FCC PART 15.247 & 15.407

EMI MEASUREMENT AND TEST REPORT

For

MERU NETWORKS

1309 S Mary Suite 220 Sunnyvale CA 94087

FCC ID: RE7-AP200

This Report Concerns:	**Equipment Type:**
☒ Original Report	802.11a/b/g Wireless Access Point

Test Engineer:	Ming Jing
Report No.:	R0411031
Report Date:	2004-11-16
Reviewed By:	Daniel Deng
Prepared By:	Bay Area Compliance Laboratory Corporation (BACL) 230 Commercial Street Sunnyvale, CA 94085 Tel: (408) 732-9162 Fax: (408) 732 9164

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Meru Networks's product*, FCC ID: *RE7-AP200*, model number: *AP200* or the "EUT" as referred to in this report is a Transceiver, Wireless Access Point. The EUT is a composite device of DTS and NII. For the DTS part (802.11a/b/g), the frequency range is 2412.00 – 2462.00 MHz (for 802.11b/g), maximum output power is 72.3mW & 5725.00 – 5850.00 MHz (for 802.11a), maximum output power is 19.7mW. For the NII part (802.11a), the frequency range is 5180.00 – 5320.00 MHz, maximum output power is 42.9mW.

** The test data gathered are from production sample, serial number: 041103AP200, provided by the manufacturer.*

Objective

This type approval report is prepared on behalf of *Meru Networks* in accordance with Part 2, Subpart J, Part 15, Subparts A, C, and E of the Federal Communication Commissions rules.

The objective of the manufacturer is to demonstrate compliance with FCC rules for Output Power, Antenna Requirements, 6 dB Bandwidth and 26 dB Bandwidth, power spectral density, 100 kHz Bandwidth of Band Edges Measurement, Out of Band Emission, Spurious Emission, Conducted and Spurious Radiated Emission, Discontinue Transmitting with Absence of Data or Operational Failure, Peak Excursion to Average Ratio and Frequency Stability.

Related Submittal(s)/Grant(s)

No Related Submittals.

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 radiated and conducted emissions measurement was performed at Bay Area Compliance Laboratory, Corp.

Test Facility

The Open Area Test site used by BACL to collect radiated and conducted emission measurement data is located in the back parking lot of the building at 230 Commercial Street, Sunnyvale, California, USA.

Test site at BACL has been fully described in reports submitted to the Federal Communication Commission (FCC) and Voluntary Control Council for Interference (VCCI). The details of these reports has been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11 and December 10, 1997 and Article 8 of the VCCI regulations on December 25, 1997. The facility also complies with the test methods and procedures set forth in ANSI C63.4-2003.

The Federal Communications Commission and Voluntary Control Council for Interference has the reports on file and is listed under FCC file 31040/SIT 1300F2 and VCCI Registration No.: C-1298 and R-1234. The test site has been approved by the FCC and VCCI for public use and is listed in the FCC Public Access Link (PAL) database.

Additionally, BACL is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200167-0). The scope of the accreditation covers the FCC Method – 47 CFR Part – Digital Devices, CISPER 22:2002 Electromagnetic Interference – Limits and Methods of Measurement of Information Technology Equipment test methods.

SYSTEM TEST CONFIGURATION

Justification

The host system was configured for testing according to ANSI C63.4-2003.

The EUT was tested in the normal (native) operating mode to represent *worst*-case results during the final qualification test.

EUT Exercise Software

The EUT exercise program used during radiated and conducted testing was designed to exercise the system components in a manner similar to a typical use. The test software, provided by the customer, is started the Windows terminal program under the Windows 98/2000/ME/XP operating system.

Once loaded, set the Tx channel to low, mid and high for testing.

Special Accessories

As shown in following test setup block diagram, all interface cables used for compliance testing are shielded. The host PC and the peripherals featured shielded metal connectors.

Schematics / Block Diagram

Please refer to Appendix A.

Equipment Modifications

No modifications were made to the EUT.

