NVLAP LAB CODE 200707-0

FCC PART 15.247

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:	Product Type:
Original Report	Wireless ADSL Router

Test Engineer:	Bruce Zhang
Report Number:	RSZ09072103
Report Date:	2009-08-20
Reviewed By:	Merry Zhao EMC Engineer
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Shenzhen).This report **must not** be used by the customer to claim product certification, approval, or endorsement by NVLAP*, NIST, or any agency of the Federal Government.

* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk "*"

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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) o*r 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: 0907050 (Assigned by BACL, Shenzhen). The EUT was received on 2009-07-21.*

Objective

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

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.247 rules.

Related Submittal(s)/Grant(s)

FCC Part 15B 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).

NVLAP LAB CODE 200707-0

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

SYSTEM TEST CONFIGURATION

Description of Test Configuration

For 802.11b and 802.11g mode, 11 channels are provided to testing:

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	7	2442
2	2417	8	2447
3	2422	9	2452
4	2427	10	2457
5	2432	11	2462
6	2437	/	/

EUT was tested with Channel 1, 6 and 11.

The selected data rate is determined by the highest output power. For 802.11b mode, 1 Mbps data rate was chosen for full testing. For 802.11g mode, 6 Mbps data rate was chosen for full testing.

EUT Exercise Software

MS-DOS Command. The test was performed under MS-DOS command about power:
802.11b: “wl txpwrl-o-q 60” data rate 1 Mbps.
802.11g: “wl txpwrl-o-q 55” data rate 6 Mbps.

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

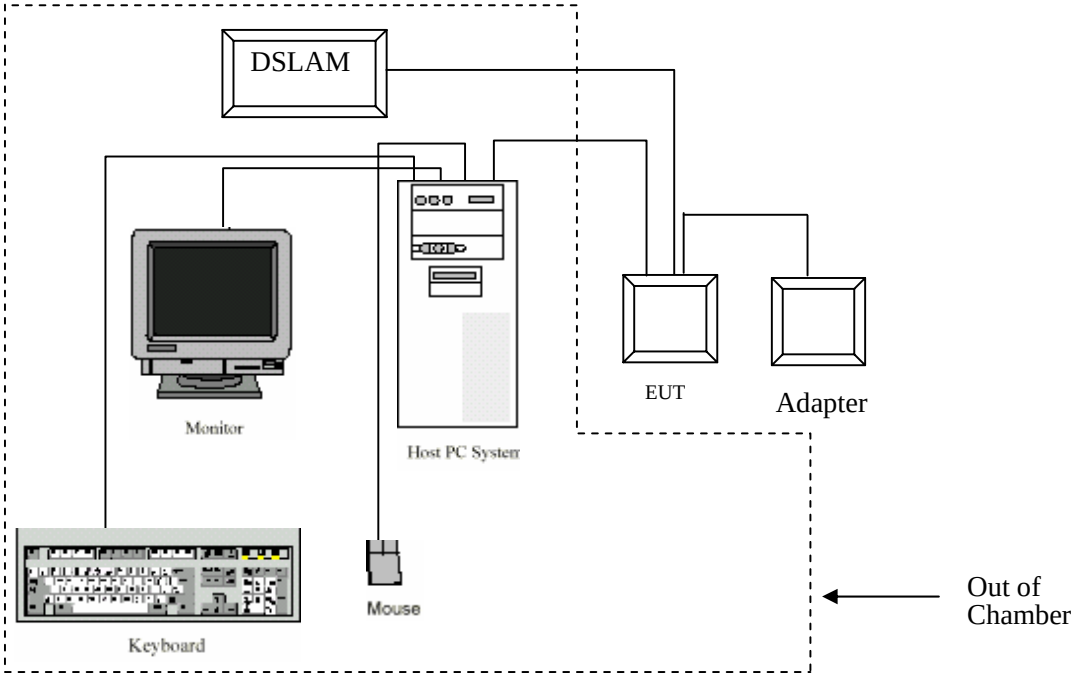
Local Support Equipment List and Details

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

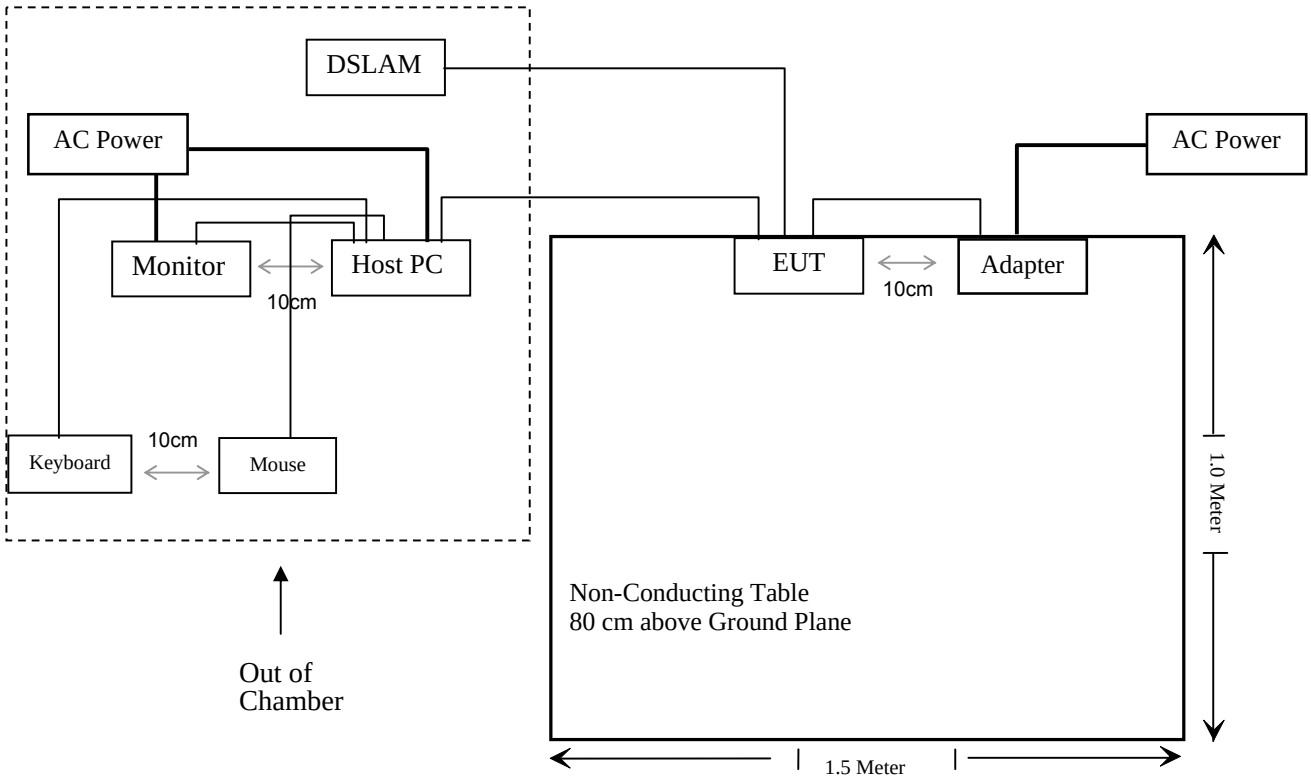
External I/O Cable

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	Result
§15.247 (i), §1.1307 (b)(1), §2.1091	Maximum Permissible exposure (MPE)	Compliance
§15.203	Antenna Requirement	Compliance
§15.207 (a)	Conducted Emissions	Compliance
§15.247(d)	Spurious Emissions at Antenna Port	Compliance
§15.209, §15.205, §15.247(d)	Spurious Emissions	Compliance
§15.247 (a)(2)	6 dB Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

FCC §15.247 (i), §1.1307 (b) (1) & §2.1091- MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Standard Applicable

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 2.1091 systems operating under the provisions of this section shall be operated in a manner that ensures the public is not exposed to RF energy level in excess of the communication guidelines.

Limits for General Population/Uncontrolled Exposure

Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	**Electric Field Strength (V/m)**	**Magnetic Field Strength (A/m)**	**Power Density (mW/cm^2)**	**Averaging Time (minutes)**
0.3-1.34	614	1.63	*(100)	30
1.34-30	824/f	2.19/f	*($180/f^2$)	30
30-300	27.5	0.073	0.2	30
300-1500	/	/	f/1500	30
1500-100,000	/	/	1.0	30

f = frequency in MHz
* = Plane-wave equivalent power density

Test Data

Predication of MPE limit at a given distance

$S = PG/4\pi R^2$

Where
S = power density (in appropriate units, e.g. mW/cm2)
P = power input to the antenna (in appropriate units, e.g., mW).
G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally ***numeric*** gain.
R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

For 802.11b:

Maximum peak output power at antenna input terminal: 17.49 (dBm)
Maximum peak output power at antenna input terminal: 56.105 (mW)
Prediction distance: 20 (cm)
Predication frequency: 2437 (MHz)
Antenna Gain (typical): 1.8 (dBi)
Antenna Gain (typical): 1.51 (numeric)
The power density at predication frequency at 20 cm: 0.0168 (mW/cm^2)

For 802.11g:

Maximum peak output power at antenna input terminal: 16.42 (dBm)
Maximum peak output power at antenna input terminal: 43.85 (mW)
Prediction distance: 20 (cm)
Predication frequency: 2437 (MHz)
Antenna Gain (typical): 1.8 (dBi)
Antenna Gain (typical): 1.51 (numeric)
The power density at predication frequency at 20 cm: 0.0132 (mW/cm^2)

Result

MPE limit for General Population/Uncontrolled exposure at prediction frequency: 1.0 (mW/cm^2);
For 802.11b, 0.0168 (mW/cm^2) < 1.0 (mW/cm^2)
For 80211g, 0.0132 (mW/cm^2) < 1.0 (mW/cm^2)

The predicted power density level at 20 cm is s below the uncontrolled exposure limit of 1.0 mw/cm^2, The EUT is used at least 20 cm away from user's body. It is determined as mobile equipment and complies with the MPE limit.

FCC §15.203 - ANTENNA REQUIREMENT

Standard Applicable

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited. The structure and application of the EUT were analyzed to determine compliance with section §15.203 of the rules. §15.203 state that the subject device must meet the following criteria:
Antenna must be permanently attached to the unit.
Antenna must use a unique type of connector to attach to the EUT.
Unit must be professionally installed, and installer shall be responsible for verifying that the correct antenna is employed with the unit.
And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Result: Compliance.

The EUT has an integral antenna soldered to the PCB, which in accordance to section 15.203, the maximum gain is 1.8 dBi; please refer to the internal photos.

