NVLAP LAB CODE 200707-0

FCC PART 15.247

MEASUREMENT AND TEST REPORT

For

Pennda Technologies Co., Ltd.

Room 1801, Overseas Chinese Scholar Venture Buildiong,

Hi-Tech Industrial Park, Shenzhen, Guangdong, China.

FCC ID: V59RGH300

Report Type:	**Product Type:**
Original Report	Multi-functional Residential Gateway

Test Engineer: Vicent Kang

Report Number: RSZ08041703

Report Date: 2008-12-22

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Reviewed By: EMC Engineer

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

The *Pennda Technologies Co., Ltd.'s* product, model number: *RGH302, RGH322, RGH303, RGH323, RGH302H, RGH322H, RGH303H, RGH323H, RGS302, RGS322, RGS303, RGS323 o*r the "EUT" as referred to in this report is a *Multi-functional Residential Gateway*, which measures approximately: 17.0 cm L x 39.0 cm W x 7.0 cm H, input voltage: 12V Adapter.

Adapter:
Model: DSA-30W-12US 120240;
Input: 100-240V 50/60Hz 0.8A;
Output: 12V 2A.

Note1: The models *RGH302, RGH322, RGH303, RGH323, RGH302H, RGH322H, RGH303H, RGH323H, RGS302, RGS322, RGS303, RGS323*, which were explained in the DECLARATION, so we selected the *RGS323 to test*.

** All measurement and test data in this report was gathered from production sample serial number: 0804038 (Assigned by BACL, Shenzhen). The EUT was received on 2008-04-17.*

Objective

This Type approval report is prepared on behalf of *Pennda Technologies Co., Ltd. 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)

FNone.

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 04, 2004. 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

The system was configured for testing in a typical fashion (as normally used by a typical user).

Equipment Modifications

No modification was made to the unit tested.

Host System Configuration List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
DELL	PC	DELL 170L	CN-0TC670-70821-560-F4Q6	DoC
DELL	Keyboard	SK-8110	CN07N244-71616-56A-1B1E	DoC
DELL	Mouse	M071KC	520027907	DoC
DELL	LCD Monitor	1505FP	Y4287-7168-571-GBSH	DoC
ProMOS	Memory	V826632K24SATG-C0	0525-K1933700	DoC
Intel	CPU	Celeron D-2533	N/A	DoC

Local Support Equipment List and Details

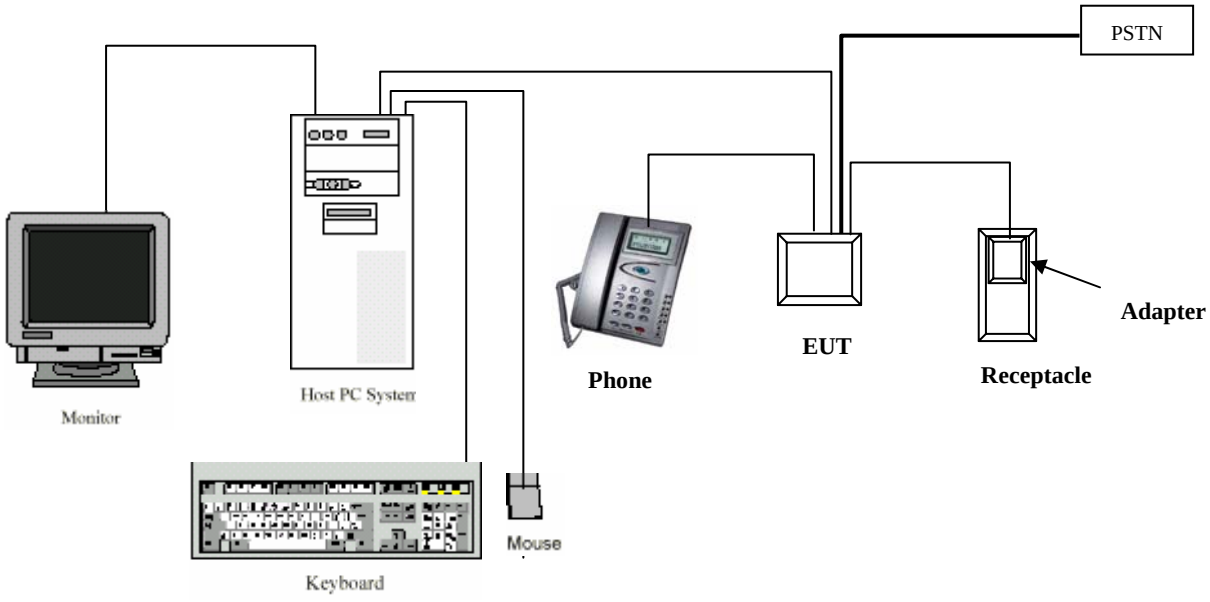
Manufacturer	Description	Model	Serial Number	FCC ID
DELL	Motherboard	OWC297	CN-OWC297-70821-564-00NI	DoC
DELL	Power	NPS-250KB D	CN-0H2678-17972-56E-80BM	DoC
Seagate	Hard Disk	ST340014A	5JXK3GXE	DoC
DELL	3.5' Floppy	N/A	CN-0N8893-69802-54Q-02P0	DoC
Lite-ON	CD-Rom	LTN-489S	N/A	DoC
Intel	Ethernet	PRO 10/100 VE	N/A	DoC

External I/O Cable

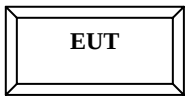
Cable Description	Length (m)	From/Port	To
Unshielded Detachable Power Cable	1.40	Adapter	EUT

Configuration of Test Setup

For Conduction Test:

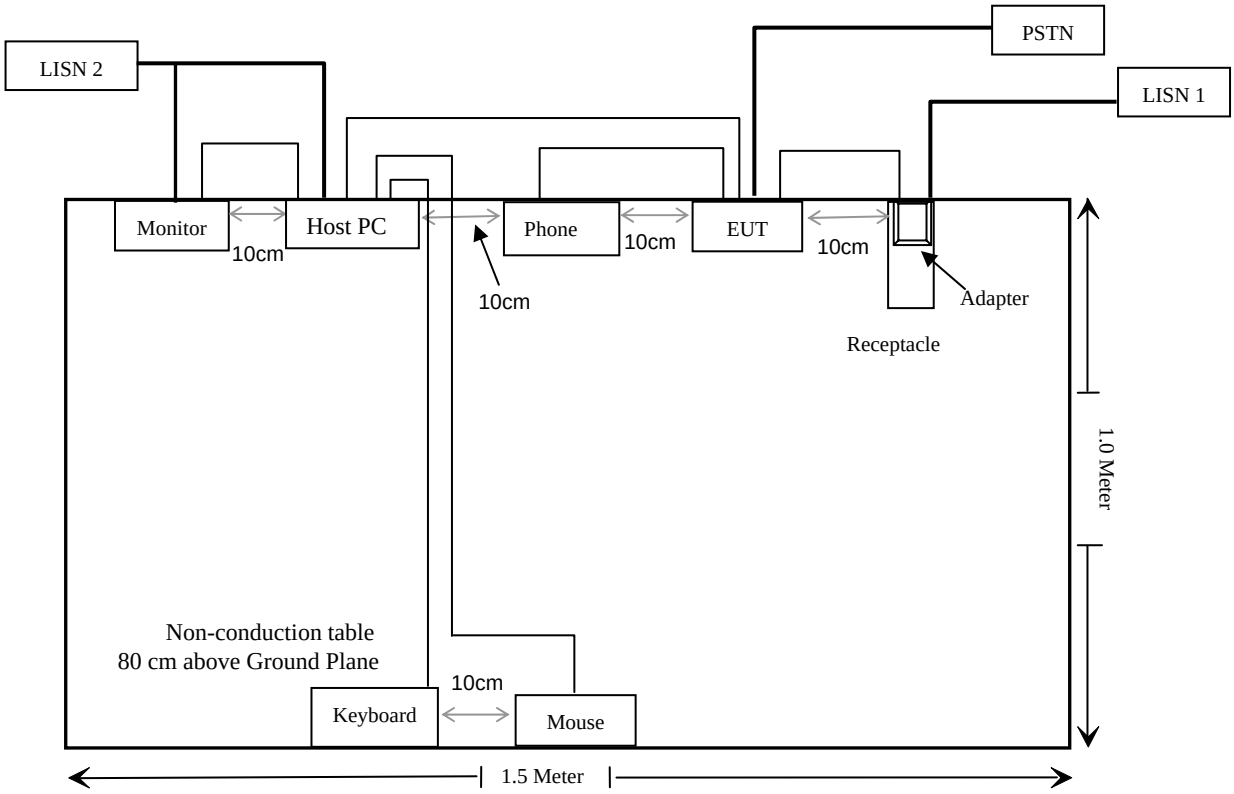


For Radiation test:

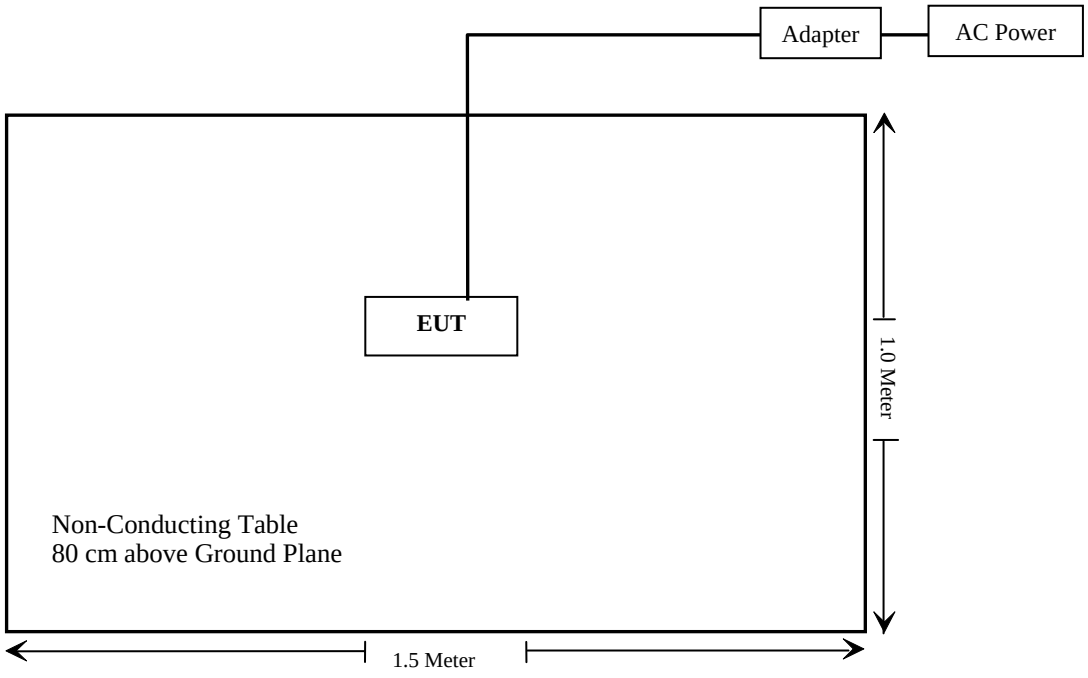


Block Diagram of Test Setup

For Conduction Test:



For Radiation test:



SUMMARY OF TEST RESULTS

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

§15.247 (i) and §1.1307 (b) (1) - MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Standard Applicable

According to subpart 15.247 (i) and subpart 1.1307 (b)(1), 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

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Averaging Time (minute)
Limits for General Population/Uncontrolled Exposure				
0.3–3.0	614	1.63	*(100)	30
3.0–30	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

Prediction of MPE limit at a given distance

Equation from page 18 of OET Bulletin 65, Edition 97-01

$S = PG/4\pi R^2$
S: Power density, in mW/cm^2
P: Power input to the antenna, in mW
G: numeric gain of the antenna
R: distance to the center of the antenna, in cm

External Antenna

802.11b Mode:

Maximum peak output power at antenna input terminal (dBm):	17.31
Maximum peak output power at antenna input terminal (mW):	53.83
Prediction distance (cm):	20
Prediction frequency (MHz):	2437
Antenna Gain, typical (dBi):	4.6
Maximum Antenna Gain (numeric):	2.884
The worst case is power density at predication frequency at 20 cm (mW/cm^2):	0.03088
MPE limit for general population exposure at prediction frequency (mW/cm^2):	1.0

802.11g Mode:

Maximum peak output power at antenna input terminal (dBm):	16.29
Maximum peak output power at antenna input terminal (mW):	42.56
Prediction distance (cm):	20
Prediction frequency (MHz):	2437
Antenna Gain, typical (dBi):	4.6
Maximum Antenna Gain (numeric):	2.884
The worst case is power density at predication frequency at 20 cm (mW/cm^2)::	0.02442
MPE limit for general population exposure at prediction frequency (mW/cm^2):	1.0

Internal Antenna

802.11b Mode:

Maximum peak output power at antenna input terminal (dBm):	17.31
Maximum peak output power at antenna input terminal (mW):	53.83
Prediction distance (cm):	20
Prediction frequency (MHz):	2437
Antenna Gain, typical (dBi):	2.6
Maximum Antenna Gain (numeric):	1.820
The worst case is power density at predication frequency at 20 cm (mW/cm^2):	0.01949
MPE limit for general population exposure at prediction frequency (mW/cm^2):	1.0

802.11g Mode:

Maximum peak output power at antenna input terminal (dBm):	16.29
Maximum peak output power at antenna input terminal (mW):	42.56
Prediction distance (cm):	20
Prediction frequency (MHz):	2437
Antenna Gain, typical (dBi):	2.6
Maximum Antenna Gain (numeric):	1.820
The worst case is power density at predication frequency at 20 cm (mW/cm^2)::	0.01541
MPE limit for general population exposure at prediction frequency (mW/cm^2):	1.0

Test Result

The EUT complies with 20 cm distance.

§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:

a. Antenna must be permanently attached to the unit.
b. 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.

Antenna Connector Construction

External antenna (RGH322, RHS323, RGH322H, RGH323H, RGS322, RGS323)
The external antennas of the EUT use a unique type of connector. The antenna gain is 4.6 dBi. The EUT have two antennas, one is Main, and the other is Auxiliary.

Internal antenna（RGH302,RGH303,RGH302H,RGH303H,RGS302,RGS303）
The EUT has an integrate antenna. The antenna must be professionally installed. The antenna gain is below 2.6 dBi, and the installer shall be responsible for verifying that the correct antenna is employed with the unit. The EUT have two antennas, one is Main, and the other is Auxiliary.

Result: Compliant.

§15.207 (a) - CONDUCTED EMISSIONS

Applicable Standard

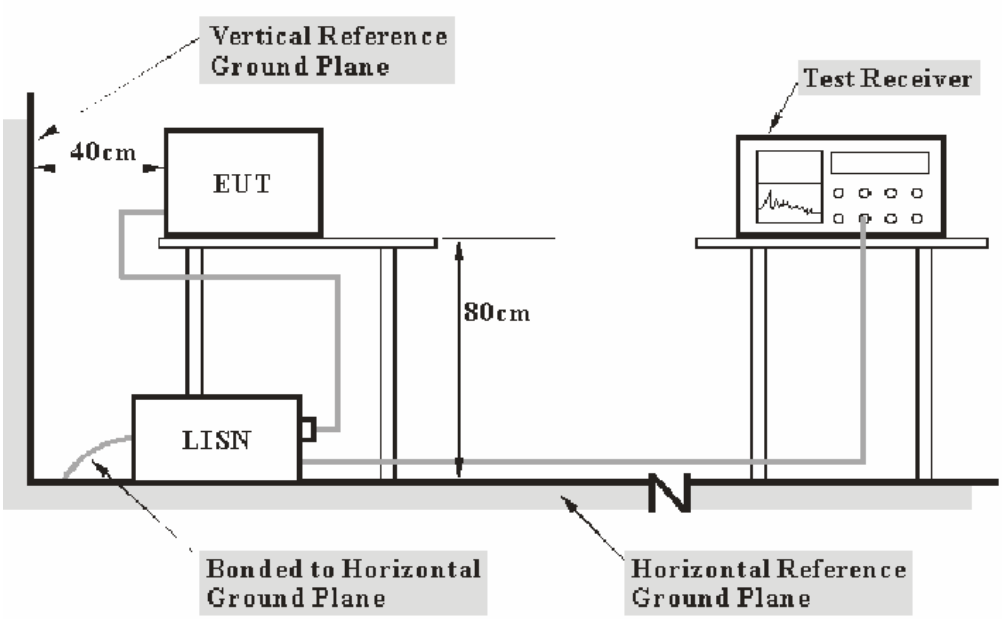
CFR47 §15.207

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	DE25330	2008-03-25	2009-03-25
Rohde & Schwarz	L.I.S.N.	ESH2-Z5	892107/021	2008-03-25	2009-03-25

*** 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, the host PC and the monitor was connected to the LISN 2.

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:

External Antenna

802.11b: 5.30 dB at **0.300 MHz** in the **Line** conductor mode

802.11g: 20.70 dB at **0.755 MHz** in the **Line** conductor mode

Internal Antenna

802.11b: 19.00 dB at **0.3550 MHz** in the **Line** conductor mode

802.11g: 21.20 dB at **0.355 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 Vicant Kang on 2008-12-11&2008-12-10.

External Antenna

Test Mode: Operating (802.11b) for Harddisk

Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	**Amplitude (dBμV)**	**Detector (QP/AV)**	**Conductor (Line/Neutral)**	**Limit (dBμV)**	**Margin (dB)**
0.300	34.90	QP	Line	40.20	5.30
0.755	35.30	QP	Line	56.00	20.70
0.355	37.90	QP	Neutral	58.90	21.00
0.755	35.00	QP	Neutral	56.00	21.00
0.560	34.50	QP	Neutral	56.00	21.50
0.560	34.20	QP	Line	56.00	21.80
0.355	37.00	QP	Line	58.90	21.90
0.355	26.70	AV	Neutral	48.90	22.20
24.730	36.90	QP	Line	60.00	23.10
0.355	25.50	AV	Line	48.90	23.40
0.560	22.10	AV	Neutral	46.00	23.90
0.300	36.20	QP	Neutral	60.20	24.00
0.270	36.70	QP	Neutral	61.10	24.40
0.560	21.20	AV	Line	46.00	24.80
0.755	20.60	AV	Neutral	46.00	25.40
0.255	36.00	QP	Line	61.60	25.60
0.255	25.20	AV	Line	51.60	26.40
24.320	33.50	QP	Neutral	60.00	26.50
24.350	22.70	AV	Neutral	50.00	27.30
0.755	18.50	AV	Line	46.00	27.50
0.270	23.30	AV	Neutral	51.10	27.80
24.900	20.90	AV	Line	50.00	29.10
0.300	20.90	AV	Neutral	50.20	29.30
0.300	19.80	AV	Line	50.20	30.40

Test Mode: Operating (802.11b) for CF Card

Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	**Amplitude (dBμV)**	**Detector (QP/AV)**	**Conductor (Line/Neutral)**	**Limit (dBμV)**	**Margin (dB)**
0.755	35.30	QP	Line	56.00	20.70
0.755	34.90	QP	Neutral	56.00	21.10
0.355	37.50	QP	Neutral	58.90	21.40
0.355	27.50	AV	Line	48.90	21.40
0.355	37.20	QP	Line	58.90	21.70
0.560	34.00	QP	Neutral	56.00	22.00
0.355	26.60	AV	Neutral	48.90	22.30
21.790	36.20	QP	Line	60.00	23.80
0.560	21.70	AV	Neutral	46.00	24.30
0.300	35.70	QP	Line	60.20	24.50
0.270	36.50	QP	Line	61.10	24.60
24.730	24.70	AV	Neutral	50.00	25.30
0.300	34.70	QP	Neutral	60.20	25.50
0.260	35.90	QP	Neutral	61.60	25.70
0.755	20.10	AV	Line	46.00	25.90
24.730	33.70	QP	Neutral	60.00	26.30
0.260	25.00	AV	Neutral	51.60	26.60
23.570	33.10	QP	Line	60.00	26.90
21.790	23.10	AV	Line	50.00	26.90
0.755	18.70	AV	Neutral	46.00	27.30
23.570	22.50	AV	Line	50.00	27.50
0.270	23.10	AV	Line	51.10	28.00
0.300	20.00	AV	Neutral	50.20	30.20
0.300	19.90	AV	Line	50.20	30.30

Internal Antenna

Test Mode: Operating (802.11b) for Harddisk

Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	**Amplitude (dBμV)**	**Detector (QP/AV)**	**Conductor (Line/Neutral)**	**Limit (dBμV)**	**Margin (dB)**
0.355	39.90	QP	Line	58.90	19.00
0.755	35.00	QP	Line	56.00	21.00
0.355	37.70	QP	Neutral	58.90	21.20
0.755	33.90	QP	Neutral	56.00	22.10
0.560	33.90	QP	Line	56.00	22.10
0.355	26.50	AV	Neutral	48.90	22.40
0.355	26.50	AV	Line	48.90	22.40
0.560	33.50	QP	Neutral	56.00	22.50
24.730	36.20	QP	Line	60.00	23.80
0.560	22.00	AV	Neutral	46.00	24.00
0.560	21.80	AV	Line	46.00	24.20
0.270	25.70	AV	Neutral	51.10	25.40
0.300	34.70	QP	Line	60.20	25.50
0.755	20.20	AV	Neutral	46.00	25.80
0.255	25.70	AV	Line	51.60	25.90
0.755	19.80	AV	Line	46.00	26.20
24.320	33.70	QP	Neutral	60.00	26.30
0.300	33.60	QP	Neutral	60.20	26.60
0.255	34.90	QP	Line	61.60	26.70
24.350	22.50	AV	Neutral	50.00	27.50
0.300	21.90	AV	Neutral	50.20	28.30
24.800	21.30	AV	Line	50.00	28.70
0.270	32.30	QP	Neutral	61.10	28.80
0.300	20.30	AV	Line	50.20	29.90

Test Mode: Operating (802.11g) for CF Card

Line Conducted Emissions				FCC Part 15.207	
Frequency (MHz)	**Amplitude (dBμV)**	**Detector (QP/AV)**	**Conductor (Line/Neutral)**	**Limit (dBμV)**	**Margin (dB)**
0.355	27.70	AV	Line	48.90	21.20
0.355	37.50	QP	Neutral	58.90	21.40
0.355	37.00	QP	Line	58.90	21.90
0.755	33.80	QP	Line	56.00	22.20
0.355	26.60	AV	Neutral	48.90	22.30
0.560	33.60	QP	Line	56.00	22.40
1.000	33.50	QP	Neutral	56.00	22.50
0.220	37.00	QP	Neutral	60.20	23.20
0.755	32.70	QP	Neutral	56.00	23.30
0.300	36.70	QP	Line	60.20	23.50
24.730	35.90	QP	Line	60.00	24.10
0.560	21.70	AV	Line	46.00	24.30
0.220	25.00	AV	Neutral	50.20	25.20
0.755	20.30	AV	Neutral	46.00	25.70
26.550	24.20	AV	Line	50.00	25.80
1.000	20.10	AV	Neutral	46.00	25.90
0.755	19.80	AV	Line	46.00	26.20
0.255	24.80	AV	Line	51.60	26.80
0.255	33.90	QP	Line	61.60	27.70
0.300	33.70	QP	Neutral	61.60	27.90
0.300	21.10	AV	Line	50.20	29.10
0.150	34.90	QP	Neutral	66.00	31.10
0.300	18.80	AV	Neutral	51.60	32.80
0.150	21.40	AV	Neutral	56.00	34.60

Note: The powers of 802.11b are lighter than 802.11g. The external antenna gain is higher than the internal antenna.

