



**FCC CFR47 PART 15 SUBPART B  
VERIFICATION TEST REPORT**

**FOR**

**DUAL- BAND CDMA (1XRTT & EVDO) MODULE**

**MODEL NUMBER: AR5550**

**REPORT NUMBER: 10U13438-2, Revision A**

**ISSUE DATE: NOVEMBER 16, 2010**

*Prepared for*

**SIERRA WIRELESS INC. - YW  
13811 WIRELESS WAY  
RICHMOND, BRITISH COLUMBIA V6V3A4, CANADA**

*Prepared by*

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**NVLAP LAB CODE 200065-0**

Revision History

Rev.	Issue Date	Revisions	Revised By
--	10/21/10	Initial Issue	T. Chan
A	11/16/10	Updated firmware information.	A. Zaffar

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## 1. ATTESTATION OF TEST RESULTS

**COMPANY NAME:** SIERRA WIRELESS INC. - YW  
13811 WIRELESS WAY  
RICHMOND, BRITISH COLUMBIA V6V3A4, CANADA

**EUT DESCRIPTION:** DUAL- BAND CDMA (1XRTT & EVDO) MODULE

**MODEL:** AR5550

**SERIAL NUMBER:** 1026060032

**DATE TESTED:** OCTOBER 20, 2010

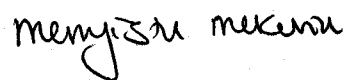
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART B	Pass

Compliance Certification Services (UL 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 UL 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 UL CCS and all revisions are duly noted in the revisions section. Any alteration of this document not carried out by UL 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 UL CCS By:

Tested By:



THU CHAN  
ENGINEERING MANAGER  
UL CCS

MENGISTU MEKURIA  
EMC ENGINEER  
UL CCS

## 2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with ANSI C63.4-2009.

## 3. FACILITIES AND ACCREDITATION

The test sites and measurement facilities used to collect data are located at 47173 Benicia Street, Fremont, California, USA.

UL 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:

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

### 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

The EUT is a wireless module that intended for data exchange.

#### GENERAL INFORMATION

Power Requirements	100-240 VAC / 50-60 Hz
List of frequencies generated or used by the EUT	32 KHz & 19.2 MHz

### 5.2. PRELIMINARY TEST CONFIGURATIONS

The following configurations were investigated during preliminary testing:

EUT Configuration	Description
Normal	The EUT attached to the interface Jig that is connected to the laptop and AC Adapter

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

### 5.3. MODE(S) OF OPERATION

Mode	Description
Normal	The interface Jig is powered using AC Adapter and the support laptop also provided power to the EUT via USB Cable. The Support laptop I/O ports are connected to the peripheral devices.

### 5.4. SOFTWARE AND FIRMWARE

The firmware installed in the EUT during testing was SWI6600\_DV31\_00.15.00

### 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
Development Kit	Sierra Wireless	ARx550	1400476 Rev A	N/A
Interface Jig	Sierra Wireless	N/a	1400475 Rev A	N/A
AC/DC Adapter	CINCON ELEC.	TR45A12	45120-0054164	DoC
Laptop	Dell	D620	(01)07898349890528	DoC
AC Adapter	Dell	PA-1650-05D	CN-05U092-71615-47N-17D2	DoC
Mouse	Dell	M-UK Del 3	HC6450G18J1	DoC
Printer	Microline 186	D22300A	AC5C018494A0	DoC