FCC §15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

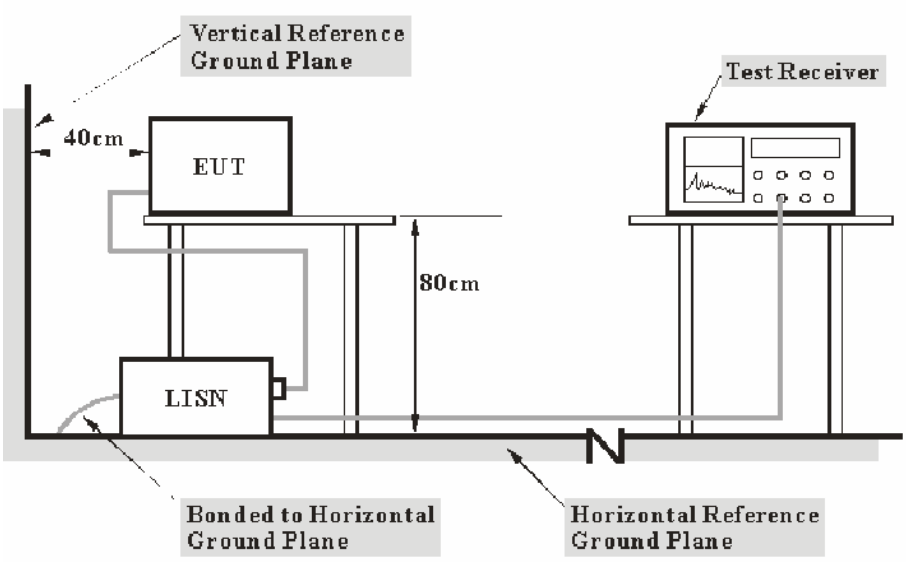
CFR47 §15.207

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 Laboratory 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 15.207 limits.

The spacing between the peripherals was 10 cm.

The adapter was connected to a 120 VAC/60 Hz 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:

Frequency Range	***IF B/W***
150 kHz – 30 MHz	9 kHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
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

*** Statement of Traceability:** Bay Area Compliance Laboratory 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 LISN 1.
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 15.207, with the worst margin reading of:

802.11b: **9.52 dB** at **0.2200 MHz** in the **Line** 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 2009-08-14.

Test mode: Running

Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	**Amplitude (dBµV)**	**Detector (QP/AV)**	**Conductor (Line/Neutral)**	**Limit (dBµV)**	**Margin (dB)**
0.2200	53.30	QP	Line	62.82	9.52
0.2800	40.40	AV	Line	50.82	10.42
0.2400	51.50	QP	Line	62.10	10.60
0.3150	48.90	QP	Line	59.84	10.94
0.2800	49.80	QP	Line	60.82	11.02
0.1850	52.30	QP	Line	64.26	11.96
0.2800	48.00	QP	Neutral	60.82	12.82
0.2050	50.40	QP	Neutral	63.41	13.01
0.2450	48.90	QP	Neutral	61.92	13.02
0.3150	36.80	AV	Line	49.84	13.04
0.5600	42.10	QP	Line	56.00	13.90
0.2800	36.10	AV	Neutral	50.82	14.72
0.1850	48.60	QP	Neutral	64.26	15.66
0.5600	29.70	AV	Line	46.00	16.30
0.8100	39.00	QP	Neutral	56.00	17.00
0.8100	27.80	AV	Neutral	46.00	18.20
23.1300	29.00	AV	Neutral	50.00	21.00
0.2400	29.70	AV	Line	52.10	22.40
0.2450	28.20	AV	Neutral	51.92	23.72
0.2050	29.60	AV	Neutral	53.41	23.81
23.1300	31.90	QP	Neutral	60.00	28.10
0.1850	25.90	AV	Line	54.26	28.36
0.2200	22.30	AV	Line	52.82	30.52
0.1850	23.30	AV	Neutral	54.26	30.96

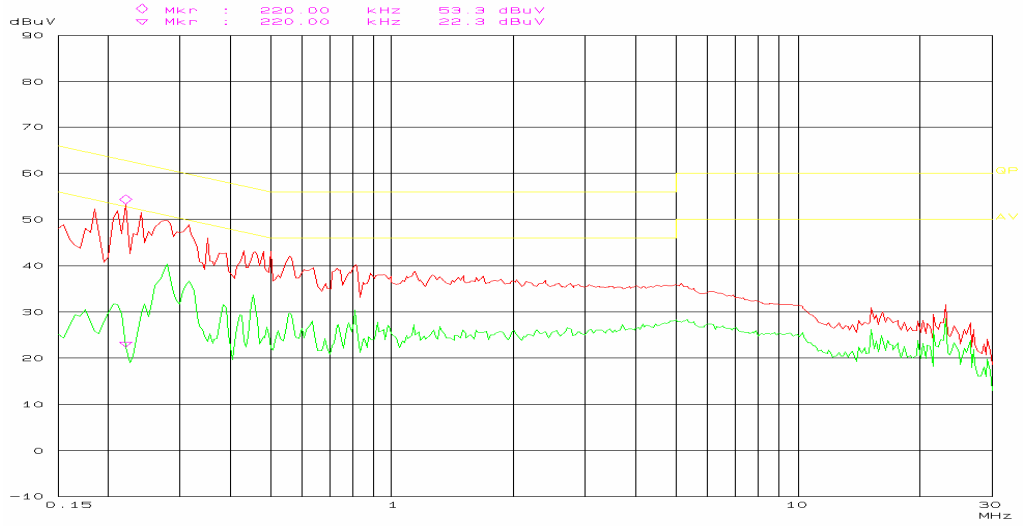
Note: The power of 802.11b is higher than 802.11g, so operating on 802.11b is worse case.

Plot(s) of Test Data

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

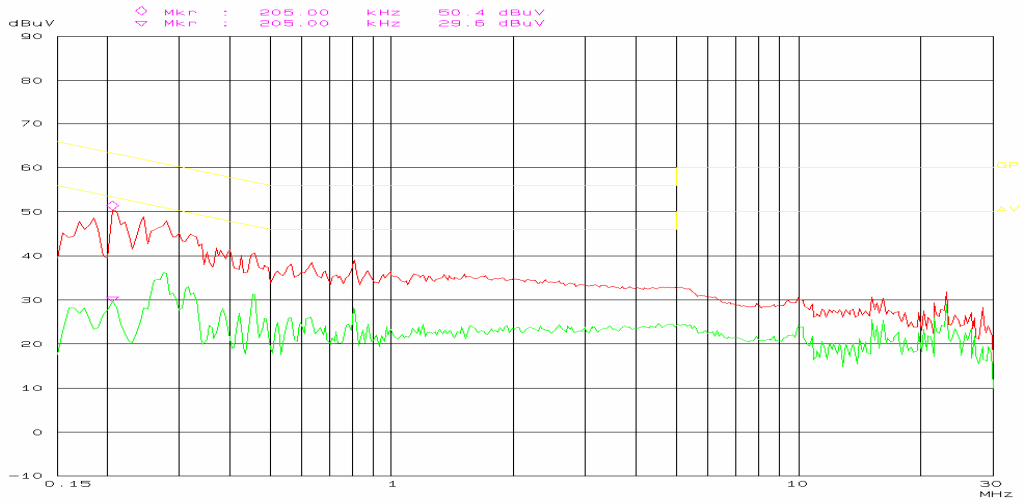
conducted emssion
FCC PART 15

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 emssion
FCC PART 15

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



FCC §15.209, §15.205 & §15.247(d) - SPURIOUS EMISSIONS

Applicable Standard

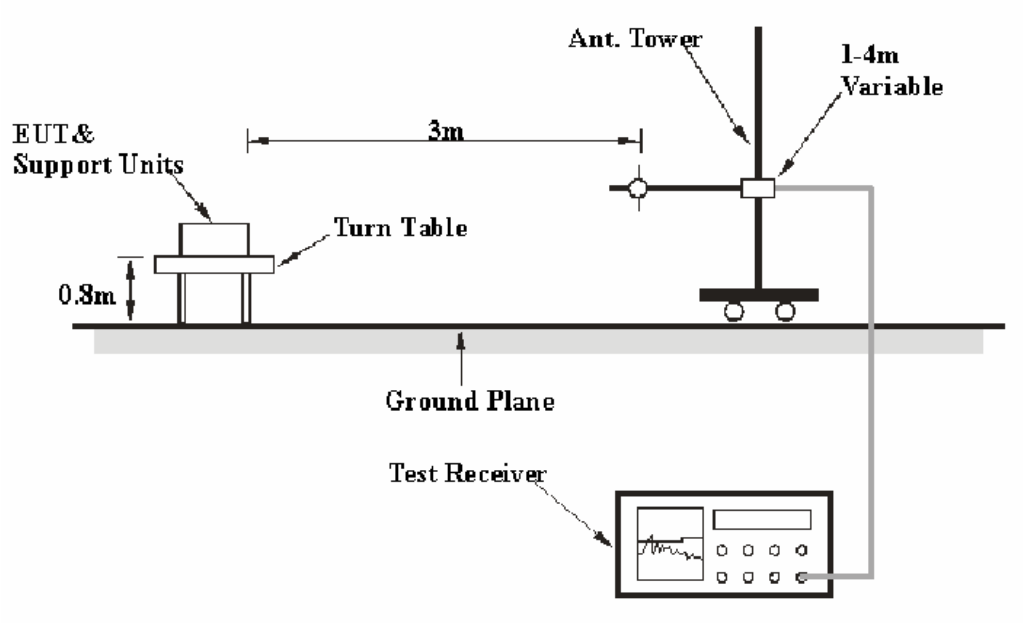
FCC §15.247 (d); §15.209; §15.205;

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 15.209 15.205 and 15.247 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 120 VAC/60 Hz power source.

EMI Test Receiver & Spectrum Analyzer Setup

The system was investigated from 30 MHz to 25 GHz.

During the radiated emission test, the EMI test receiver & Spectrum Analyzer Setup were set with the following configurations:

Frequency Range	*RBW*	*Video B/W*
30MHz – 1000 MHz	100 kHz	300 kHz
1000 MHz – 25 GHz	1 MHz	3 MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
HP	Amplifier	8447E	1937A01046	2008-11-15	2009-11-15
Rohde & Schwarz	EMI Test Receiver	ESCI	100224	2008-11-07	2009-11-06
Sunol Sciences	Bilog Antenna	JB1	A040904-2	2009-03-11	2010-03-11
HP	Amplifier	8449B	3008A00277	2008-09-29	2009-09-29
Sunol Sciences	Horn Antenna	DRH-118	A052604	2008-09-25	2009-09-25
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-08-28	2009-08-27
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-11-07	2009-11-06

*** 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, the host PC and monitor were connected to the AC floor outlet.

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

Data was recorded in Quasi-peak detection mode for frequency range of 30 MHz-1GHz and peak and Average detection modes for frequencies above 1GHz.

