FCC CFR47 PART 15 SUBPART B

CERTIFICATION TEST REPORT

FOR

CDMA+ WIMAX + WIFI MOBILE HOT SPOT

MODEL NUMBER: AirCard W802S

REPORT NUMBER: 10u13412-3, Revision A

ISSUE DATE: JANUARY 12, 2011

Prepared for
SIERRA WIRELESS INC.
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Prepared by
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NVLAP LAB CODE 200065-0

Revision History

Rev.	Issue Date	Revisions	Revised By
---	09/29/10	Initial Issue	T. Chan
A	01/12/11	Changed model name	A. Zaffar

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1. ATTESTATION OF TEST RESULTS

COMPANY NAME: SIERRA WIRELESS INC.
2290 COSMOS COURT, CARLSBAD
CALIFORNIA 92011, USA

EUT DESCRIPTION: CDMA+ WIMAX + WIFI MOBILE HOT SPOT

MODEL: AirCard W802S

SERIAL NUMBER: Primary Unit #3

DATE TESTED: SEPTEMBER 28-29, 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:

THU CHAN
EMC MANAGER
UL CCS

Tested By:

CHIN PANG
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:

Field Strength (dBuV/m) = Measured Voltage (dBuV) + Antenna Factor (dB/m) + Cable Loss (dB) – Preamp Gain (dB)

36.5 dBuV + 18.7 dB/m + 0.6 dB – 26.9 dB = 28.9 dBuV/m

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.

The WiMax radio module is manufactured by Sierra Wireless.

GENERAL INFORMATION

Power Requirements	5.2VDC from AC/DC Adapter
List of frequencies generated or used by the EUT	40 MHz crystal on the WiMAX is the fastest clock crystal in the system

5.2. PRELIMINARY TEST CONFIGURATIONS

The following configurations were investigated during preliminary testing:

EUT Configuration	Description
Typical Configuration	EUT connected via USB cable to laptop PC. Also laptop PC was connected to printer and mouse.

5.3. MODE(S) OF OPERATION

Mode	Description
Standalone Mode	EUT was alone standby configuration
Charging Mode	EUT was charging with AC/DC adapter at standby configuration
Normal Mode	Laptop PC was pinging EUT with minimum configuration

5.4. MODIFICATIONS

No modifications were made during testing.

5.5. DETAILS OF TESTED SYSTEM

SUPPORT EQUIPMENT & PERIPHERALS

PERIPHERAL SUPPORT EQUIPMENT LIST				
Description	**Manufacture**	**Model**	**Serial Number**	**FCC ID**
Laptop	HP	Compaq 6515b	CNU82518TY	DoC
AC Adapter	HP	PA-1900-08H2	597920SLLUJOXZ	DoC
AC/DC Adapter	AirLink	WRG10F-120A	None	DoC
Printer	HP	Q6335A	MY56K1304B	DoC
AC/DC Adapter	HP	0957-2084	5715480604	DoC

I/O CABLES

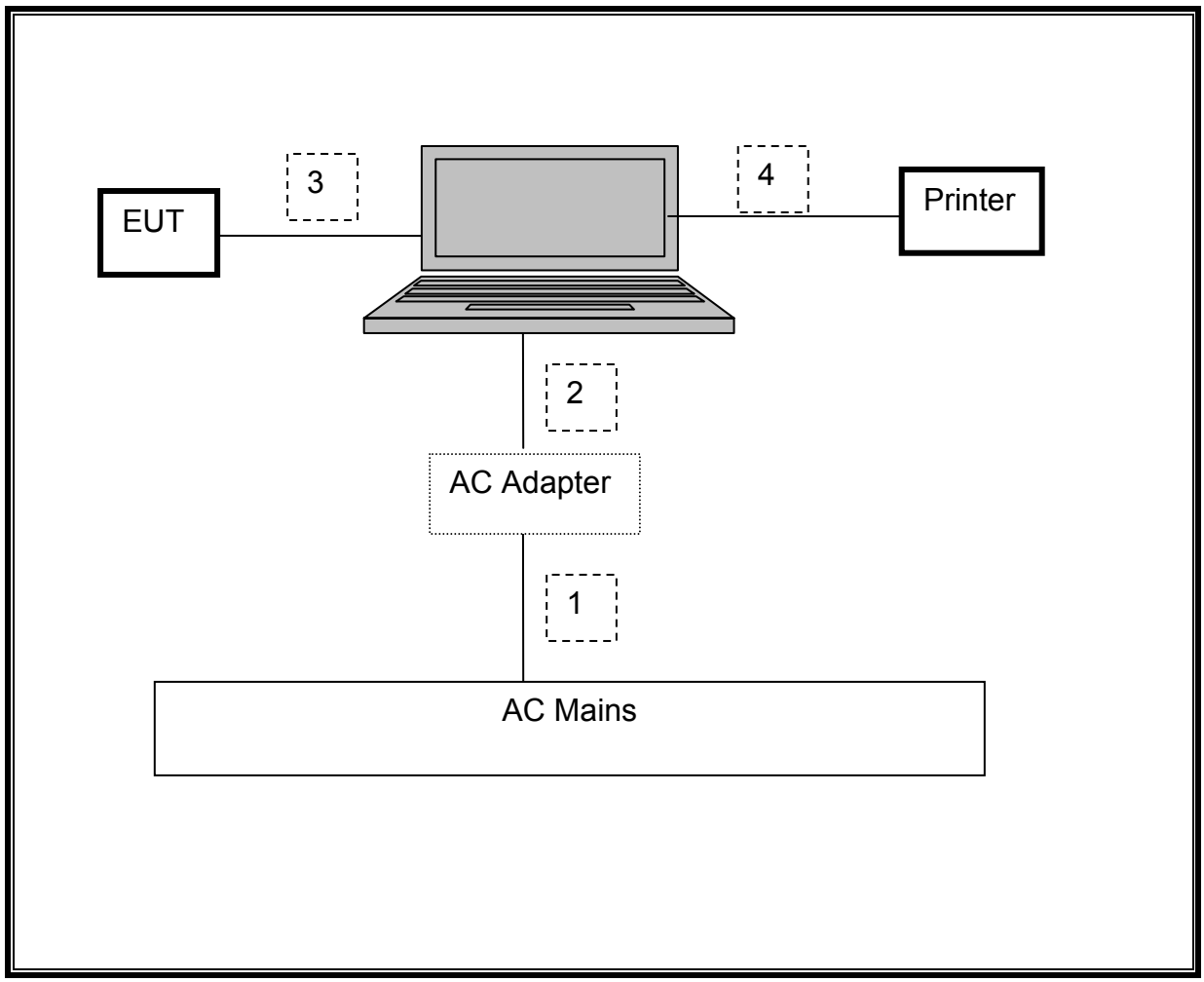
I/O CABLE LIST						
Cable No.	**Port**	**# of Identic Ports**	**Connector Type**	**Cable Type**	**Cable Length**	**Remarks**
1	AC	2	US 115V	Un-shielded	1.8m	N/A
2	DC	3	DC Plug	Un-shielded	1.8m	N/A
3	USB	1	USB	Un-shielded	1.2m	N/A
4	USB	1	USB	Un-shielded	1.8m	N/A