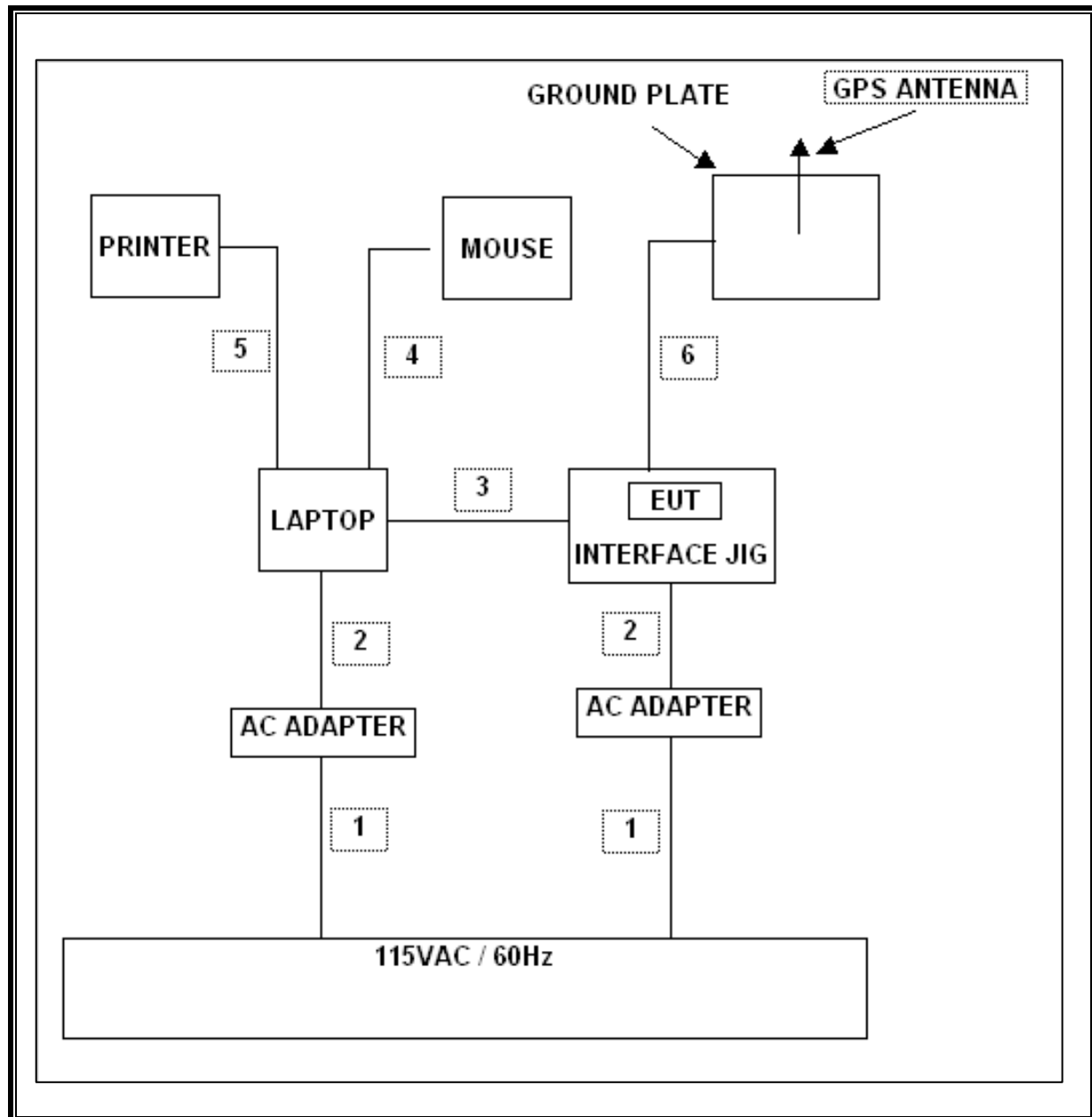
### I/O CABLES

I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	2	AC	Un-Shielded	2.0 m	N/A
2	DC	2	DC	Un-Shielded	2.0 m	N/A
3	USB	1	USB	Un-Shielded	2.0 m	N/A
4	Mouse	1	USB	Un-Shielded	2.0 m	N/A
5	Printer	1	USB	Un-Shielded	2.0 m	N/A
6	SMA	1	SMA	Shielded	0.8m	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	Serial Number	Cal Due
Spectrum Analyzer, 44 GHz	Agilent / HP	E4446A	C01069	03/05/11
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00580	01/06/11
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01016	07/12/11
LISN, 10 kHz ~ 30 MHz	Solar	8012-50-R-24-BNC	N02481	11/05/10
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	05/06/11
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/06/01

## 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 19.2 MHz, therefore the frequency range was investigated from 30 MHz to 1000 MHz.