Corrected Amplitude & Margin Calculation

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

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - 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:

Margin = Limit – Corrected Amplitude

Test Results Summary

According to the recorded data in following table, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.209, 15.205, and 15.247, with the worst margin reading of:

30 -1000 MHz:

802.11b: 2.4 dB at **250.013750 MHz** in the **Horizontal** polarization
802.11g: 2.5 dB at **250.007500 MHz** in the **Horizontal** polarization

Above 1 GHz:

6.46 dB at **4824 MHz** in the **Vertical** polarization**, 802.11b Low Channel**
10.14 dB at **4874 MHz** in the **Horizontal** polarization**, 802.11b Middle Channel**
5.52 dB at **2543.6 MHz** in the **Vertical** polarization**, 802.11b High Channel**

10.13 dB at **2490.3 MHz** in the **Vertical** polarization**, 802.11g Low Channel**
10.26 dB at **4874 MHz** in the **Horizontal** polarization**, 802.11g Middle Channel**
9.53 dB at **2483.7 MHz** in the **Vertical** polarization**, 802.11g High Channel**

Test Data

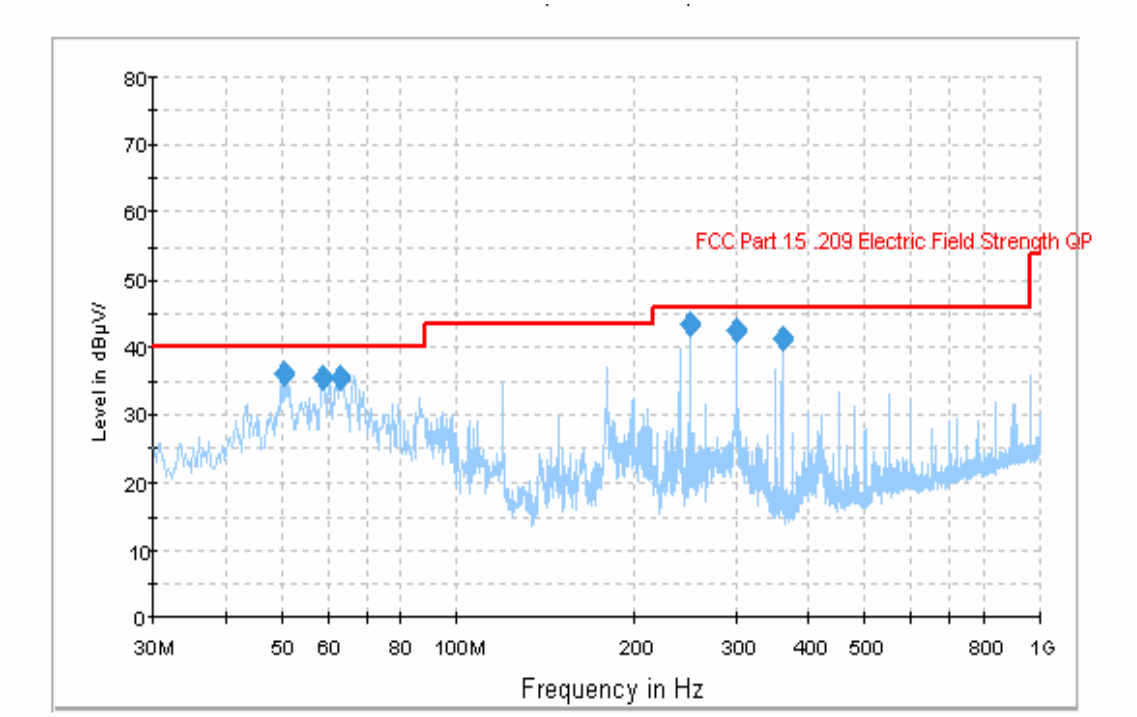
Environmental Conditions

Temperature:	24 °C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Bruce Zhang on 2009-08-07 to 2009-08-13

30-1000 MHz:

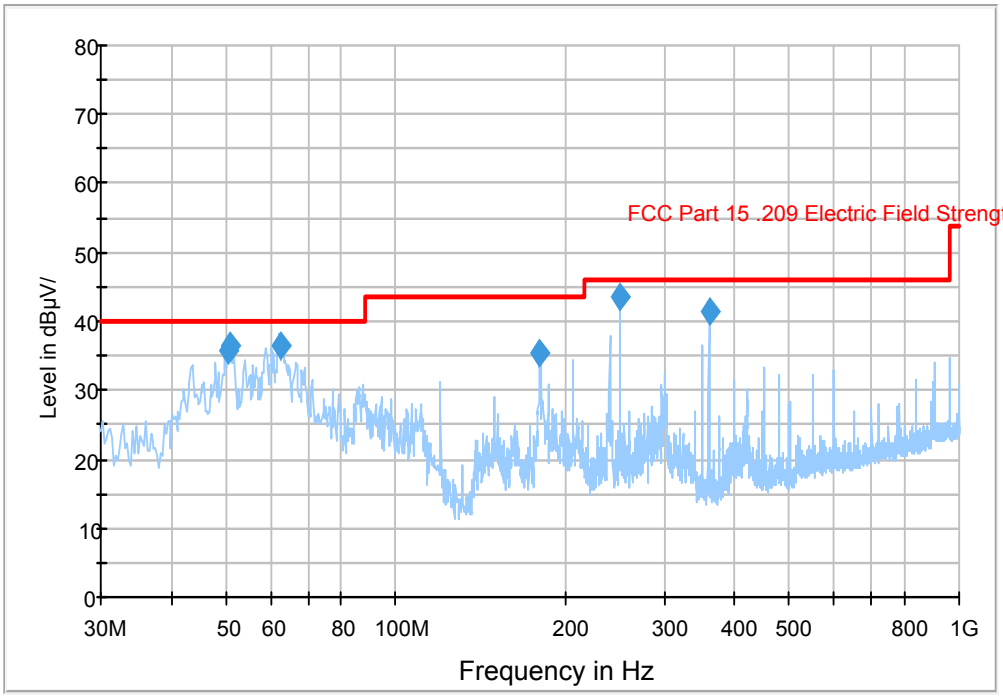
Test Mode: Transmitting (802.11b)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
250.013750	43.6	138.0	H	62.0	-15.9	46.0	2.4*
299.954500	42.4	126.0	H	53.0	-14.6	46.0	3.6*
50.435250	36.2	111.0	V	208.0	-20.3	40.0	3.8*
58.687500	35.4	153.0	V	209.0	-21.6	40.0	4.6
360.003250	41.4	100.0	H	69.0	-12.9	46.0	4.6
62.981750	35.3	100.0	V	209.0	-21.9	40.0	4.7

** Within measurement uncertainty.*

Test Mode: Transmitting (802.11g)



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
250.007500	43.5	132.0	H	55.0	-15.9	46.0	2.5*
51.056250	36.5	134.0	V	161.0	-20.4	40.0	3.5*
62.748500	36.3	99.0	V	356.0	-21.9	40.0	3.7*
50.380500	35.6	100.0	V	178.0	-20.3	40.0	4.4
360.002000	41.3	100.0	H	73.0	-12.9	46.0	4.7
180.345500	35.4	100.0	V	359.0	-17.2	43.5	8.1

** Within measurement uncertainty.*

Above 1 GHz:

Test mode: Transmitting (802.11b):

Indicated		Detector (PK/AV)	Table Angle Degree	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBµV/m)	FCC Part 15.247/15.209		
Frenquency (MHz)	S.A. Reading (dBµV/m)			Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBµV/m)	Margin (dB)	Comment
Low Channel (2412 MHz)												
4824	35.50	AV	9	1.37	V	33.5	9.36	30.82	47.54	54	6.46	harmonic
2489.2	39.7	AV	187	1.42	V	29.1	5.85	30.58	44.07	54	9.93	spurious
4824	31.43	AV	224	1.50	H	33.8	9.36	30.82	43.77	54	10.23	harmonic
2310.8	59.17	PK	240	1.70	V	28.8	6.22	31.83	62.36	74	11.64	spurious
2331.2	38.28	AV	315	1.22	V	28.8	6.22	31.20	42.1	54	11.9	spurious
4824	48.21	PK	9	1.37	V	33.5	9.36	30.82	60.25	74	13.75	harmonic
2260.5	36.67	AV	5	1.01	H	28.5	6.22	31.70	39.69	54	14.31	spurious
4824	47.05	PK	224	1.50	H	33.8	9.36	30.82	59.39	74	14.61	harmonic
2489.2	54.6	PK	187	1.42	V	29.1	5.85	30.58	58.97	74	15.03	spurious
2310.8	35.12	AV	240	1.70	V	28.8	6.22	31.83	38.31	54	15.69	spurious
2314.6	33.52	AV	273	1.50	H	28.5	6.22	31.83	36.41	54	17.59	spurious
2331.2	51.83	PK	315	1.22	V	28.8	6.22	31.20	55.65	74	18.35	spurious
2260.5	49.53	PK	5	1.01	H	28.5	6.22	31.70	52.55	74	21.45	spurious
2314.6	48.16	PK	273	1.50	H	28.5	6.22	31.83	51.05	74	22.95	spurious
Middle Channel (2437 MHz)												
4874	31.52	AV	25	1.35	H	33.8	9.36	30.82	43.86	54	10.14	harmonic
4874	31.43	AV	179	1.54	V	33.5	9.36	30.82	43.47	54	10.53	harmonic
2338.1	56.77	PK	175	1.77	V	28.8	6.22	31.20	60.59	74	13.41	spurious
2338.1	36.04	AV	175	1.77	V	28.8	6.22	31.20	39.86	54	14.14	spurious
4874	47.35	PK	25	1.35	H	33.8	9.36	30.82	59.69	74	14.31	harmonic
4874	44.86	PK	179	1.54	V	33.5	9.36	30.82	56.9	74	17.1	harmonic
2335.4	31.34	AV	210	1.25	H	28.6	6.22	31.20	34.96	54	19.04	spurious
2335.4	47.11	PK	210	1.25	H	28.6	6.22	31.20	50.73	74	23.27	spurious
High Channel (2462 MHz)												
2543.6	43.71	AV	343	1.05	V	29.1	6.05	30.38	48.48	54	5.52	spurious
2499.8	42.26	AV	328	1.10	V	29.1	5.85	30.58	46.63	54	7.37	spurious
4924	31.55	AV	158	1.91	H	33.8	9.36	30.82	43.89	54	10.11	harmonic
4924	31.24	AV	50	1.56	V	33.5	9.36	30.82	43.28	54	10.72	harmonic
2543.6	57.22	PK	343	1.05	V	29.1	6.05	30.38	61.99	74	12.01	spurious
2499.8	57.08	PK	328	1.10	V	29.1	5.85	30.58	61.45	74	12.55	spurious
4924	47.21	PK	158	1.91	H	33.8	9.36	30.82	59.55	74	14.45	harmonic
4924	45.67	PK	50	1.56	V	33.5	9.36	30.82	57.71	74	16.29	harmonic
2498.0	31.50	AV	120	1.66	H	28.9	5.85	30.58	35.67	54	18.33	spurious
2498.0	48.76	PK	150	1.93	H	28.9	5.85	30.58	52.93	74	21.07	spurious
1615.8	31.47	AV	285	1.66	H	25.3	4.85	31.68	29.94	54	24.06	spurious
1615.8	46.66	PK	285	1.66	H	25.3	4.85	31.68	45.13	74	28.87	spurious

