



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

FOR

CDMA+ WIMAX + WIFI MOBILE HOT SPOT

MODEL NUMBER: AirCard W802S

REPORT NUMBER: 11U13729-2

ISSUE DATE: APRIL 12, 2011

Prepared for
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NVLAP LAB CODE 200065-0

Revision History

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SIERRA WIRELESS INC.
2200 FARADAY AVENUE, SUITE 150
CARLSBAD, CA 92008, U.S.A.

EUT DESCRIPTION: CDMA+ WIMAX + WIFI MOBILE HOT SPOT

MODEL: AirCard W802S

SERIAL NUMBER: FCC Unit #3

DATE TESTED: MARCH 27-28, 2011

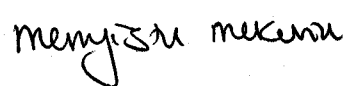
APPLICABLE STANDARDS	
STANDARD	TEST RESULTS
FCC PART 15 SUBPART B	PASS

Compliance Certification Services, Inc. (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 C63.4-2003.

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:

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

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 CDMA+ WiMAX + WiFi Mobile Hot Spot that is manufactured by Sierra Wireless.

GENERAL INFORMATION

Desktop Cradle	PLASTIC
ENCLOSURE MATERIAL	PLASTIC
POWER REQUIREMENTS	5VDC from USB port & AC/DC Adapter
LIST OF ALL OSCILLATOR FREQUENCIES GREATER THAN OR EQUAL TO 9 kHz	32.766KHz, 13MHz, 19.2MHz, 24MHz, 26MHz and 40MHz

5.2. WORST CASE CONFIGURATIONS

The natural way of configuration with minimum peripheral is considered to be the worst-case configurations.

5.3. MODE(S) OF OPERATION

Configuration	Description
Configuration 1	Charging mode, EUT on desktop Cradle
Configuration 2	The EUT was in normal mode, while all the I/O ports active to transfer data between the laptop and other peripherals.

5.4. MODIFICATIONS

No modifications were made during testing

5.5. DETAILS OF TESTED SYSTEM

SUPPORT EQUIPMENT & PERIPHERALS

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	Manufacturer	Model	Serial Number	FCC ID
LAPTOP	HP	Compaq 6515b	CNU82518TY	DoC
AC/DC Adapter	HP	PA-1900-08H2	CT:597920ALLUJOXZ	DoC
Desktop Cradle	Sierra Wireless	NA	NA	NA
AC Adapter	Sierra Wireless	SSW-2012	NA	DoC

I/O CABLES

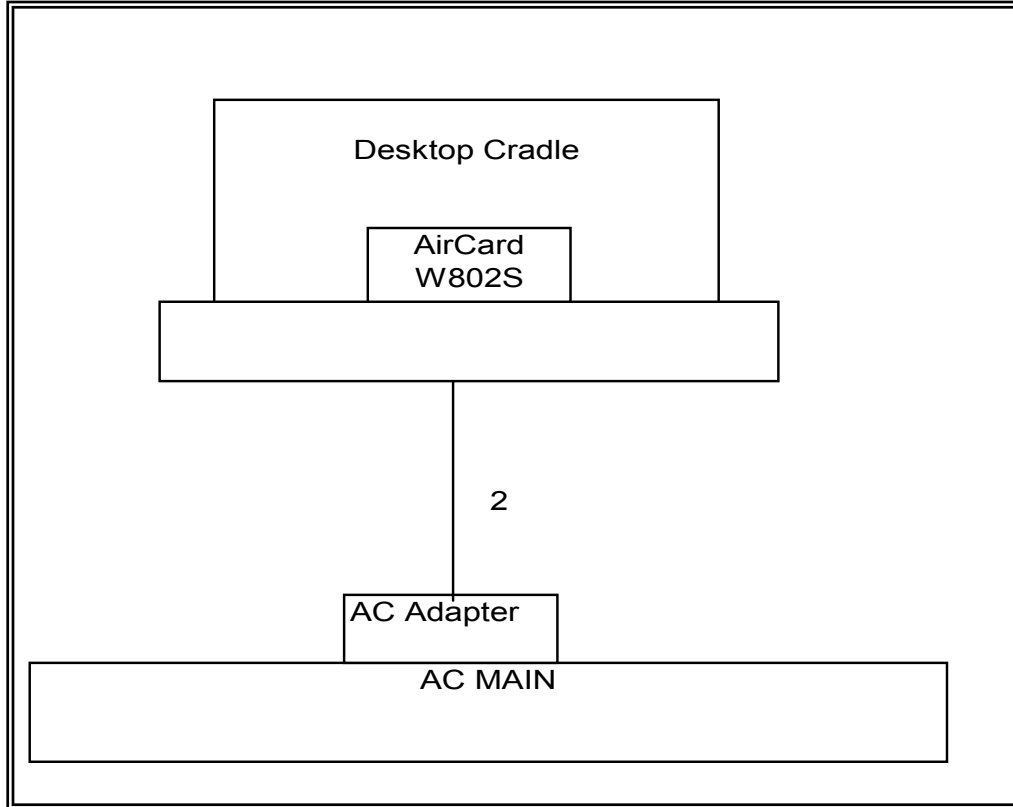
I/O CABLE LIST						
Cable No.	Port	# of Identical Ports	Connector Type	Cable Type	Cable Length	Remarks
1	AC	2	US 115V	Un-shielded	2m	N/A
2	DC	2	DC	Un-shielded	1m	Ferrite at one end
3	USB	1	Desktop Cradle	Un-Shielded	1m	N/A
4	USB	1	Printer	Un-Shielded	2.0 m	N/A

