



NVLAP LAB CODE 200707-0



FCC PART 15B

MEASUREMENT AND TEST REPORT

For

Sagem Communications

31-33 rue des Beaux Soleils BP 20212 OSNY 95523

CERGY PONTOISE CEDEX FRANCE

FCC ID: VW3FAST1704

Report Type: Original Report	Product Type: Wireless ADSL Router
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Report Number: <u>RSZ09082501</u>	
Report Date: <u>2009-08-26</u>	
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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk “*” (Rev.2)

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Sagem Communications*'s product, model number: *MODEM/ROUTER SAGEM FAST 1704 GREY* (FCC ID: VW3FAST1704) or the "EUT" as referred to in this report is a *Wireless ADSL Router*, which measures approximately: 15.8 cm L x 13.5 cm W x 3.9 cm H, input voltage: DC 12V Adapter.

Adapter: SWITCHING POWER SUPPLY

Model: CPS012A120080U;

Input: 100-240VAC~50/60Hz 0.4A;

Output: 12VDC 0.8A.

**All measurement and test data in this report was gathered from production sample serial number: 0908031 (Assigned by BACL, Shenzhen). The EUT was received on 2009-08-25.*

Objective

This Type approval report is prepared on behalf of *Sagem Communications* in accordance with Part 2, Subpart J, Part 15, Subparts A and B of the Federal Communication Commissions rules.

The objective of the manufacturer is to determine compliance with FCC Part 15 Class B.

Related Submittal(s)/Grant(s)

FCC Part 15.247 submission with FCC ID: VW3FAST1704.

Test Methodology

All measurements contained in this report were conducted with ANSI C63.4-2003, American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the range of 9 kHz to 40 GHz.

All emissions measurement was performed and Bay Area Compliance Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect test data is located in the 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China.

Test site at Bay Area Compliance Laboratories Corp. (Shenzhen) has been fully described in reports submitted to the Federal Communication Commission (FCC). The details of these reports have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on November 21, 2007. The facility also complies with the radiated and AC line conducted test site criteria set forth in ANSI C63.4-2003.

The Federal Communications Commission has the reports on file and is listed under FCC Registration No.: 382179. The test site has been approved by the FCC for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

SYSTEM TEST CONFIGURATION

Justification

The system was configured for testing in a manufacturer testing fashion.

EUT Exercise Software

N/A.

Special Accessories

The special accessories were supplied by Bay Area Compliance Laboratories Corp. (Shenzhen).

Equipment Modifications

No modification was made to the unit tested.

Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	Motherboard	OWC297	CN-OWC297-70821-566-02BR	DoC
DELL	Power	NPS-250KB D	CN-0H2678-17972-56E8NBM	DoC
Seagate	Hard Disk	ST340014A	5JXK3NAD	DoC
DELL	3.5' Floppy	N/A	CN-0N8893-69802-54Q-02OZ	DoC
Lite-ON	CD-Rom	LTN-489S	N/A	DoC
Intel	CPU	Celeron D-2533	N/A	N/A
ProMOS	Memory	V826632K24SATG-C0	0525-K1933700	N/A
Intel	Ethernet	PRO 10/100 VE	N/A	DoC