Local Support Equipment List and Details

Manufacturer	Description	Model	Serial Number	FCC ID
IBM	Laptop PC	2388	/	None

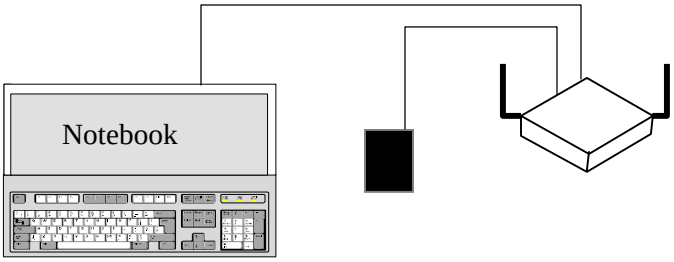
External I/O Cabling List and Details

Cable Description	Length (M)	Port/From	To
Shield Cable	1.0	RJ45 Port / EUT	RJ45 Port / Laptop PC
Shield Cable	1.0	RJ45 Port / EUT	Power & Data Port / Power – LAN Hub

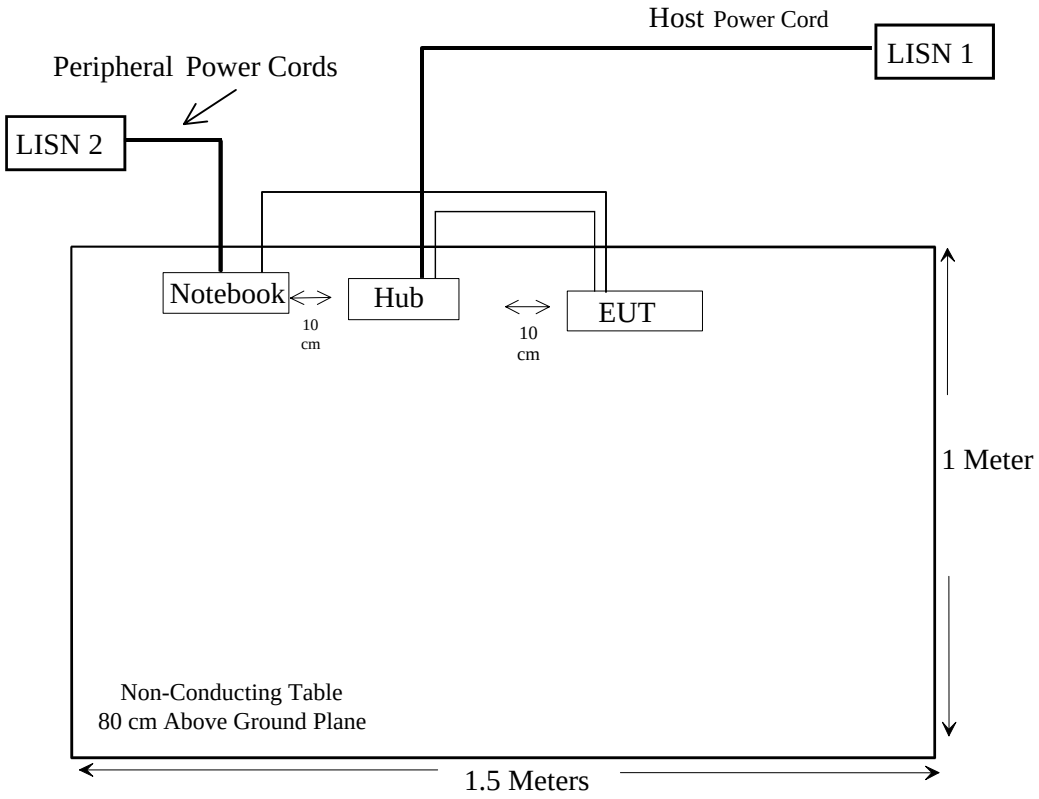
Power Supply Information

Manufacturer	Description	Model	Serial Number	FCC ID
Meru	Power over LAN Hub	PD-6001/AC	None	None

Configuration of Test System



Test Setup Block Diagram



SUMMARY OF TEST RESULTS

Results reported relate only to the product tested, serial number: 041103AP200.

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1093, §15.247(b)(4), §15.407 (f)	RF Exposure Requirement	Compliant
§15.203	Antenna Requirement	Compliant
§ 15.205, §15.209(a), §15.407(b)(5), §15.407(b)(6)	Restricted Bands, Radiated Emission	Within Measurement Uncertainty
§ 15.207(a)	AC Line Conduction	Within Measurement Uncertainty
§15.247(a)(2), §15.407	6 dB Bandwidth & 26 dB Bandwidth	Compliant
§15.247(b)(3), §15.407(a)(2)	RF Output Power	Compliant
§ 15.247(c)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247(d), §15.407(a)(2)	Peak Power Spectral Density	Compliant
§15.407(a)(6)	Peak Excursion	Compliant
§15.407(b)	Out of Band Emission	Compliant
§15.407(c)	Discontinue Transmitting with Absence of Data or Operational Failure	Compliant
§ 15.407(g)	Frequency Stability	Compliant

§1.1307(b)(1) & §2.1093 - RF EXPOSURE

According to §15.247(b)(4) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

According to §1.1310 and §2.1093 RF exposure is calculated.