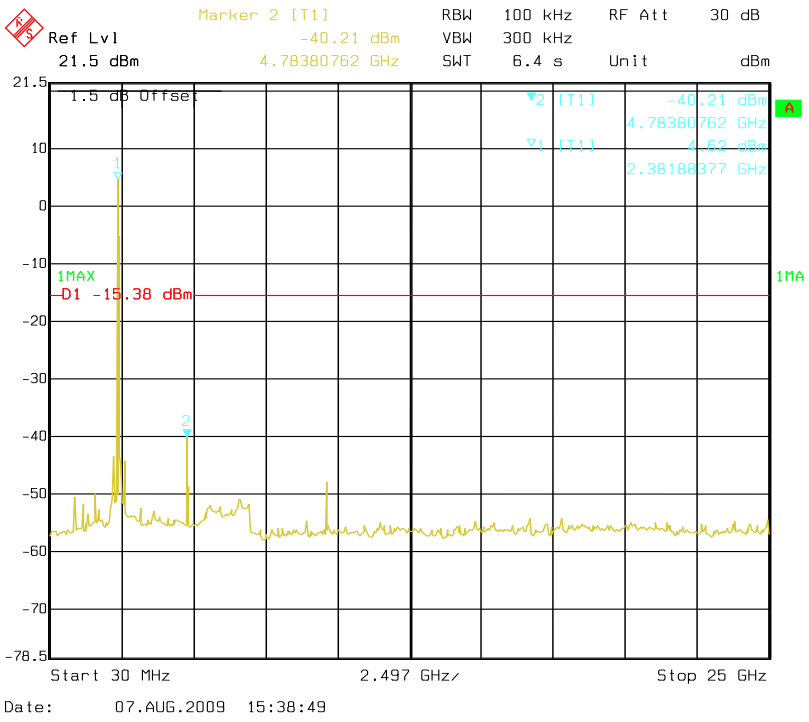
Test mode: Transmitting (802.11g):

Indicated		Detector (PK/AV)	Table Angle Degree	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	FCC Part 15.247/15.209		
Frenquency (MHz)	S.A. Reading (dBμV/m)			Height (m)	Polar (H/V)	Factor (dB/m)				Limit (dBμV/m)	Margin (dB)	Comment
Low Channel (2412 MHz)												
2490.3	39.5	AV	147	1.22	V	29.1	5.85	30.58	43.87	54	10.13	spurious
4824	31.51	AV	250	1.52	H	33.8	9.36	30.82	43.85	54	10.15	harmonic
2264.8	40.52	AV	14	146	V	28.8	6.22	31.83	43.71	54	10.29	spurious
4824	31.60	AV	101	1.35	V	33.5	9.36	30.82	43.64	54	10.36	harmonic
2264.8	59.0	PK	14	146	V	28.8	6.22	31.83	62.19	74	11.81	spurious
2490.3	57.14	PK	147	1.22	V	29.1	5.85	30.58	61.51	74	12.49	spurious
4824	45.22	PK	250	1.52	H	33.8	9.36	30.82	57.56	74	16.44	harmonic
4824	45.12	PK	101	1.35	V	33.5	9.36	30.82	57.16	74	16.84	harmonic
2490.3	31.68	AV	310	1.35	H	28.9	5.85	30.58	35.85	54	18.15	spurious
2315.5	31.60	AV	275	1.57	V	28.8	6.22	31.83	34.79	54	19.21	spurious
2314.8	31.48	AV	260	1.56	H	28.5	6.22	31.83	34.37	54	19.63	spurious
2264.8	31.62	AV	185	1.10	H	28.5	5.61	31.70	34.03	54	19.97	spurious
2490.3	45.85	PK	310	1.35	H	28.9	5.85	30.58	50.02	74	23.98	spurious
2264.8	46.77	PK	185	1.10	H	28.5	5.61	31.70	49.18	74	24.82	spurious
2315.5	44.87	PK	275	1.57	V	28.8	6.22	31.83	48.06	74	25.94	spurious
2314.8	44.85	PK	260	1.56	H	28.5	6.22	31.83	47.74	74	26.26	spurious
Middle Channel (2437 MHz)												
4874	31.4	AV	218	1.36	H	33.8	9.36	30.82	43.74	54	10.26	harmonic
4874	31.52	AV	220	1.46	V	33.5	9.36	30.82	43.56	54	10.44	harmonic
2289.3	59.72	PK	228	1.05	V	28.9	6.22	31.83	63.01	74	10.99	spurious
2289.3	39.40	AV	228	1.05	V	28.9	6.22	31.83	42.69	54	11.31	spurious
2289.3	31.89	AV	115	1.32	H	36.0	6.22	31.83	42.28	54	11.72	spurious
2486.1	33.90	AV	167	1.22	V	29.1	5.85	30.58	38.27	54	15.73	spurious
4874	46.20	PK	220	1.46	V	33.5	9.36	30.82	58.24	74	15.76	harmonic
2486.1	53.35	PK	167	1.22	V	29.1	5.85	30.58	57.72	74	16.28	spurious
4874	44.48	PK	218	1.36	H	33.8	9.36	30.82	56.82	74	17.18	harmonic
2289.3	45.78	PK	115	1.32	H	36.0	6.22	31.83	56.17	74	17.83	spurious
2490.3	31.68	AV	208	1.50	H	28.9	5.85	30.58	35.85	54	18.15	spurious
2490.3	46.46	PK	208	1.50	H	28.9	5.85	30.58	50.63	74	23.37	spurious
High Channel (2462 MHz)												
2483.7	60.1	PK	130	1.26	V	29.1	5.85	30.58	64.47	74	9.53	spurious
4924	31.5	AV	157	1.69	H	33.8	9.36	30.82	43.84	54	10.16	harmonic
4924	31.7	AV	260	1.31	V	33.5	9.36	30.82	43.74	54	10.26	harmonic
2316.1	59.77	PK	360	1.22	V	28.9	6.22	31.83	63.06	74	10.94	spurious
2483.7	36.91	AV	130	1.26	V	29.1	5.85	30.58	41.28	54	12.72	spurious
2316.1	36.9	AV	360	1.22	V	28.9	6.22	31.83	40.19	54	13.81	spurious
4924	46.1	PK	157	1.69	H	33.8	9.36	30.82	58.44	74	15.56	harmonic
4924	46.4	PK	260	1.31	V	33.5	9.36	30.82	58.44	74	15.56	harmonic
2316.1	31.85	AV	165	1.52	H	28.9	6.22	31.83	35.14	54	18.86	spurious
2483.7	32.02	AV	174	1.60	H	25.3	5.85	30.58	32.59	54	21.41	spurious
2483.7	49.30	PK	174	1.60	H	25.3	5.85	30.58	49.87	74	24.13	spurious
2316.1	45.77	PK	165	1.52	H	28.9	6.22	31.83	49.06	74	24.94	spurious

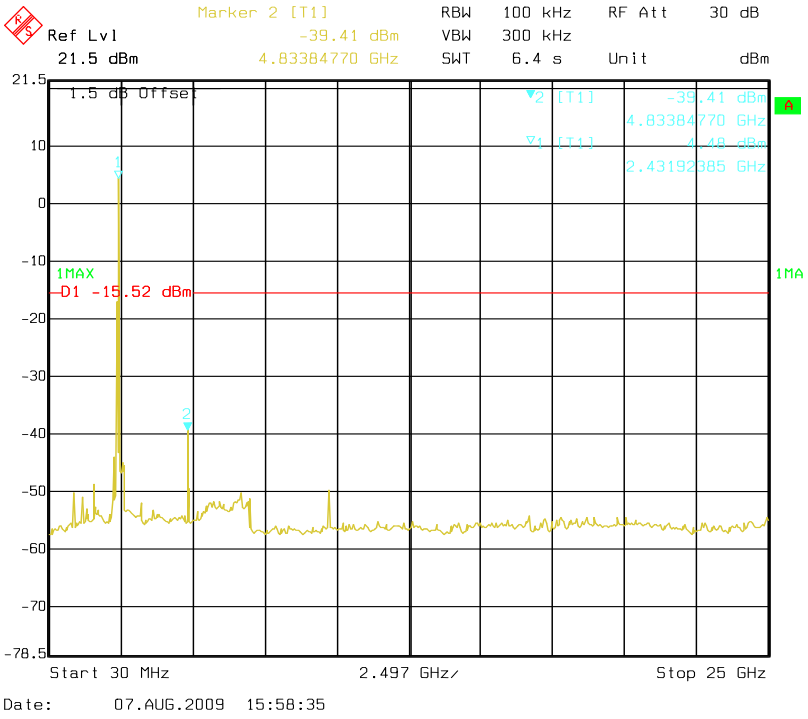
Antenna Port Conducted Spurious Emissions

Channel Frequency (MHz)	Data Rate (Mbps)	Delta Value (dBc)	Limit (dBc)	Ref Plot	Result
802.11b mode					
2412	1	*	20	Plot 1	Pass
2437	1	*	20	Plot 2	Pass
2462	1	*	20	Plot 3	Pass
802.11g mode					
2412	6	*	20	Plot 4	Pass
2437	6	*	20	Plot 5	Pass
2462	6	*	20	Plot 6	Pass