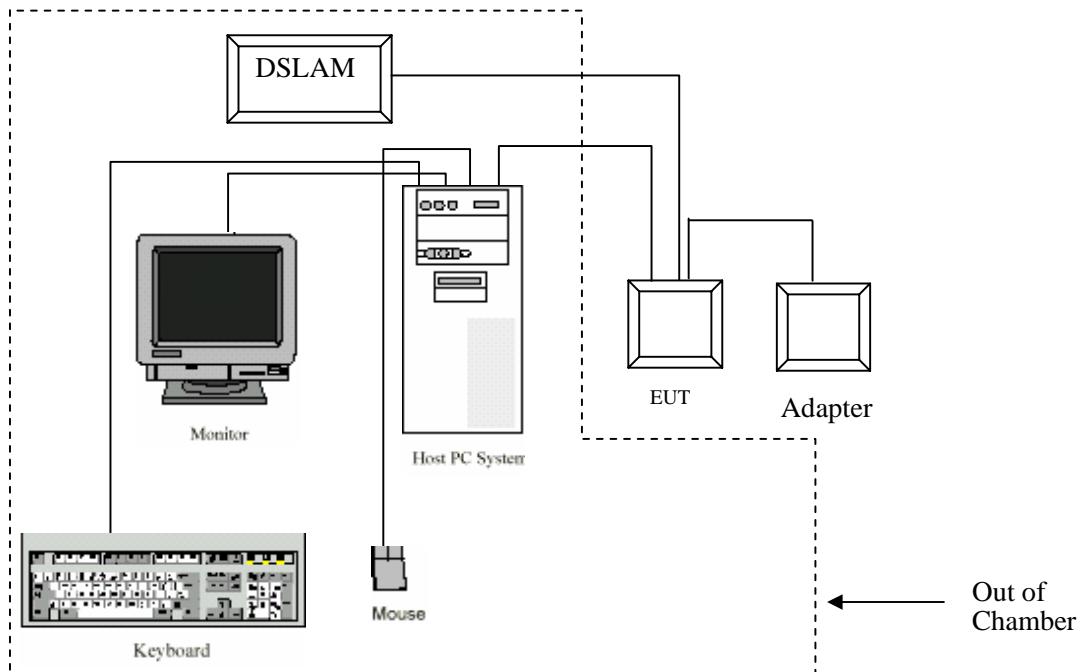
Local Support Equipment List and Details

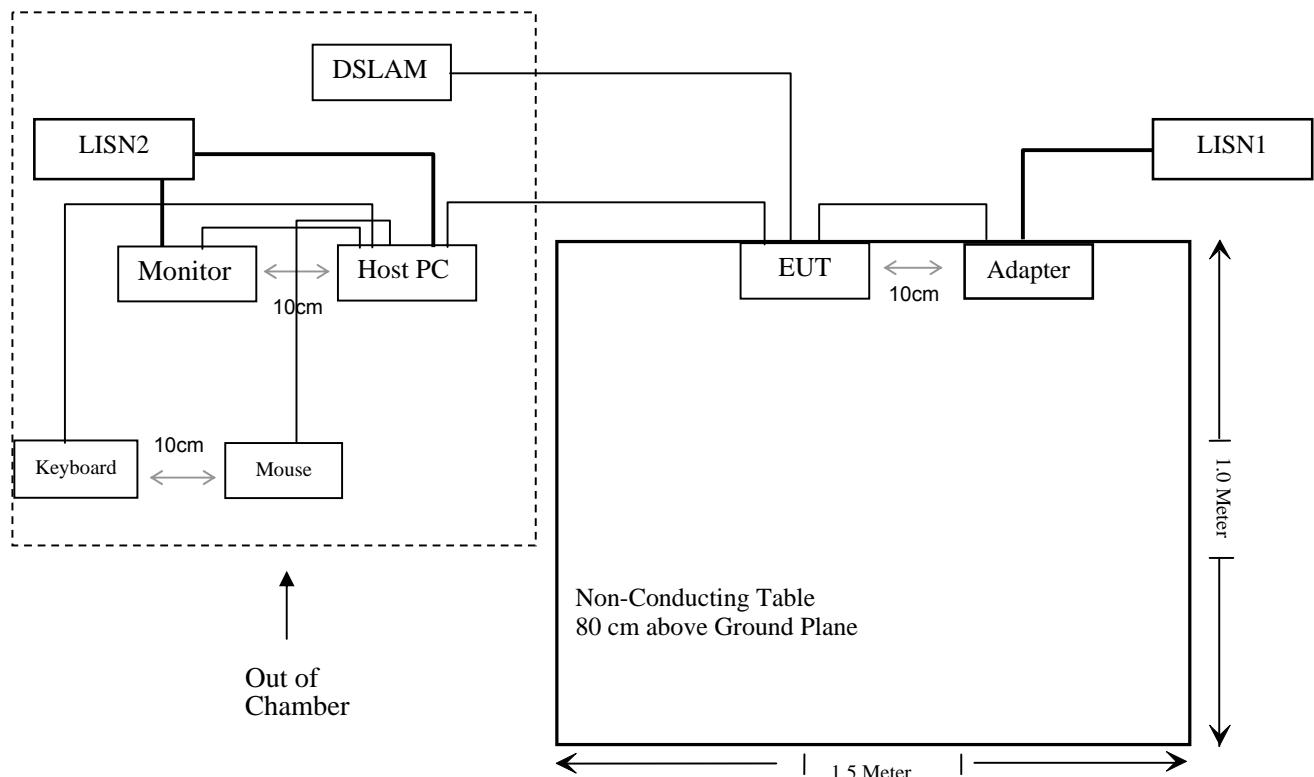
Manufacturer	Description	Model	Serial Number	FCC ID
DELL	PC	DELL 170L	CN-0TC670-70821-560-F4WQ	DoC
DELL	Keyboard	L100	CNORH656658907BL05DC	DoC
DELL	Mouse	MOC5UO	G1900NKD	DoC
DELL	LCD Monitor	1505FP	CN-OY4287-71618-574-GBSH	DoC
SAGEM	DSLAM	3P@C 4048E	N/A	N/A