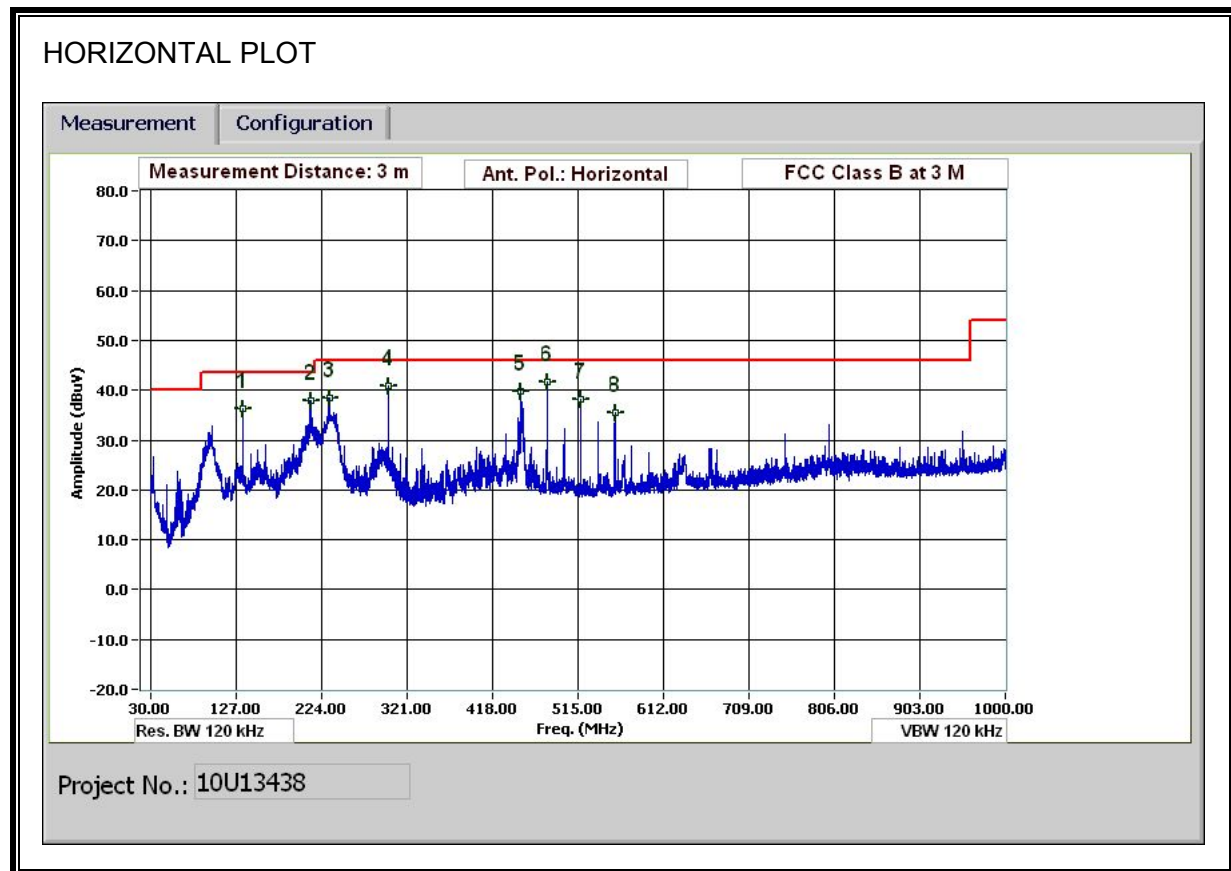
#### LIMIT

§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:

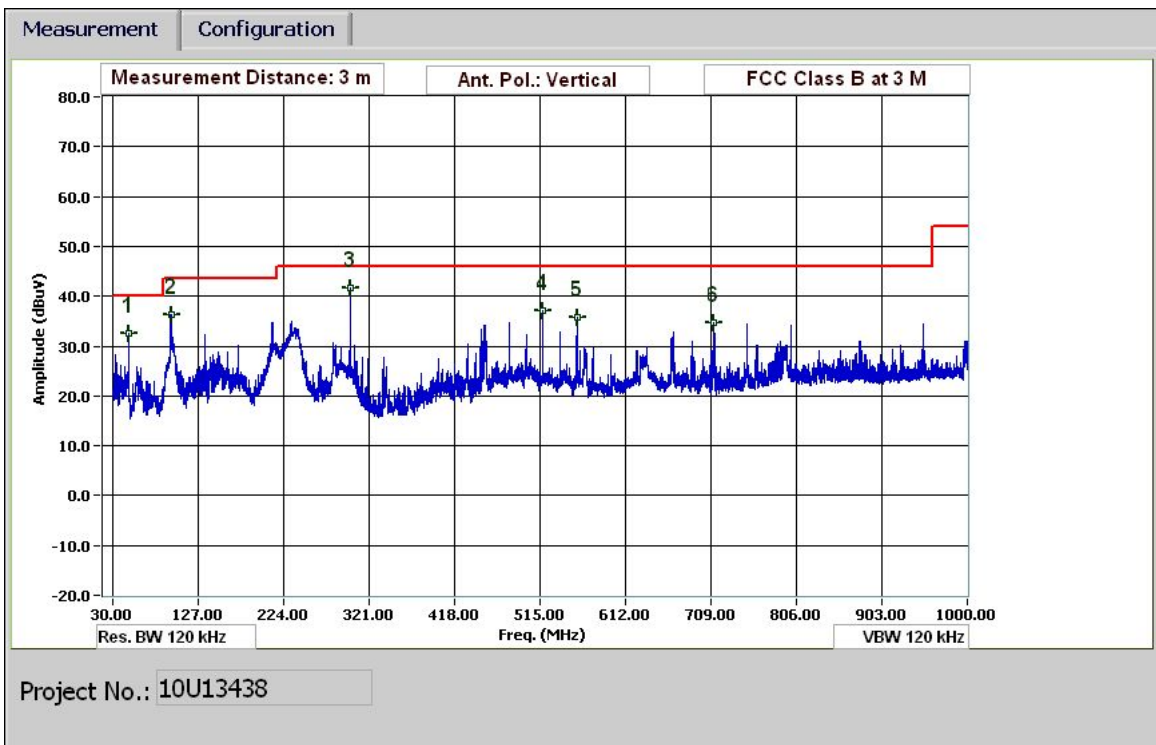
Limits for radiated disturbance of Class B ITE at measuring distance of 3 m	
Frequency range (MHz)	Quasi-peak limits (dB $\mu$ V/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960 MHz	54
Note: The lower limit shall apply at the transition frequency.	

