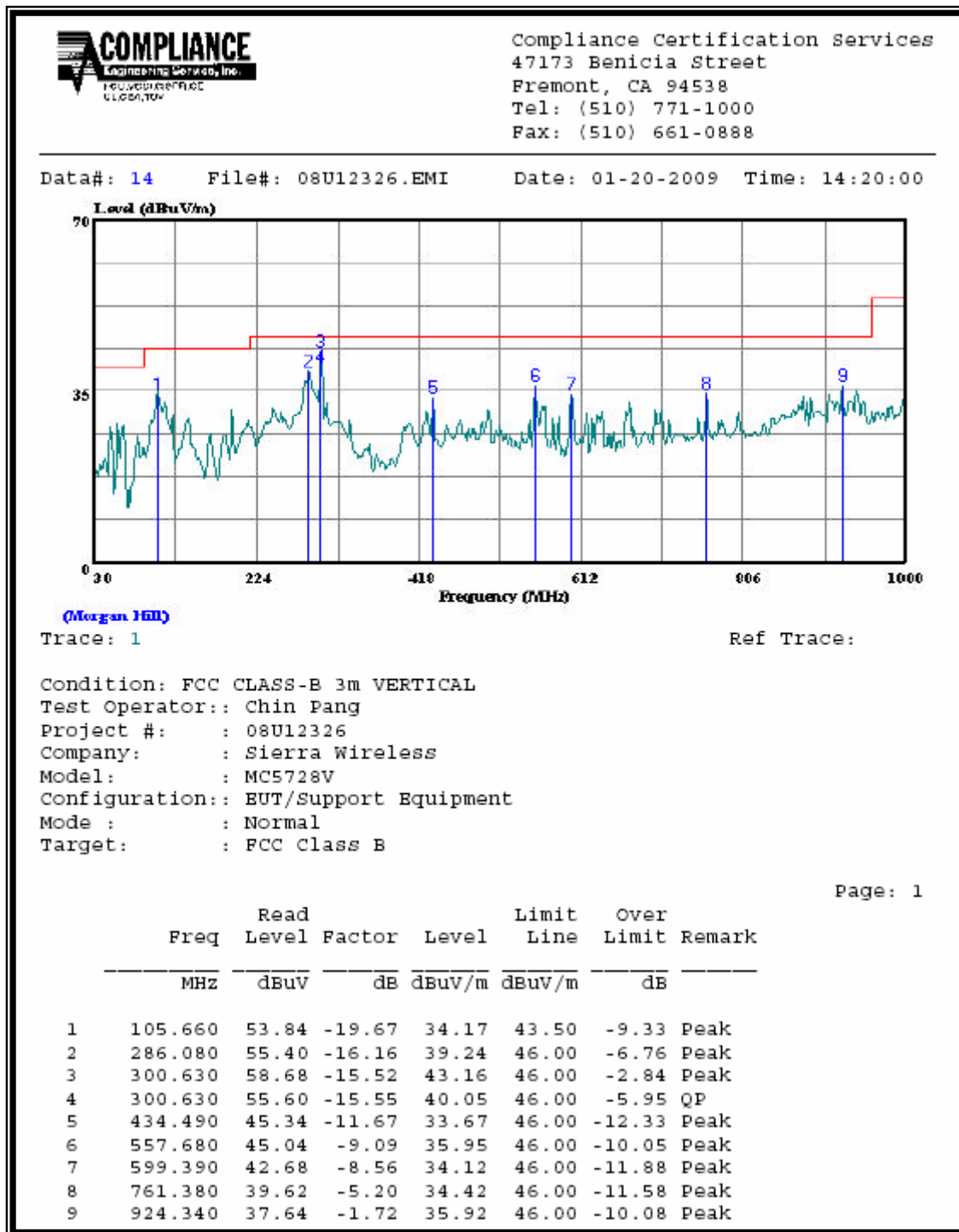
Limits for radiated disturbance of Class A ITE at measuring distance of 10 m	
Frequency range (MHz)	Quasi-peak limits (dB $\mu$ V/m)
30 to 88	39
88 to 216	43.5
216 to 960	46.4
Above 960 MHz	49.5
Note: The lower limit shall apply at the transition frequency.	