Plot(s) of Test Data

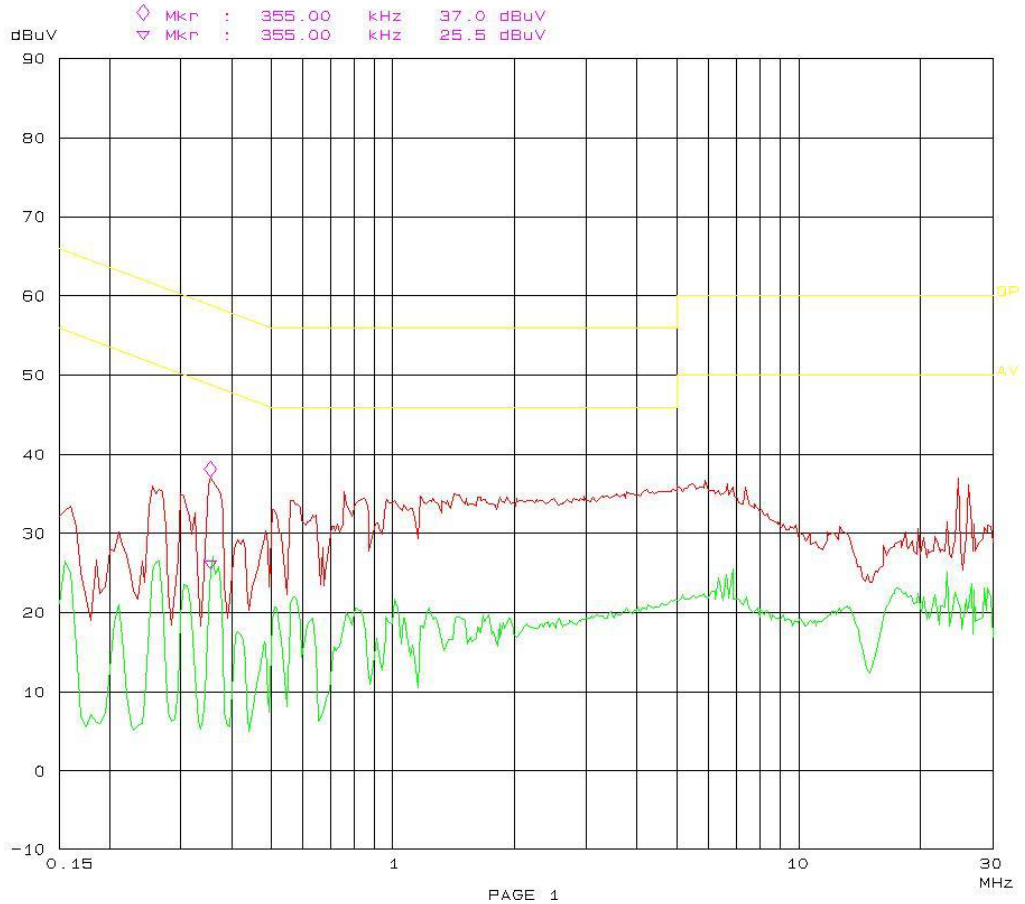
Plot(s) of Test Data is presented hereinafter as reference.

External Antenna

802.11b for Harddisk：

Conducted emission 11. Dec 08 10:56
FCC Part15

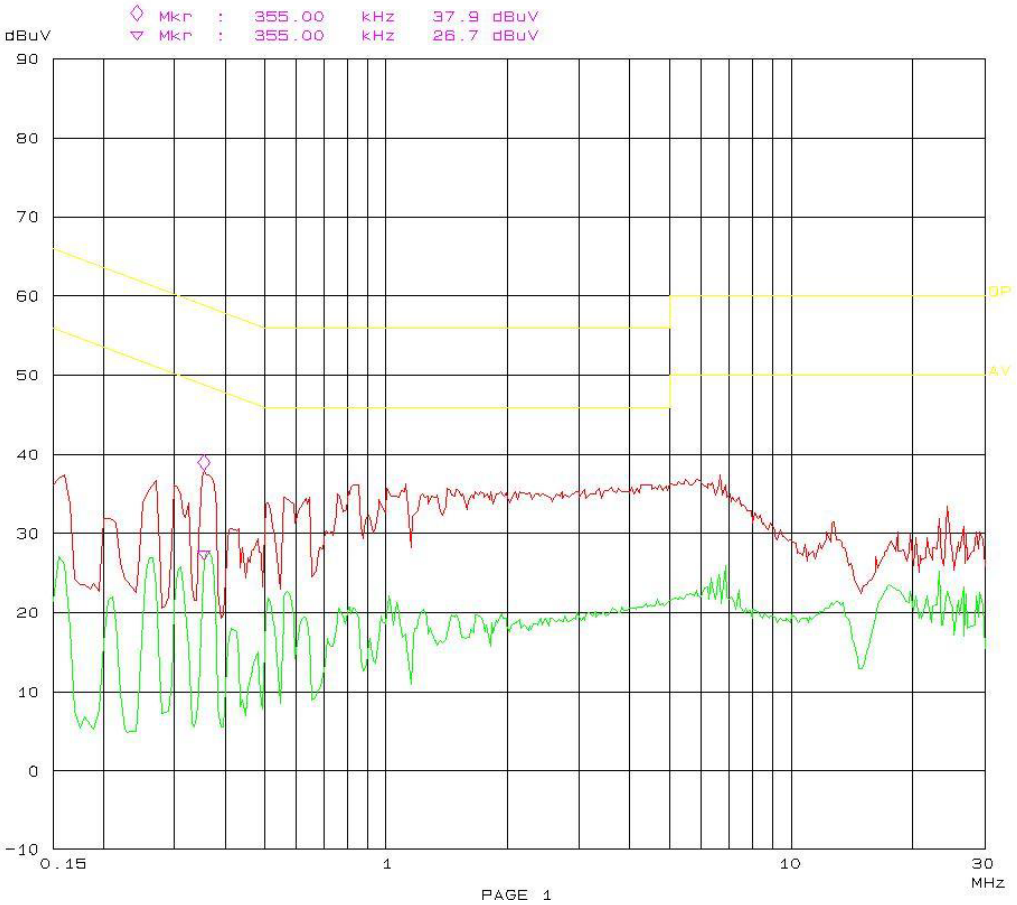
EUT: Multi-funtional residential gateway
Manuf: Pennda M/N: RGS323
Op Cond: Operating
Operator: Vicent
Test Spec: AC 120V/60Hz L
Comment: Temp: 25 Hum: 56%
BACL



Conducted emission
FCC Part15

11. Dec 08 11:09

EUT: Multi-funtional residential gateway
Manuf: Pennda M/N: RGS323
Op Cond: Operating
Operator: Vicent
Test Spec: AC 120V/60Hz N
Comment: Temp: 25 Hum: 56%
BACL

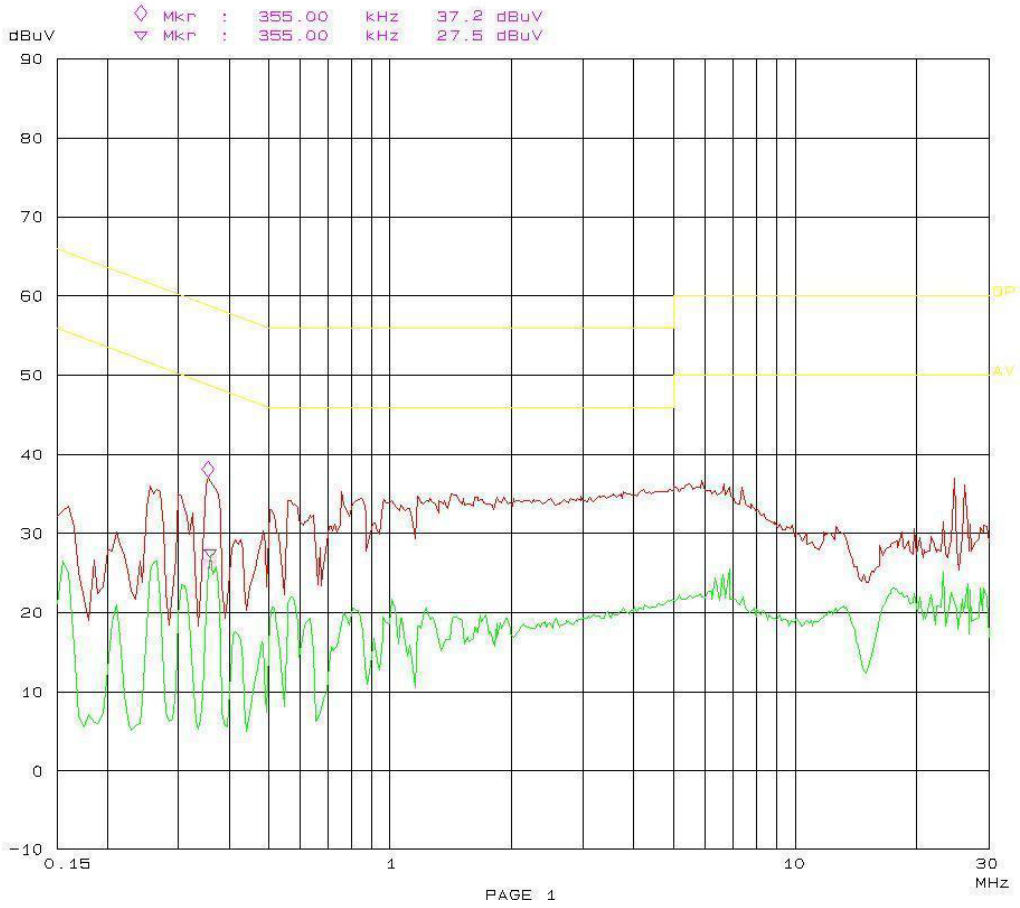


PAGE 1

802.11b for CF Card:

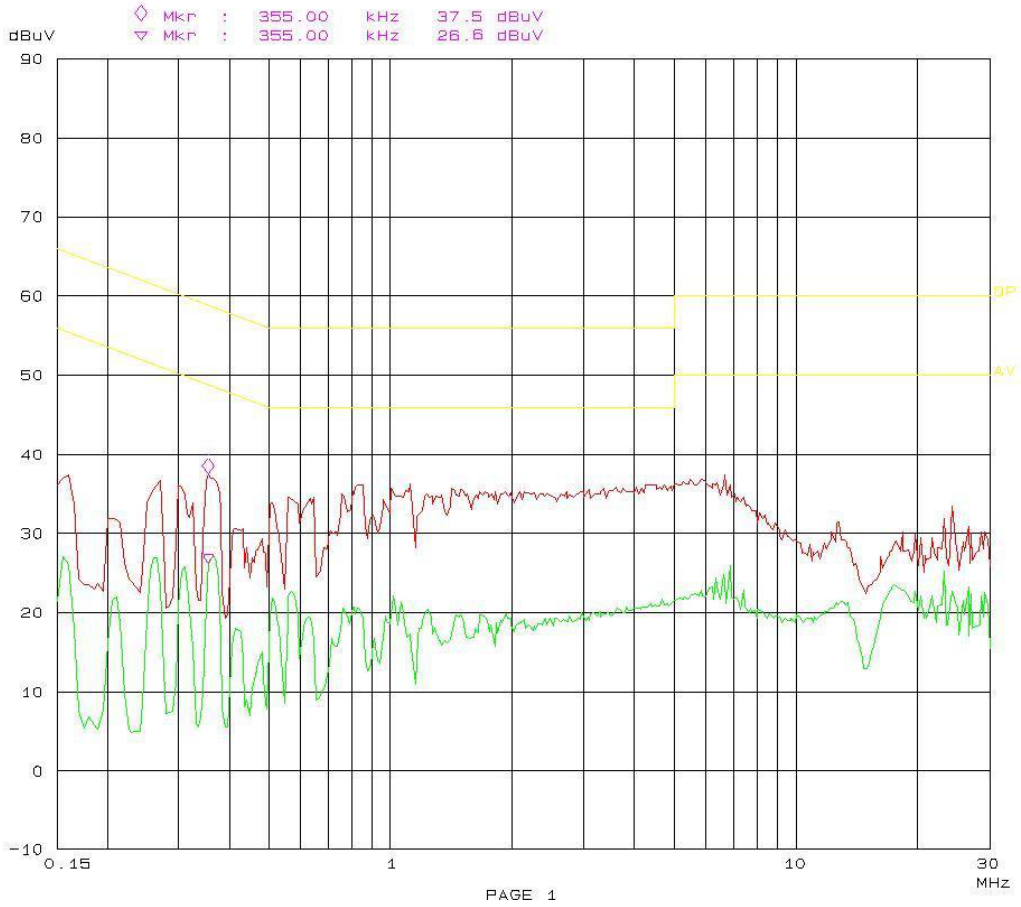
Conducted emission 11. Dec 08 11:36
FCC Part15

EUT:	Multi-funtional residential gateway
Manuf:	Pennda M/N: RGS323
Op Cond:	Operating
Operator:	Vicent
Test Spec:	AC 120V/60Hz L
Comment:	Temp: 25 Hum: 56%
	BACL



Conducted emission 11. Dec 08 11:19
FCC Part15

EUT:	Multi-funtional residential gateway
Manuf:	Pennda M/N: RGS323
Op Cond:	Operating
Operator:	Vicent
Test Spec:	AC 120V/60Hz N
Comment:	Temp: 25 Hum: 56%
	BACL



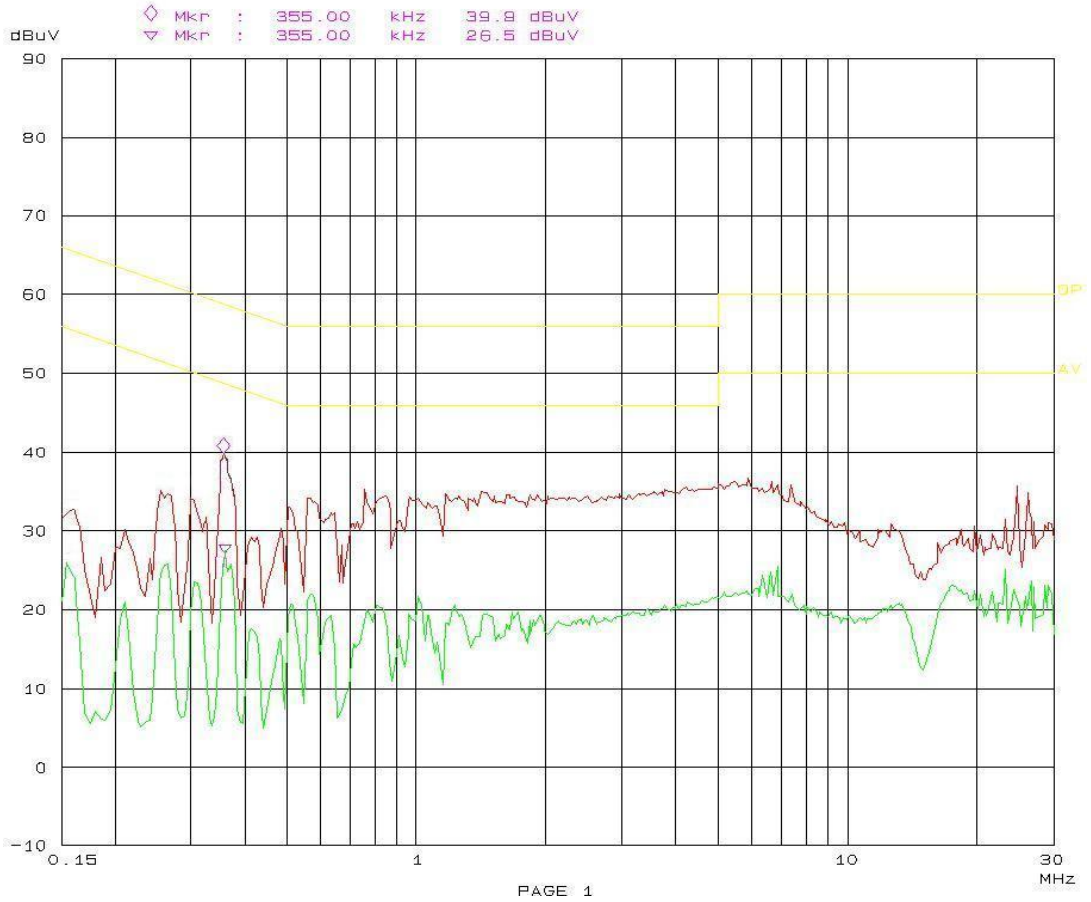
PAGE 1

Internal Antenna

802.11b for Harddisk：

Conducted emission 10. Dec 08 10:56
FCC Part15

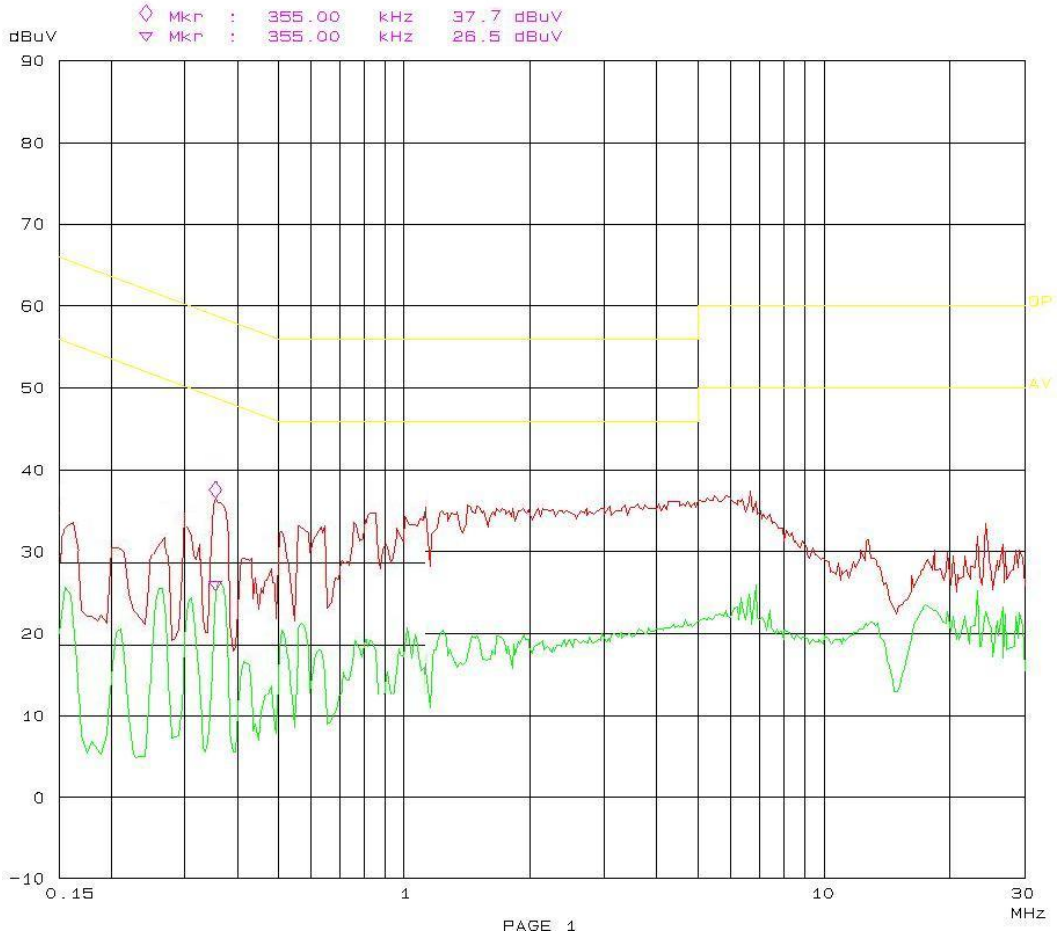
EUT: Multi-funtional residential gateway
Manuf: Pennda M/N: RGS323
Op Cond: Operating
Operator: Vicent
Test Spec: AC 120V/60Hz L
Comment: Temp: 25 Hum: 56%
BACL



Conducted emission
FCC Part15

10. Dec 08 11:00

EUT: Multi-funtional residential gateway
Manuf: Pennda M/N: RGS323
Op Cond: Operating
Operator: Vicent
Test Spec: AC 120V/60Hz N
Comment: Temp: 25 Hum: 56%
BACL