## RESULTS

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



## VERTICAL PLOT



## HORIZONTAL AND VERTICAL DATA

### 30-1000MHz Frequency Measurement

Compliance Certification Services, Fremont 5m Chamber

Test Engr: Mengistu Mekuria  
Date: 10/21/10  
Project #: 10U13438  
Company: Sierra Wireless  
Test Target: FCC Class B  
Mode Oper: Normal 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	Pad dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol. V/H	Det. P/A/QP	Notes
48.241	3.0	52.4	9.1	0.6	29.6	0.0	0.0	32.5	40.0	-7.5	V	P	
96.003	3.0	56.0	9.1	0.9	29.5	0.0	0.0	36.4	43.5	-7.1	V	P	
299.531	3.0	55.6	13.3	1.6	28.8	0.0	0.0	41.7	46.0	-4.3	V	P	
518.42	3.0	47.5	17.1	2.2	29.7	0.0	0.0	37.0	46.0	-9.0	V	P	
556.822	3.0	45.6	17.6	2.3	29.7	0.0	0.0	35.8	46.0	-10.2	V	P	
712.108	3.0	42.1	19.5	2.6	29.5	0.0	0.0	34.7	46.0	-11.3	V	P	
134.404	3.0	51.2	13.5	1.0	29.4	0.0	0.0	36.3	43.5	-7.2	H	P	
211.207	3.0	53.6	12.0	1.3	28.9	0.0	0.0	38.0	43.5	-5.5	H	P	