#### RESULTS

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



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



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

<b>High Frequency Measurement</b> Compliance Certification Services, Fremont 5m Chamber  Company: Sierra Wireless Project #: 08U12326 Date: 1-19-2009 Test Engineer: Chin Pang Configuration: EUT/Support Equipment Mode: Normal															
<b>Test Equipment:</b>															
Horn 1-18GHz		Pre-amplifier 1-26GHz		Pre-amplifier 26-40GHz		Horn > 18GHz				Limit					
T73; S/N: 6717 @3m		T145 Aqilent 3008A0056								FCC 15.209					
<b>Hi Frequency Cables</b>															
3' cable 22807700		12' cable 22807600		20' cable 22807500		HPF		Reject Filter		<b>Peak Measurements</b> RBW=VBW=1MHz <b>Average Measurements</b> RBW=1MHz ; VBW=10Hz					
3' cable 22807700		12' cable 22807600		20' cable 22807500											
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)
1.331	3.0	56.0	32.4	26.6	2.7	-35.9	0.0	0.0	49.4	25.8	74	54	-24.6	-28.2	V
1.831	3.0	58.6	35.5	27.9	3.3	-35.5	0.0	0.0	54.3	31.2	74	54	-19.7	-22.8	V
1.330	3.0	55.6	34.7	26.6	2.7	-35.9	0.0	0.0	49.0	28.1	74	54	-25.0	-25.9	H
1.827	3.0	60.6	37.2	27.9	3.3	-35.5	0.0	0.0	56.3	32.9	74	54	-17.7	-21.1	H
Rev. 11.10.08 <b>Note: No other emissions were detected above the system noise floor.</b>															
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

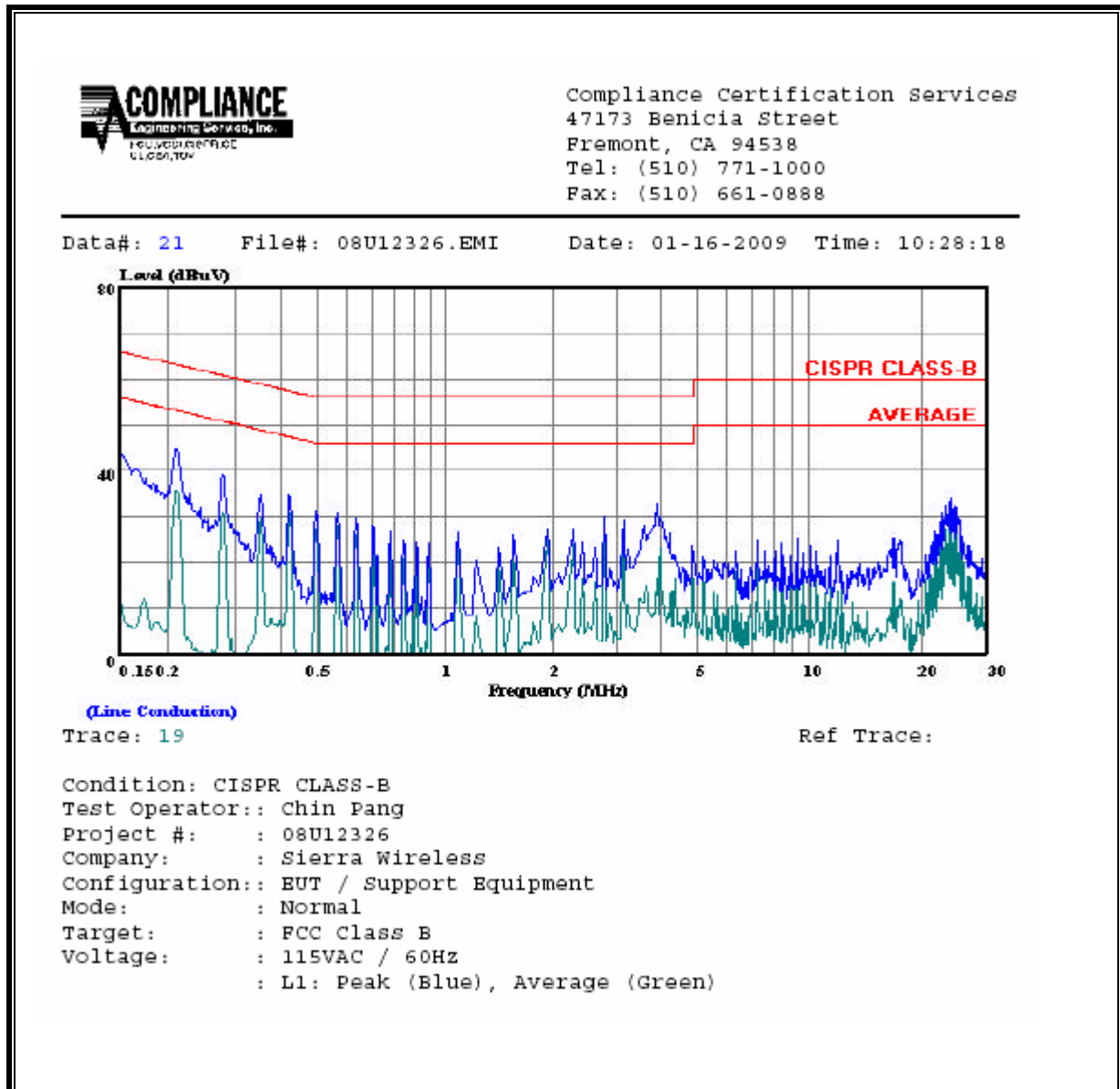
Notes:

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			Closs	Limit	EN B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.21	46.62	--	36.57	0.00	63.13	53.13	-16.51	-16.56	L1
0.84	41.75	--	22.81	0.00	56.00	46.00	-14.25	-23.19	L1
24.14	32.48	--	28.91	0.00	60.00	50.00	-27.52	-21.09	L1
0.21	45.36	--	37.00	0.00	63.13	53.13	-17.77	-16.13	L2
0.28	52.51	--	38.28	0.00	60.76	50.76	-8.25	-12.48	L2
12.00	32.79	--	21.38	0.00	60.00	50.00	-27.21	-28.62	L2
6 Worst Data									

**LINE 1 RESULTS**

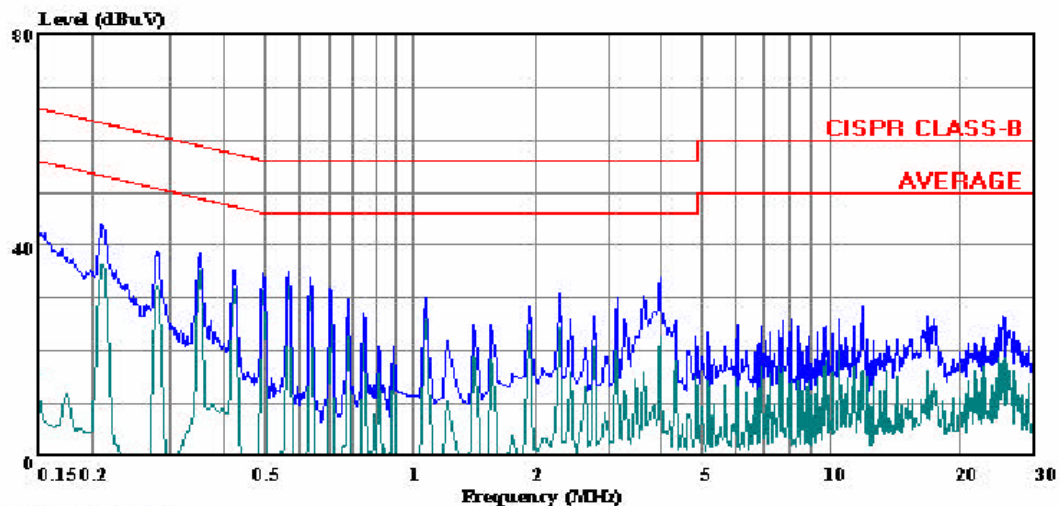




**LINE 2 RESULTS**

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

Data#: 28 File#: 08U12326.EMI Date: 01-16-2009 Time: 10:34:34



(Line Conduction)

Trace: 26

Ref Trace:

Condition: CISPR CLASS-B  
Test Operator:: Chin Pang  
Project #: 08U12326  
Company: Sierra Wireless  
Configuration:: EUT / Support Equipment  
Mode: Normal  
Target: FCC Class B  
Voltage: 115VAC / 60Hz  
L2: Peak (Blue), Average (Green)