External I/O Cable

Cable Description	Length (m)	From/Port	To
Shielded Detachable K/B Cable	1.50	K/B Port / Host	K/B
Shielded Detachable Mouse Cable	1.50	PS/2 Port / Host	Mouse
Shielded Detachable VGA Cable	1.50	VGA Port / Host	Monitor
Shielded Detachable Serial Cable	1.20	Serial Port / Host	Modem
Unshielded Detachable Power Line	1.50	Adapter	EUT

Configuration of Test Setup



Block Diagram of Test Setup

SUMMARY OF TEST RESULTS

FCC Rules	Description of Test	Results
§15.107	Conducted Emissions	Compliant
§15.109	Radiated Emissions	Compliant*

Note: * Within measurement uncertainty.

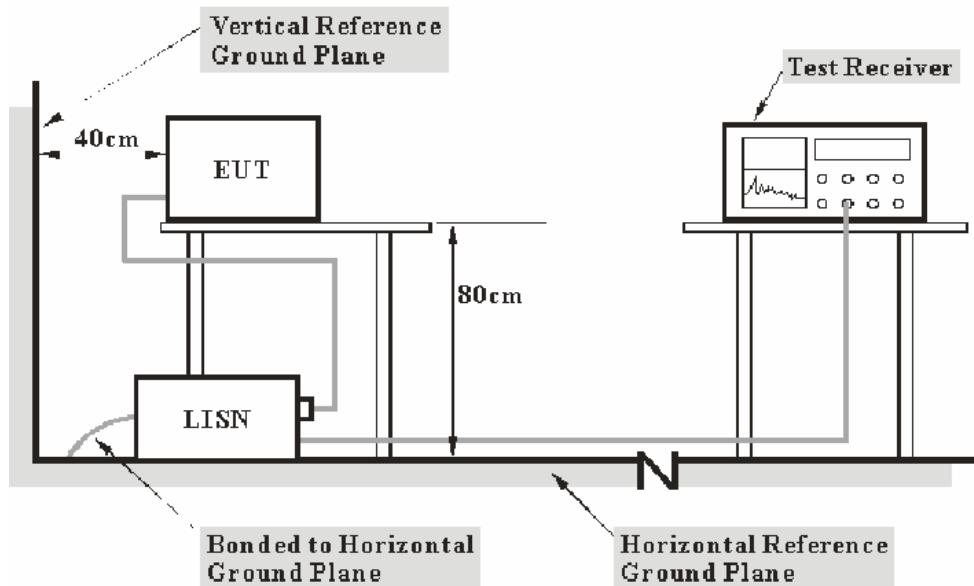
FCC §15.107 - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, and LISN.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is ± 2.4 dB.

EUT Setup



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.4-2003 measurement procedure. The specification used was with the FCC Part 15 Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120V 60Hz power source.

EMI Test Receiver Setup

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz.

During the conducted emission test, the EMI test receiver was set with the following configurations:

<u>Frequency Range</u>	<u>IF B/W</u>
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Com-Power	L.I.S.N.	LI-200	12005	N/A	N/A
Com-Power	L.I.S.N.	LI-200	12208	N/A	N/A
Rohde & Schwarz	EMI Test Receiver	ESCS30	830245/006	2009-04-28	2010-04-27
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2009-04-28	2010-04-27

* Com-Power's LISN were used as the supporting equipment.

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the adapter was connected to the outlet of the first LISN, the other local support equipments were connected to the outlet of the second LISN.

Maximizing procedure was performed on the six (6) highest emissions of the EUT.

All data was recorded in the Quasi-peak and average detection mode.

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Part 15 Class B, with the worst margin reading of:

10.02 dB at 0.2900 MHz in the Neutral conductor mode

Test Data

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Bruce Zhang on 2009-08-25.