232.448	3.0	54.0	11.9	1.4	28.8	0.0	0.0	38.4	46.0	-7.6	H	P	
299.411	3.0	54.8	13.3	1.6	28.8	0.0	0.0	40.8	46.0	-5.2	H	P	
449.537	3.0	51.3	15.9	2.0	29.5	0.0	0.0	39.7	46.0	-6.3	H	P	
480.019	3.0	52.8	16.4	2.1	29.6	0.0	0.0	41.7	46.0	-4.3	H	P	
518.42	3.0	48.6	17.1	2.2	29.7	0.0	0.0	38.1	46.0	-7.9	H	P	
556.822	3.0	45.3	17.6	2.3	29.7	0.0	0.0	35.5	46.0	-10.5	H	P	

Rev. 1.27.09

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

## 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

#### AC ADAPTER

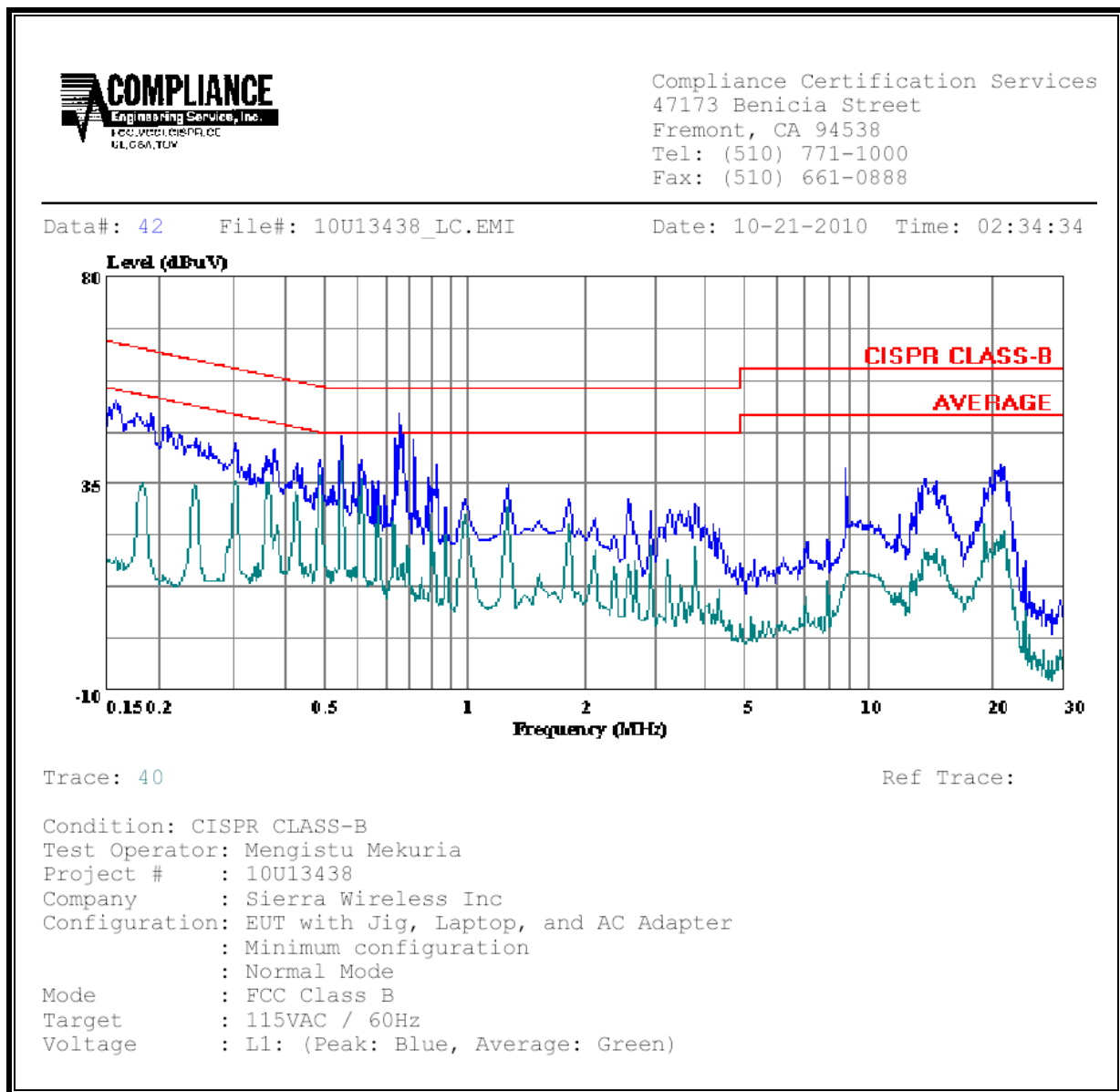
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.49	40.07	--	36.88	0.00	56.24	46.24	-16.17	-9.36	L1
0.55	45.49	--	42.52	0.00	56.00	46.00	-10.51	-3.48	L1
0.61	50.53	--	36.25	0.00	56.00	46.00	-5.47	-9.75	L1
0.49	48.22	--	38.92	0.00	56.24	46.24	-8.02	-7.32	L2
0.55	44.15	--	42.39	0.00	56.00	46.00	-11.85	-3.61	L2
0.61	39.31	--	36.12	0.00	56.00	46.00	-16.69	-9.88	L2
6 Worst Data									