TEST SETUP

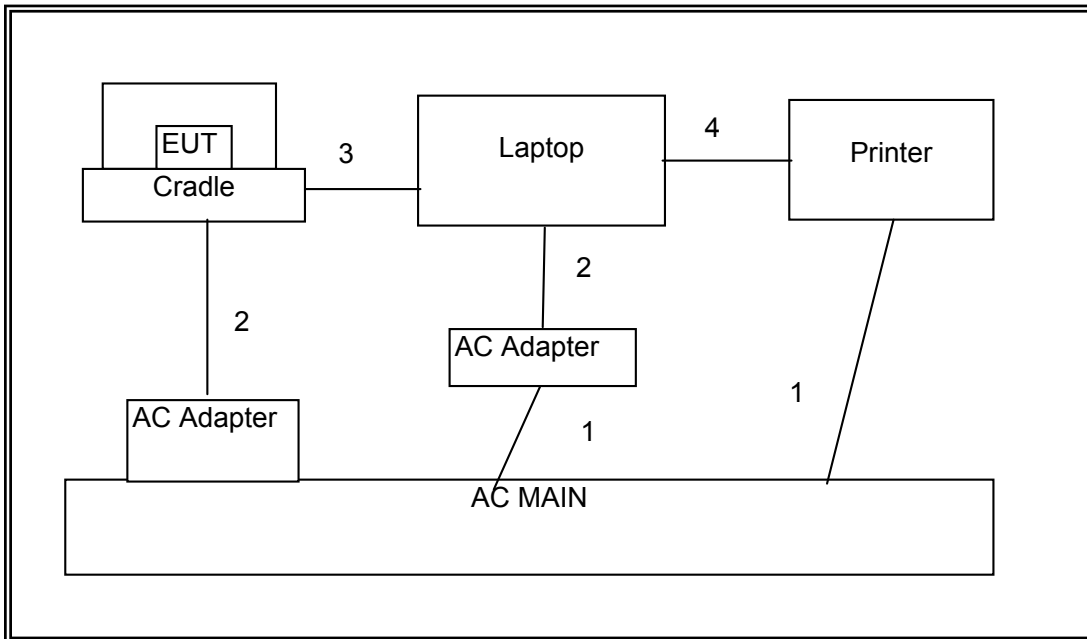
The EUT is connected to the support laptop via USB port. Test software exercised the EUT.

TEST SETUP DIAGRAM

CONFIGURATION 1



CONFIGURATION 2



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	Asset	Cal Due
Antenna, Horn, 18Ghz	EMCO	3115	C00872	6-29-11
Preamplifier, 1300MHz	Agilent/HP	8447D	C00558	01-6-11
Preamplifier, 26.5GHz	Agilent/HP	8449B	C00749	7-14-11
Spectrum Analyzer, 26.5GHz	Agilent/HP	E4440A	C01176	08-10-11
Antenna, Bilog, 2GHz	Sundt Sciences	JB1	C01171	07-12-11
EMI Test Receiver, 30MHz	R & S	ESH5 20	N02396	05-6-11
LISN, 30MHz	FCC	LISN-50/250-25-2	N02625	11-10-11
LISN, 10KHz ~ 30MHz	Solar	801 2-50-R-24-BNC	N02481	11-10-11

7. APPLICABLE LIMITS AND TEST RESULTS

7.1. RADIATED EMISSIONS

TEST PROCEDURE

ANSI C63.4

The highest clock frequency generated is 40MHz in the EUT. Therefore the frequency range was investigated from 30 MHz to 1 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:

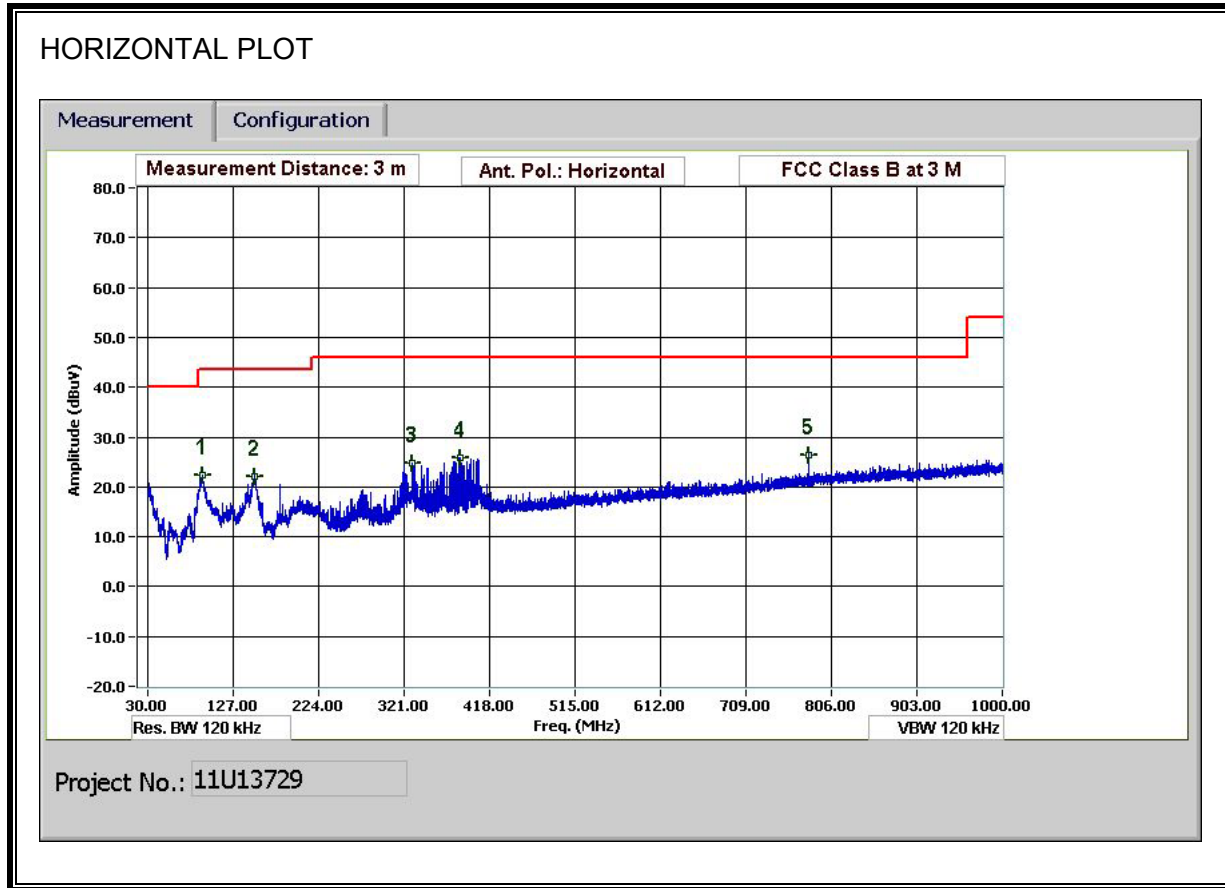
Limits for radiated disturbance of Class B ITE at measuring distance of 3 m	
Frequency range (MHz)	Quasi-peak limits (dB μ V/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
Above 960 MHz	54