Test Mode: Running (ADSL & Ethernet)

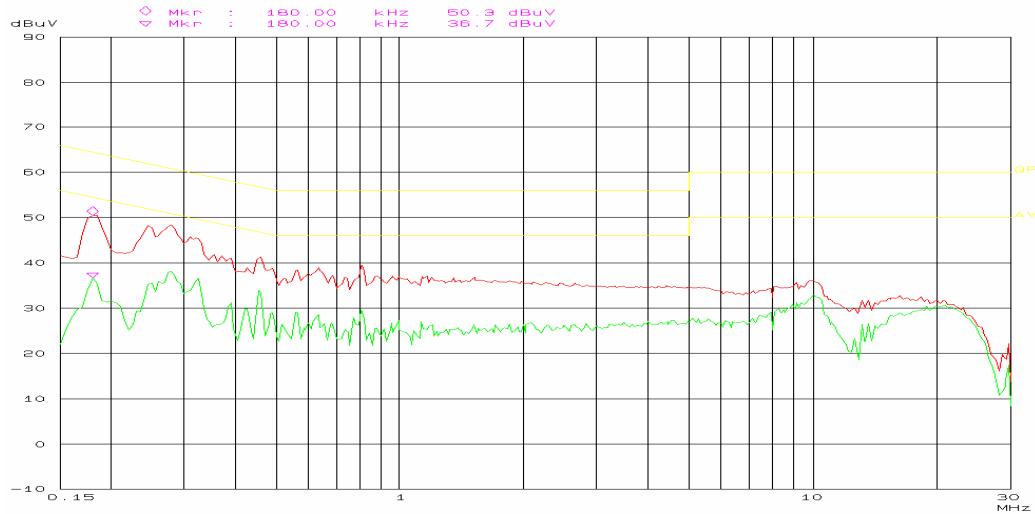
Line Conducted Emissions				FCC Part 15.107 Class B	
Frequency (MHz)	Amplitude (dB μ V)	Detector (QP/AV)	Conductor (Line/Neutral)	Limit (dB μ V)	Margin (dB)
0.2900	40.50	AV	Neutral	50.52	10.02
0.2450	51.40	QP	Neutral	61.92	10.52
0.1750	54.00	QP	Neutral	64.72	10.72
0.2900	49.20	QP	Neutral	60.52	11.32
0.2800	48.40	QP	Line	60.82	12.42
0.2800	38.10	AV	Line	50.82	12.72
0.4550	33.90	AV	Line	46.78	12.88
0.4450	33.30	AV	Neutral	46.97	13.67
0.2450	48.20	QP	Line	61.92	13.72
0.4500	43.10	QP	Neutral	56.88	13.78
0.8000	42.10	QP	Neutral	56.00	13.90
0.1800	50.30	QP	Line	64.49	14.19
0.8050	31.10	AV	Neutral	46.00	14.90
0.4550	41.00	QP	Line	56.78	15.78
0.8050	29.60	AV	Line	46.00	16.40
0.2450	35.20	AV	Neutral	51.92	16.72
0.2450	35.20	AV	Line	51.92	16.72
0.8050	39.10	QP	Line	56.00	16.90
10.0450	32.90	AV	Line	50.00	17.10
0.1800	36.70	AV	Line	54.49	17.79
8.7650	30.80	AV	Neutral	50.00	19.20
0.1750	34.00	AV	Neutral	54.72	20.72
8.8250	36.30	QP	Neutral	60.00	23.70
10.0450	36.10	QP	Line	60.00	23.90