#### SUPPORT LAPTOP

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
0.20	49.31	--	34.86	0.00	63.69	53.69	-14.38	-18.83	L1
0.30	37.74	--	27.26	0.00	60.30	50.30	-22.56	-23.04	L1
0.40	35.65	--	26.35	0.00	57.90	47.90	-22.25	-21.55	L1
0.19	49.09	--	32.11	0.00	63.91	53.91	-14.82	-21.80	L2
0.30	40.25	--	29.96	0.00	60.33	50.33	-20.08	-20.37	L2
0.50	37.32	--	25.74	0.00	56.02	46.02	-18.70	-20.28	L2
6 Worst Data									

## AC ADAPTER

### LINE 1 RESULTS



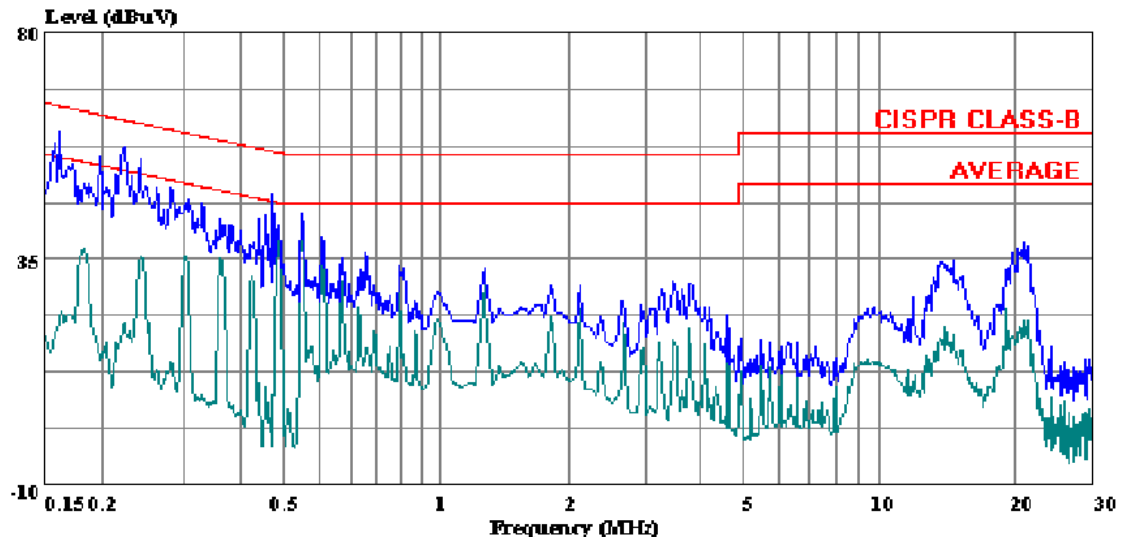


## LINE 2 RESULTS



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

Data#: 35 File#: 10U13438\_LC.EMI Date: 10-21-2010 Time: 02:27:54



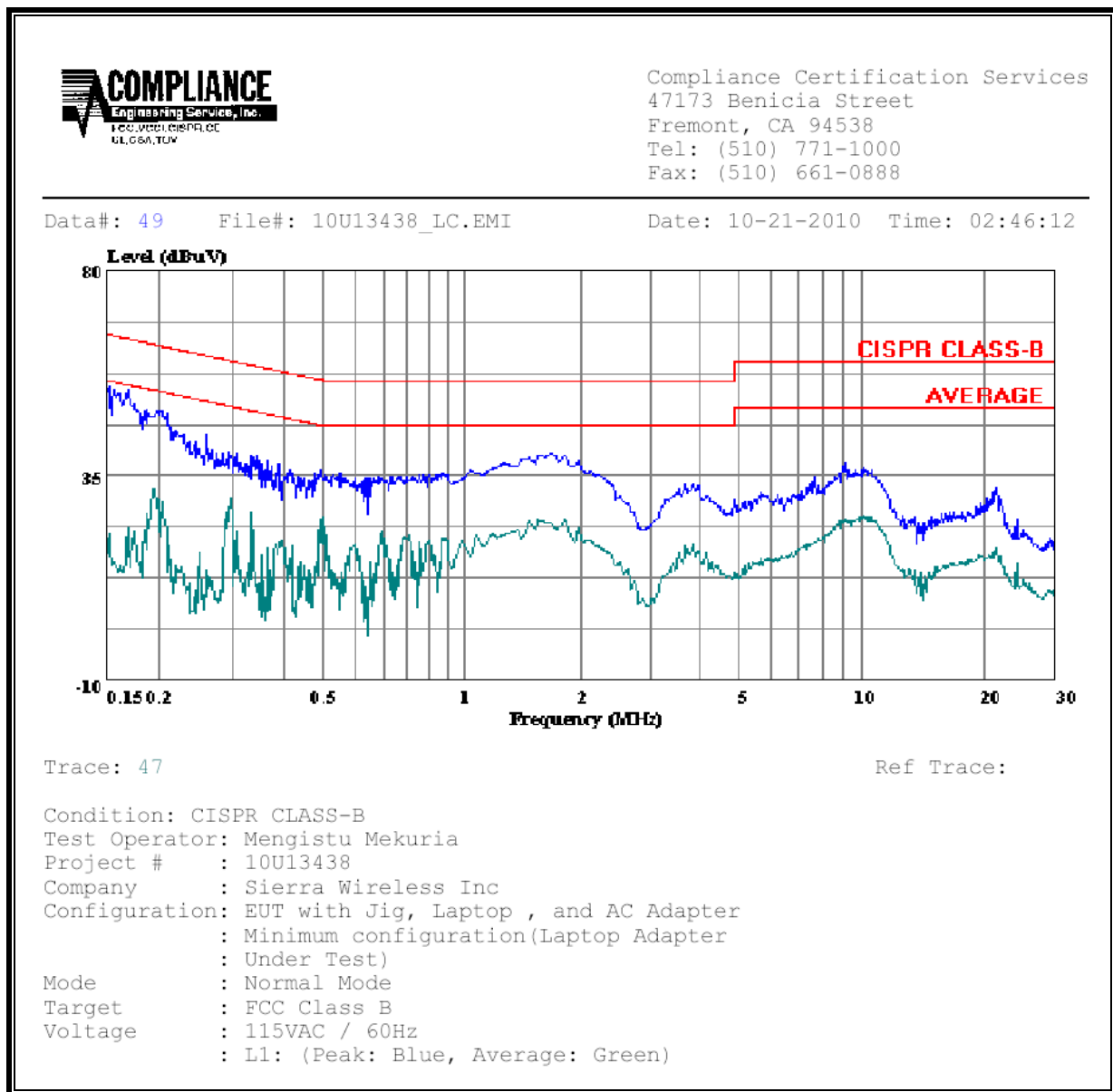
Trace: 33

Ref Trace:

Condition: CISPR CLASS-B  
Test Operator: Mengistu Mekuria  
Project # : 10U13438  