TEST SETUP

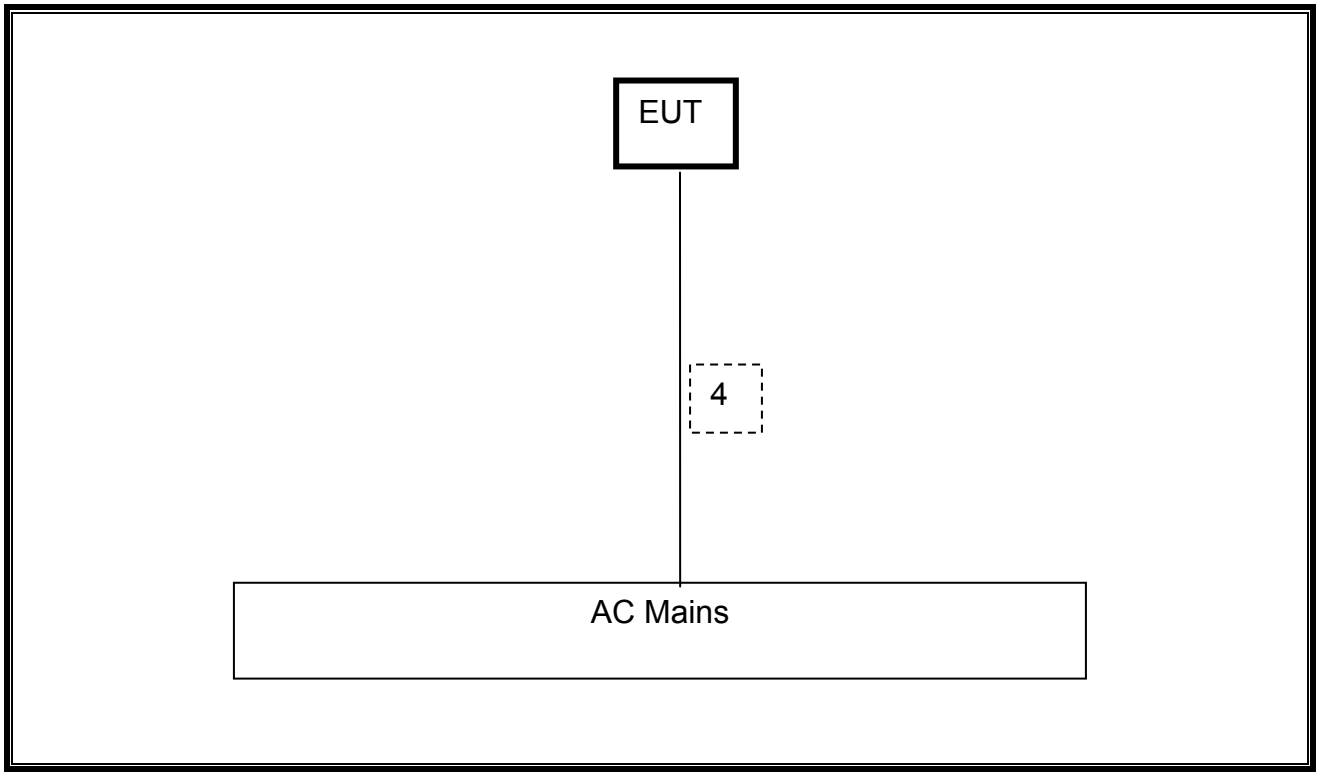
The EUT was connected via USB cable to laptop PC, and test software exercised the EUT.

TEST SETUP DIAGRAM

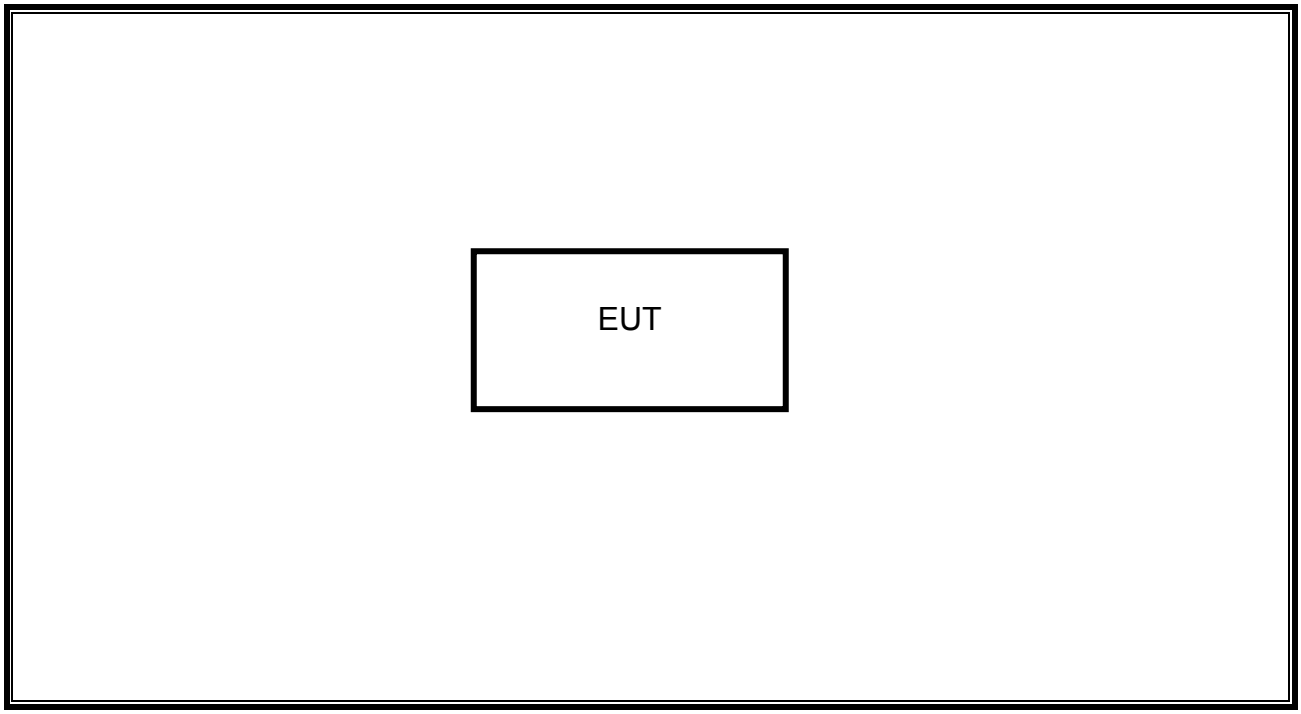
EUT with laptop via USB cable in Link Mode