Plot(s) of Test Data

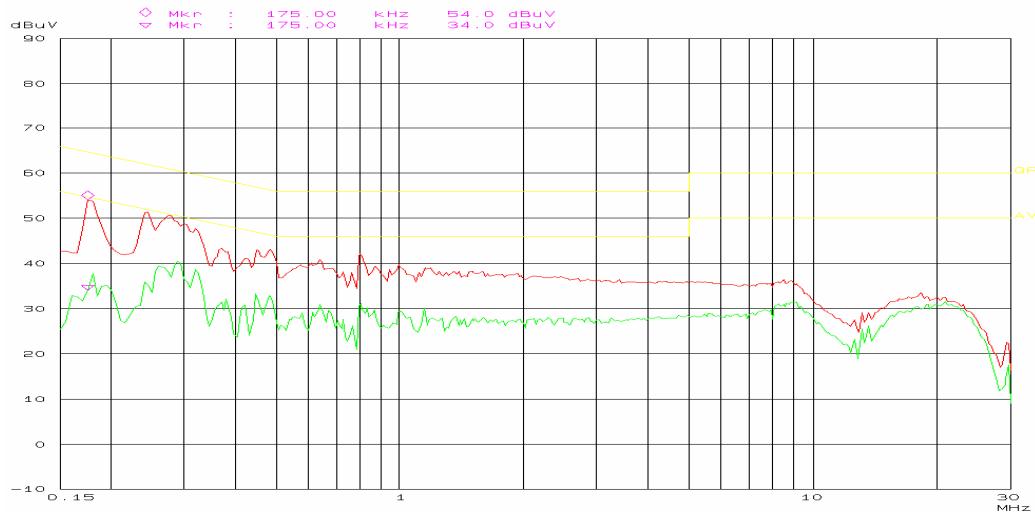
Plot(s) of Test Data is presented hereinafter as reference.

Conducted emission
FCC Part 15 class B

EUT: Wireless ADSL Router
Manuf: Sagem M/N: Sagem FAST 1704 GREY
Op Cond: Running
Operator: Bruce
Test Spec: AC 120V 60HZ L
Comment: Temp: 25 Hum: 56%
BACL

Conducted emission
FCC Part 15 class B

EUT: Wireless ADSL Router
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BACL



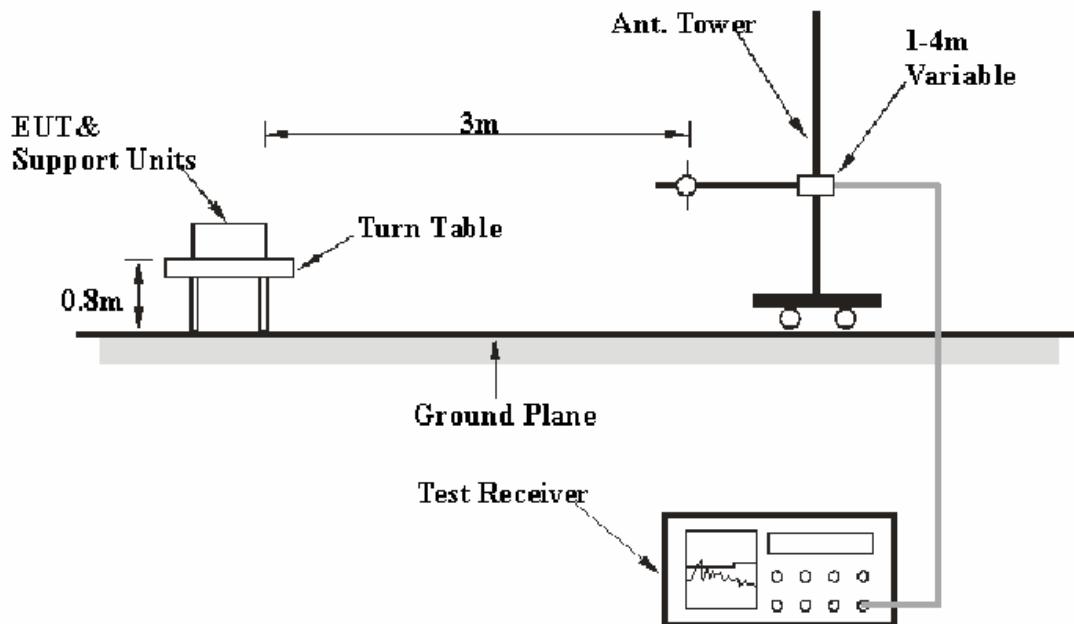
FCC §15.109 - RADIATED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties, especially in field of EMC. The factors contributing to uncertainties are spectrum analyzer, cable loss, antenna factor calibration, antenna directivity, antenna factor variation with height, antenna phase center variation, antenna factor frequency interpolation, measurement distance variation, site imperfections, mismatch (average), and system repeatability.

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of a radiation emissions measurement at Bay Area Compliance Laboratories Corp. (Shenzhen) is ± 4.0 dB.

EUT Setup



The radiated emission tests were performed in the 3 meters chamber B test site, using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC Part 15 Class B limits.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120V 60Hz power source.