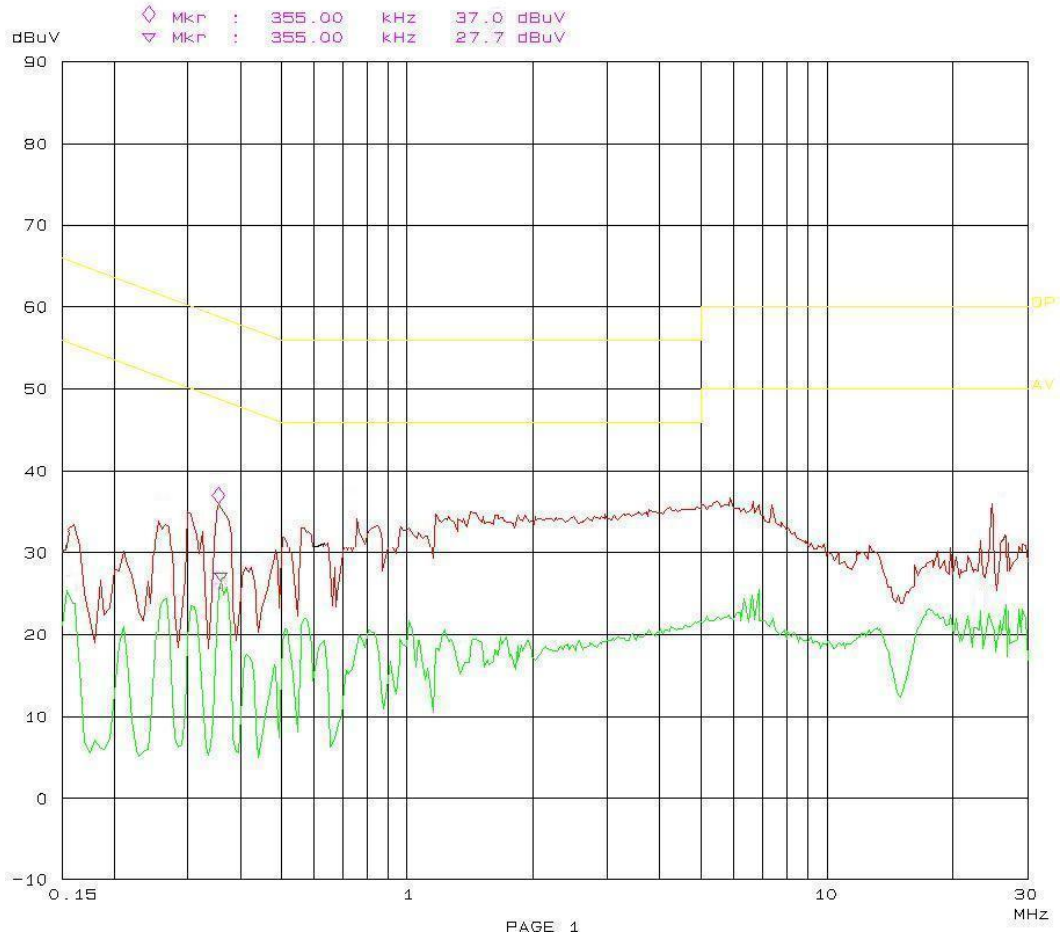


802.11g for CF Card:

Conducted emission
FCC Part15

10. Dec 08 11:38

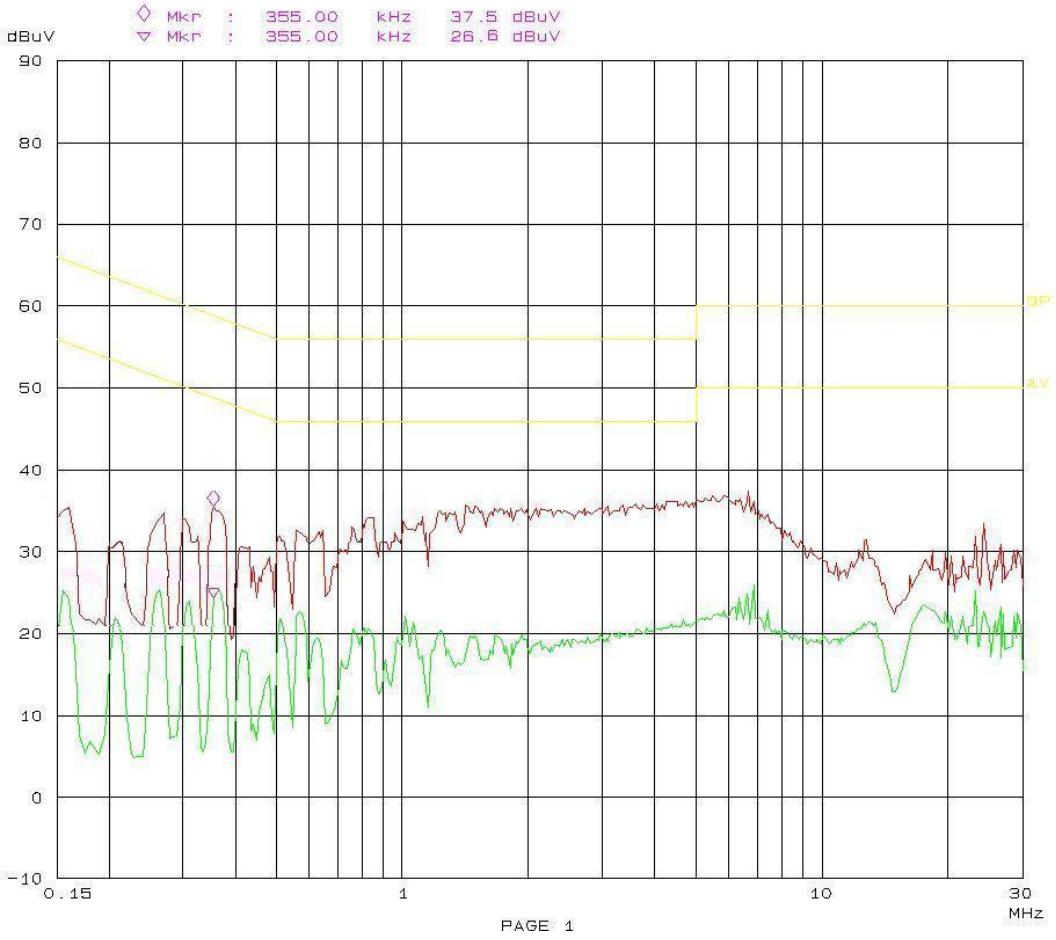
EUT:	Multi-funtional residential gateway
Manuf:	Pennda M/N: RGS323
Op Cond:	Operating
Operator:	Vicent
Test Spec:	AC 120V/60Hz L
Comment:	Temp: 25 Hum: 56%
	BACL



Conducted emission
FCC Part15

10. Dec 08 11:18

EUT: Multi-funtional residential gateway
Manuf: Pennda M/N: RGS323
Op Cond: Operating
Operator: Vicent
Test Spec: AC 120V/60Hz N
Comment: Temp: 25 Hum: 56%
BACL



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

Applicable Standard

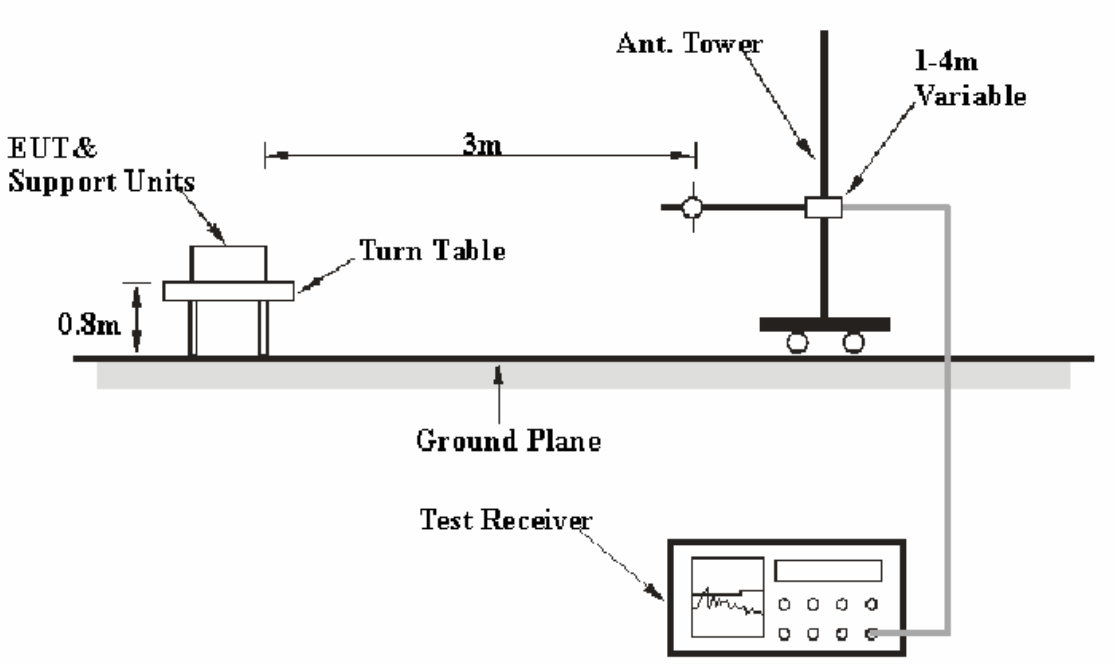
FCC §15.247 (d); §15.209; §15.205.

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 15.109, FCC 15.209 and FCC 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	2008-04-12	2009-04-11
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

*** 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:

External Antenna

30 -1000MHz:

802.11b: 3.9 dB at **623.112550 MHz** in the **Vertical** polarization for Harddisk
802.11b:4.1 dB at **344.482775 MHz** in the **Vertical** polarization for CF Card
802.11g: 3.6 dB at **344.480825 MHz** in the **Horizontall** polarization for Harddisk
802.11g: 3.8 dB at **344.488700 MHz** in the **Horizontall** polarization for CF Card

Above 1GHz:

3.26 dB at **4824 MHz** in the **Horizontal** polarization**, 802.11b Low Channel**
3.70 dB at **4874 MHz** in the **Vertical** polarization**, 802.11b Middle Channel**
4.33 dB at **4924 MHz** in the **Vertical** polarization**, 802.11b High Channel**

4.41 dB at **2279.9 MHz** in the **Vertical** polarization**, 802.11g Low Channel**
3.71 dB at **2279.9 MHz** in the **Vertical** polarization**, 802.11g Middle Channel**
3.39 dB at **2279.9 MHz** in the **Vertical** polarization**, 802.11g High Channel**

Internal Antenna

30 -1000MHz:

802.11b: 6.1 dB at **599.107375 MHz** in the **Vertical** polarization for Harddisk
802.11b: 8.1 dB at **344.482775 MHz** in the **Vertical** polarization for CF Card
802.11g: 5.6 dB at **344.480825 MHz** in the **Horizontall** polarization for Harddisk
802.11g: 7.4 dB at **623.091100MHz** in the **Vertical** polarization for CF Card

Above 1GHz:

6.66 dB at **4824 MHz** in the **Horizontal** polarization**, 802.11b Low Channel**
6.30 dB at **4874 MHz** in the **Vertical** polarization**, 802.11b Middle Channel**
6.83 dB at **4924 MHz** in the **Vertical** polarization**, 802.11b High Channel**

6.71 dB at **2279.9 MHz** in the **Vertical** polarization**, 802.11g Low Channel**
6.01 dB at **2279.9 MHz** in the **Vertical** polarization**, 802.11g Middle Channel**
5.79dB at **2279.9 MHz** in the **Vertical** polarization**, 802.11g High Channel**

Test Data

Environmental Conditions

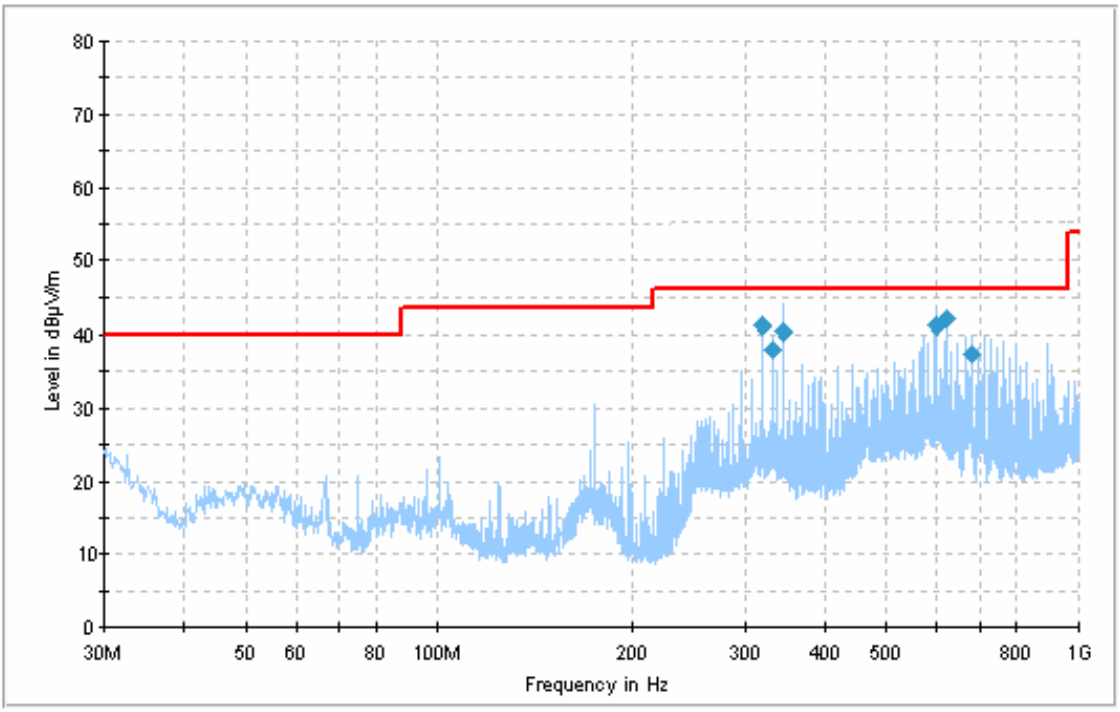
Temperature:	24 ° C
Relative Humidity:	56 %
ATM Pressure:	100.0kPa

The testing was performed by Vicent Kang on 2008-12-11.

External Antenna

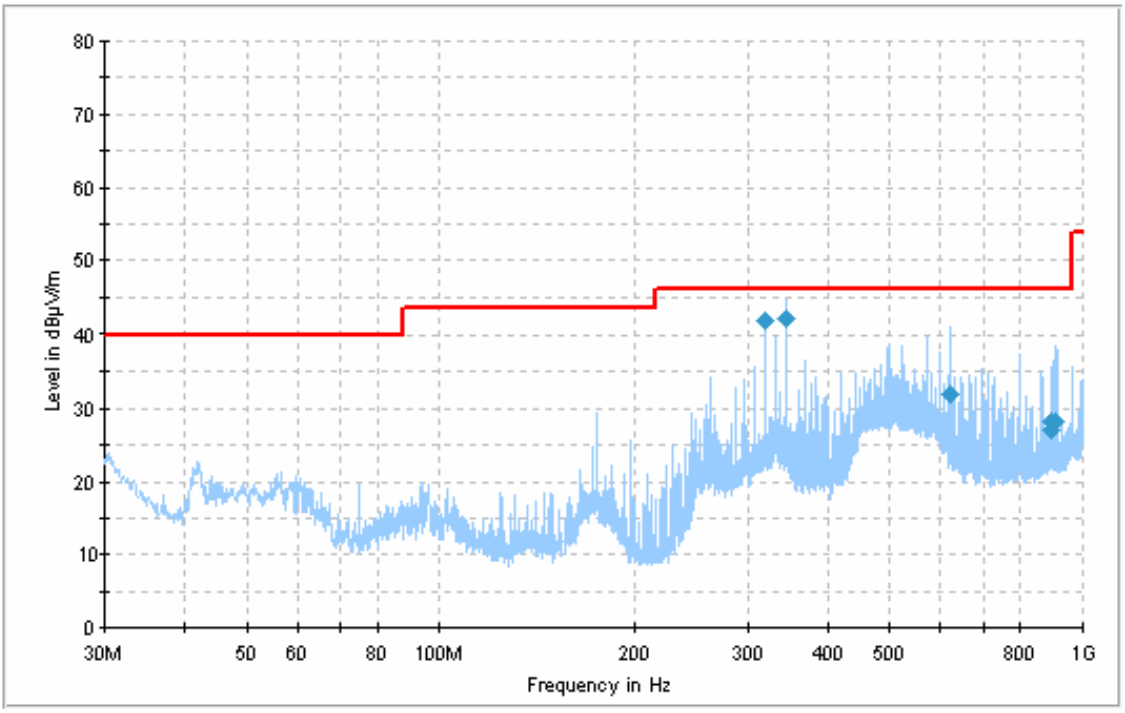
30-1000 MHz:

Test Mode: Transmitting (802.11b) for Harddisk



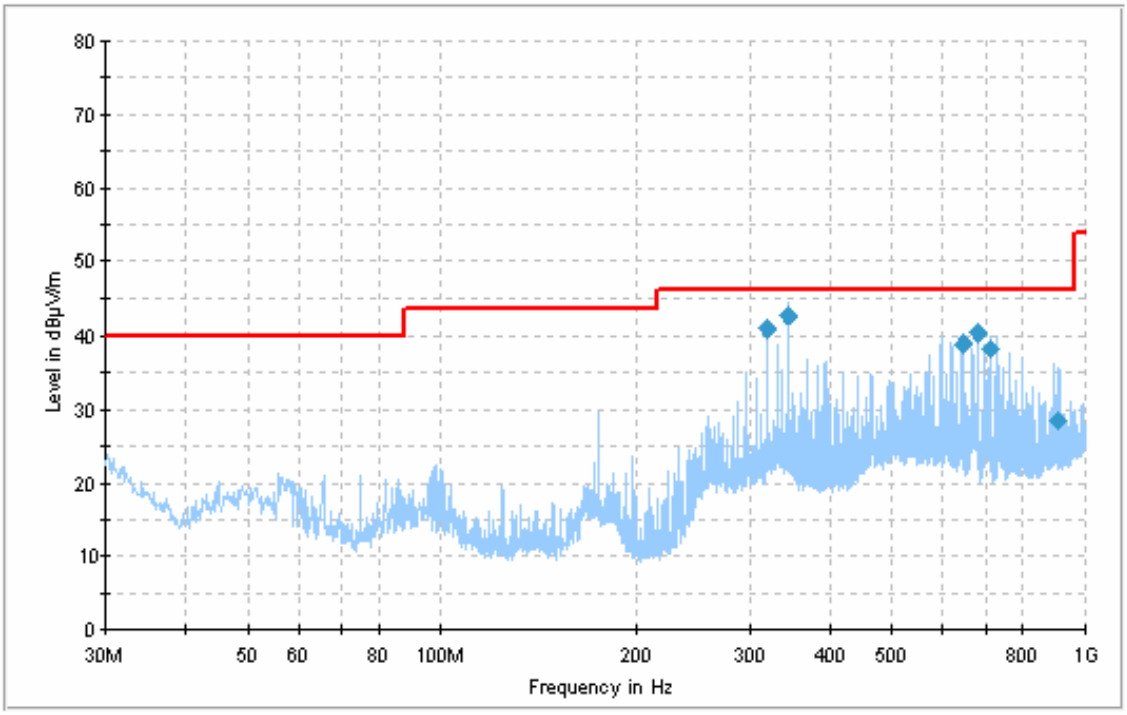
Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
623.112550	42.1	99.0	V	170.0	-17.0	46.0	3.9*
599.107375	41.1	99.0	V	180.0	-18.1	46.0	4.9
319.883100	41.0	99.0	H	183.0	-24.3	46.0	5.0
344.488550	40.4	99.0	H	7.0	-23.6	46.0	5.6
332.191000	38.0	100.0	H	174.0	-24.0	46.0	8.0
679.906675	37.4	169.0	V	165.0	-14.8	46.0	8.6

Test Mode: Transmitting (802.11b) for CF Card



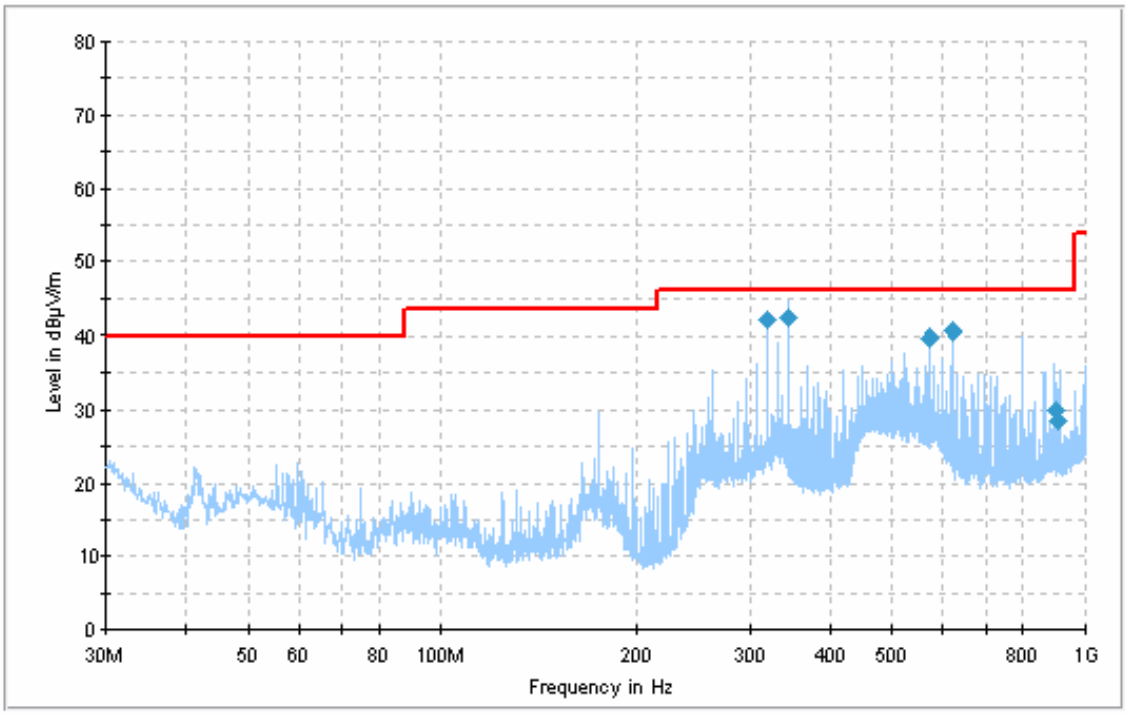
Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
344.482775	41.9	121.0	V	11.0	-23.6	46.0	4.1
319.876425	41.7	100.0	H	0.0	-24.3	46.0	4.3
623.100325	32.1	127.0	H	0.0	-17.0	46.0	13.9
906.998550	28.3	100.0	H	0.0	-9.5	46.0	17.7
890.298175	28.1	100.0	H	247.0	-9.3	46.0	17.9
894.222225	27.1	143.0	H	2.0	-9.3	46.0	18.9