EUT with AC Adapter Mode



EUT Standalone Mode



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**
EMI Test Receiver, 30 MHz	R & S	ESHS 20	N02396	05/06/11
LISN, 30 MHz	FCC	LISN-50/250-25-2	N02625	11/06/10
Preamplifier, 26.5 GHz	Agilent / HP	8449B	C01063	08/24/11
Preamplifier, 1300 MHz	Agilent / HP	8447D	C00778	07/06/11
Antenna, Horn, 18 GHz	EMCO	3115	C00783	07/29/11
Antenna, Bilog, 2 GHz	Sunol Sciences	JB1	C01011	07/14/11
Spectrum Analyzer, 26.5 GHz	Agilent / HP	E4440A	C01179	08/24/11

7. APPLICABLE LIMITS AND TEST RESULTS

7.1. RADIATED EMISSIONS

TEST PROCEDURE

ANSI C63.4 and CAN/CSA-CEI/IEC CISPR 22:02 as referenced by ICES-003 Issue 4.

The highest clock frequency generated is 40 MHz in the EUT, but RX standby mode at PCS 1900MHz band; therefore the frequency range was investigated from 30 MHz to 2 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 (dBµV/m)
30 to 88	40
88 to 216	43.5
216 to 960	46
960 to 1000	54
Note: The lower limit shall apply at the transition frequency.	

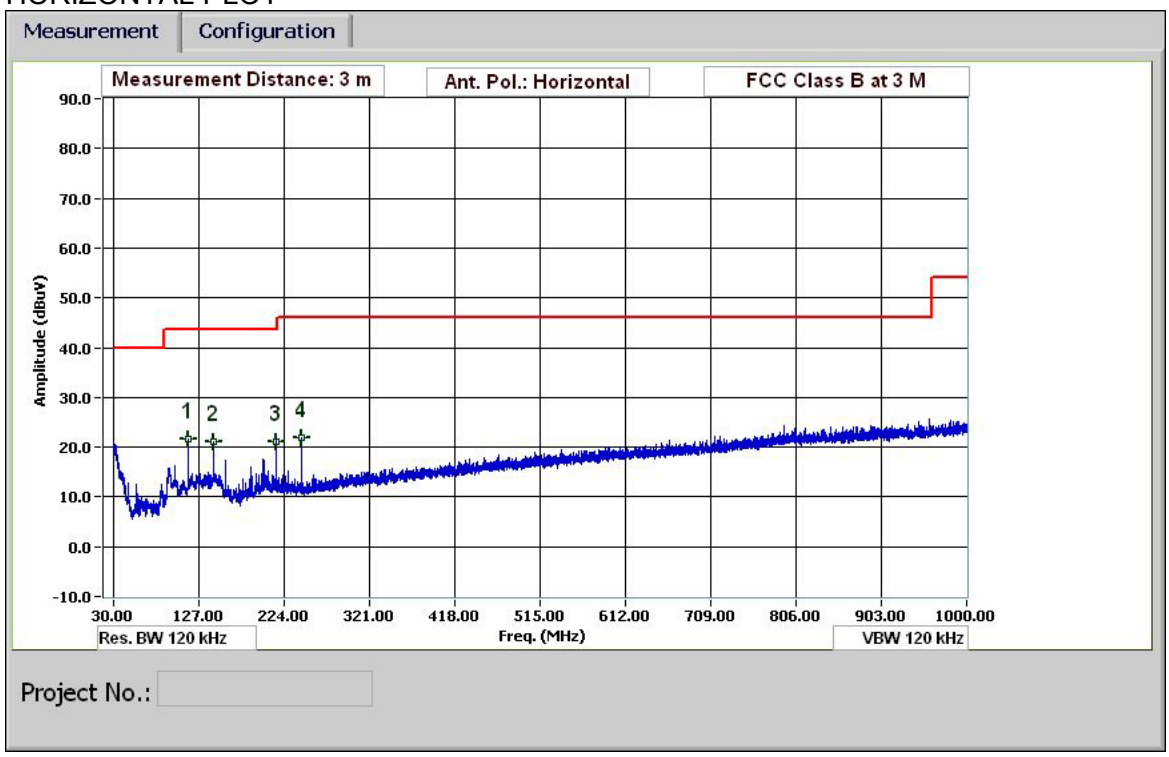
Limits for radiated disturbance of Class B_ ITE at measuring distance of 3 m		
Frequency range (MHz)	Peak limits (dBµV/m)	Average limits (dBµV/m)
1000 to 2000	74	54
Note: The lower limit shall apply at the transition frequency.		

7.1.1. RADIATED EMISSIONS 30 to 1000 MHz

EUT STANDALONE

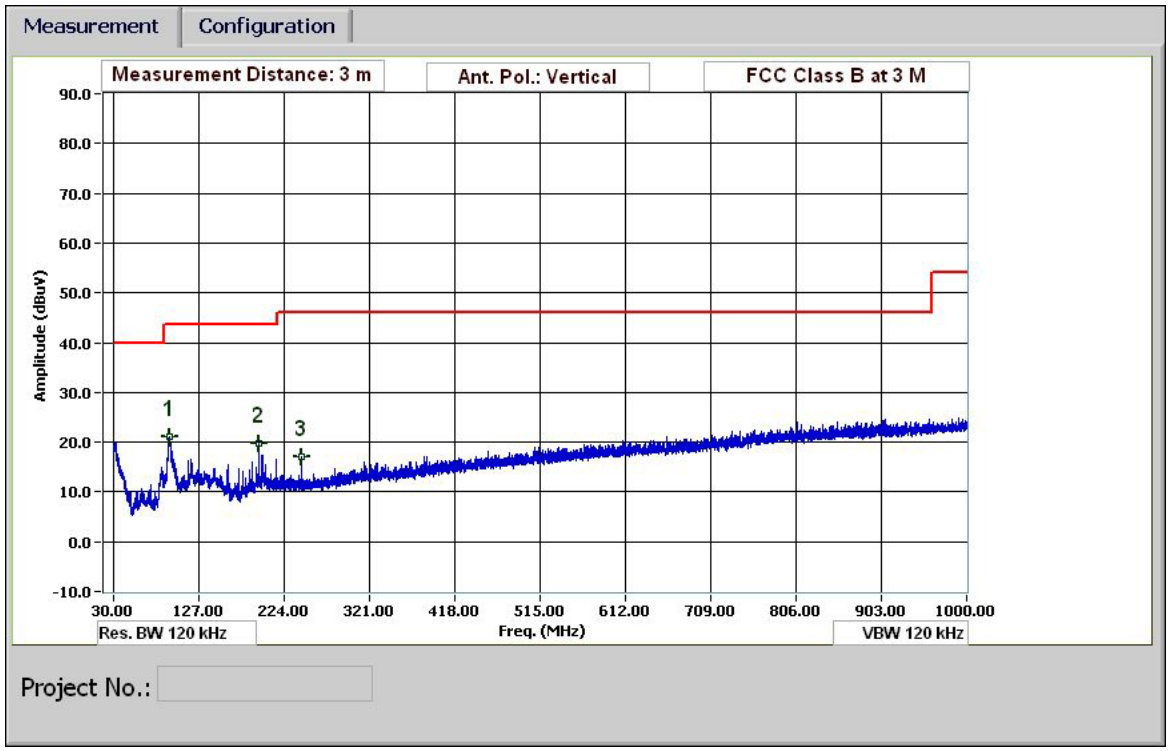
RADIATED EMISSIONS 30 TO 1000 MHz, HORIZONTAL)