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

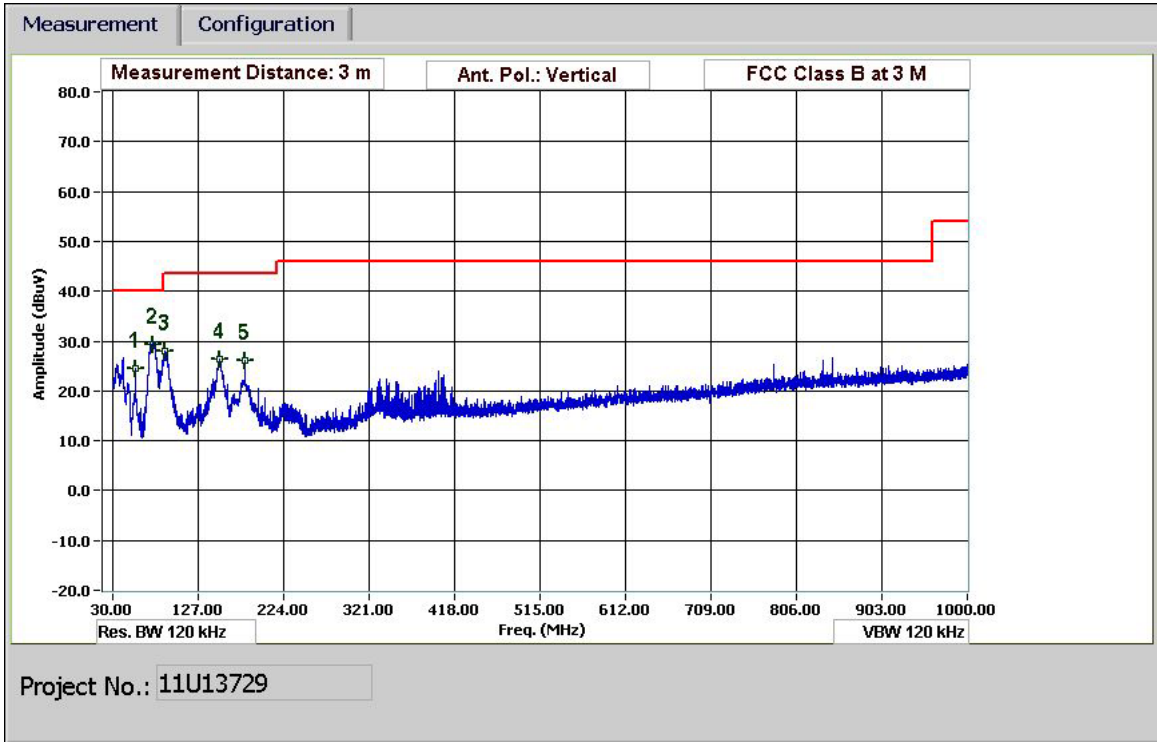
RESULTS

CONFIGURATION 1

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



VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

30-1000MHz Frequency Measurement
 Compliance Certification Services, Fremont 5m Chamber

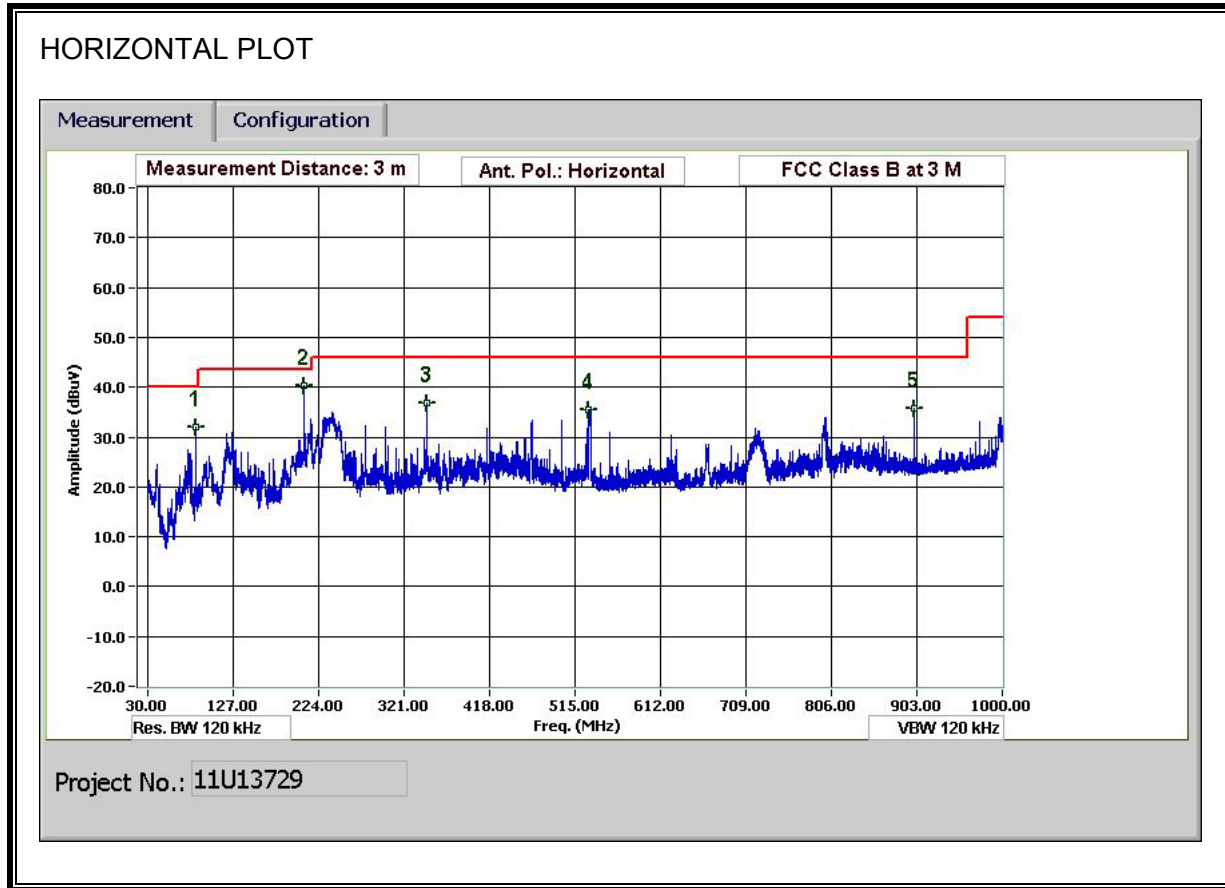
Test Engr: Mengistu Mekura
 Date: 3/28/11
 Project #: 11U13729
 Company: Sierra Wireless
 Test Target: FCC 15B
 Mode Oper: Charging mode
 Configuration: EUT and Desktop Cradle