Test Mode: Transmitting (802.11g) for Harddisk



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
344.480825	42.4	100.0	H	181.0	-23.6	46.0	3.6*
319.878825	40.9	100.0	H	196.0	-24.3	46.0	5.1
679.935850	40.3	100.0	V	173.0	-14.8	46.0	5.7
647.168650	38.8	136.0	V	0.0	-16.5	46.0	7.2
712.696350	38.2	100.0	V	176.0	-14.1	46.0	7.8
907.095075	28.6	100.0	H	6.0	-9.5	46.0	17.4

Test Mode: Transmitting (802.11g) for CF Card



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
344.488700	42.2	100.0	H	8.0	-23.6	46.0	3.8*
319.873875	42.1	101.0	H	2.0	-24.3	46.0	3.9
623.091100	40.6	101.0	V	352.0	-17.0	46.0	5.4
573.233075	39.7	100.0	V	348.0	-18.4	46.0	6.3
897.251375	30.0	117.0	V	219.0	-9.4	46.0	16.0
907.234175	28.4	101.0	V	0.0	-9.5	46.0	17.6

Above 1GHz:

802.11b

Indicated		Detector (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209		
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2412MHz)											
4824.0	48.20	AV	180	1.1	H	31.3	4.64	33.4	50.74	54	3.26*
2279.9	43.93	AV	180	1.3	V	30.0	6.51	33.9	46.54	54	7.46
4824.0	60.99	PK	160.0	1.1	V	31.3	4.64	33.4	63.53	74	10.47
2279.9	38.86	AV	180	1.4	H	30.0	6.51	33.9	41.47	54	12.53
4824.0	33.38	AV	0	1.5	H	31.3	4.64	33.4	35.92	54	18.08
2279.9	52.93	PK	90	1.1	V	30.0	6.51	33.9	55.54	74	18.46
2279.9	48.61	PK	270.0	1.5	H	30.0	6.51	33.9	51.22	74	22.78
4824.0	48.63	PK	180.0	1.4	H	31.3	4.64	33.4	51.17	74	22.83
Middle Channel (2437MHz)											
4874.0	47.76	AV	175	1.2	V	31.3	4.64	33.4	50.30	54	3.70*
2279.9	45.78	AV	90	1.1	V	30.0	6.51	33.9	48.39	54	5.61
4874.0	44.53	AV	180	1.3	H	31.3	4.64	33.4	47.07	54	6.93
4874.0	60.48	PK	180	1.2	V	31.3	4.64	33.4	63.02	74	10.98
2279.9	39.79	AV	90	1.4	H	30.0	6.51	33.9	42.40	54	11.6
2279.9	54.57	PK	180	1.3	V	30.0	6.51	33.9	57.18	74	16.82
4874.0	50.40	PK	10	1.4	H	31.3	4.64	33.4	52.94	74	21.06
2279.9	50.12	PK	90	1.2	H	30.0	6.51	33.9	52.73	74	21.27
HighChannel (2462MHz)											
4924.0	46.92	AV	90	1.3	V	31.6	4.55	33.4	49.67	54	4.33
2279.9	46.32	AV	90	1.5	V	30.0	6.51	33.9	48.93	54	5.07
4924.0	60.37	PK	180	1.2	V	31.6	4.55	33.4	63.12	74	10.88
2279.9	40.17	AV	120	1.4	H	30.0	6.51	33.9	42.78	54	11.22
4924.0	35.50	AV	140	1.2	H	31.6	4.55	33.4	38.25	54	15.75
2279.9	53.27	PK	45	1.2	V	30.0	6.51	33.9	55.88	74	18.12
4924.0	49.35	PK	180	1.2	H	31.6	4.55	33.4	52.1	74	21.9
2279.9	47.51	PK	90	1.2	H	30.0	6.51	33.9	50.12	74	23.88

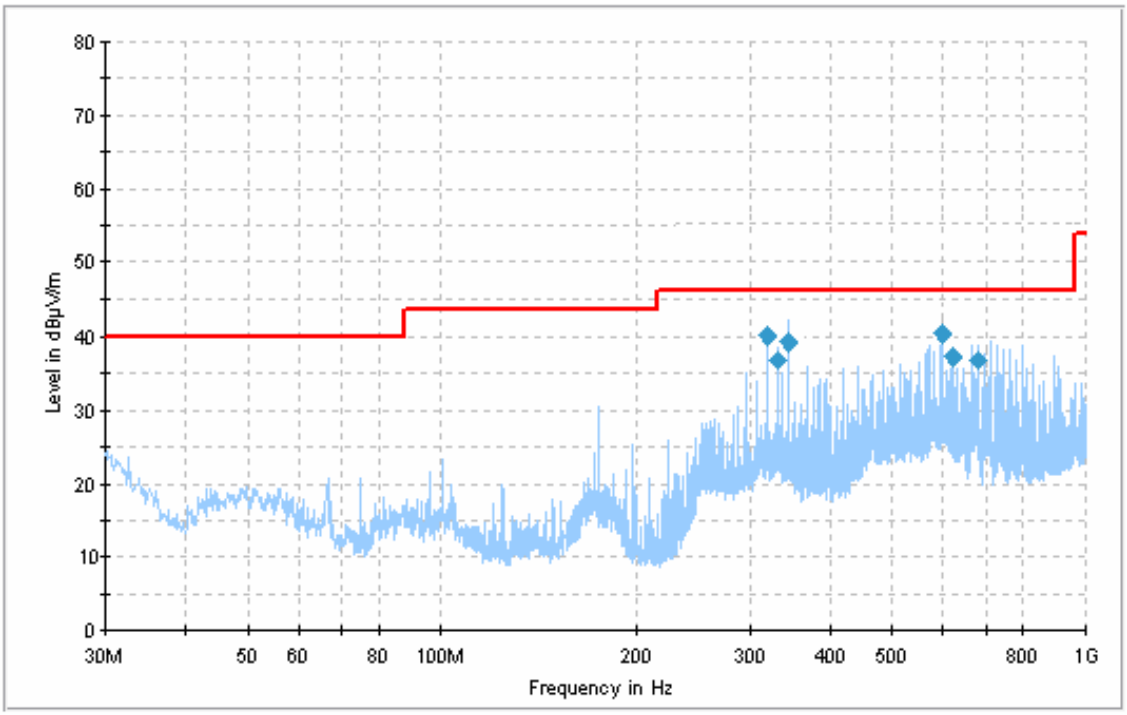
802.11g

Indicated		Detector (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209		
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2412MHz)											
2279.9	46.98	AV	90	1.1	V	30.0	6.51	33.9	49.59	54	4.41
4824.0	46.73	AV	170	1.3	V	31.3	4.64	33.4	49.27	54	4.73
4824.0	45.69	AV	160	1.2	H	31.3	4.64	33.4	48.23	54	5.77
2279.9	42.43	AV	120	1.2	H	30.0	6.51	33.9	45.04	54	8.96
4824.0	50.47	PK	180	1.5	V	31.3	4.64	33.4	53.01	74	20.99
2279.9	49.76	PK	90	1.2	V	30.0	6.51	33.9	52.37	74	21.63
4824.0	48.82	PK	90	1.2	H	31.3	4.64	33.4	51.36	74	22.64
2279.9	45.57	PK	60	1.1	H	30.0	6.51	33.9	48.18	74	25.82
Middle Channel (2437MHz)											
2279.9	47.68	AV	90	1.5	V	30.0	6.51	33.9	50.29	54	3.71*
4874.0	45.07	AV	180	1.2	V	31.3	4.64	33.4	47.61	54	6.39
2279.9	42.42	AV	120	1.2	H	30.0	6.51	33.9	45.03	54	8.97
4874.0	36.55	AV	110	1.5	H	31.3	4.64	33.4	39.09	54	14.91
2279.9	50.77	PK	45	1.2	V	30.0	6.51	33.9	53.38	74	20.62
4874.0	49.32	PK	180	1.2	V	31.3	4.64	33.4	51.86	74	22.14
2279.9	45.46	PK	120	1.4	H	30.0	6.51	33.9	48.07	74	25.93
4874.0	39.82	PK	180	1.2	H	31.3	4.64	33.4	42.36	74	31.64
HighChannel (2462MHz)											
2279.9	48.00	AV	90	1.3	V	30.0	6.51	33.9	50.61	54	3.39*
2279.9	40.71	AV	120	1.1	H	30.0	6.51	33.9	43.32	54	10.68
4924.0	38.70	AV	180	1.3	V	31.3	4.55	33.4	41.15	54	12.85
4924.0	32.56	AV	140	1.1	H	31.3	4.55	33.4	35.01	54	18.99
2279.9	50.92	PK	20	1.2	V	30.0	6.51	33.9	53.53	74	20.47
4924.0	44.90	PK	180	1.1	V	31.3	4.55	33.4	47.35	74	26.65
2279.9	43.51	PK	90	1.2	H	30.0	6.51	33.9	46.12	74	27.88
4924.0	37.28	PK	0	1.2	H	31.3	4.55	33.4	39.73	74	34.27

Internal Antenna

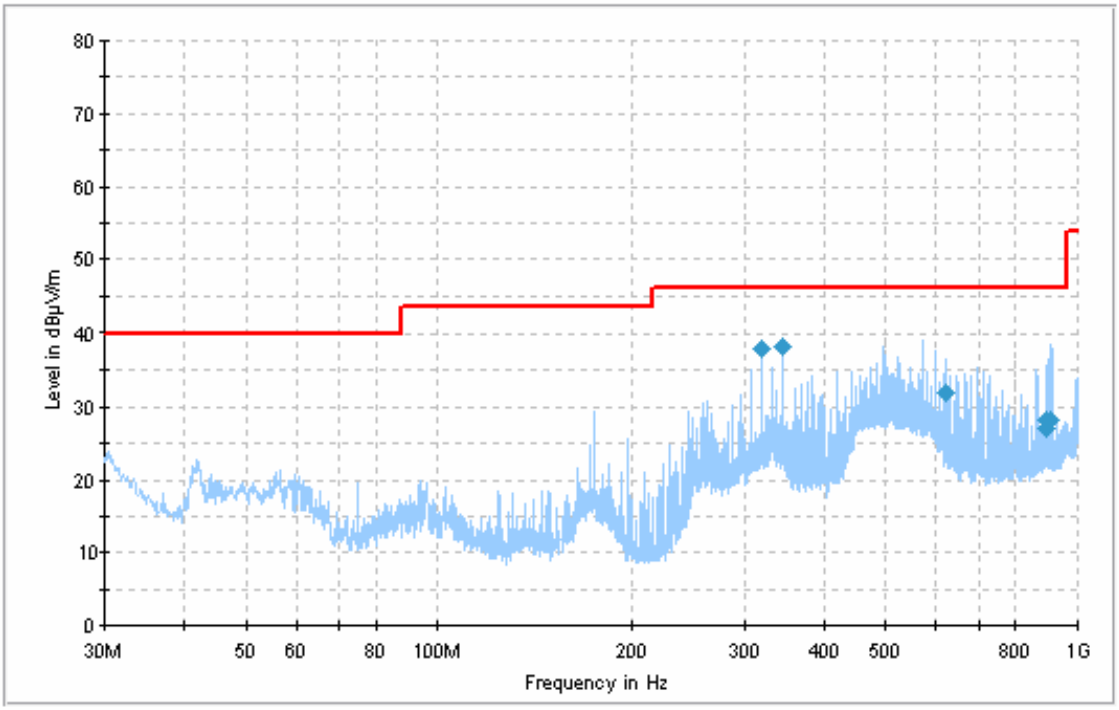
30-1000 MHz:

Test Mode: Transmitting (802.11b) for Harddisk



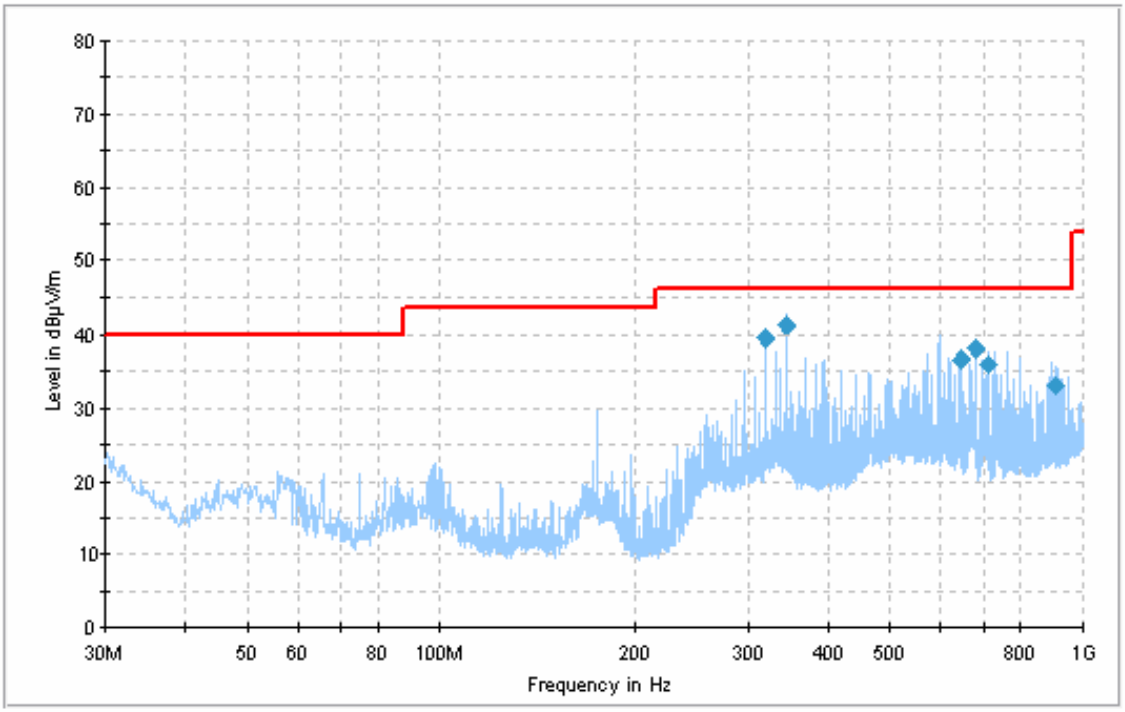
Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
599.107375	39.9	99.0	V	180.0	-18.1	46.0	6.1
319.883100	38.8	99.0	H	183.0	-24.3	46.0	7.2
344.488550	38.4	99.0	H	7.0	-23.6	46.0	7.6
623.112550	37.4	99.0	V	170.0	-17.0	46.0	8.6
679.906675	37.1	169.0	V	165.0	-14.8	46.0	8.9
332.191000	36.7	100.0	H	174.0	-24.0	46.0	9.3

Test Mode: Transmitting (802.11b) for CF Card



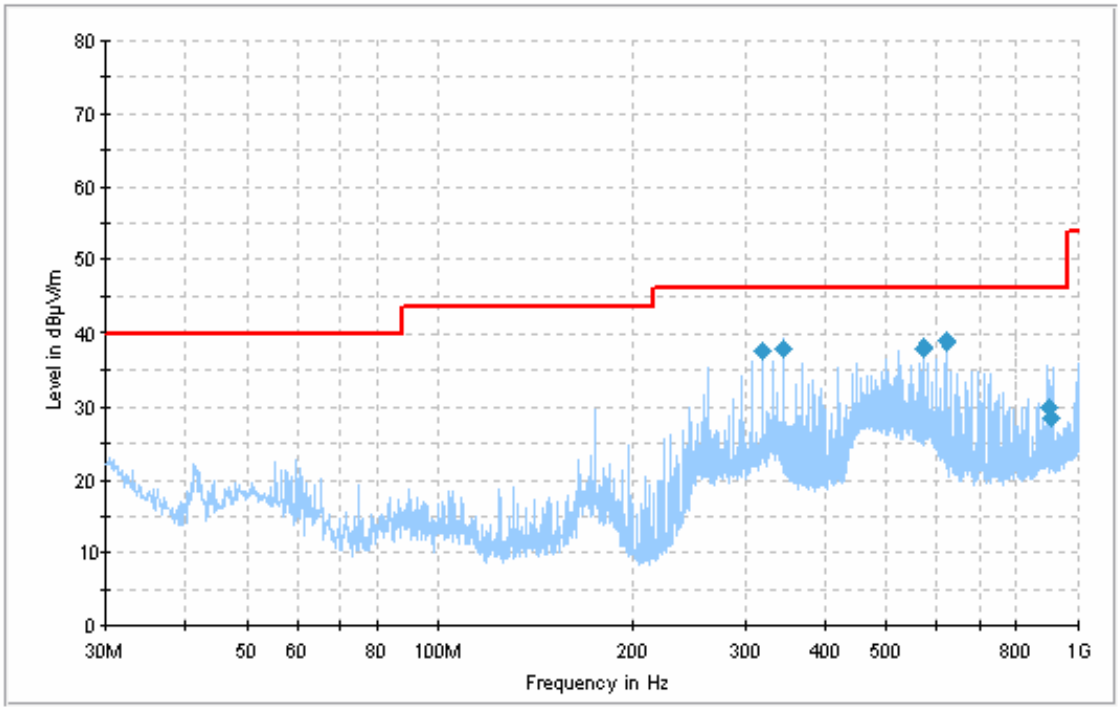
Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
344.482775	37.9	121.0	V	11.0	-23.6	46.0	8.1
319.876425	37.7	100.0	H	0.0	-24.3	46.0	8.3
623.100325	31.9	127.0	H	0.0	-17.0	46.0	14.1
906.998550	28.1	100.0	H	0.0	-9.5	46.0	17.9
890.298175	27.9	100.0	H	247.0	-9.3	46.0	18.1
894.222225	27.0	143.0	H	2.0	-9.3	46.0	19.0

Test Mode: Transmitting (802.11g) for Harddisk



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
344.480825	40.4	100.0	H	181.0	-23.6	46.0	5.6
319.878825	38.9	100.0	H	196.0	-24.3	46.0	7.1
679.935850	37.3	100.0	V	173.0	-14.8	46.0	8.7
647.168650	35.8	136.0	V	0.0	-16.5	46.0	10.2
712.696350	35.2	100.0	V	176.0	-14.1	46.0	10.8
907.095075	33.2	100.0	H	6.0	-9.5	46.0	12.8

Test Mode: Transmitting (802.11g) for CF Card



Frequency (MHz)	Corrected Amplitude (dBµV/m)	Ant. Height (cm)	Ant. Polarity (H/V)	Turntable Position (deg)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
623.091100	38.6	101.0	V	352.0	-17.0	46.0	7.4
573.233075	37.4	100.0	V	348.0	-18.4	46.0	8.6
344.488700	37.2	100.0	H	8.0	-23.6	46.0	8.8
319.873875	37.1	101.0	H	2.0	-24.3	46.0	8.9
897.251375	29.7	117.0	V	219.0	-9.4	46.0	16.3
907.234175	28.4	101.0	V	0.0	-9.5	46.0	17.6

Above 1GHz:

802.11b

Indicated		Detector (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209		
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2412MHz)											
4824.0	44.80	AV	180	1.1	H	31.3	4.64	33.4	47.34	54	6.66
4824.0	45.43	PK	180.0	1.4	H	31.3	4.64	33.4	47.97	74	26.03
2279.9	45.32	PK	270.0	1.5	H	30.0	6.51	33.9	47.93	74	26.07
2279.9	41.33	AV	180	1.3	V	30.0	6.51	33.9	43.94	54	10.06
4824.0	57.31	PK	160.0	1.1	V	31.3	4.64	33.4	59.85	74	14.15
2279.9	50.33	PK	90	1.1	V	30.0	6.51	33.9	52.94	74	21.06
4824.0	30.22	AV	0	1.5	H	31.3	4.64	33.4	32.76	54	21.24
2279.9	30.07	AV	180	1.4	H	30.0	6.51	33.9	32.68	54	21.32
Middle Channel (2437MHz)											
4874.0	45.16	AV	175	1.2	V	31.3	4.64	33.4	47.70	54	6.30
2279.9	43.58	AV	90	1.1	V	30.0	6.51	33.9	46.19	54	7.81
4874.0	42.13	AV	180	1.3	H	31.3	4.64	33.4	44.67	54	9.33
4874.0	57.68	PK	180	1.2	V	31.3	4.64	33.4	60.22	74	13.78
2279.9	37.09	AV	90	1.4	H	30.0	6.51	33.9	39.70	54	14.30
2279.9	52.17	PK	180	1.3	V	30.0	6.51	33.9	54.78	74	19.22
4874.0	47.80	PK	10	1.4	H	31.3	4.64	33.4	50.34	74	23.66
2279.9	47.02	PK	90	1.2	H	30.0	6.51	33.9	49.63	74	24.37
HighChannel (2462MHz)											
4924.0	44.42	AV	90	1.3	V	31.6	4.55	33.4	47.17	54	6.83
2279.9	43.72	AV	90	1.5	V	30.0	6.51	33.9	46.33	54	7.67
4924.0	57.67	PK	180	1.2	V	31.6	4.55	33.4	60.42	74	13.58
2279.9	37.27	AV	120	1.4	H	30.0	6.51	33.9	39.88	54	14.12
4924.0	33.00	AV	140	1.2	H	31.6	4.55	33.4	35.75	54	18.25
2279.9	51.17	PK	45	1.2	V	30.0	6.51	33.9	53.78	74	20.22
4924.0	46.65	PK	180	1.2	H	31.6	4.55	33.4	49.40	74	24.60
2279.9	44.71	PK	90	1.2	H	30.0	6.51	33.9	47.32	74	26.68