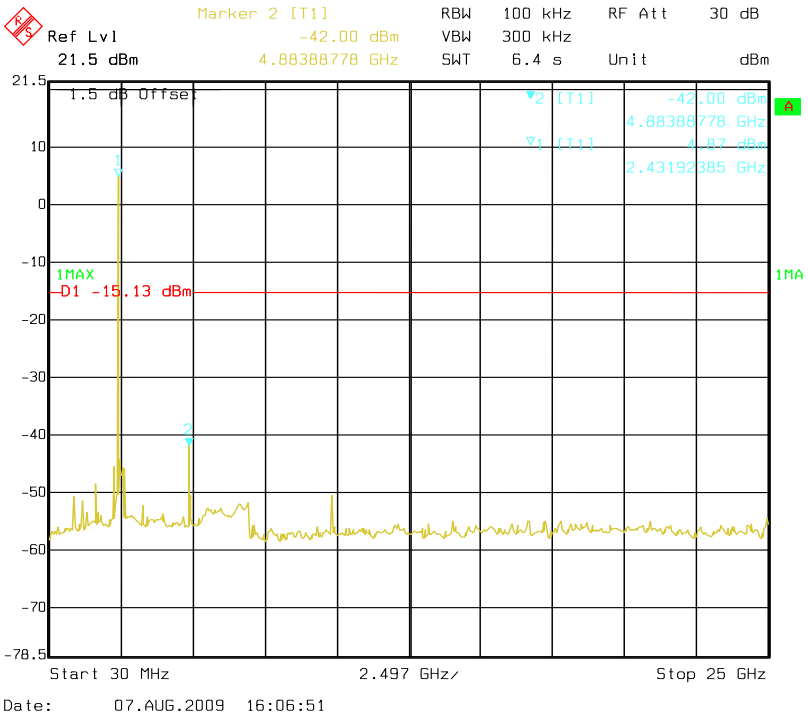
Plot 1: 802.11b Low Channel



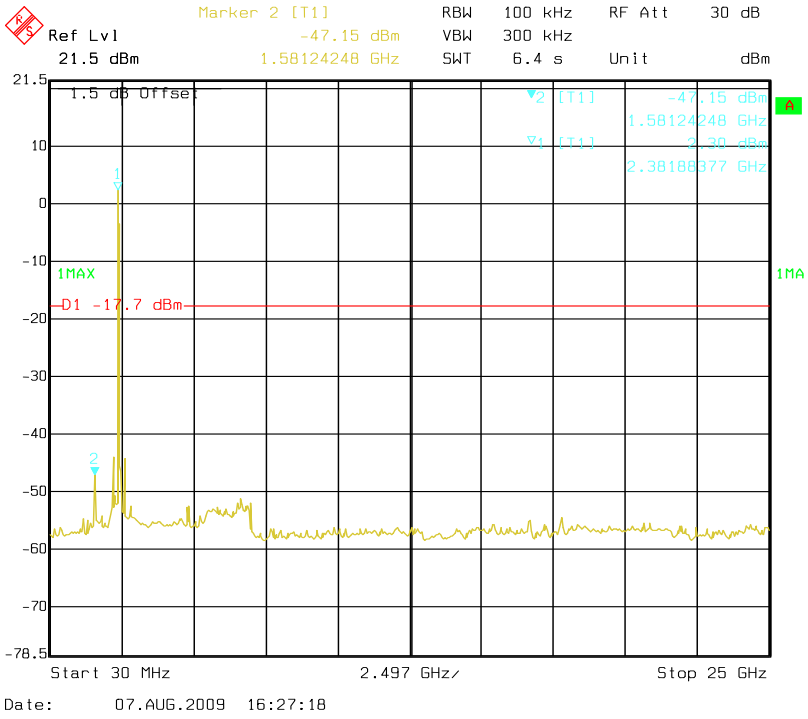
Plot 2: 802.11b Middle Channel



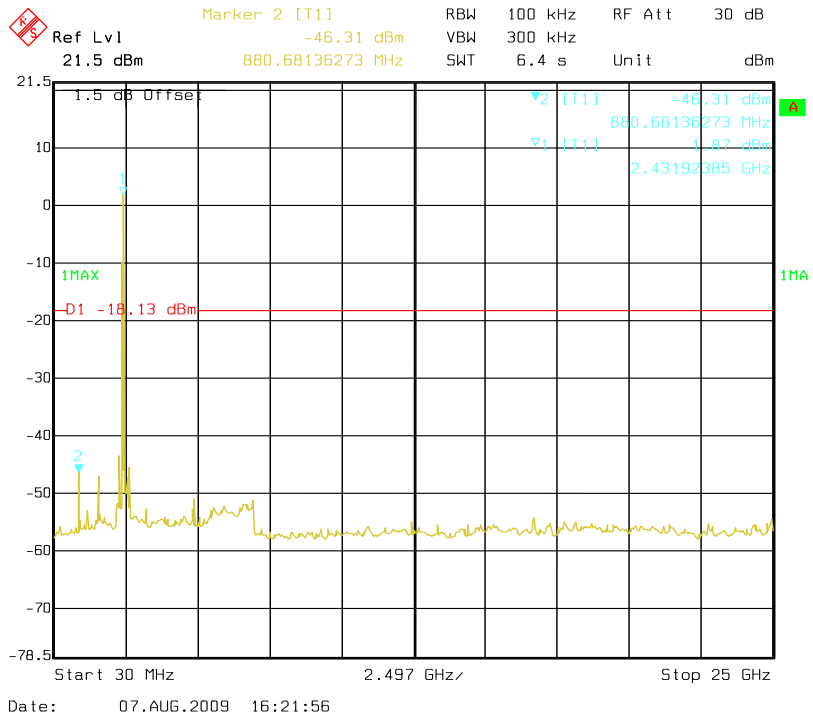
Plot 3: 802.11b High Channel



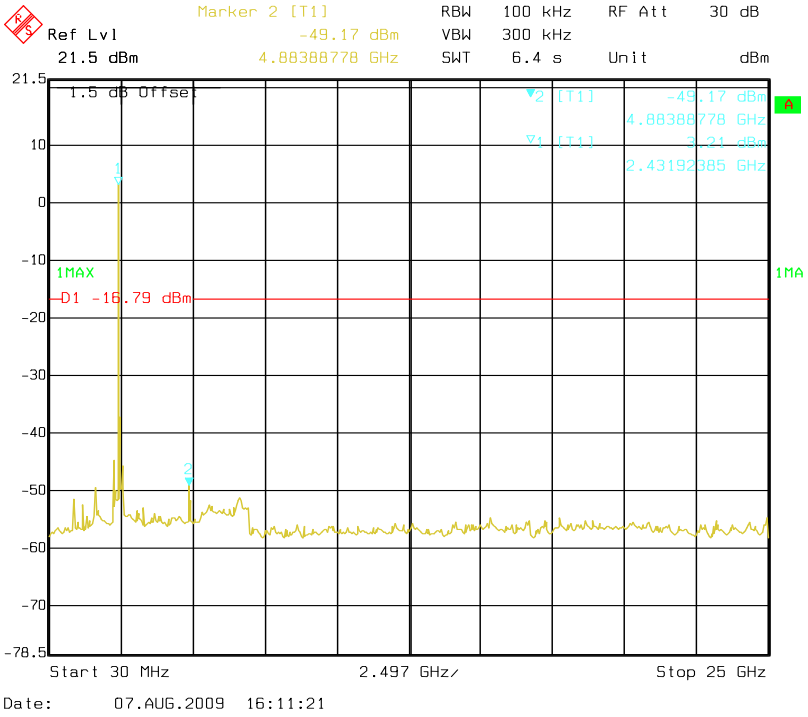
Plot 4: 802.11g Low Channel



Plot 5: 802.11g Middle Channel



Plot 6: 802.11g High Channel



FCC §15.247(a) (2) – 6 dB BANDWIDTH TESTING

Applicable Standard

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 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

*** 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

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect it to measurement instrument. Then set it to any one convenient frequency within its operating range. Set a reference level on the measuring instrument equal to the highest peak value.
3. Measure the frequency difference of two frequencies that were attenuated 6 dB from the reference level. Record the frequency difference as the emission bandwidth.
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

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

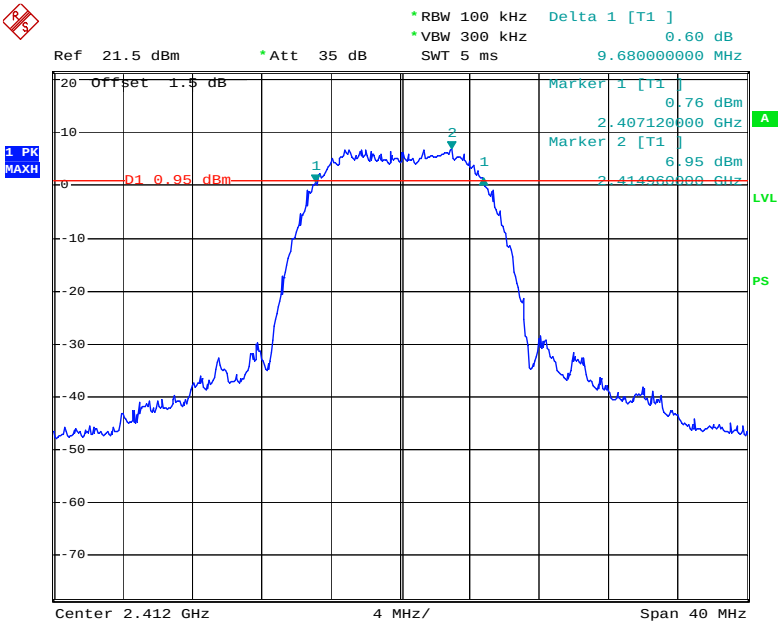
The testing was performed by Bruce Zhang on 2009-08-07

Test Result: Pass.

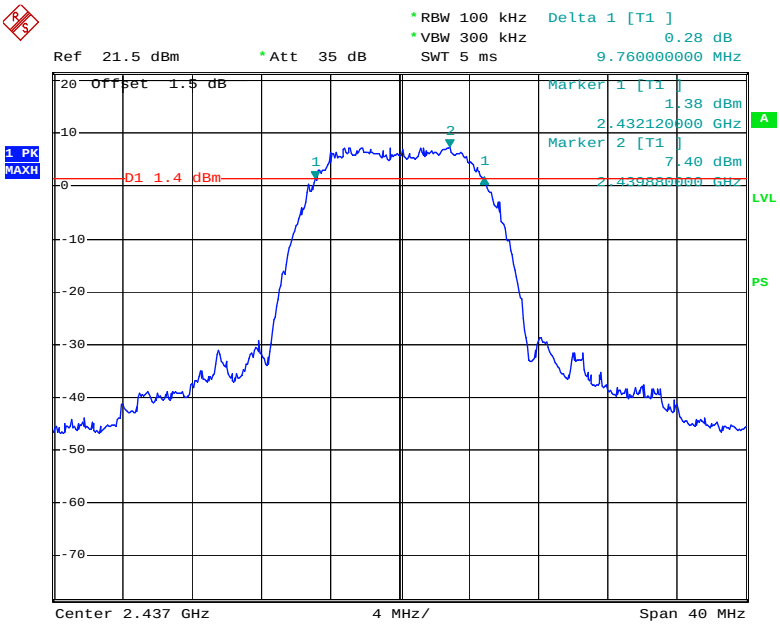
Please refer to the following tables and plots.

Channel	Frequency (MHz)	Data Rate (Mbps)	6 dB Bandwidth (MHz)	Limit (kHz)
802.11b mode				
Low Channel	2412	11	9.68	>500
Middle Channel	2437	11	9.76	>500
High Channel	2462	11	9.60	>500
802.11g mode				
Low Channel	2412	54	16.40	>500
Middle Channel	2437	54	16.40	>500
High Channel	2462	54	16.40	>500