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

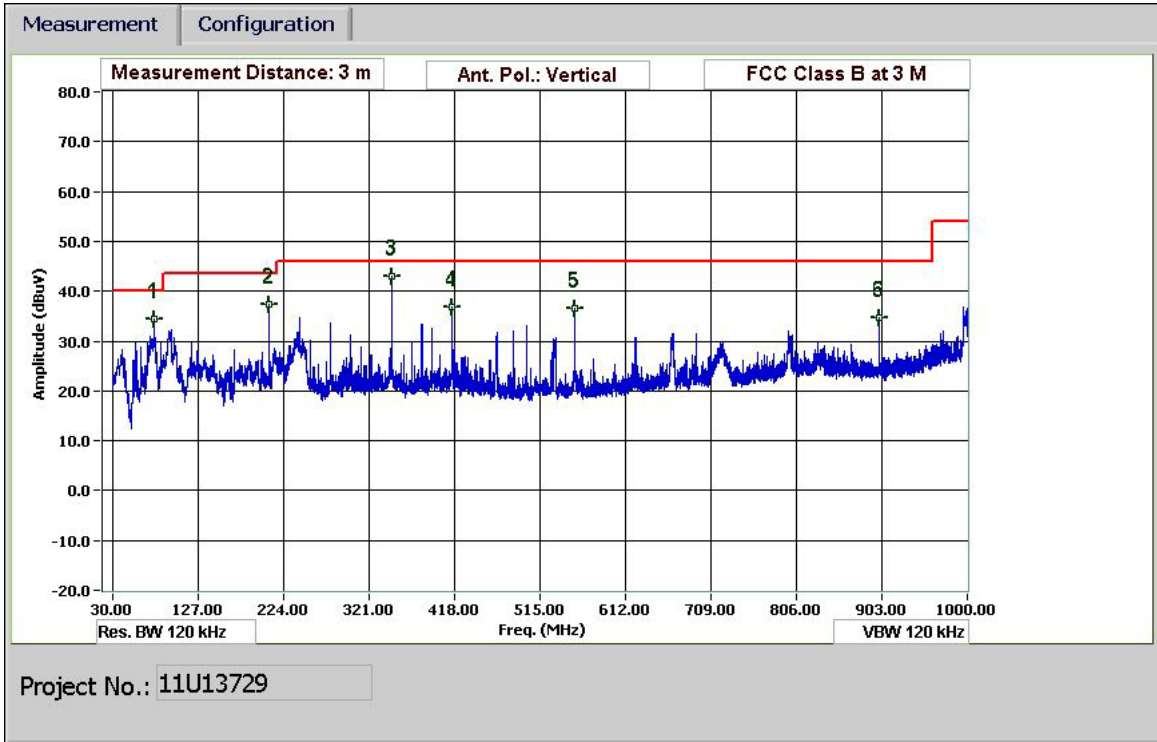
f MHz	Dist (m)	Read dBuV	AF dB/m	CL dB	Amp dB	D Corr dB	Pad dB	Corr. dBuV/m	Limit dBuV/m	Margin dB	Ant. Pol V/H	Det. P/A/QP	Notes
55.801	3.0	45.5	7.9	0.6	29.6	0.0	0.0	24.4	40.0	-15.6	V	P	
75.122	3.0	50.2	7.9	0.8	29.6	0.0	0.0	29.3	40.0	-10.7	V	P	
89.522	3.0	49.1	7.5	0.8	29.6	0.0	0.0	27.9	43.5	-15.6	V	P	
150.845	3.0	42.3	12.4	1.1	29.3	0.0	0.0	26.5	43.5	-17.0	V	P	
180.006	3.0	43.1	10.9	1.2	29.0	0.0	0.0	26.2	43.5	-17.3	V	P	
92.883	3.0	42.8	8.3	0.9	29.6	0.0	0.0	22.4	43.5	-21.1	H	P	
151.085	3.0	37.9	12.4	1.1	29.3	0.0	0.0	22.1	43.5	-21.4	H	P	
330.252	3.0	38.2	13.8	1.7	28.9	0.0	0.0	24.8	46.0	-21.2	H	P	
384.015	3.0	38.4	14.8	1.9	29.2	0.0	0.0	25.8	46.0	-20.2	H	P	
779.911	3.0	32.3	20.7	2.8	29.2	0.0	0.0	26.5	46.0	-19.5	H	P	

CONFIGURATION 2

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



VERTICAL PLOT



HORIZONTAL AND VERTICAL DATA

30-1000MHz Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Test Engr: MENGISTU MEKURIA
Date: 03-27-11
Project #: 11U13729
Company: SIERRA WIRELESS
Test Target: FCC CLASS B
Mode Oper: NORMAL MODE
Configuration: EUT and support Equipment