802.11g

Indicated		Detector (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/15.209		
Frequency (MHz)	Receiver Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Corrected Amplitude (dBμV/m)	Limit (dBμV/m)	Margin (dB)
Low Channel (2412MHz)											
2279.9	44.68	AV	90	1.1	V	30.0	6.51	33.9	47.29	54	6.71
4824.0	43.93	AV	170	1.3	V	31.3	4.64	33.4	46.47	54	7.53
4824.0	42.99	AV	160	1.2	H	31.3	4.64	33.4	45.53	54	8.47
2279.9	39.83	AV	120	1.2	H	30.0	6.51	33.9	42.44	54	11.56
4824.0	47.47	PK	180	1.5	V	31.3	4.64	33.4	50.01	74	23.99
2279.9	47.26	PK	90	1.2	V	30.0	6.51	33.9	49.87	74	24.13
4824.0	46.02	PK	90	1.2	H	31.3	4.64	33.4	48.56	74	25.44
2279.9	43.07	PK	60	1.1	H	30.0	6.51	33.9	45.68	74	28.32
Middle Channel (2437MHz)											
2279.9	45.38	AV	90	1.5	V	30.0	6.51	33.9	47.99	54	6.01
4874.0	42.27	AV	180	1.2	V	31.3	4.64	33.4	44.81	54	9.19
2279.9	39.82	AV	120	1.2	H	30.0	6.51	33.9	42.43	54	11.57
4874.0	33.85	AV	110	1.5	H	31.3	4.64	33.4	36.39	54	17.61
2279.9	48.27	PK	45	1.2	V	30.0	6.51	33.9	50.88	74	23.12
4874.0	46.62	PK	180	1.2	V	31.3	4.64	33.4	49.16	74	24.84
2279.9	43.06	PK	120	1.4	H	30.0	6.51	33.9	45.67	74	28.33
4874.0	36.92	PK	180	1.2	H	31.3	4.64	33.4	39.46	74	34.54
HighChannel (2462MHz)											
2279.9	45.60	AV	90	1.3	V	30.0	6.51	33.9	48.21	54	5.79
2279.9	38.11	AV	120	1.1	H	30.0	6.51	33.9	40.72	54	13.28
4924.0	35.90	AV	180	1.3	V	31.3	4.55	33.4	38.35	54	15.65
4924.0	30.06	AV	140	1.1	H	31.3	4.55	33.4	32.51	54	21.49
2279.9	48.42	PK	20	1.2	V	30.0	6.51	33.9	51.03	74	22.97
4924.0	42.10	PK	180	1.1	V	31.3	4.55	33.4	44.55	74	29.45
2279.9	41.11	PK	90	1.2	H	30.0	6.51	33.9	43.72	74	30.28
4924.0	34.48	PK	0	1.2	H	31.3	4.55	33.4	36.93	74	37.07

** Within measurement uncertainty.*

Antenna Port Conducted Spurious Emissions

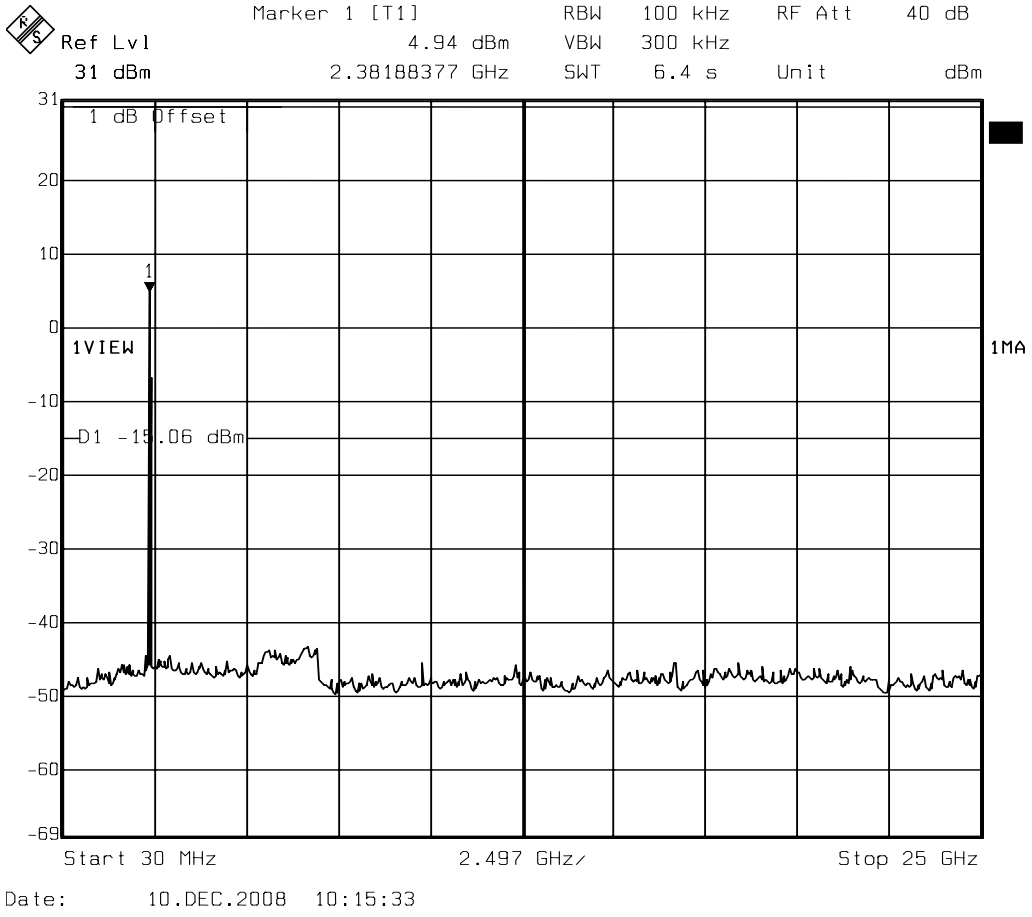
802.11b

Channel Frequency (MHz)	Data Rate (Mbps)	Delta Value (dBc)	Limit (dBc)	Ref Plot	Result
2412	1	*	20	PLOT1	Pass
2437	1	*	20	PLOT2	Pass
2462	1	*	20	PLOT3	Pass

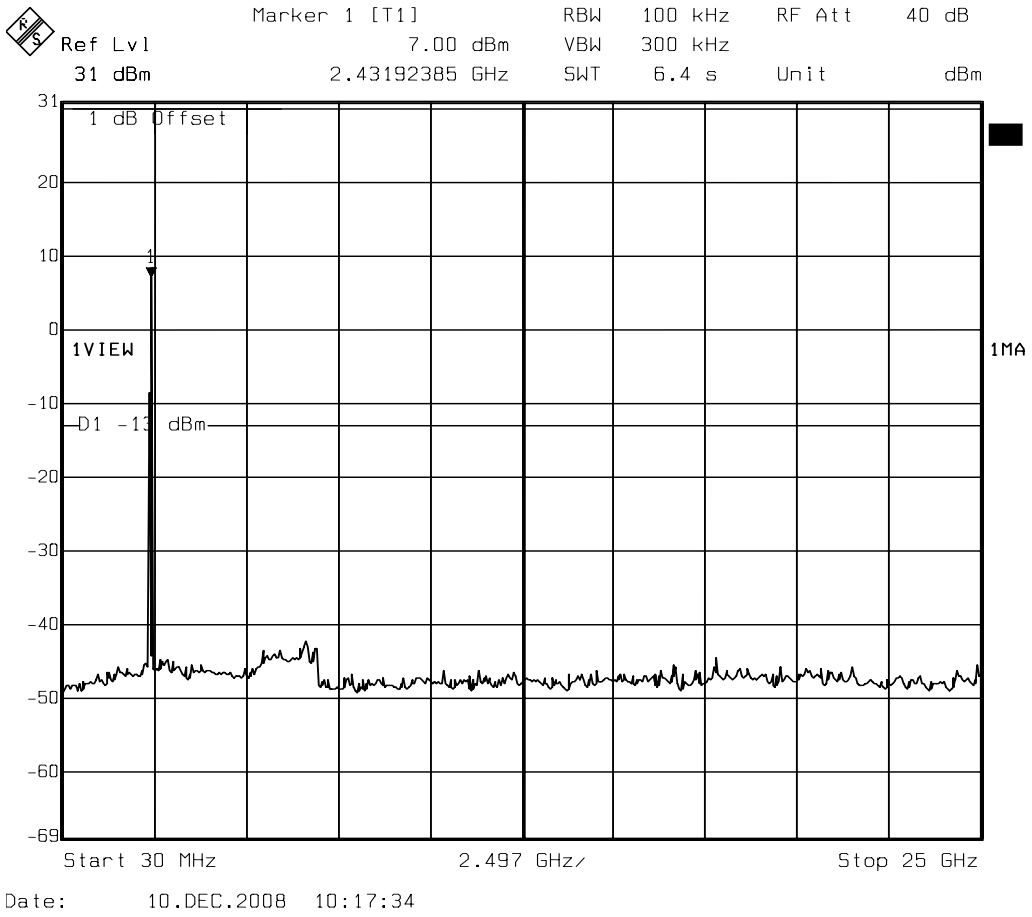
802.11g

Channel Frequency (MHz)	Data Rate (Mbps)	Delta Value (dBc)	Limit (dBc)	Ref Plot	Result
2412	6	*	20	PLOT4	Pass
2437	6	*	20	PLOT5	Pass
2462	6	*	20	PLOT6	Pass

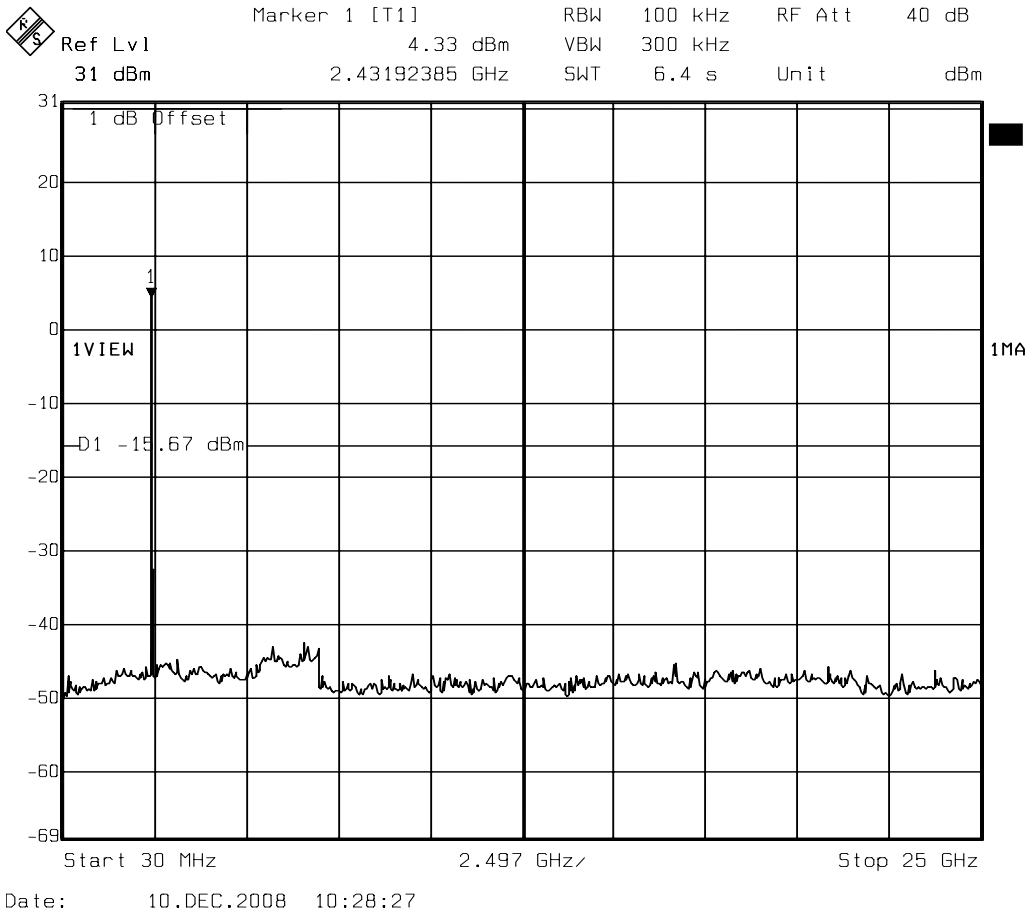
802.11b Low Channel



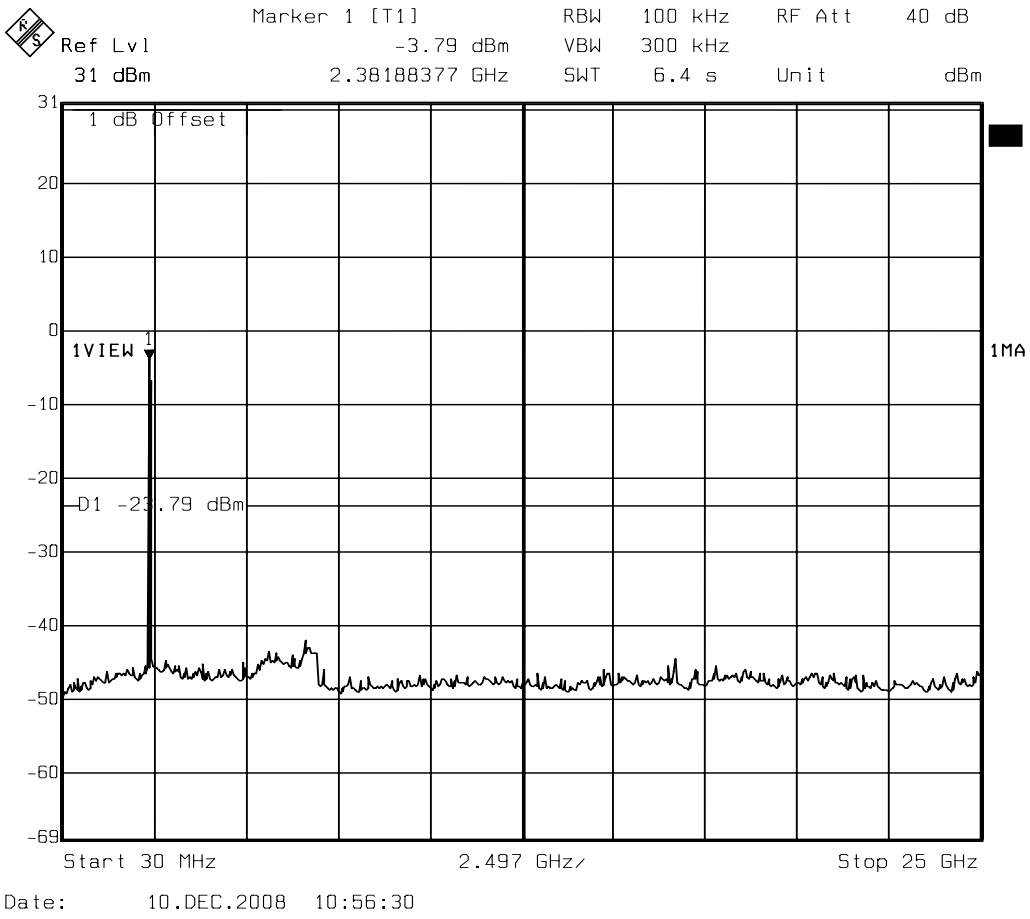
802.11b Middle Channel



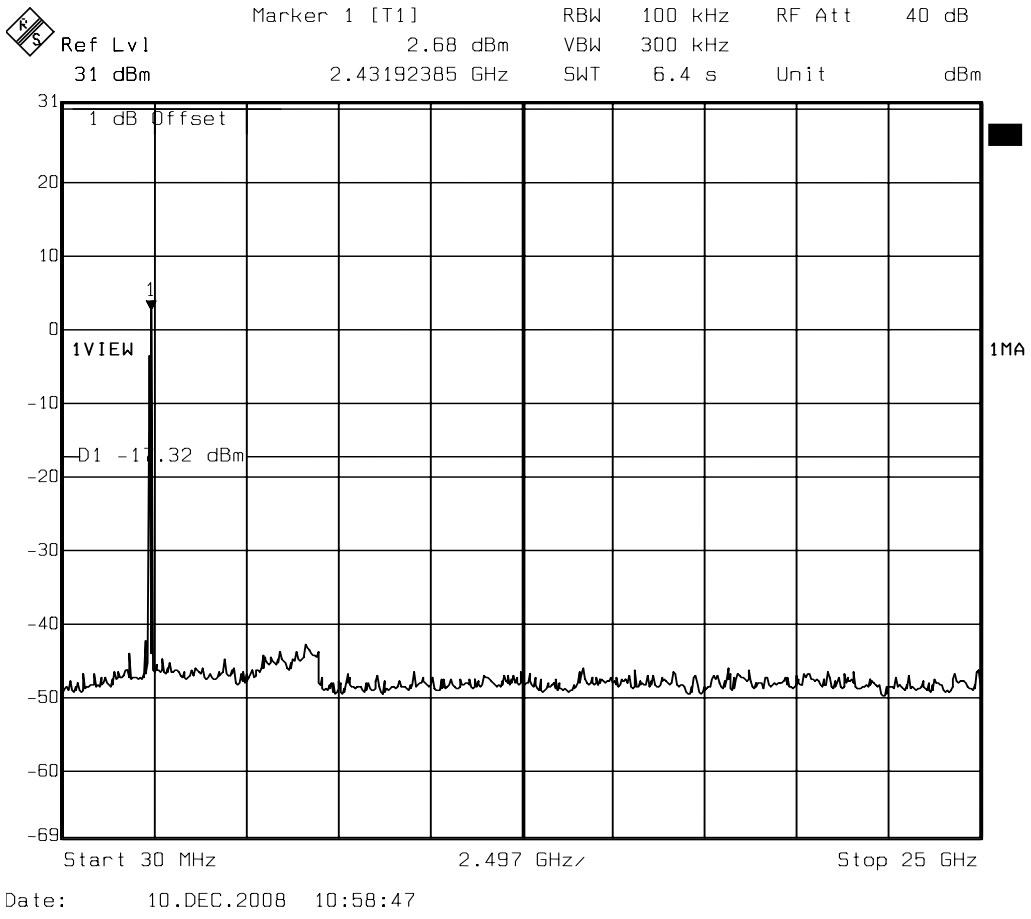
802.11b High Channel



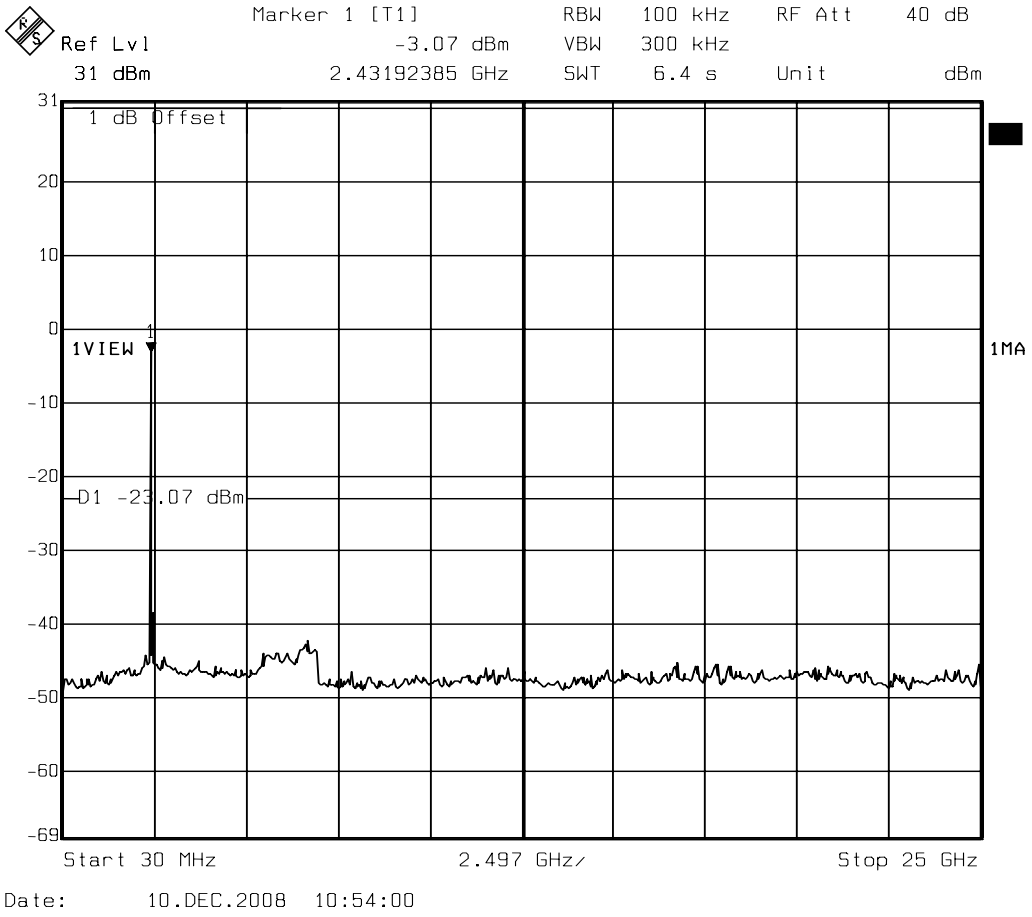
802.11g Low Channel



802.11g Middle Channel



802.11g High Channel



§15.247(a) (2) – 6dB 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

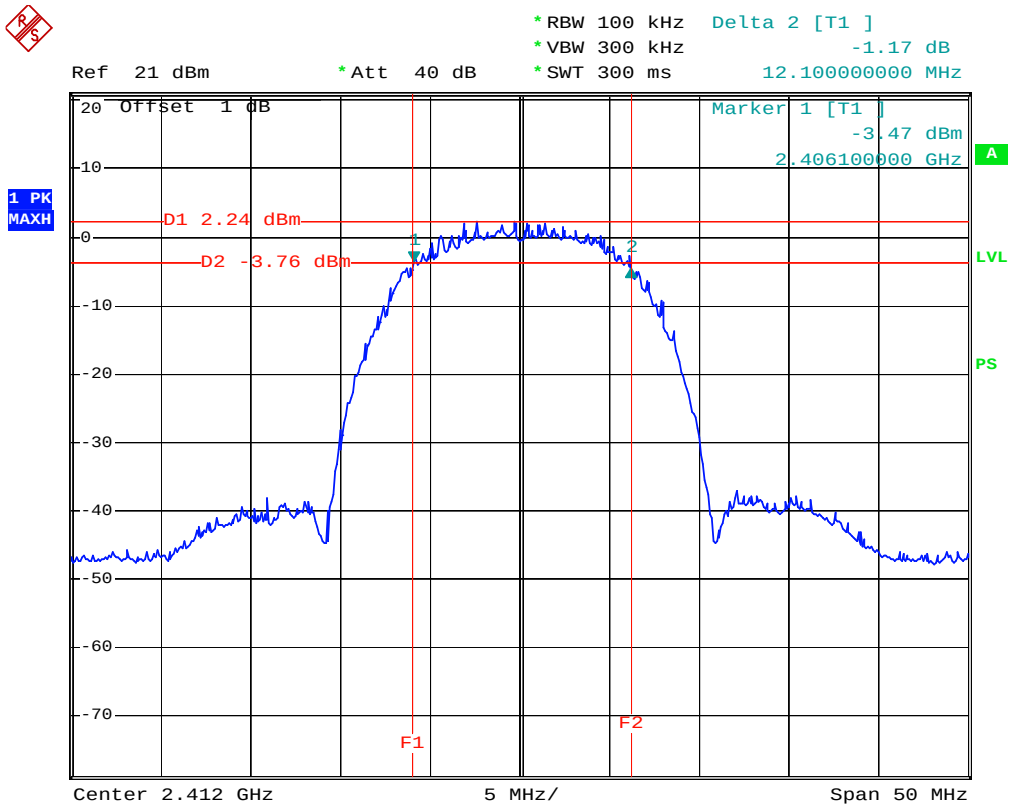
The testing was performed by Vicent Kang on 2008-12-03 and 2008-12-05.