802.11b Low Channel

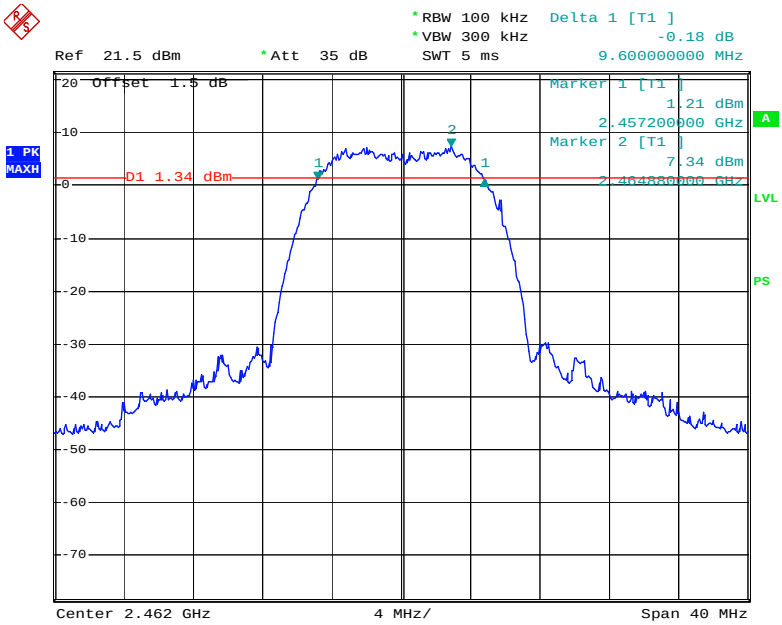


802.11b Middle Channel



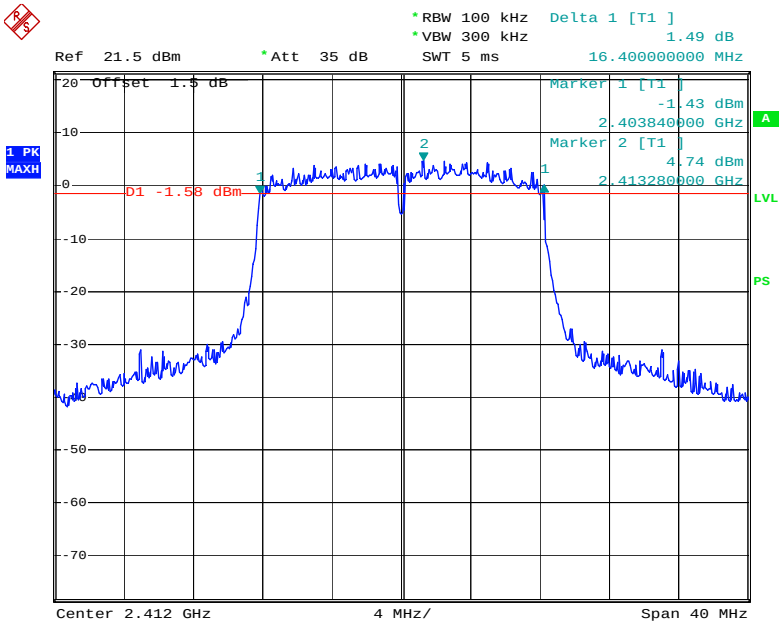
Date: 7.AUG.2009 10:37:16

802.11b High Channel



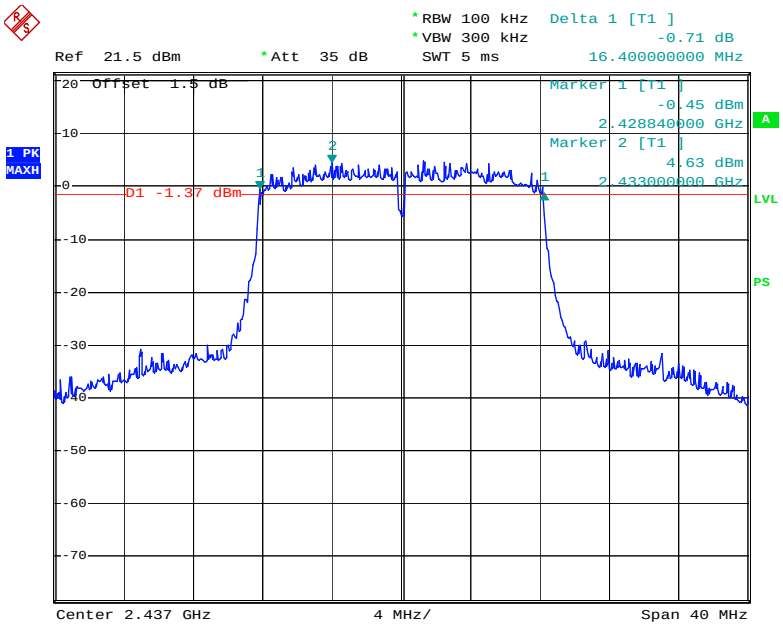
Date: 7.AUG.2009 10:33:48

802.11g Low Channel



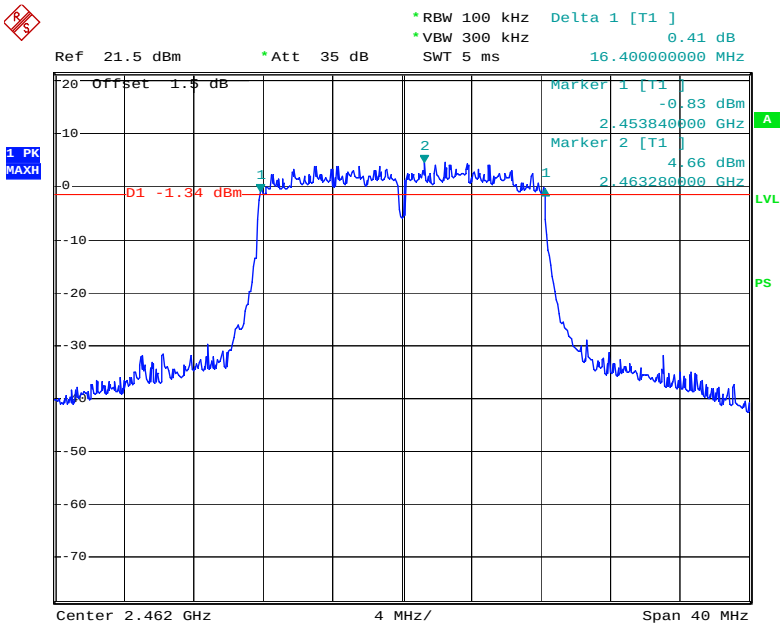
Date: 7.AUG.2009 10:43:18

802.11g Middle Channel



Date: 7.AUG.2009 10:46:36

802.11g High Channel



Date: 7.AUG.2009 10:50:42

FCC §15.247(b) (3) - MAXIMUM PEAK OUTPUT POWER

Applicable Standard

According to §15.247(b) (3), for systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

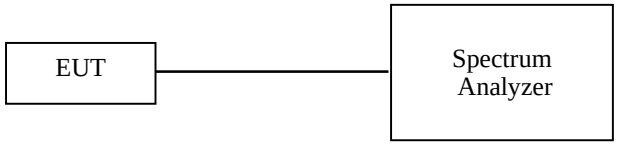
Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
Rohde & Schwarz	EMI Test Receiver	ESCI	100035	2008-11-07	2009-11-06

*** 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

1. Place the EUT on a bench and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to an EMI Test Receiver.
3. Add a correction factor to the display.



Test Data

Environmental Conditions

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

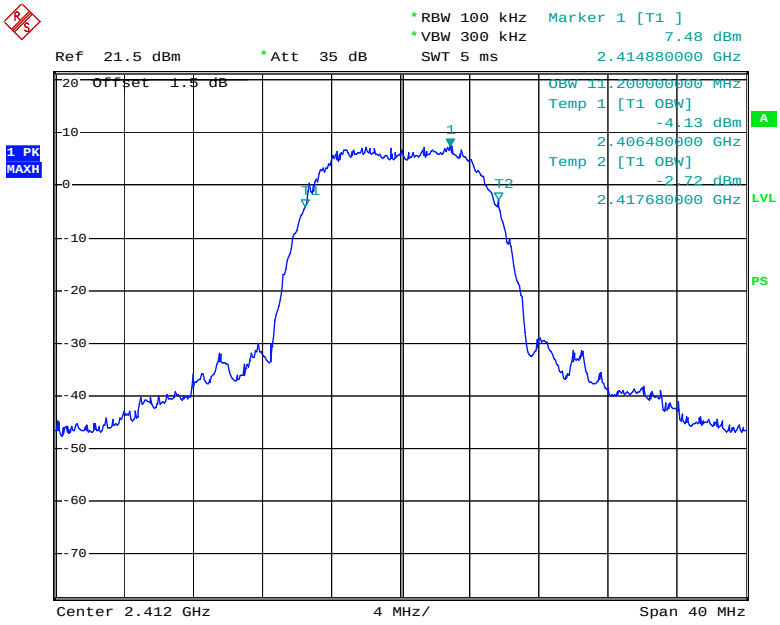
The testing was performed by Bruce Zhang on 2009-08-07.

Test Result: Pass

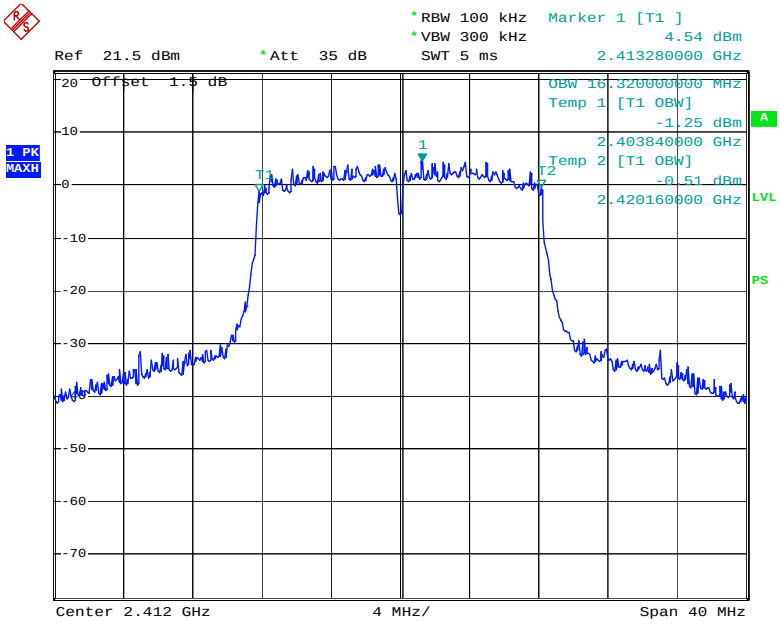
Test Mode: Transmitting

Channel	Frequency (MHz)	Data Rate (Mbps)	Output Power (dBm)	Limit (dBm)
802.11b mode				
Low	2412	1	17.33	30
Middle	2437	1	17.49	30
High	2462	1	17.20	30
802.11g mode				
Low	2412	6	16.16	30
Middle	2437	6	16.42	30
High	2462	6	16.22	30