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
84.242	3.0	53.3	7.5	0.8	29.6	0.0	0.0	32.1	40.0	-7.9	H	P	
207.847	3.0	56.0	12.0	1.3	28.9	0.0	0.0	40.4	43.5	-3.1	H	P	
346.333	3.0	50.0	14.1	1.7	29.0	0.0	0.0	36.8	46.0	-9.2	H	P	
530.901	3.0	45.6	17.2	2.2	29.7	0.0	0.0	35.4	46.0	-10.6	H	P	
900.036	3.0	39.8	21.5	3.0	28.6	0.0	0.0	35.8	46.0	-10.2	H	P	
76.922	3.0	55.4	7.8	0.8	29.6	0.0	0.0	34.4	40.0	-5.6	V	P	
207.727	3.0	52.9	12.0	1.3	28.9	0.0	0.0	37.3	43.5	-6.2	V	P	
346.333	3.0	56.1	14.1	1.7	29.0	0.0	0.0	42.9	46.0	-3.1	V	P	
415.576	3.0	48.8	15.3	1.9	29.4	0.0	0.0	36.7	46.0	-9.3	V	P	
554.062	3.0	46.3	17.6	2.3	29.7	0.0	0.0	36.5	46.0	-9.5	V	P	
900.036	3.0	38.6	21.5	3.0	28.6	0.0	0.0	34.6	46.0	-11.4	V	P	

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 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.

RESULTS

6 WORST EMISSIONS

CNNFIGURATION 1

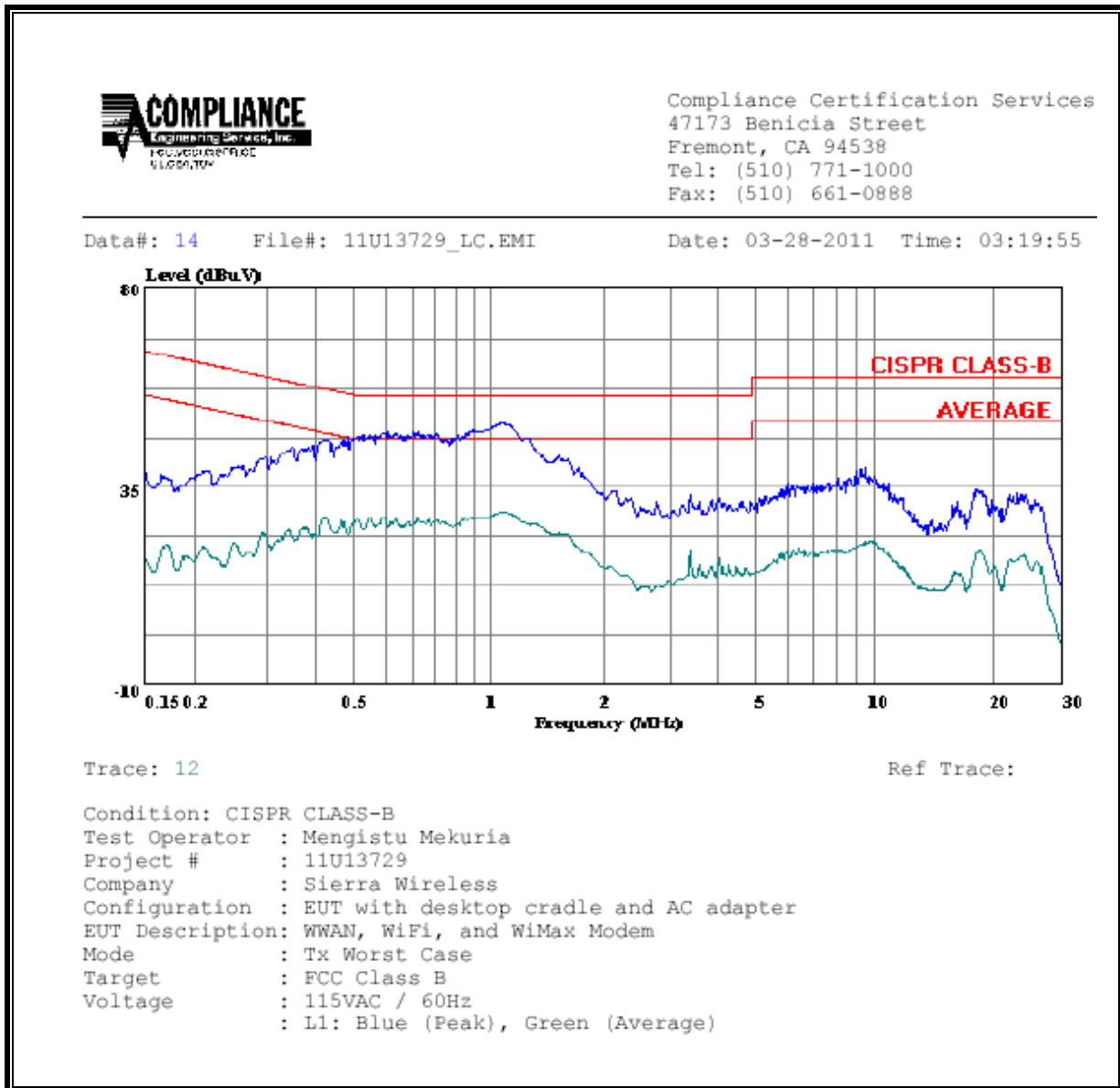
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Class (dB)	Limit QP	EN B AV	Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.43	45.60	--	27.97	0.00	57.33	47.33	-11.73	-19.36	L1
0.72	47.13	--	28.08	0.00	56.00	46.00	-8.87	-17.92	L1
1.23	49.26	--	29.09	0.00	56.00	46.00	-6.74	-16.91	L1
0.41	45.25	--	20.36	0.00	57.65	47.65	-12.40	-27.29	L2
0.60	42.17	--	19.53	0.00	56.00	46.00	-13.83	-26.47	L2
1.20	44.04	--	20.53	0.00	56.00	46.00	-11.96	-25.47	L2
6 Worst Data									