Test Result: Pass.

Please refer to the following tables and plots.

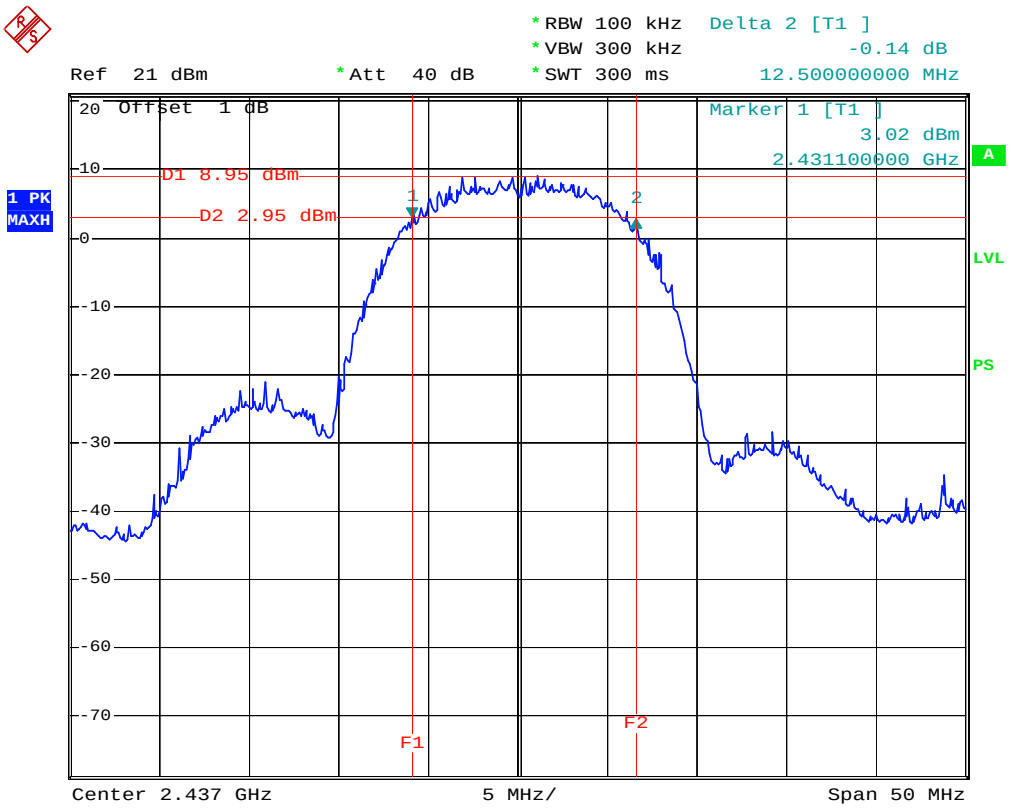
Channel	Channel Frequency (MHz)	Data Rate (Mbps)	6dB Bandwidth (kHz)	Limit (kHz)
802.11b Mode				
Low	2412	11	12100	＞500
Mid	2437	11	12500	＞500
High	2462	11	12000	＞500
802.11g Mode				
Low	2412	54	16700	＞500
Mid	2437	54	16700	＞500
High	2462	54	16600	＞500

802.11b Low Channel



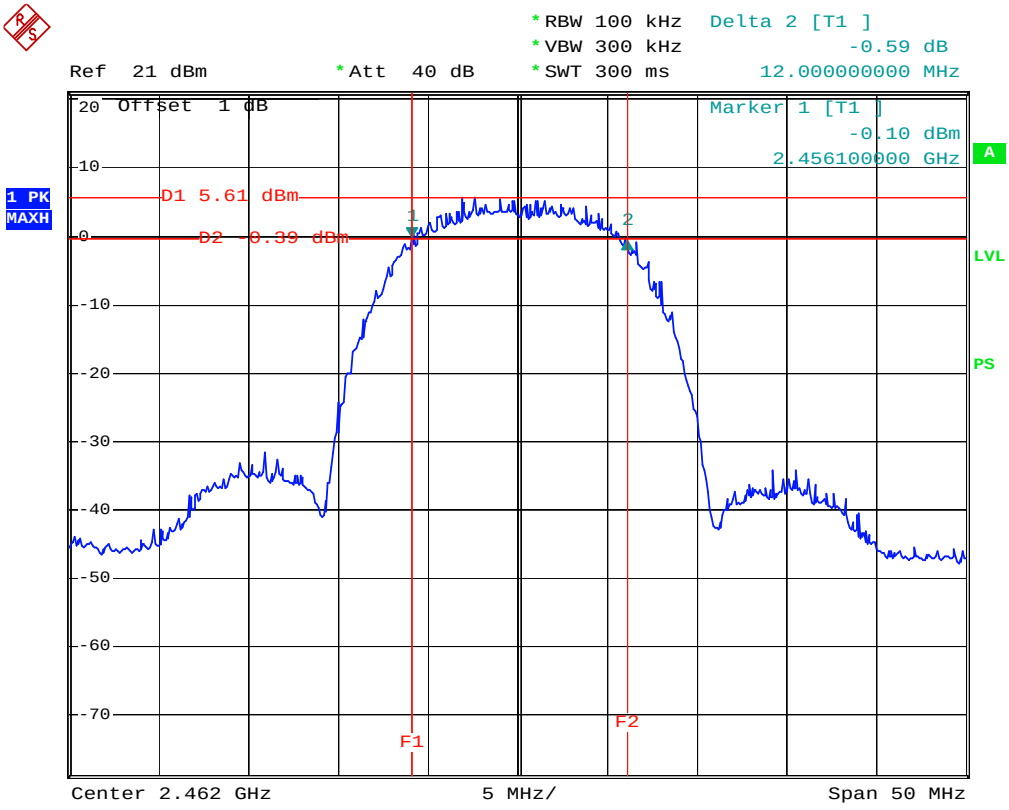
Date: 3.DEC.2008 15:51:53

802.11b Middle Channel



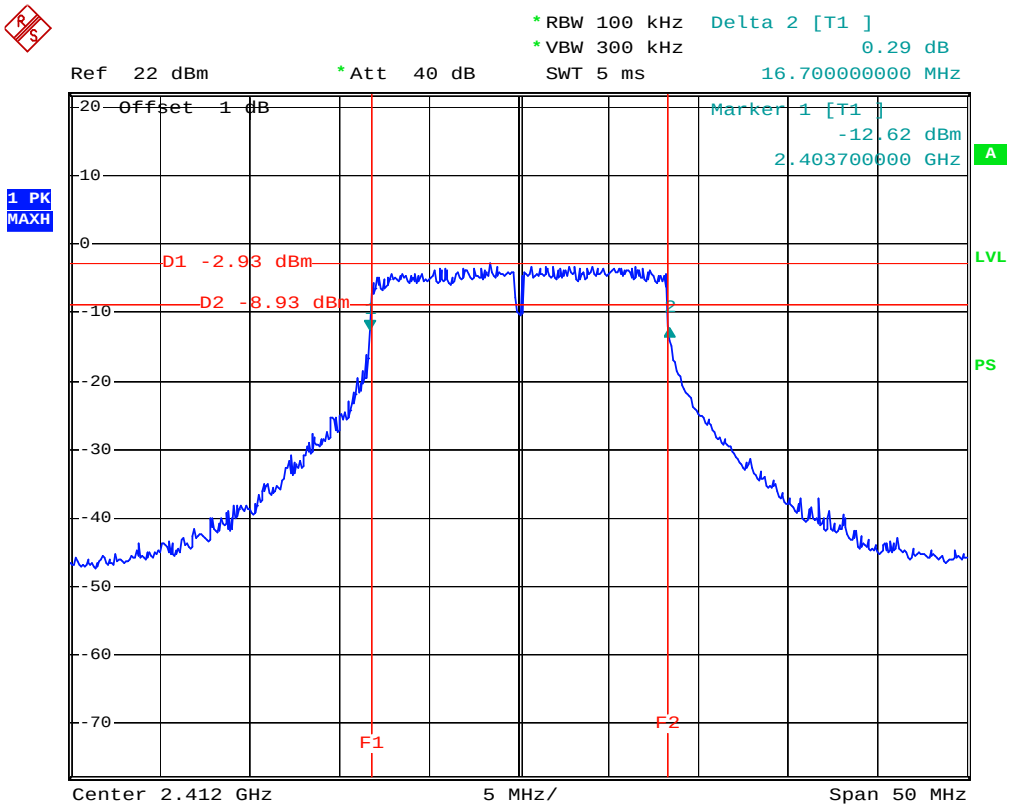
Date: 3.DEC.2008 15:58:43

802.11b High Channel



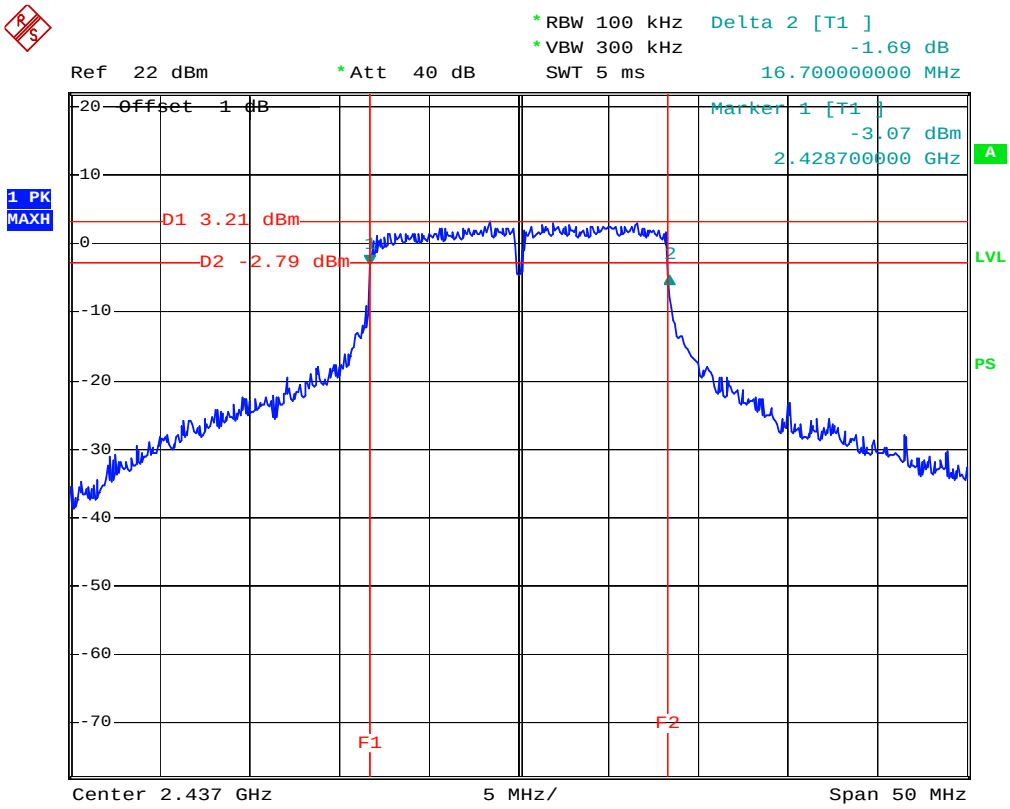
Date: 3.DEC.2008 16:01:28

802.11g Low Channel



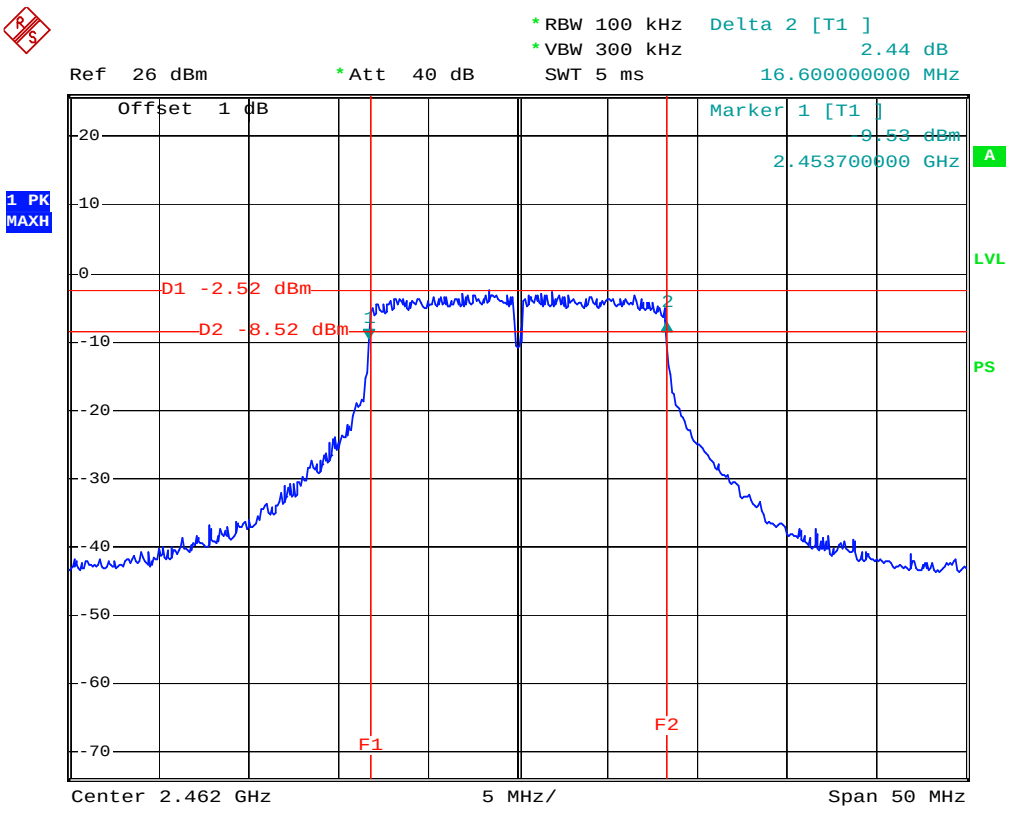
Date: 5.DEC.2008 13:57:50

802.11g Middle Channel



Date: 5.DEC.2008 13:55:24

802.11g High Channel



Date: 4.DEC.2008 16:51:35

§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.

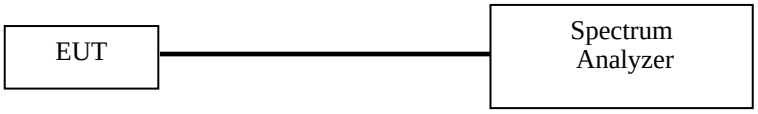
Test Equipment List and Details

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 Vicent Kang on 2008-12-03 to 2008-12-05.

Test Mode: Transmitting

Test Result: Pass

802.11b Mode:

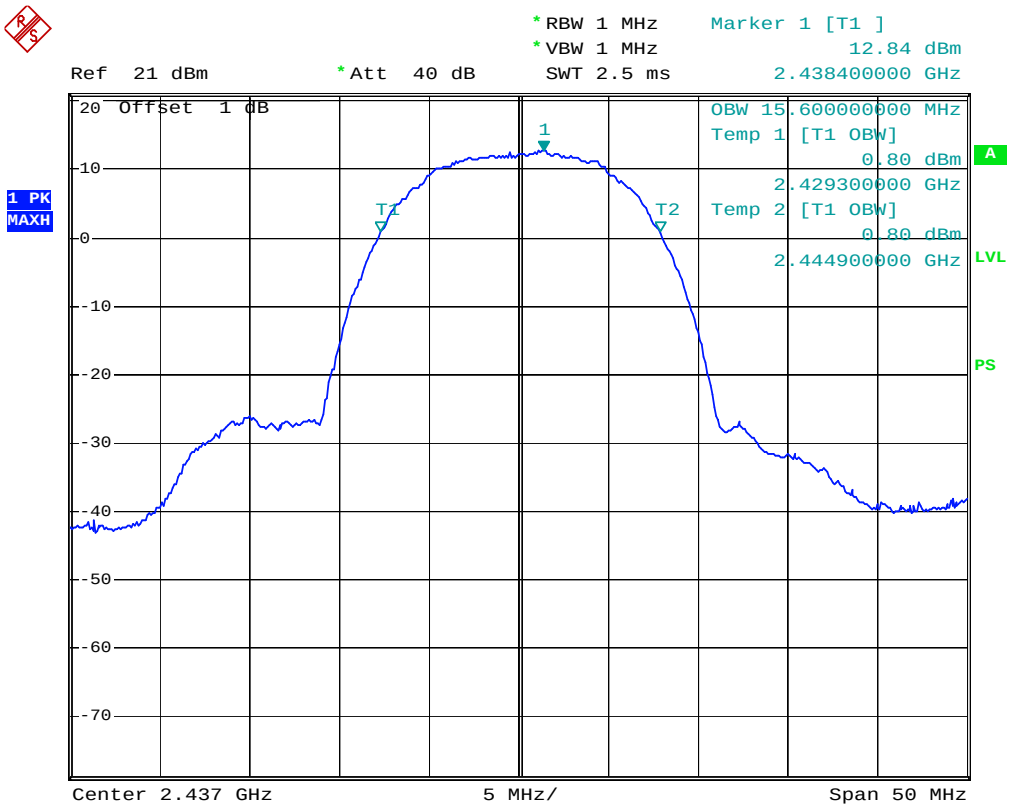
Channel	Channel Frequency (MHz)	Data Rate (Mbps)	Power Output (dBm)	Limit (dBm)
Low	2412	1	15.83	30
Mid	2437	1	17.31	30
High	2462	1	16.73	30

802.11g Mode:

Channel	Channel Frequency (MHz)	Data Rate (Mbps)	Power Output (dBm)	Limit (dBm)
Low	2412	6	13.37	30
Mid	2437	6	16.29	30
High	2462	6	12.56	30

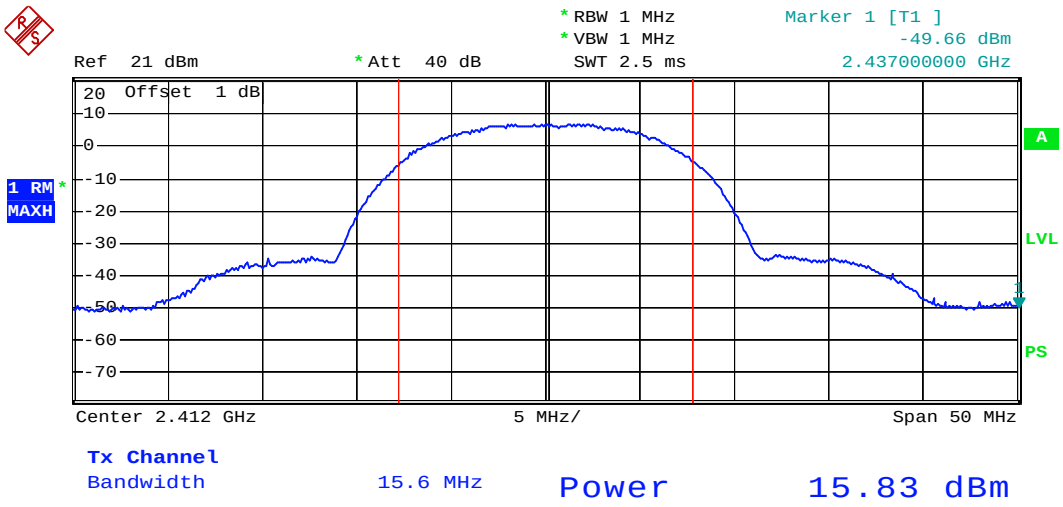
802.11b Mode:

99% Occupied Bandwith



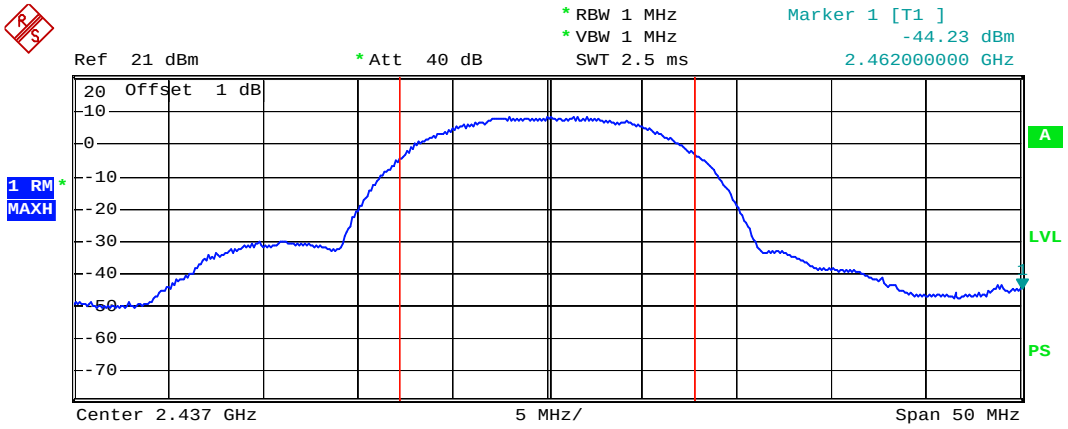
Date: 3.DEC.2008 15:12:24

802.11b Low Channel



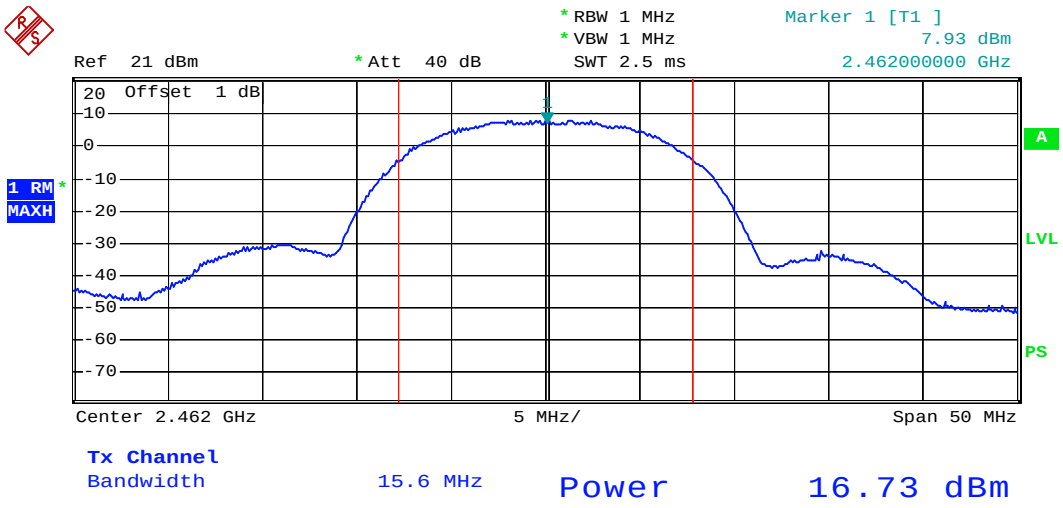
Date: 3.DEC.2008 15:30:18

802.11b Middle Channel



Date: 3.DEC.2008 15:28:54

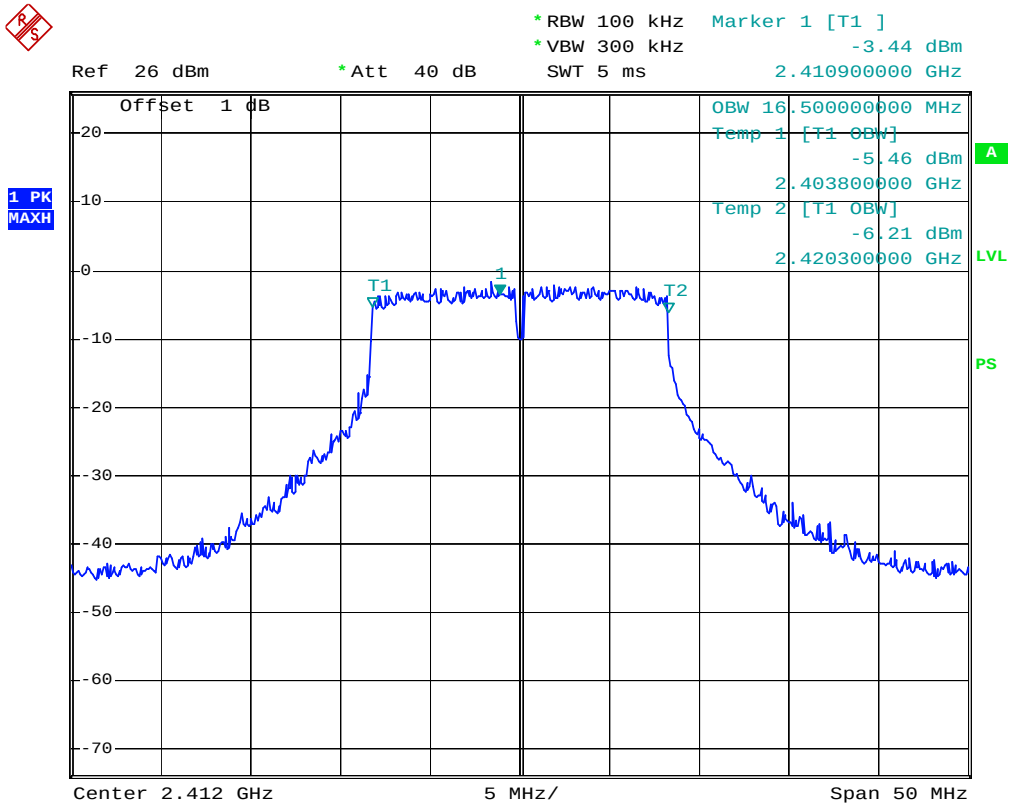
802.11b High Channel



Date: 3.DEC.2008 15:27:26

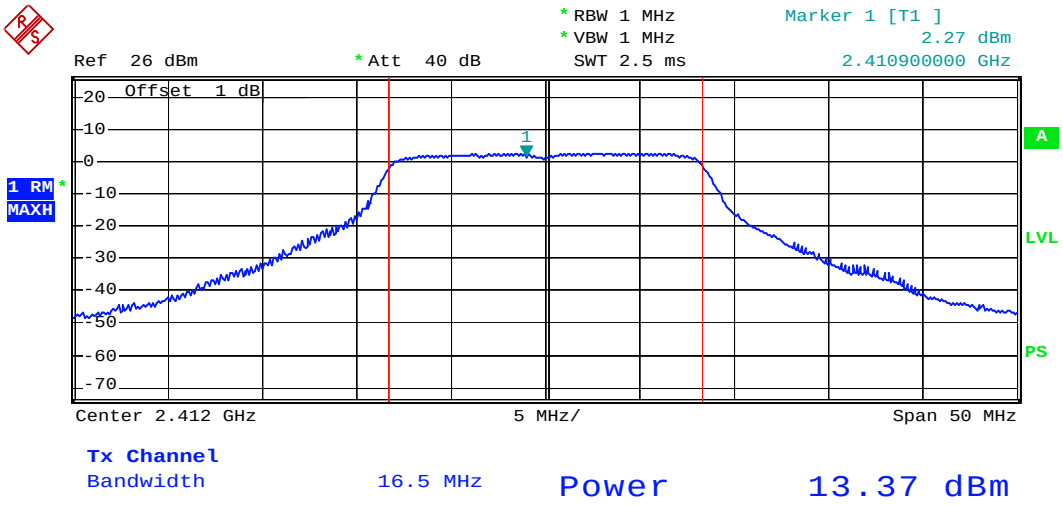
802.11g Mode:

99% Occupied Bandwith



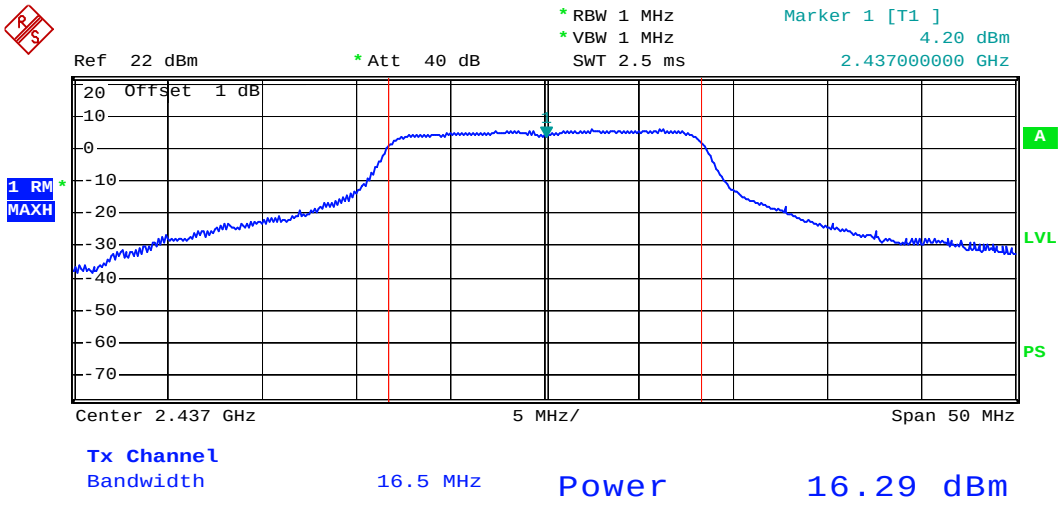
Date: 4.DEC.2008 16:39:35

802.11g Low Channel



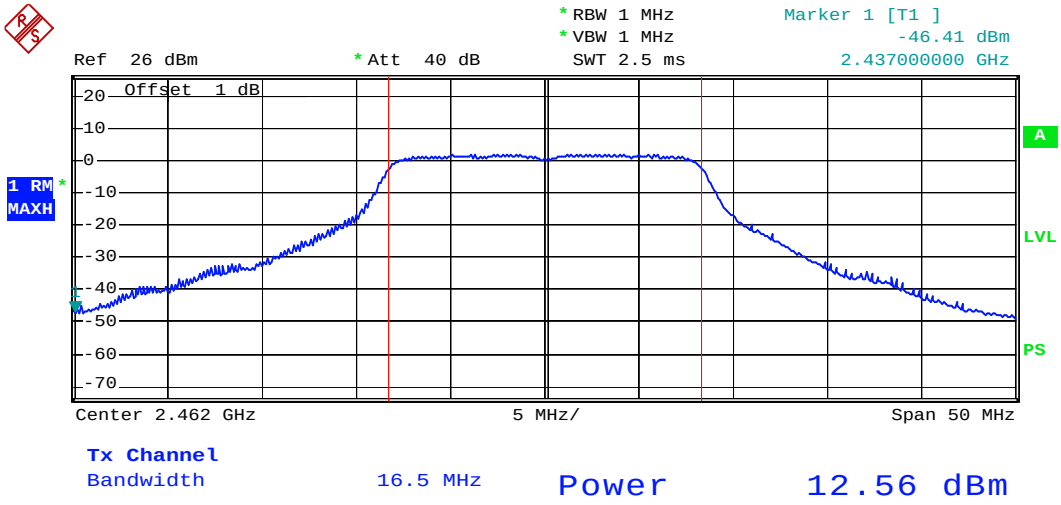
Date: 4.DEC.2008 16:41:09

802.11g Middle Channel



Date: 5.DEC.2008 13:34:13

802.11g High Channel



Date: 4.DEC.2008 16:49:24

§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 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
   Note: For Rdstricted Band
   RBW=100 kHz
   VBW=300 kHz
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

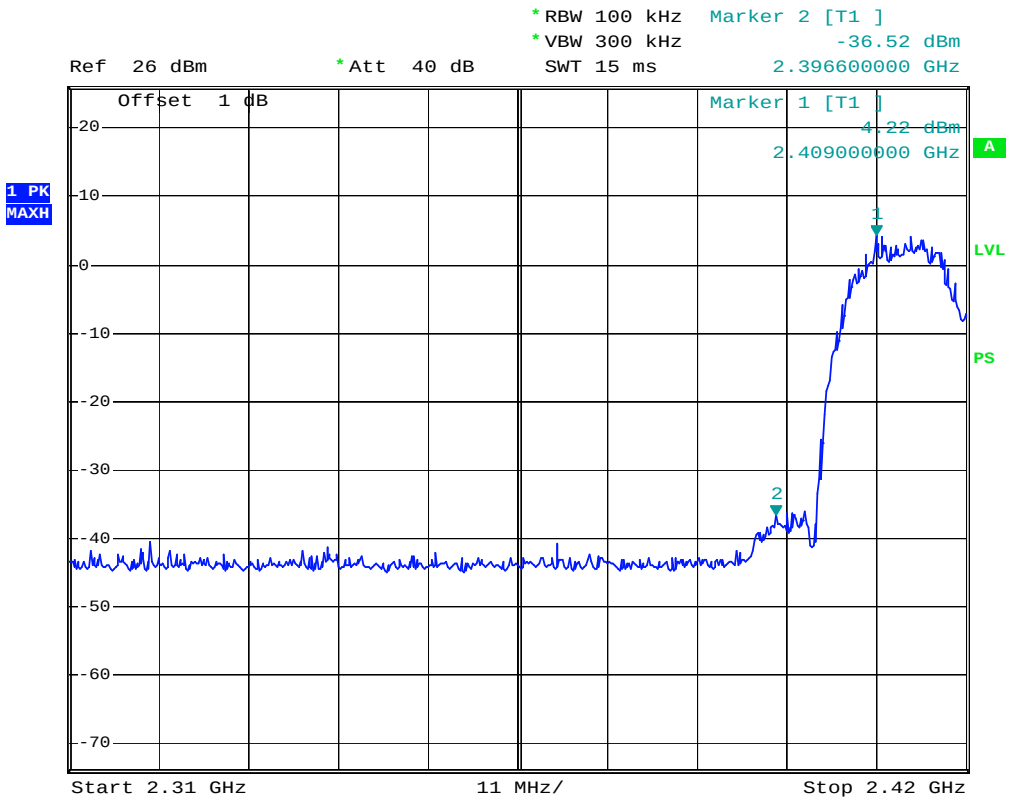
The testing was performed by Vicent Kang on 2008-12-18.

Test Result: *Compliant.*

Frequency (MHz)	Data Rate (Mbps)	Delta Value (dBc)	Limit (dBc)	Ref Plot	Result
802.11b					
2396.60	11	40.74	20	PLOT1	Pass
2487.20	11	46.45	20	PLOT2	Pass
802.11g					
2399.02	54	28.92	20	PLOT3	Pass
2485.50	54	36.39	20	PLOT4	Pass

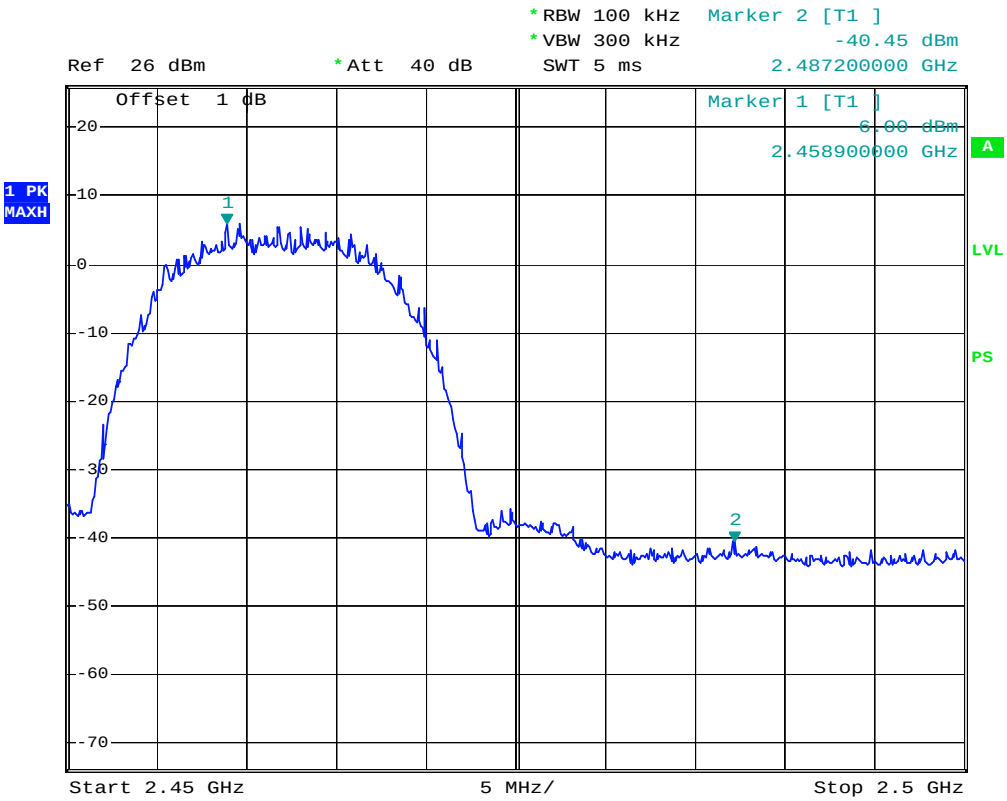
Please refer to following plots.

Plot 1:



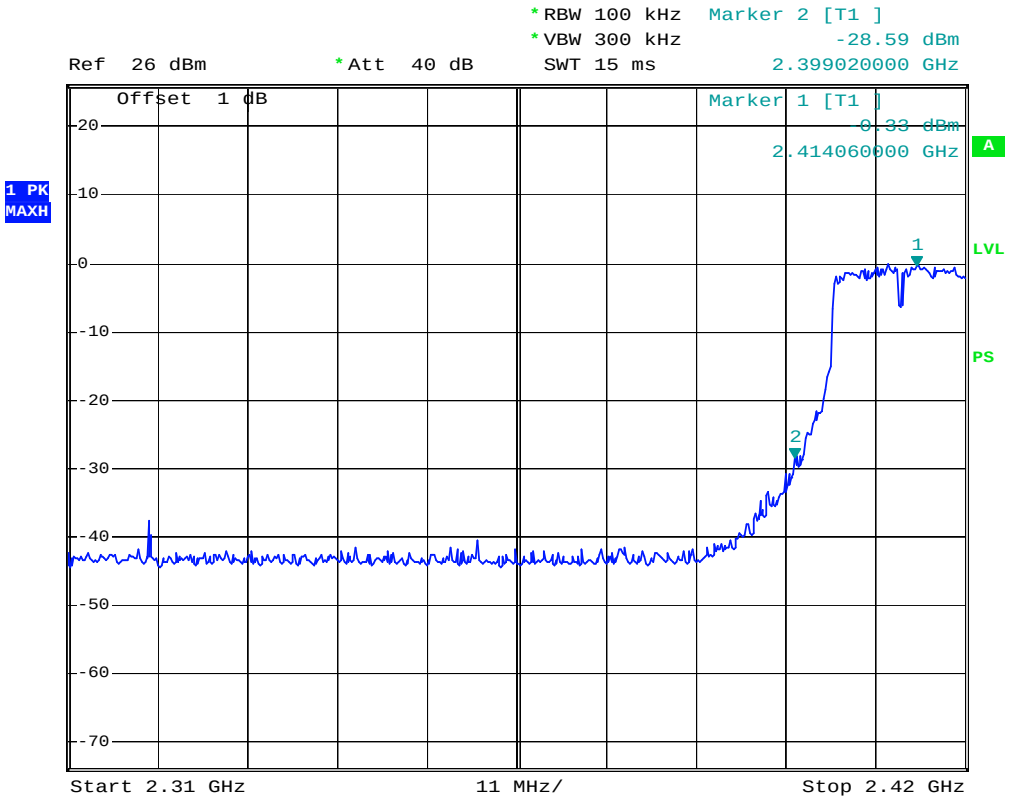
Date: 18.DEC.2008 19:48:51

Plot 2:



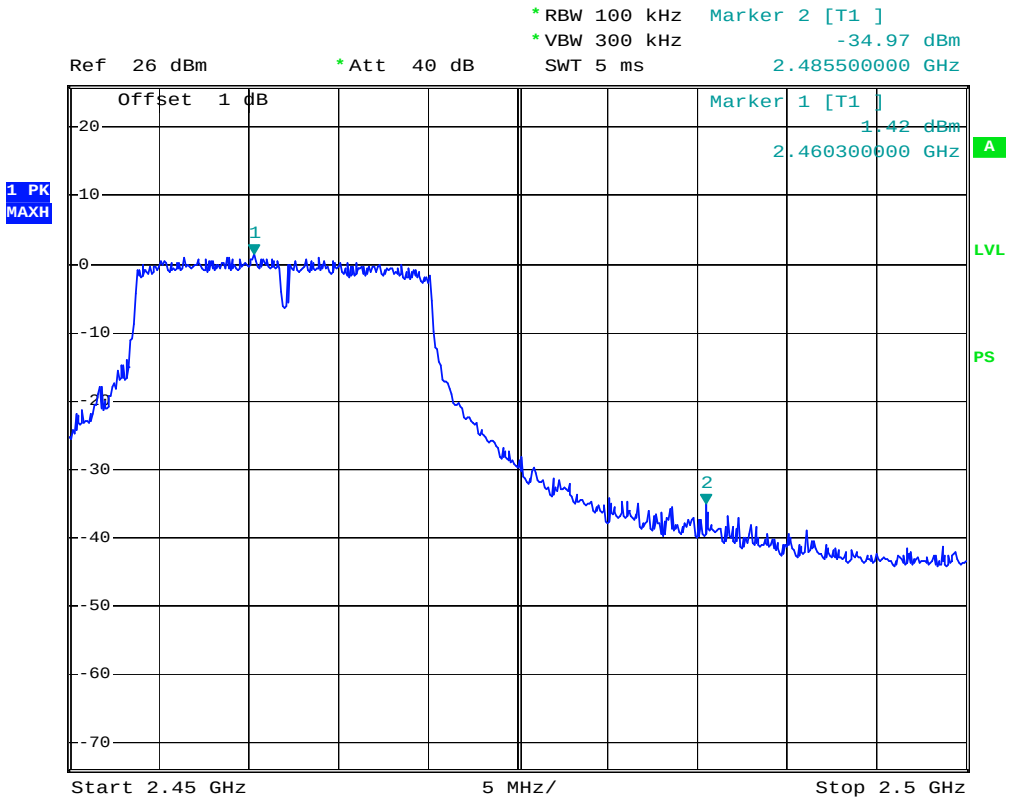
Date: 18.DEC.2008 19:47:39

Plot 3:



Date: 18.DEC.2008 19:52:21

Plot 4:



Date: 18.DEC.2008 19:54:38

Restricted Bands

External Antenna

Indicated		Detector (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/209		
Frequency (MHz)	S.A. Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11b (2310-2390 MHz)											
2320.26	47.84	AV	90	1.0	V	30.3	7.30	33.9	51.54	54	2.46
2320.26	40.61	AV	60	1.5	H	30.3	7.30	33.9	44.31	54	9.69
2320.26	56.18	PK	180	1.2	V	30.3	7.30	33.9	59.88	74	14.12
2320.26	48.58	PK	180	1.2	H	30.3	7.30	33.9	52.28	74	21.72
802.11b (2483.5-2500 MHz)											
2489.58	39.86	AV	156	1.4	V	30.6	7.94	33.9	44.50	54	9.50
2499.74	34.61	AV	243	1.4	H	30.6	7.94	33.9	39.25	54	14.75
2489.58	51.89	PK	234	1.6	V	30.6	7.94	33.9	56.53	74	17.47
2499.74	48.04	PK	153	1.5	H	30.6	7.94	33.9	52.68	74	21.32
802.11g (2310-2390 MHz)											
2320.26	47.97	AV	156	1.4	V	30.3	7.30	33.9	51.67	54	2.33
2320.26	42.72	AV	243	1.4	H	30.3	7.30	33.9	46.42	54	7.58
2320.26	51.26	PK	234	1.6	V	30.3	7.30	33.9	54.96	74	19.04
2320.26	44.36	PK	153	1.5	H	30.3	7.30	33.9	48.06	74	25.94
802.11g (2483.5-2500 MHz)											
2483.93	44.72	AV	243	1.4	H	30.6	7.94	33.9	49.36	54	4.64
2483.93	38.82	AV	156	1.4	V	30.6	7.94	33.9	43.46	54	10.54
2483.93	49.11	PK	153	1.5	H	30.6	7.94	33.9	53.75	74	20.25
2483.93	48.12	PK	234	1.6	V	30.6	7.94	33.9	52.76	74	21.24

Internal Antenna

Indicated		Detector (PK/AV)	Table Angle Degree	Antenna		Correction Factor			FCC Part 15.247/209		
Frequency (MHz)	S.A. Reading (dBμV/m)			Height (m)	Polar (H/V)	Ant. Factor (dB/m)	Cable Loss (dB)	Pre-Amp. Gain (dB)	Cord. Amp. (dBμV/m)	Limit (dBμV/m)	Margin (dB)
802.11b (2310-2390 MHz)											
2320.26	45.44	AV	90	1.0	V	30.3	7.30	33.9	49.14	54	4.86
2320.26	37.91	AV	60	1.5	H	30.3	7.30	33.9	41.61	54	12.39
2320.26	53.48	PK	180	1.2	V	30.3	7.30	33.9	57.18	74	16.82
2320.26	46.08	PK	180	1.2	H	30.3	7.30	33.9	49.78	74	24.22
802.11b (2483.5-2500 MHz)											
2489.58	37.36	AV	156	1.4	V	30.6	7.94	33.9	42.00	54	12.00
2499.74	32.21	AV	243	1.4	H	30.6	7.94	33.9	36.85	54	17.15
2489.58	49.29	PK	234	1.6	V	30.6	7.94	33.9	53.93	74	20.07
2499.74	45.34	PK	153	1.5	H	30.6	7.94	33.9	49.98	74	24.02
802.11g (2310-2390 MHz)											
2320.26	45.47	AV	156	1.4	V	30.3	7.30	33.9	49.17	54	4.83
2320.26	40.02	AV	243	1.4	H	30.3	7.30	33.9	43.72	54	10.28
2320.26	48.86	PK	234	1.6	V	30.3	7.30	33.9	52.56	74	21.44
2320.26	41.76	PK	153	1.5	H	30.3	7.30	33.9	45.46	74	28.54
802.11g (2483.5-2500 MHz)											
2483.93	42.32	AV	243	1.4	H	30.6	7.94	33.9	46.96	54	7.04
2483.93	36.22	AV	156	1.4	V	30.6	7.94	33.9	40.86	54	13.14
2483.93	46.61	PK	153	1.5	H	30.6	7.94	33.9	51.25	74	22.75
2483.93	45.32	PK	234	1.6	V	30.6	7.94	33.9	49.96	74	24.04

§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

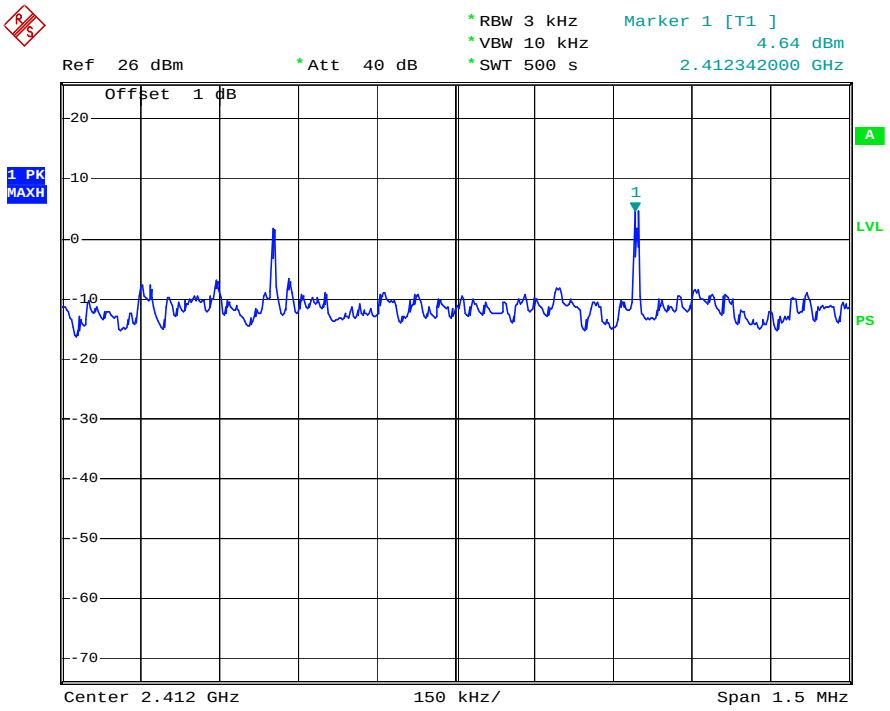
The testing was performed by Vicent Kang on 2008-12-04 and 2008-12-05.

Test Mode: Transmitting

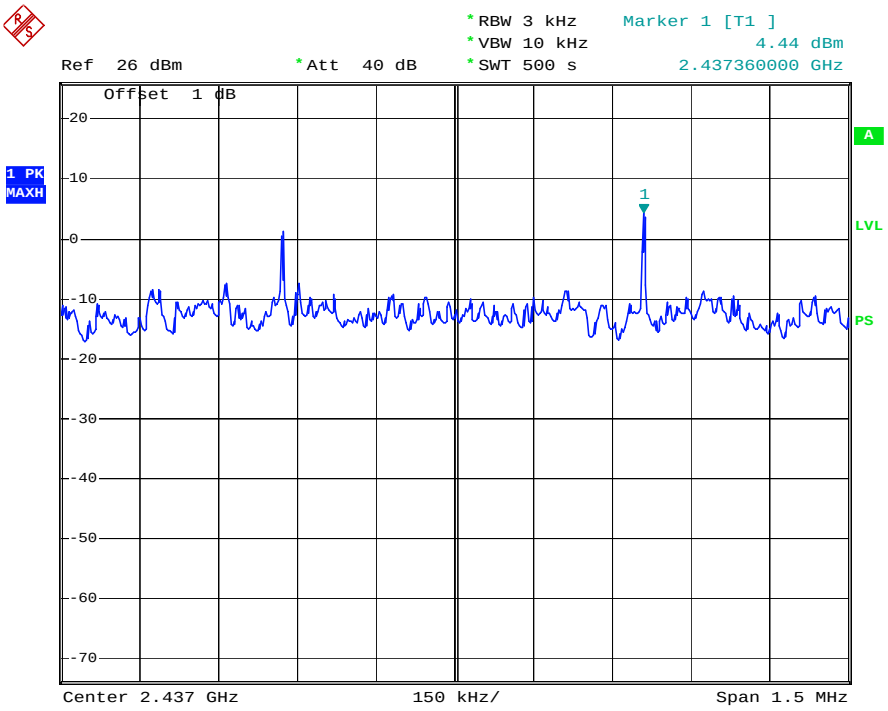
Test Result: Pass

Channel	Frequency (MHz)	Data Rate (Mbps)	PSD (dBm/3kHz)	Limit (dBm/3kHz)	Result
802.11b Mode					
Low	2412	1	4.64	8	Pass
Mid	2437	1	4.44	8	Pass
High	2462	1	3.77	8	Pass
802.11g Mode					
Low	2412	6	-15.25	8	Pass
Mid	2437	6	-10.31	8	Pass
High	2462	6	-14.32	8	Pass

802.11b Low Channel

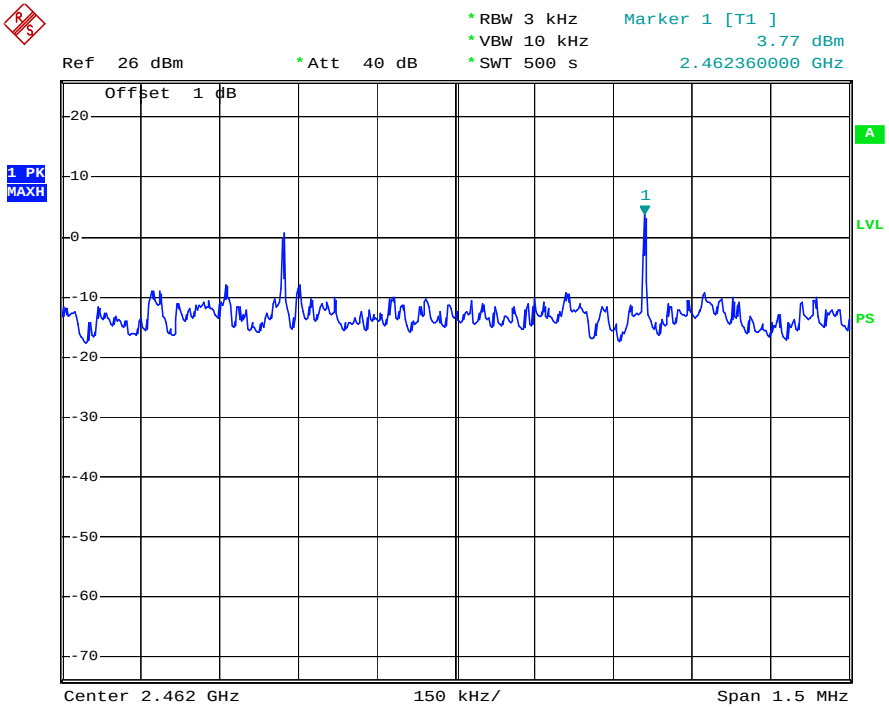


802.11b Middle Channel



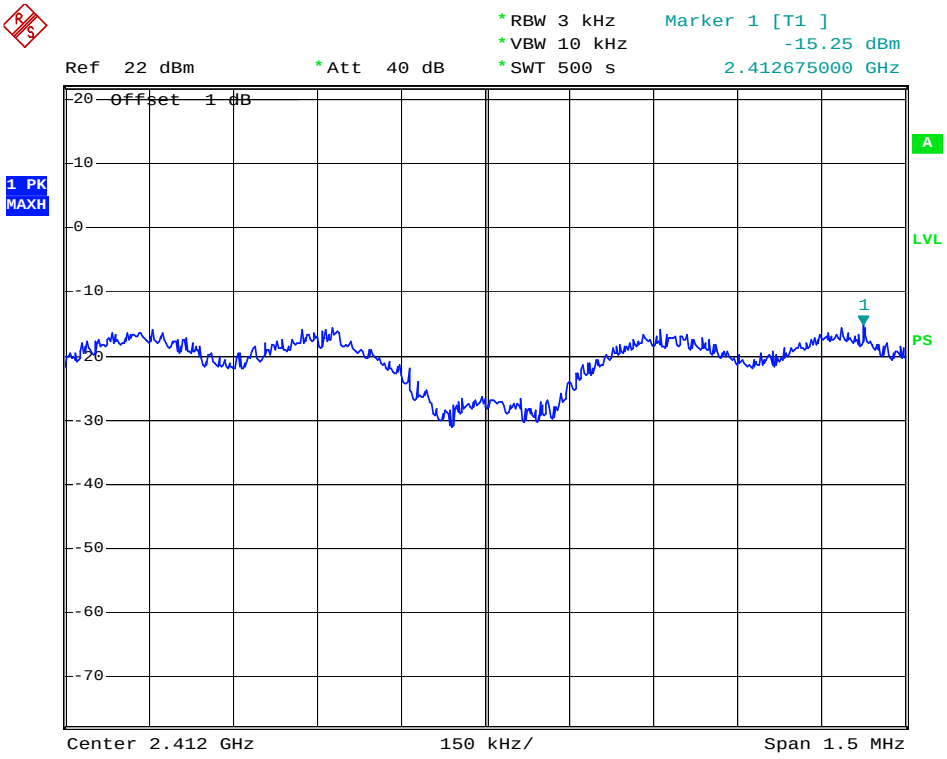
Date: 4.DEC.2008 15:31:42

802.11b High Channel

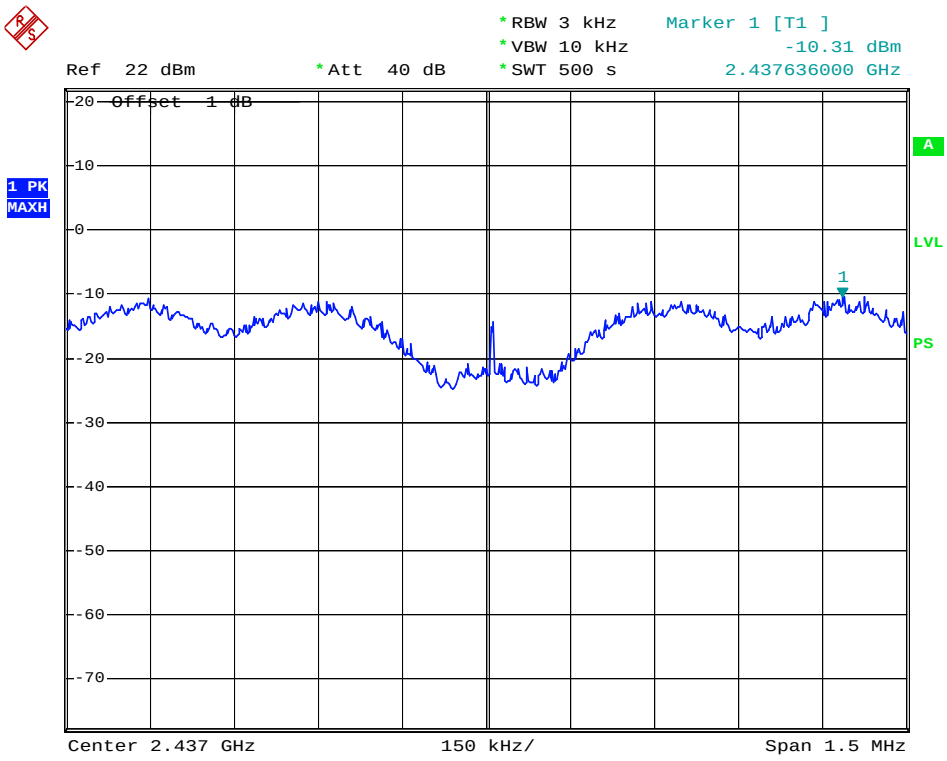


Date: 4.DEC.2008 15:10:22

802.11g Low Channel

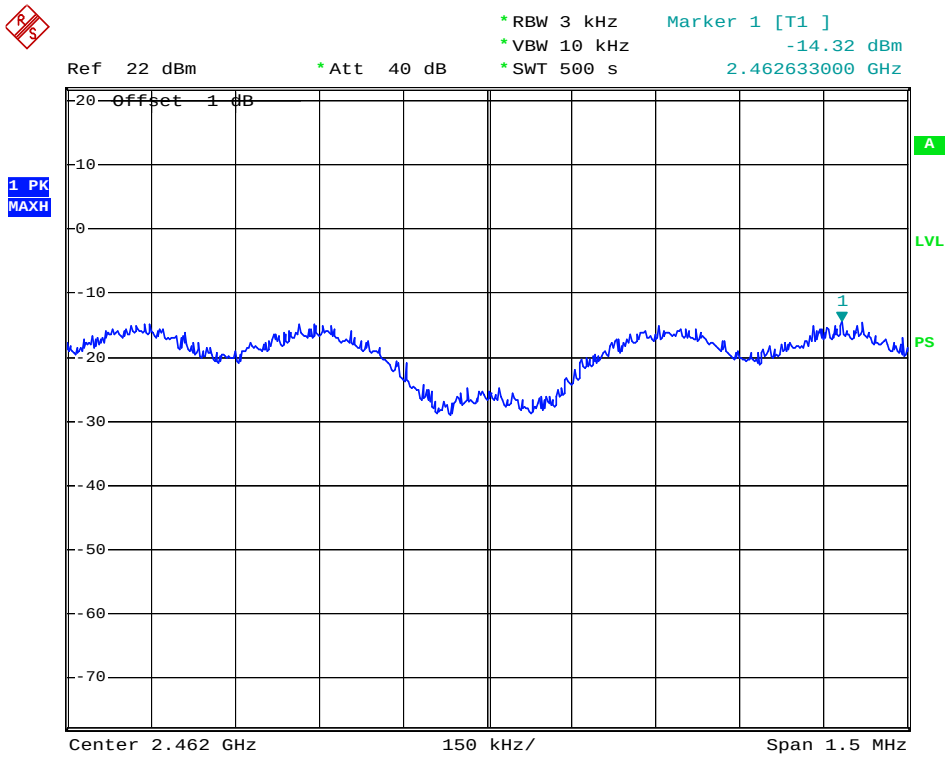


802.11g Middle Channel



Date: 5.DEC.2008 14:39:27

802.11g High Channel



Date: 5.DEC.2008 14:21:45

DECLARATION LETTER

Pennda Shenzhen Pennda Technologies Co., Ltd.

To: Bay Area Compliance Laboratories Corp.

Declaration of Similarity

To whom it may concern,

We, Shenzhen Pennda Technologies Co., Ltd.
Hereby declare that
Our product Name: Multi-functional Residential Gateway
Model No:
RGH302,RGH322,RGH303,RGH323,RGH302H,RGH322H,RGH303H,RGH323H,RGS302,RGS322,RGS303,RGS323
For our business issue and market requirement , We would like to list twelve models on reports and certifications, We declare that
RGH302,RGH322,RGH303,RGH323,RGH302H,RGH322H,RGH303H,RGH323H,RGS302,RGS322,RGS303 and RGS323 Which was certified by BACL have the same schematic and board layout, The differences between them as following:

Model Number	Description
RGH302	Internal antenna*2,CF Card,FXO*1,FXS*2,AP function
RGH322	External antenna*2,CF Card,FXO*1,FXS*2,AP+Client function
RGH303	Internal antenna*2,CF Card,FXO*1,FXS*3,AP function
RGH323	External antenna*2,CF Card,FXO*1,FXS*3,AP+Client function
RGH302H	Internal antenna*2, 2.5" Harddisk,FXO*1,FXS*2,AP function
RGH322H	External antenna*2, 2.5" Harddisk,FXO*1,FXS*2,AP+Client function
RGH303H	Internal antenna*2, 2.5" Harddisk,FXO*1,FXS*3,AP function
RGH323H	External antenna*2, 2.5" Harddisk,FXO*1,FXS*3,AP+Client function
RGS302	Internal antenna*2, 2.5" Harddisk,FXO*2,FXS*2,AP function
RGS322	External antenna*2, 2.5" Harddisk,FXO*2,FXS*2,AP+Client function
RGS303	Internal antenna*2, 2.5" Harddisk,FXO*3,FXS*1,AP function
RGS323	External antenna*2, 2.5" Harddisk,FXO*3,FXS*1,AP+Client function

Please kindly handle on the project.

Peng zhou
President
Shenzhen Pennda Technologies Co., Ltd.

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