HORIZONTAL PLOT



RADIATED EMISSIONS 30 TO 1000 MHz, VERTICAL)

VERTICAL PLOT



RADIATED EMISSION DATA

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

Test Engr: Chin Pang
Date: 09/29/10
Project #: 10U13412
Configuration: EUT only
Company: Sierra Wireless Inc.
Test Target: FCC 15B
Mode Oper: Normal

f	Measurement Frequency	Amp	Preamp Gain
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

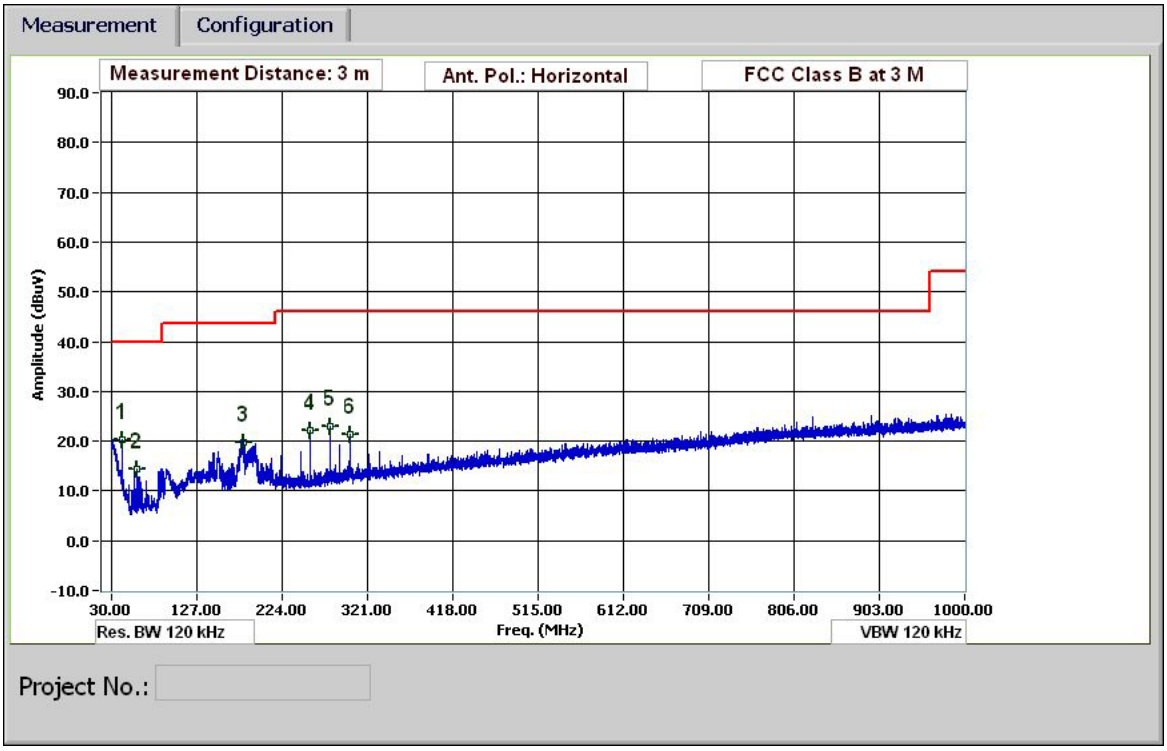
Margin Margin vs. Limit

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
114.603	3.0	37.5	12.7	1.0	29.5	0.0	0.0	21.7	43.5	-21.8	H	P	
143.165	3.0	36.2	13.0	1.1	29.3	0.0	0.0	21.0	43.5	-22.5	H	P	
214.688	3.0	36.6	11.9	1.3	28.9	0.0	0.0	21.0	43.5	-22.5	H	P	
243.369	3.0	37.5	11.8	1.4	28.8	0.0	0.0	21.9	46.0	-24.1	H	P	
93.363	3.0	41.3	8.4	0.9	29.6	0.0	0.0	21.0	43.5	-22.5	V	P	
195.367	3.0	35.8	11.6	1.3	28.9	0.0	0.0	19.7	43.5	-23.8	V	P	
243.369	3.0	32.8	11.8	1.4	28.8	0.0	0.0	17.2	46.0	-28.8	V	P	

EUT WITH AC ADAPTER

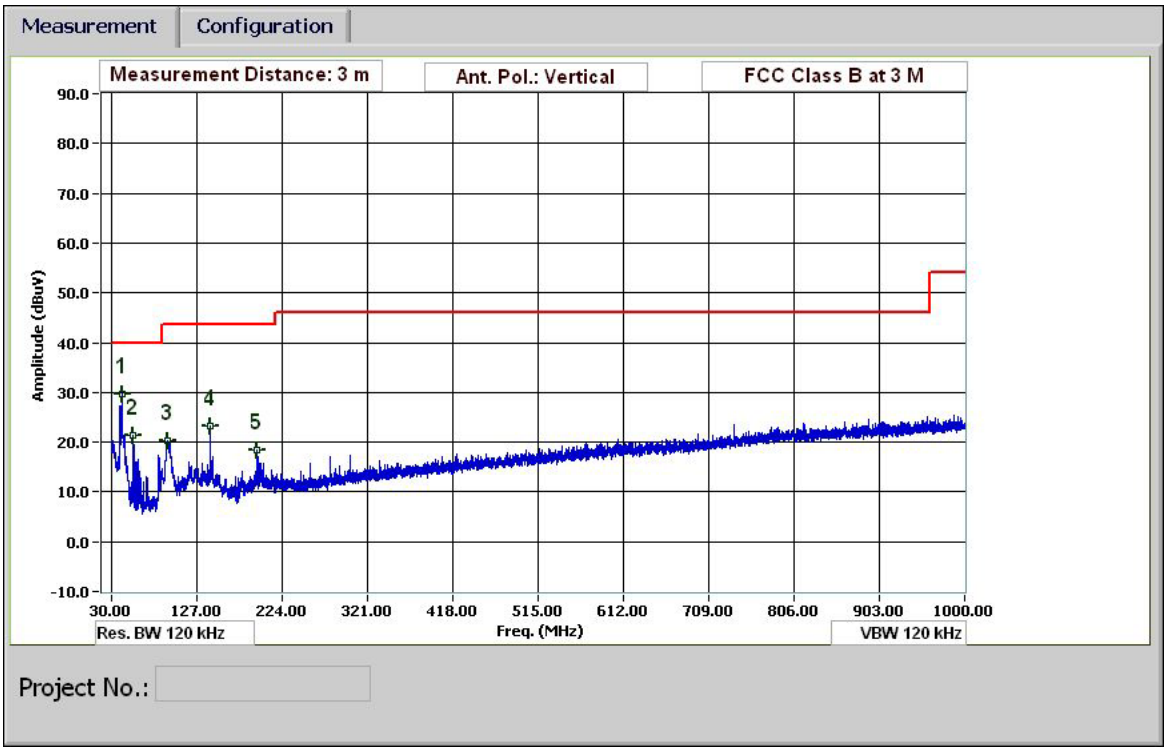
RADIATED EMISSIONS 30 TO 1000 MHz, HORIZONTAL