802.11b: 99% Occupied Bandwidth

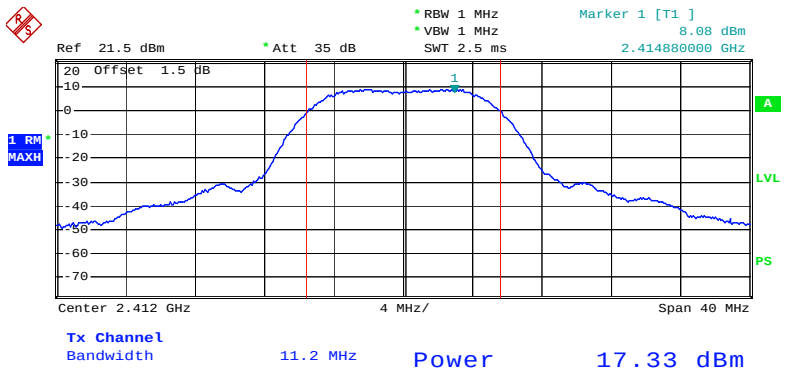


802.11g: 99% Occupied Bandwith



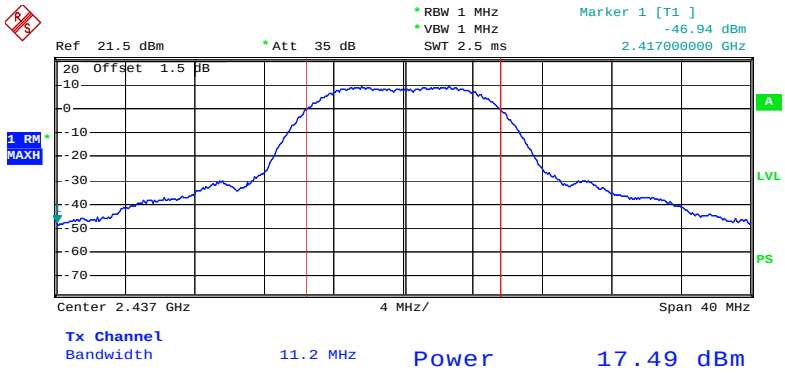
Date: 7.AUG.2009 09:02:14

802.11b Low Channel



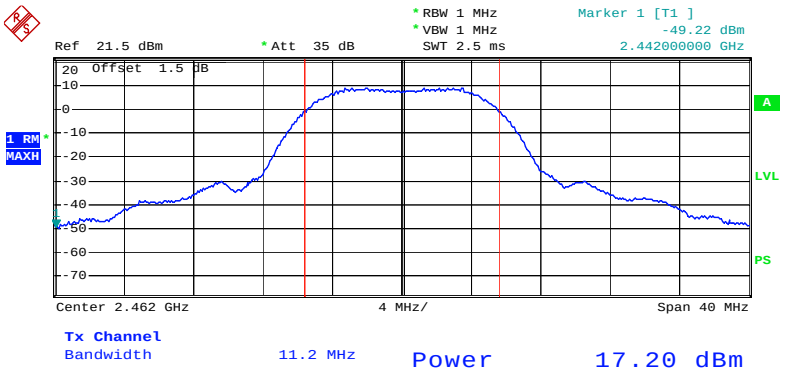
Date: 7.AUG.2009 08:53:34

802.11b Middle Channel



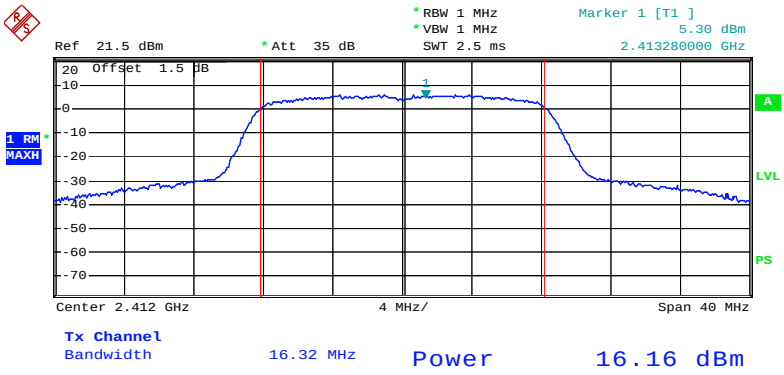
Date: 7.AUG.2009 08:54:46

802.11b High Channel



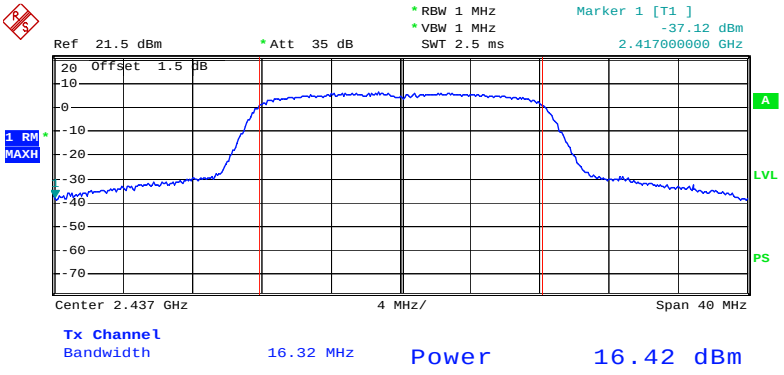
Date: 7.AUG.2009 08:57:09

802.11g Low Channel



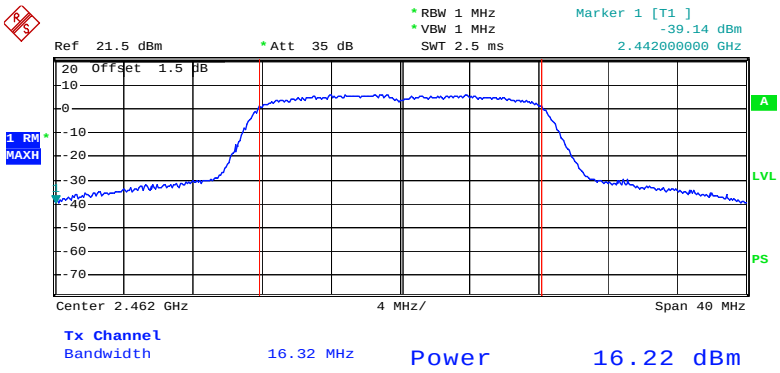
Date: 7.AUG.2009 09:05:35

802.11g Middle Channel



Date: 7.AUG.2009 09:06:46

802.11g High Channel



Date: 7.AUG.2009 09:10:09

FCC §15.247(d) – 100 kHz BANDWIDTH OF FREQUENCY BAND EDGE

Applicable Standard

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

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

*** 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

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Set RBW to 1 MHz and VBW of spectrum analyzer to 1 MHz with a convenient frequency span including 100 kHz bandwidth from band edge.
4. Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.
5. Repeat above procedures until all measured frequencies were complete.

Test Data

Environmental Conditions

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

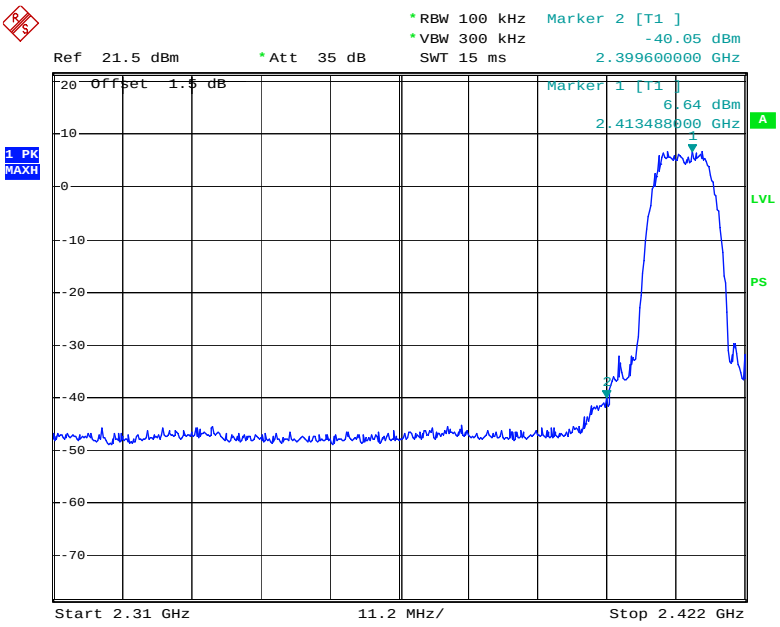
The testing was performed by Bruce Zhang on 2009-08-07 to 2009-08-20.

Test Result: *Compliant.*

Frequency (MHz)	Delta Peak to band emission (dBc)	Limit (dBc)
802.11b Mode		
2399.600	46.69	20
2483.600	51.31	20
802.11g Mode		
2398.332	36.30	20
2483.600	46.72	20

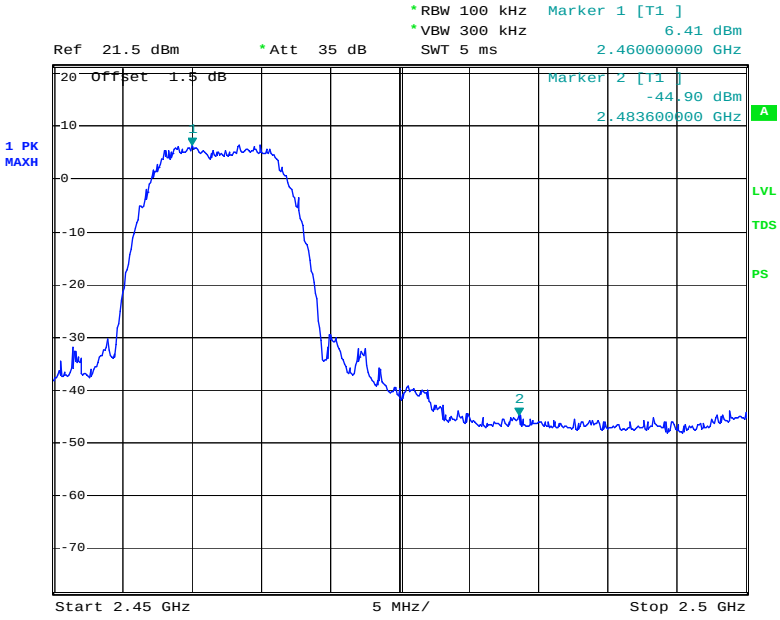
Please refer to following plots.

802.11b: Band Edge, Lowest CH



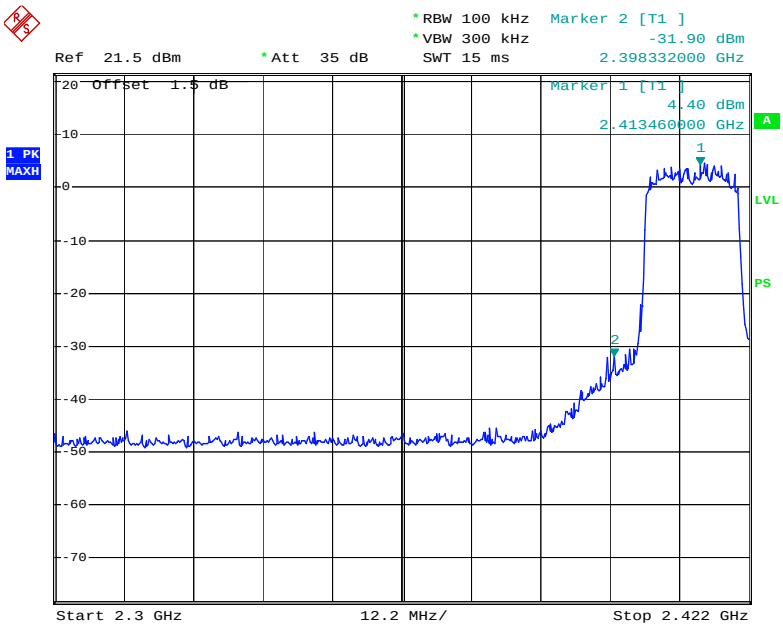
Date: 7.AUG.2009 10:58:12

802.11b: Band Edge, Highest CH



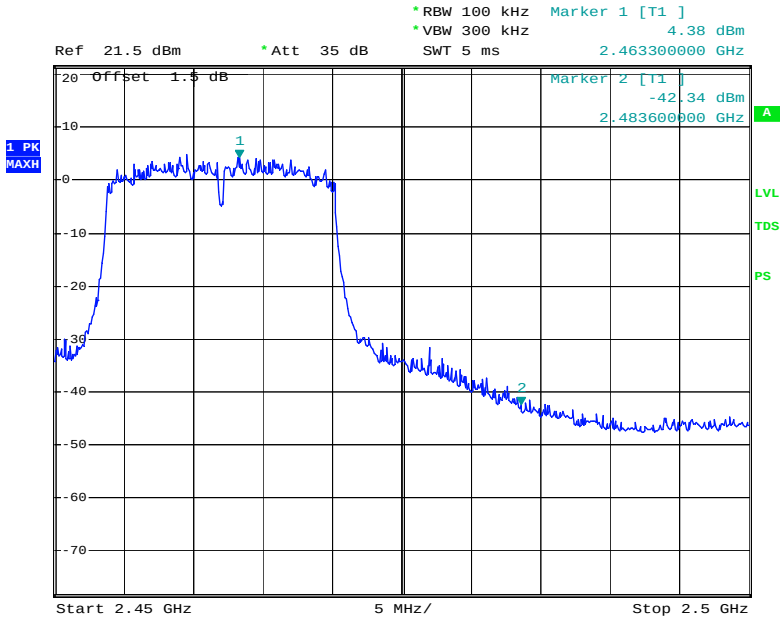
Date: 20.AUG.2009 09:18:26

802.11g: Band Edge, Lowest CH



Date: 7.AUG.2009 10:55:00

802.11g: Band Edge, Highest CH



Date: 20.AUG.2009 09:28:38

FCC §15.247(e) - POWER SPECTRAL DENSITY

Applicable Standard

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

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

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

Test Procedure

1. Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
2. Position the EUT was set without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
3. Adjust the center frequency of SA on any frequency be measured and set SA to 1.5MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value. (DTS)
4. Repeat above procedures until all frequencies measured were complete.