Company : Sierra Wireless Inc  
Configuration: EUT with Jig, Laptop, and AC Adapter  
: Minimum configuration  
: Normal Mode  
Mode : FCC Class B  
Target : 115VAC / 60Hz  
Voltage : L2: (Peak: Blue, Average: Green)

**SUPPORT LAPTOP**

**LINE 1 RESULTS**

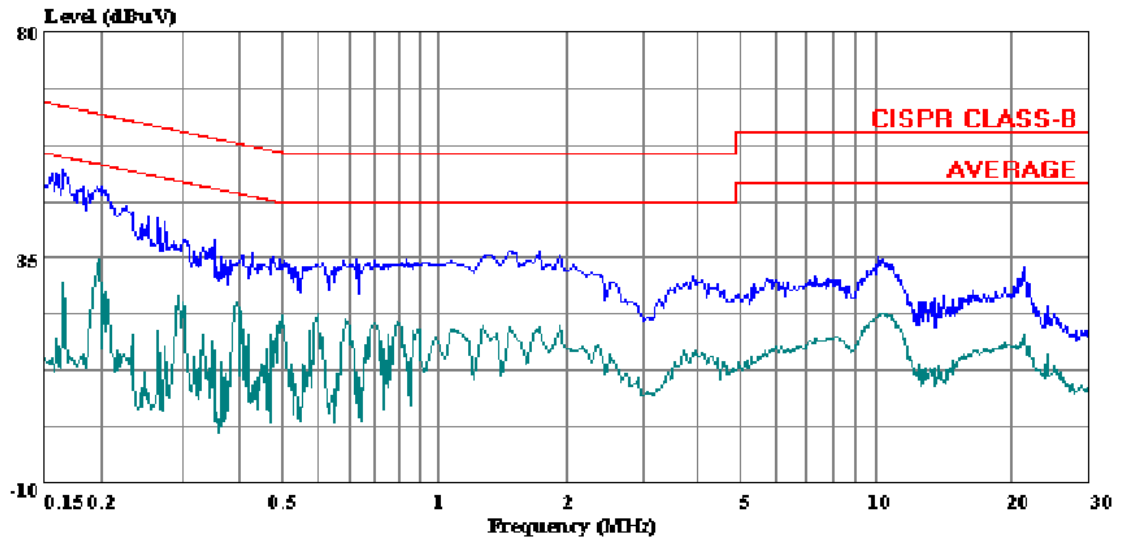


**LINE 2 RESULTS**



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

Data#: 56 File#: 10U13438\_LC.EMI Date: 10-21-2010 Time: 02:54:20



Trace: 54

Ref Trace:

Condition: CISPR CLASS-B  
Test Operator: Mengistu Mekuria  
Project # : 10U13438  
Company : Sierra Wireless Inc  
Configuration: EUT with Jig, Laptop , and AC Adapter  
: Minimum configuration(Laptop Adapter  
: Under Test)  
Mode : Normal Mode  
Target : FCC Class B  
Voltage : 115VAC / 60Hz  
: L2: (Peak: Blue, Average: Green)