EMI Test Receiver Setup

The system was investigated from 30 MHz to 1000 MHz.

During the radiated emission test, the EMI test receiver was set with the following configurations:

Frequency	RB/W	VB/W	IF B/W
30 MHz-1 GHz above 1GHz	100 kHz	300 kHz	120 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-11-07	2009-11-06
HP	Amplifier	HP8447E	1937A01046	2008-11-15	2009-11-15
Sunol Sciences	Broadband Antenna	JB1	A040904-2	2009-04-12	2010-04-12
Rohde&Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-08-28	2009-08-27
HP	Amplifier	8449B	3008A00277	2008-09-29	2009-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2008-09-25	2009-09-25

* **Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed in accordance to NVLAP requirements, traceable to the NIST.

Test Procedure

For the radiated emissions test, the adapter was connected to AC floor outlet.

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations.

All data was recorded in the Quasi-peak detection mode.

Corrected Amplitude & Margin Calculation

The Corrected Amplitude is calculated by adding the Antenna Loss and Cable Loss, and subtracting the Amplifier Gain from the Meter Reading. The basic equation is as follows:

$$\text{Corrected Amplitude} = \text{Meter Reading} + \text{Antenna Loss} + \text{Cable Loss} - \text{Amplifier Gain}$$

The “Margin” column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of 7dB means the emission is 7dB below the limit for Class B. The equation for margin calculation is as follows:

$$\text{Margin} = \text{Limit} - \text{Corrected Amplitude}$$

Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.109 Class B, with the worst margin reading of:

2.7 dB at 250.003250 MHz in the **Horizontal** polarization

Test Data

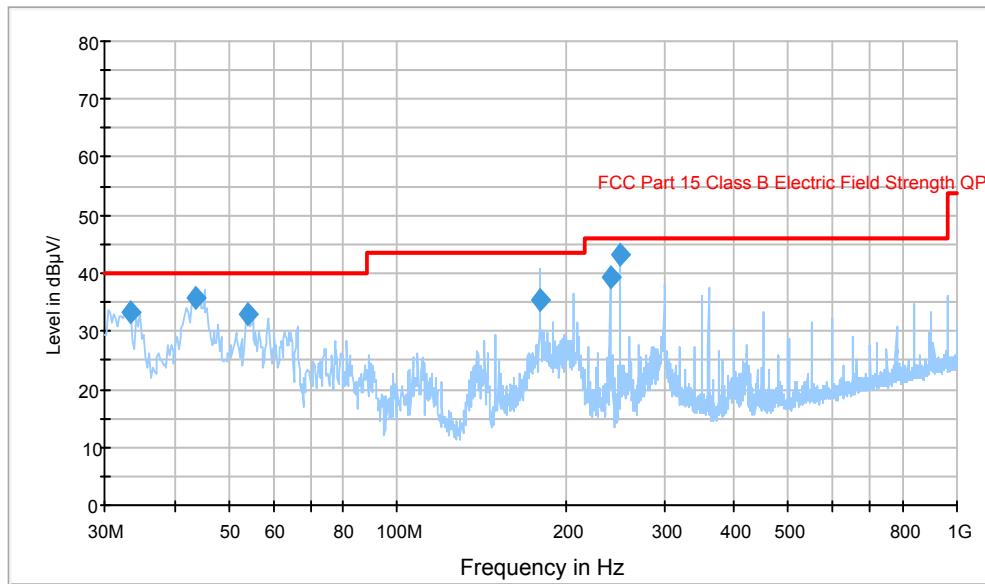
Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

The testing was performed by Bruce Zhang on 2009-08-25.

Test mode: Running (ADSL & Ethernet)

Auto Test(FCC 15 Class B)



Frequency (MHz)	Corrected Amplitude (dB μ V/m)	Antenna Height (cm)	Antenna Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dB μ V/m)	Margin (dB)
250.003250	43.3	132.0	H	168.0	-15.9	46.0	2.7*
43.811500	35.6	113.0	V	74.0	-17.5	40.0	4.4
240.016250	39.3	139.0	H	173.0	-16.1	46.0	6.7
33.447250	33.2	350.0	H	99.0	-10.9	40.0	6.8
53.947500	33.1	154.0	V	14.0	-21.1	40.0	6.9
180.090500	35.4	100.0	V	7.0	-17.2	43.5	8.1

Note: * Within measurement uncertainty.

***** END OF REPORT *****