Test Data

Environmental Conditions

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

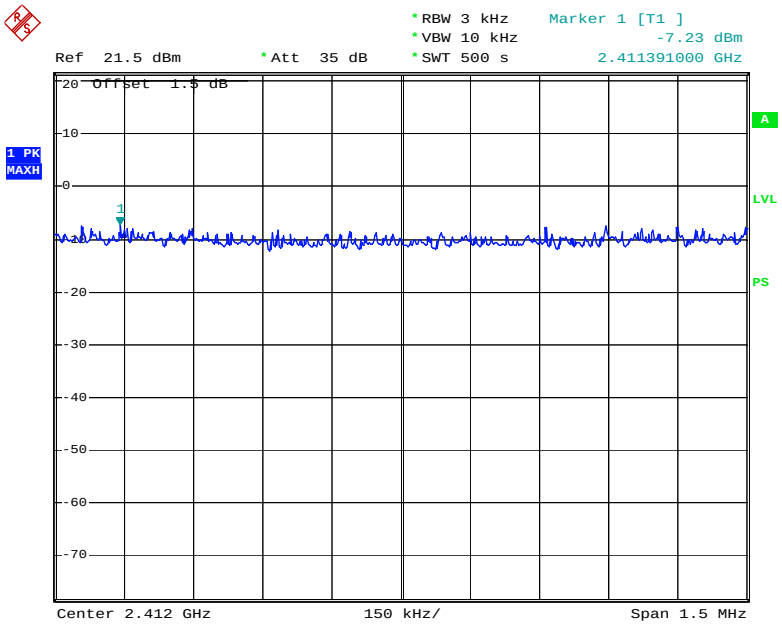
The testing was performed by Bruce Zhang on 2009-08-07.

Test Mode: Transmitting

Test Result: Pass

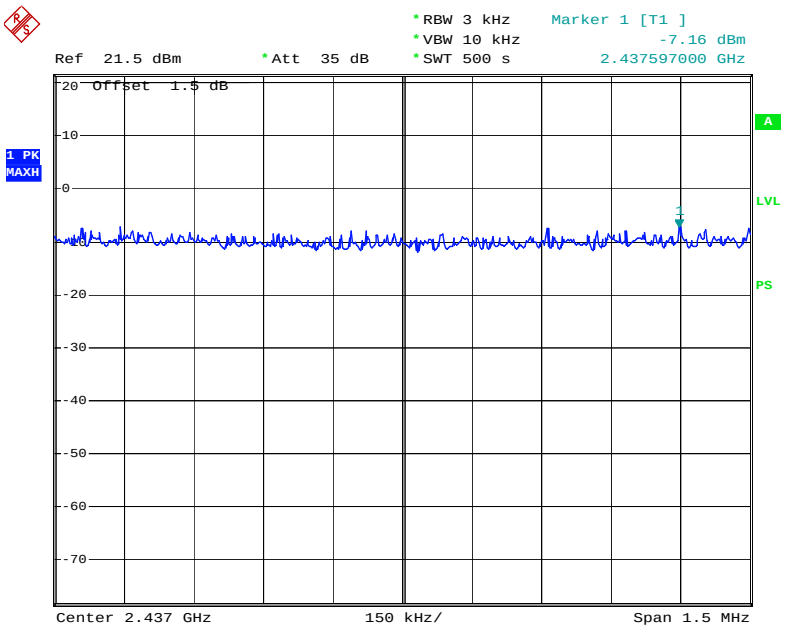
Channel	Frequency (MHz)	Data Rate (Mbps)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11b mode					
Low	2412	1	-7.23	8	Pass
Middle	2437	1	-7.16	8	Pass
High	2462	1	-7.16	8	Pass
802.11g mode					
Low	2412	6	-12.04	8	Pass
Middle	2437	6	-11.91	8	Pass
High	2462	6	-11.93	8	Pass

802.11b Low Channel



Date: 7.AUG.2009 13:50:15

802.11b Middle Channel



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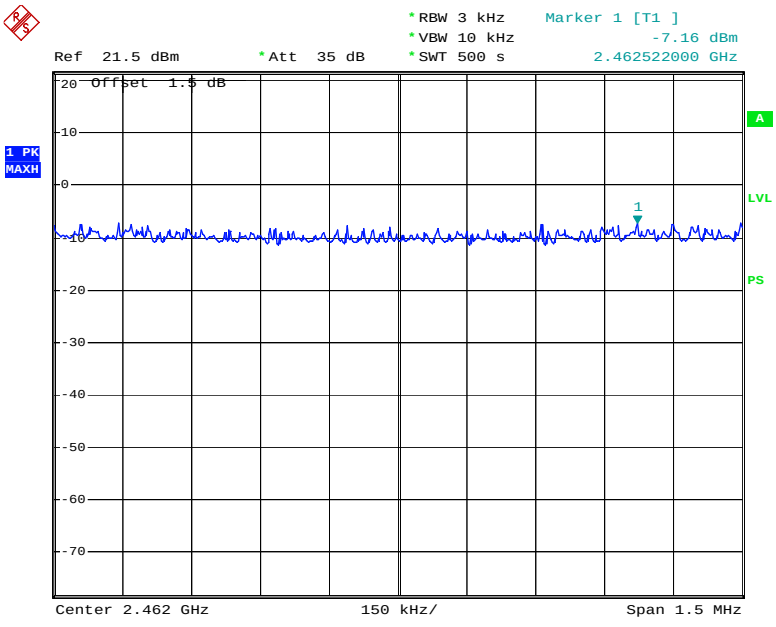
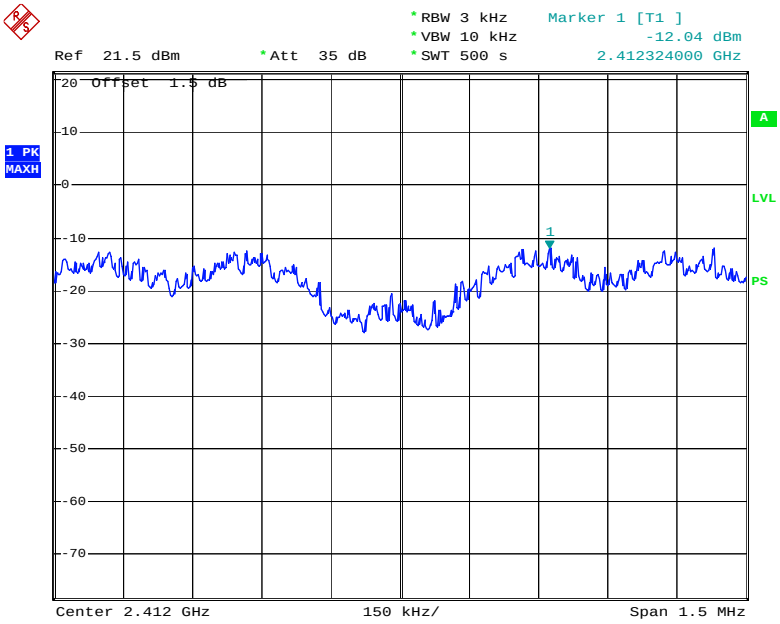
802.11b High Channel



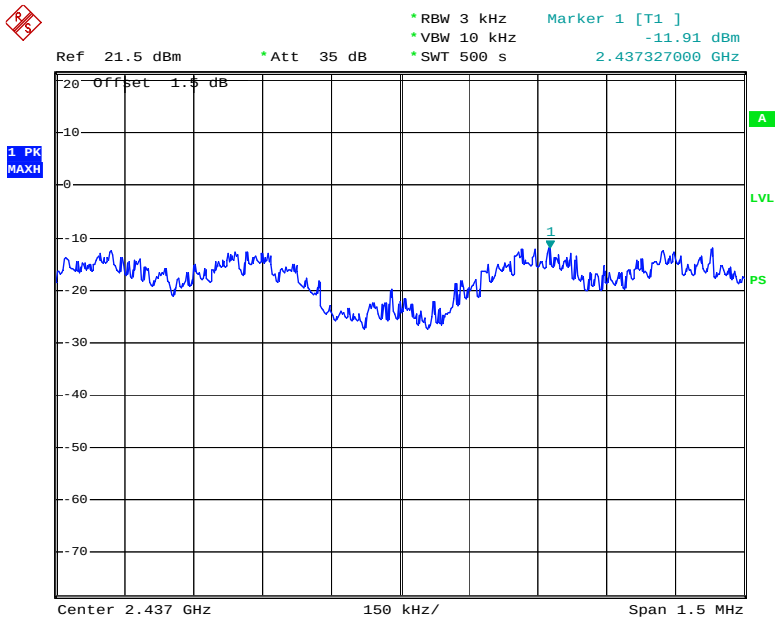
Date: 7.AUG.2009 13:11:10

802.11g Low Channel



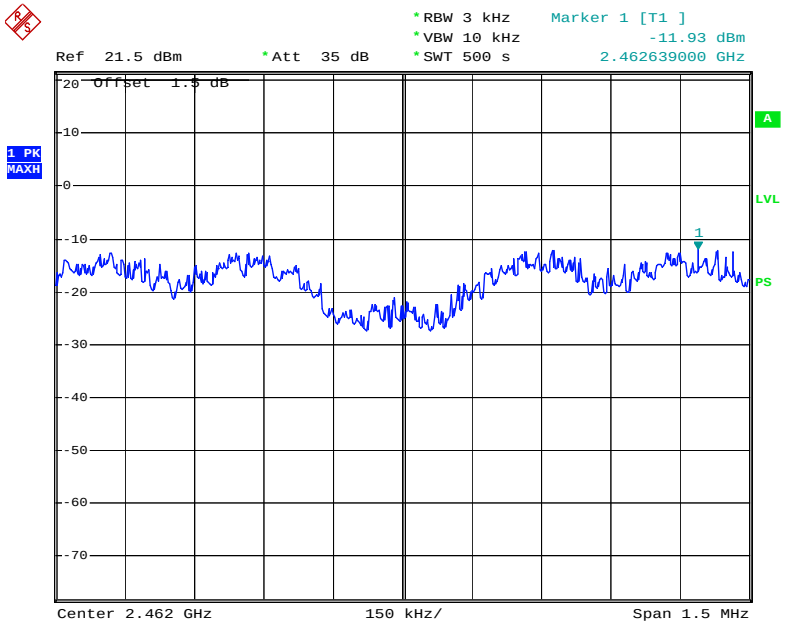
Date: 7.AUG.2009 14:09:02

802.11g Middle Channel



Date: 7.AUG.2009 14:33:59

802.11g High Channel



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