HORIZONTAL PLOT



RADIATED EMISSIONS 30 TO 1000 MHz, VERTICAL

VERTICAL PLOT



RADIATED EMISSION DATA

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

Test Engr: Chin Pang
Date: 09/29/10
Project #: 10U13412
Configuration: EUT and AC Adapter
Company: Sierra Wireless Inc.
Test Target: FCC 15B
Mode Oper: Charging

f	Measurement Frequency	Amp	Preamp Gain
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

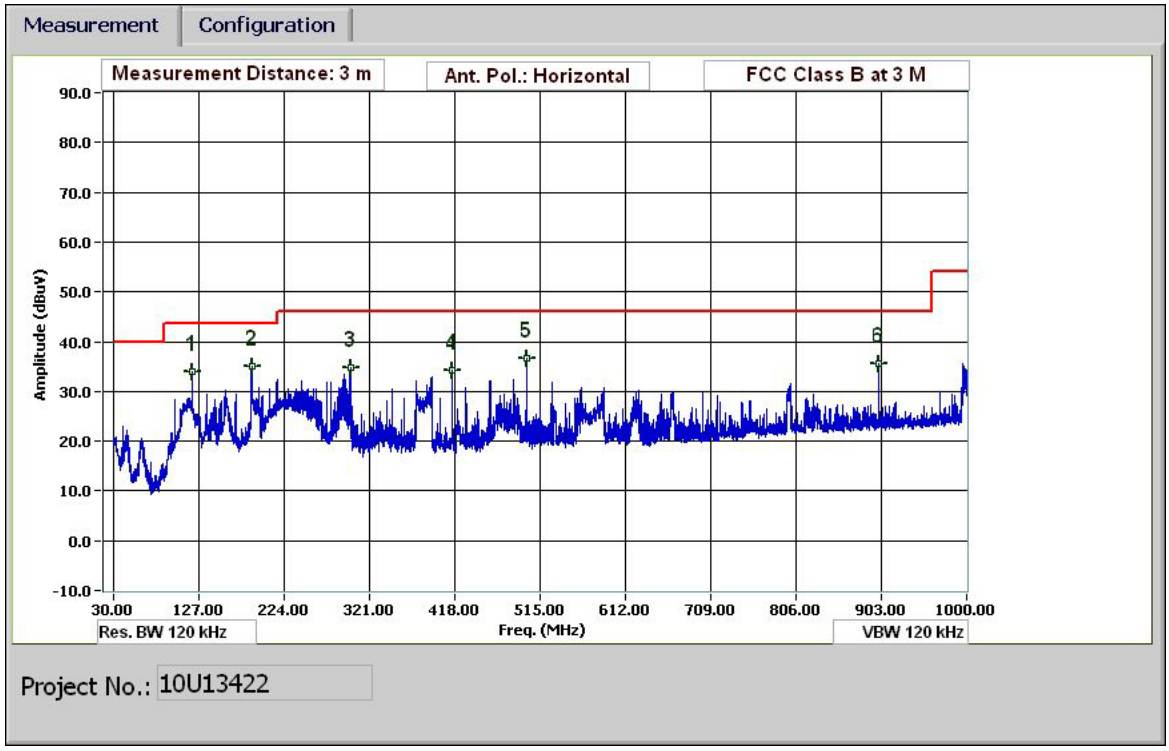
Margin Margin vs. Limit

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
42.241	3.0	36.6	12.7	0.6	29.6	0.0	0.0	20.3	40.0	-19.7	H	P	
59.521	3.0	35.5	7.9	0.7	29.6	0.0	0.0	14.4	40.0	-25.6	H	P	
180.366	3.0	36.5	10.9	1.2	29.0	0.0	0.0	19.6	43.5	-23.9	H	P	
256.329	3.0	37.4	12.0	1.5	28.8	0.0	0.0	22.0	46.0	-24.0	H	P	
278.53	3.0	37.5	12.6	1.5	28.8	0.0	0.0	22.9	46.0	-23.1	H	P	
300.851	3.0	35.3	13.3	1.6	28.8	0.0	0.0	21.4	46.0	-24.6	H	P	
42.841	3.0	46.4	12.4	0.6	29.6	0.0	0.0	29.7	40.0	-10.3	V	P	
53.881	3.0	42.4	7.9	0.6	29.6	0.0	0.0	21.3	40.0	-18.7	V	P	
93.483	3.0	40.5	8.4	0.9	29.6	0.0	0.0	20.2	43.5	-23.3	V	P	
142.325	3.0	38.5	13.1	1.1	29.4	0.0	0.0	23.3	43.5	-20.2	V	P	
195.367	3.0	34.6	11.6	1.3	28.9	0.0	0.0	18.5	43.5	-25.0	V	P	

EUT WITH LAPTOP AND PRINTER (USB Link)