CNNFIGURATION 2

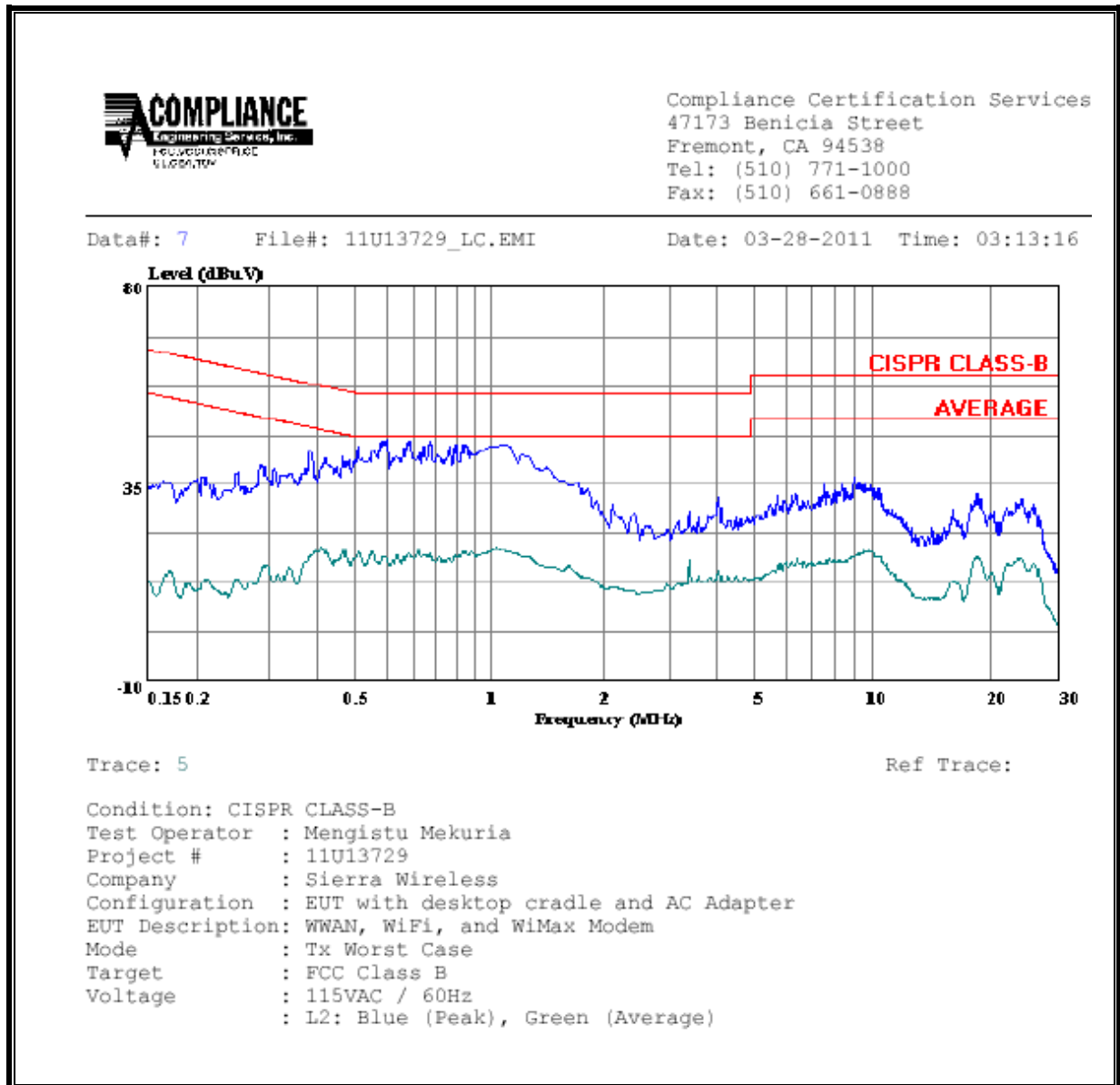
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq. (MHz)	Reading			Class (dB)	Limit QP	EN B AV	Margin		Remark L1 / L2
	PK (dBuV)	QP (dBuV)	AV (dBuV)				QP (dB)	AV (dB)	
0.16	53.96	--	37.17	0.00	65.62	55.62	-11.66	-18.45	L1
0.67	44.79	--	35.27	0.00	56.00	46.00	-11.21	-10.73	L1
3.38	43.99	--	31.60	0.00	56.00	46.00	-12.01	-14.40	L1
0.29	48.86	--	36.72	0.00	60.41	50.41	-11.55	-13.69	L2
0.47	45.76	--	31.28	0.00	56.50	46.50	-10.74	-15.22	L2
0.76	43.31	--	35.32	0.00	56.00	46.00	-12.69	-10.68	L2
6 Worst Data									