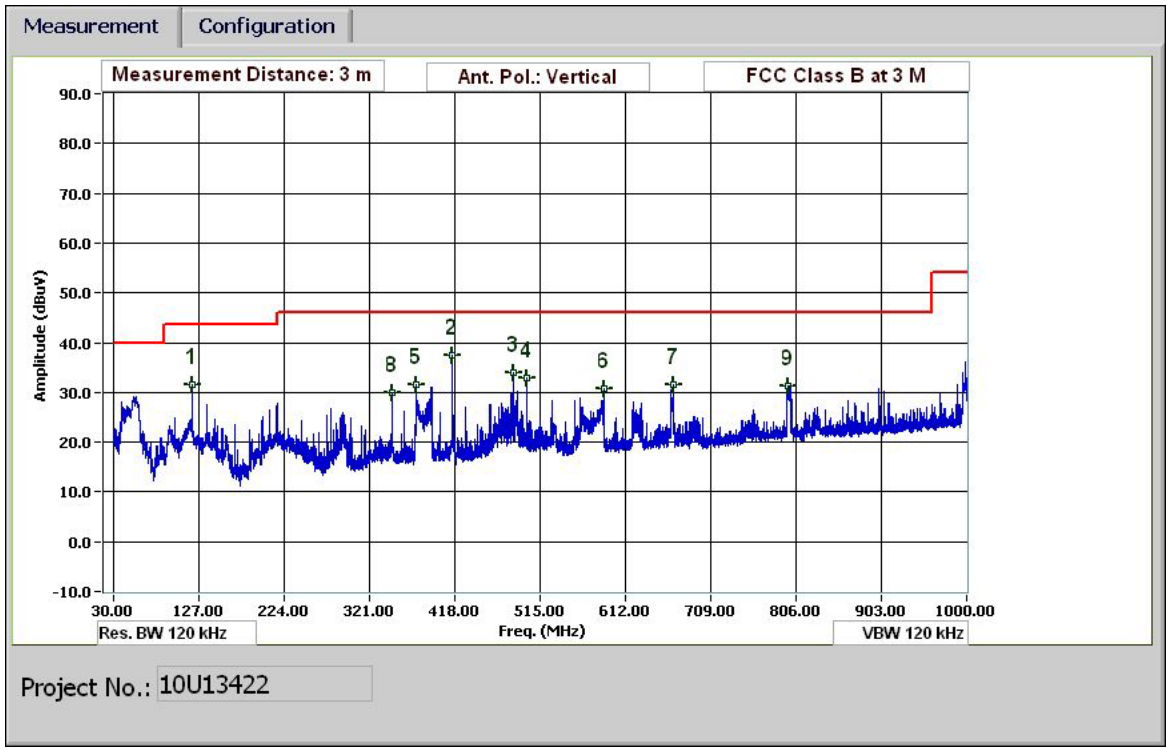
RADIATED EMISSIONS 30 TO 1000 MHz (BATTERY CONFIGURATION, HORIZONTAL)

HORIZONTAL PLOT



RADIATED EMISSIONS 30 TO 1000 MHz (BATTERY CONFIGURATION, VERTICAL)

VERTICAL PLOT



RADIATED EMISSION DATA

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

Test Engr: Chin Pang
Date: 09/29/10
Project #: 10U13422
Configuration: EUTwith Laptop and Printer
Company: Sierra Wireless Inc.
Test Target: FCC 15B
Mode Oper: Normal

f	Measurement Frequency	Amp	Preamp Gain
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

Margin Margin vs. 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
120.004	3.0	48.8	13.7	1.0	29.5	0.0	0.0	34.0	43.5	-9.5	H	P	
187.086	3.0	51.7	11.1	1.2	29.0	0.0	0.0	35.1	43.5	-8.4	H	P	
300.011	3.0	48.8	13.3	1.6	28.8	0.0	0.0	34.9	46.0	-11.1	H	P	
415.576	3.0	46.3	15.3	1.9	29.4	0.0	0.0	34.2	46.0	-11.8	H	P	
499.939	3.0	47.4	16.8	2.1	29.7	0.0	0.0	36.6	46.0	-9.4	H	P	
900.036	3.0	39.7	21.5	3.0	28.6	0.0	0.0	35.7	46.0	-10.3	H	P	
120.004	3.0	46.4	13.7	1.0	29.5	0.0	0.0	31.6	43.5	-11.9	V	P	
346.333	3.0	43.2	14.1	1.7	29.0	0.0	0.0	30.0	46.0	-16.0	V	P	
374.174	3.0	44.4	14.6	1.8	29.2	0.0	0.0	31.7	46.0	-14.3	V	P	
415.576	3.0	49.7	15.3	1.9	29.4	0.0	0.0	37.6	46.0	-8.4	V	P	
484.819	3.0	45.1	16.5	2.1	29.7	0.0	0.0	34.0	46.0	-12.0	V	P	
499.939	3.0	43.6	16.8	2.1	29.7	0.0	0.0	32.9	46.0	-13.1	V	P	
587.663	3.0	39.9	18.1	2.4	29.6	0.0	0.0	30.7	46.0	-15.3	V	P	
666.146	3.0	39.6	18.9	2.5	29.6	0.0	0.0	31.4	46.0	-14.6	V	P	
796.712	3.0	36.6	21.0	2.8	29.2	0.0	0.0	31.2	46.0	-14.8	V	P	

7.1.2. RADIATED EMISSIONS ABOVE 1GHz

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

High Frequency Measurement
Compliance Certification Services, Fremont 5m Chamber

Company: Sierra Wireless Inc.
Project #: 10U13412
Date: 09/29/10
Test Engineer: Chin Pang
Configuration: EUT with Laptop and printer
Mode: Normal

Test Equipment:

Horn 1-18GHz	Pre-amplifer 1-26GHz	Pre-amplifer 26-40GHz	Horn > 18GHz	Limit
T59; S/N: 3245 @3m	T145 Agilent 3008A0056			FCC 15.209

Hi Frequency Cables

3' cable 22807700	12' cable 22807600	20' cable 22807500	HPF	Reject Filter
3' cable 22807700	12' cable 22807600	20' cable 22807500		

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	Fltr 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	58.5	37.5	25.2	2.7	-35.9	0.0	0.0	50.5	29.5	74	54	-23.5	-24.5	H
1.760	3.0	52.0	38.3	26.7	3.2	-35.6	0.0	0.0	46.4	32.7	74	54	-27.6	-21.3	H
2.500	3.0	50.6	41.3	28.5	3.9	-35.1	0.0	0.0	47.9	38.6	74	54	-26.1	-15.4	H
1.331	3.0	59.6	38.2	25.2	2.7	-35.9	0.0	0.0	51.6	30.2	74	54	-22.4	-23.8	V
1.760	3.0	55.0	39.6	26.7	3.2	-35.6	0.0	0.0	49.4	34.0	74	54	-24.6	-20.0	V
2.500	3.0	48.3	38.6	28.5	3.9	-35.1	0.0	0.0	45.6	35.9	74	54	-28.4	-18.1	V

Rev. 07.22.09

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 and CAN/CSA-CEI/IEC CISPR 22:02 as referenced by ICES-003 Issue 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 μH/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 (dBμV)	
	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

EUT With AC Adaptor Mode:

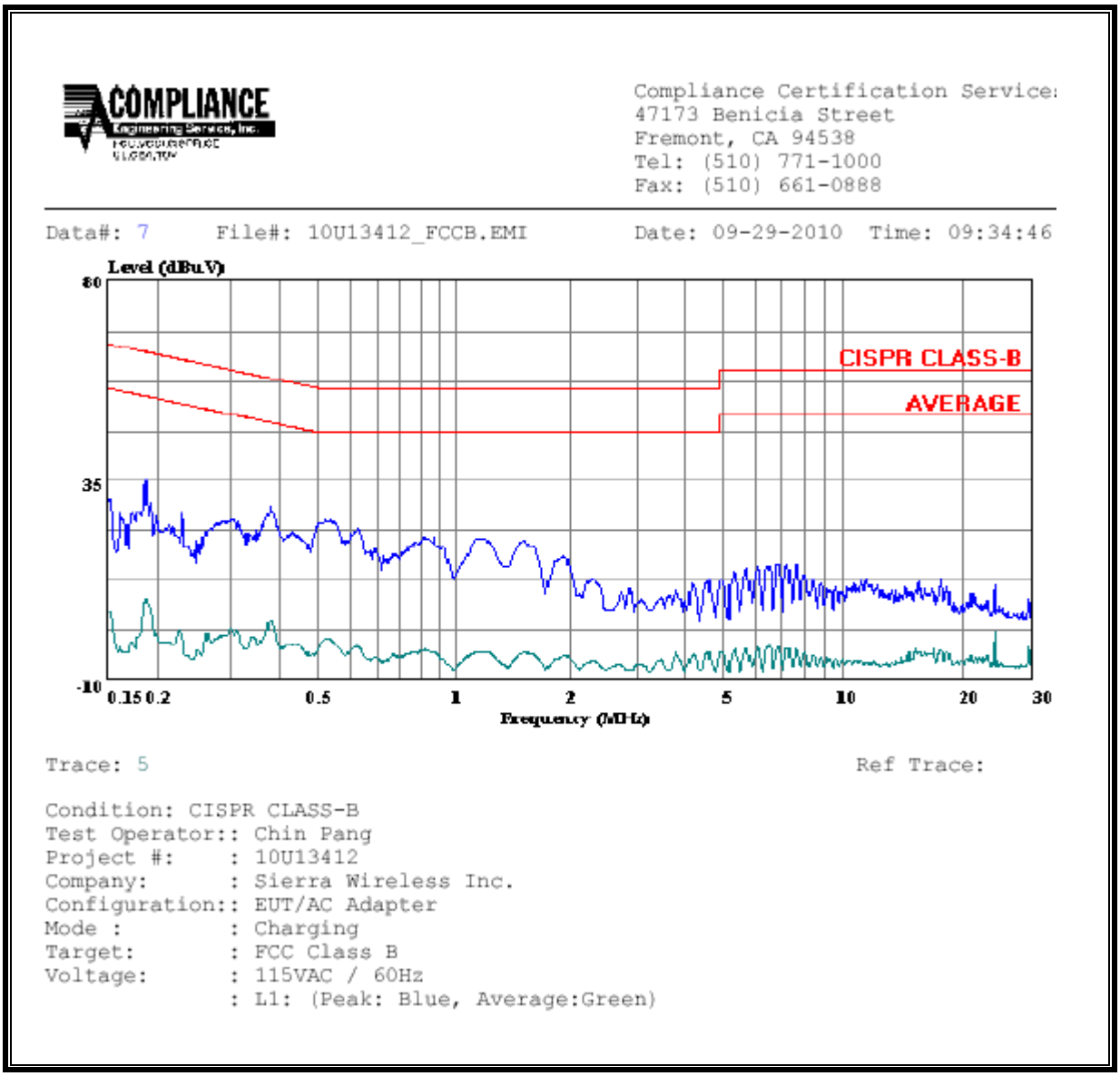
CONDUCTED EMISSIONS DATA (115VAC 60Hz)									
Freq.	Reading			Closs	Limit	EN_B	Margin		Remark
(MHz)	PK (dBuV)	QP (dBuV)	AV (dBuV)	(dB)	QP	AV	QP (dB)	AV (dB)	L1 / L2
0.19	35.16	--	7.02	0.00	64.12	54.12	-28.96	-47.10	L1
0.38	29.22	--	3.05	0.00	58.21	48.21	-28.99	-45.16	L1
6.56	16.23	--	-2.56	0.00	60.00	50.00	-43.77	-52.56	L1
0.19	46.99	--	10.56	0.00	64.17	54.17	-17.18	-43.61	L2
0.38	42.01	--	12.43	0.00	58.26	48.26	-16.25	-35.83	L2
24.01	26.56	--	7.44	0.00	60.00	50.00	-33.44	-42.56	L2
6 Worst Data									

EUT With Laptop Via USB Cable Link Mode:

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
0.18	53.85	--	39.89	0.00	64.67	54.67	-10.82	-14.78	L1
0.64	44.20	--	35.08	0.00	56.00	46.00	-11.80	-10.92	L1
3.33	44.99	--	32.79	0.00	56.00	46.00	-11.01	-13.21	L1
0.19	50.23	--	37.25	0.00	64.17	54.17	-13.94	-16.92	L2
0.48	44.93	--	32.08	0.00	56.36	46.36	-11.43	-14.28	L2
3.68	42.93	--	32.45	0.00	56.00	46.00	-13.07	-13.55	L2
6 Worst Data									

EUT With AC Adaptor Mode:

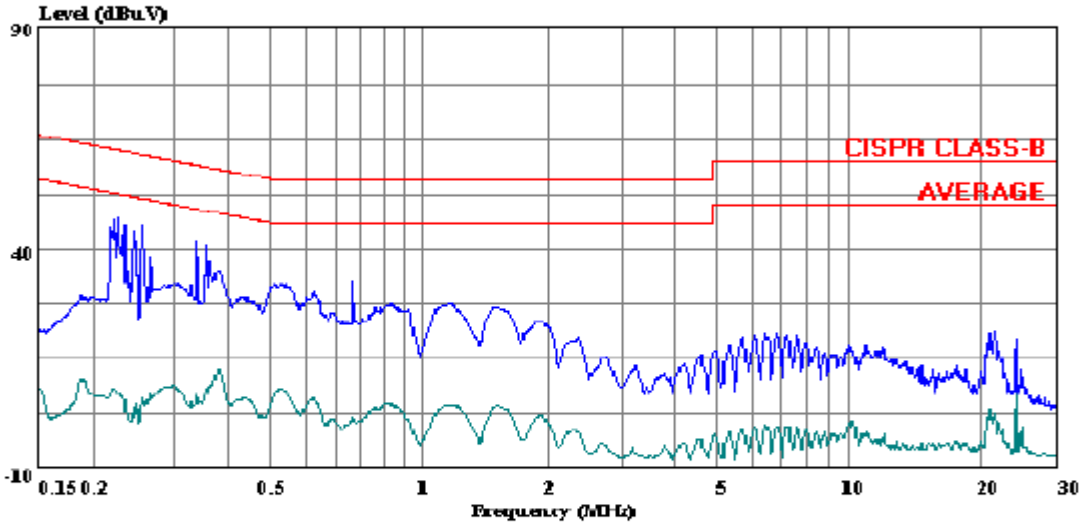
LINE 1 RESULTS



LINE 2 RESULTS

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

Data#: 14 File#: 10U13412_FCCB.EMI Date: 09-29-2010 Time: 09:52:25

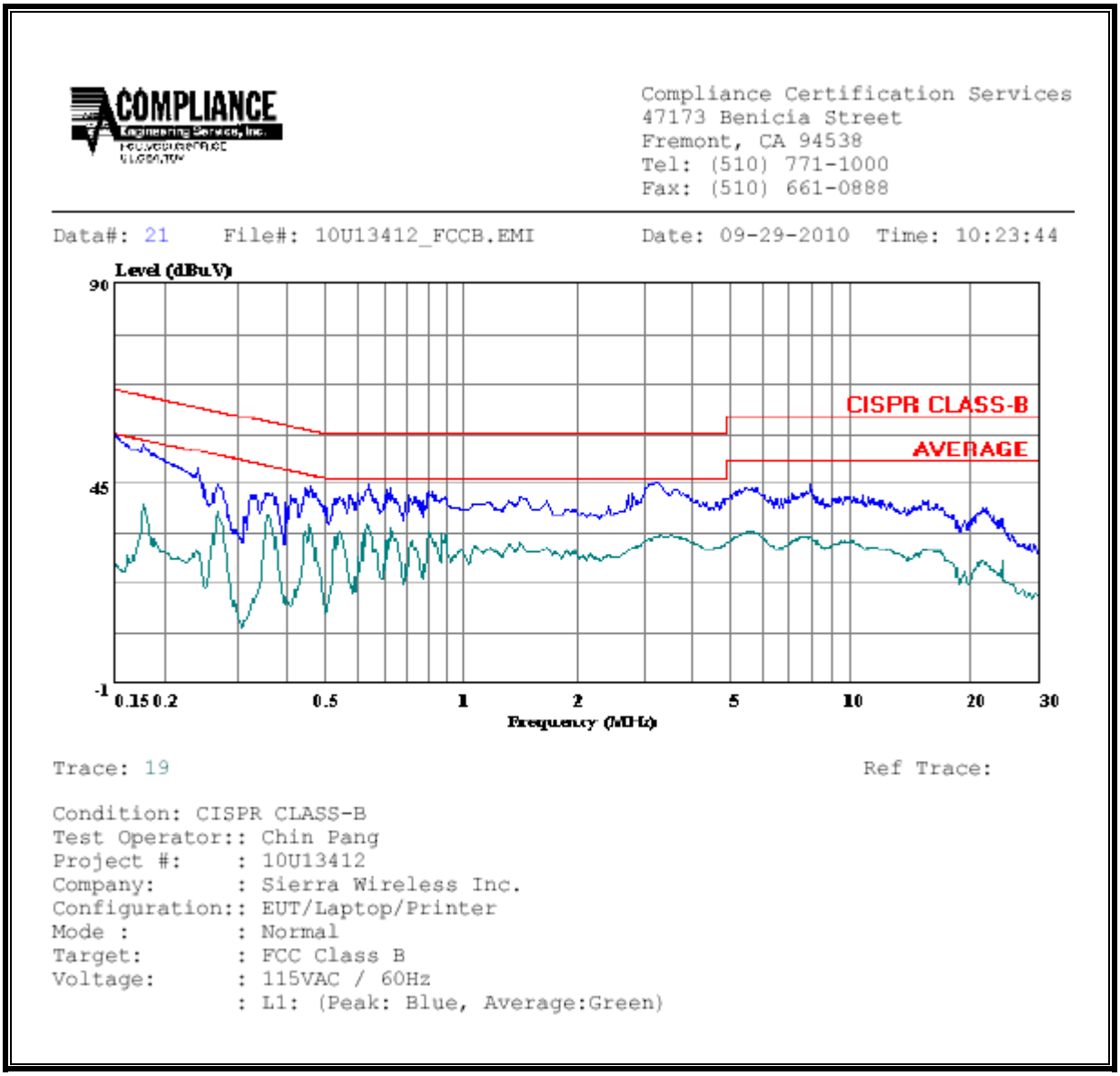


Trace: 12 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Chin Pang
Project #: : 10U13412
Company: : Sierra Wireless Inc.
Configuration:: EUT/AC Adapter
Mode : : Charging
Target: : FCC Class B
Voltage: : 115VAC / 60Hz
: L2: (Peak: Blue, Average:Green)

EUT With Laptop Via USB Cable Link Mode::

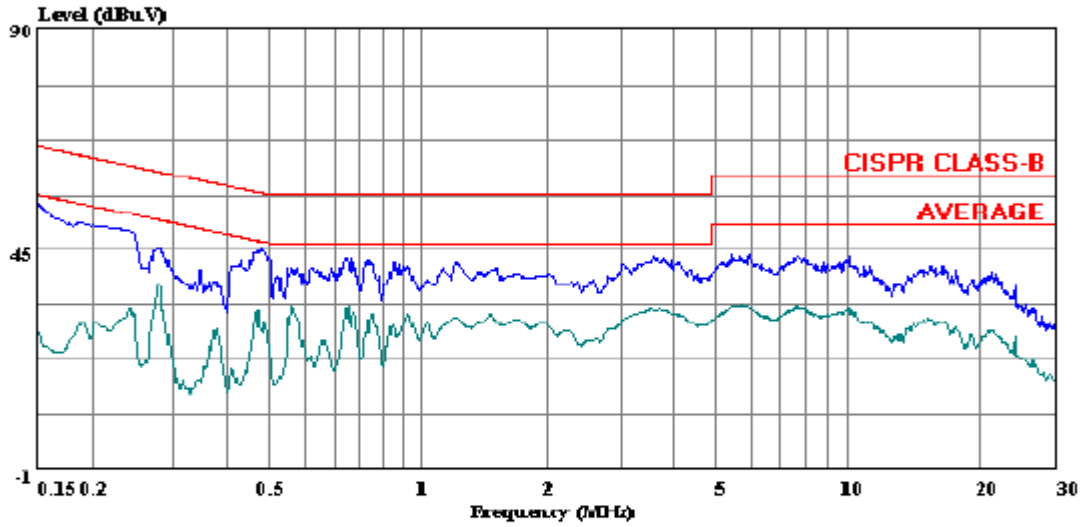
LINE 1 RESULTS



LINE 2 RESULTS

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

Data#: 28 File#: 10U13412_FCCB.EMI Date: 09-29-2010 Time: 10:29:28



Trace: 26 Ref Trace:

Condition: CISPR CLASS-B
Test Operator:: Chin Pang
Project #: : 10U13412
Company: : Sierra Wireless Inc.
Configuration:: EUT/Laptop/Printer
Mode : : Normal
Target: : FCC Class B
Voltage: : 115VAC / 60Hz
: L2: (Peak: Blue, Average:Green)