CONFIGURATION 1

LINE 1 RESULTS

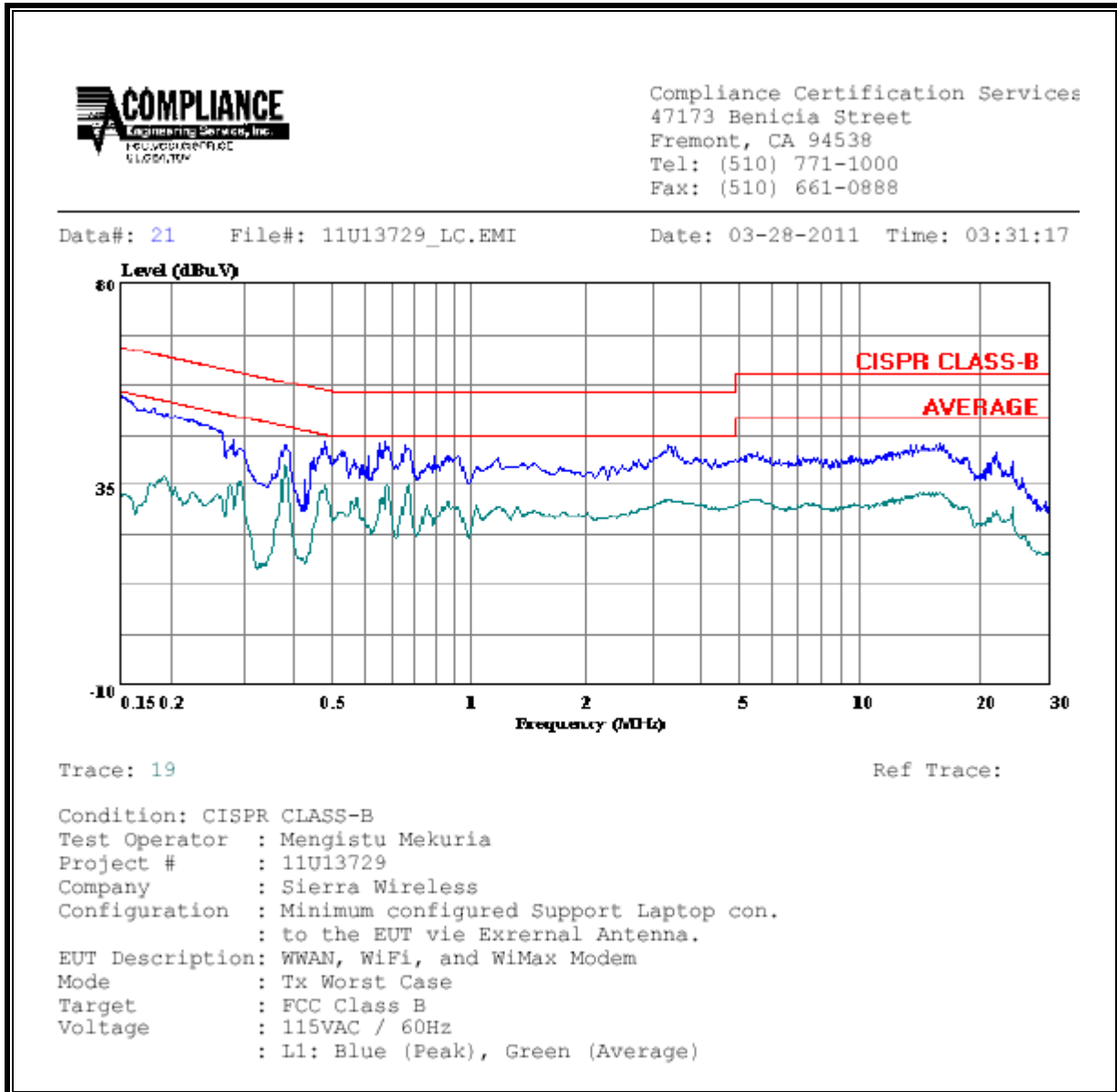


LINE 2 RESULTS



CONFIGURATION 2

LINE 1 RESULTS



LINE 2 RESULTS