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				
0.3-1.34	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

MPE Prediction

Predication of MPE limit at a given distance

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

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

Where: S = power density
P = power input to antenna
G = power gain of the antenna in the direction of interest relative to an isotropic radiator
R = distance to the center of radiation of the antenna

2412 – 2462 MHz:
Maximum peak output power at antenna input terminal: 18.59 (dBm)
Maximum peak output power at antenna input terminal: 72.28 (mW)
Predication frequency: 2400 (MHz)
Antenna Gain (typical): 4 (dBi)
antenna gain: 2.51 (numeric)
Prediction distance: 3.9 (cm)
Power density at predication frequency at 3.9 cm: 0.95 (mW/cm^2)

MPE limit for uncontrolled exposure at prediction frequency: 1.0 (mW/cm^2)

5180.00 – 5320.00 MHz
Maximum peak output power at antenna input terminal: 16.33 (dBm)
Maximum peak output power at antenna input terminal: 42.95 (mW)
Predication frequency: 5300 (MHz)
Antenna Gain (typical): 5 (dBi)
antenna gain: 3.16 (numeric)
Prediction distance: 3.3 (cm)
Power density at predication frequency at 3.3 cm: 0.99 (mW/cm^2)

MPE limit for uncontrolled exposure at prediction frequency: 1.0 (mW/cm^2)

5725 – 5850 MHz:
Maximum peak output power at antenna input terminal: 12.94 (dBm)
Maximum peak output power at antenna input terminal: 19.68 (mW)
Predication frequency: 5800 (MHz)
Antenna Gain (typical): 4.5 (dBi)
antenna gain: 2.82 (numeric)
Prediction distance: 1.8 (cm)
Power density at predication frequency at 1.8 cm: 0.90 (mW/cm^2)

MPE limit for uncontrolled exposure at prediction frequency: 1.0 (mW/cm^2)

Test Result

The EUT is of fixed outdoor installation, point -to-point or point-to-multipoint. 1mW/cm2 limit applies. The prediction distance for the 2.4G Hz antenna is 3.9cm. The prediction distance for the 5G Hz antenna is 3.3cm.

Note: The DTS cannot transmit simultaneously with the UNII.

§15.203 - ANTENNA REQUIREMENT

Standard Applicable

For intentional device, 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.

And according to § 15.247 (1), if transmitting antennas of directional gain greater than 6 dBi are used the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

§15.205, §15.209(a), §15.407(b)(5), §15.407(b)(6) - SPURIOUS RADIATED EMISSION

Measurement Uncertainty

All measurements involve certain levels of uncertainties. 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 BACL is ±4.0 dB.

According to §15.205, except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090 – 0.110	16.42 – 16.423	399.9 – 410	4.5 – 5.15
[1]0.495 – 0.505	16.69475 – 16.69525	608 – 614	5.35 – 5.46
2.1735 – 2.1905	16.80425 – 16.80475	960 – 1240	7.25 – 7.75
4.125 – 4.128	25.5 – 25.67	1300 – 1427	8.025 – 8.5
4.17725 – 4.17775	37.5 – 38.25	1435 – 1626.5	9.0 – 9.2
4.20725 – 4.20775	73 – 74.6	1645.5 – 1646.5	9.3 – 9.5
6.215 – 6.218	74.8 – 75.2	1660 – 1710	10.6 – 12.7
6.26775 – 6.26825	108 – 121.94	1718.8 – 1722.2	13.25 – 13.4
6.31175 – 6.31225	123 – 138	2200 – 2300	14.47 – 14.5
8.291 – 8.294	149.9 – 150.05	2310 – 2390	15.35 – 16.2
8.362 – 8.366	156.52475 – 156.52525	2483.5 – 2500	17.7 – 21.4
8.37625 – 8.38675	156.7 – 156.9	2655 – 2900	22.01 – 23.12
8.41425 – 8.41475	162.0125 – 167.17	3260 – 3267	23.6 – 24.0
12.29 – 12.293	167.72 – 173.2	3332 – 3339	31.2 – 31.8
12.51975 – 12.57725	240 – 285	3345.8 – 3358	36.43 – 36.5
13.36 – 13.41	322 – 335.4	3600 – 4400	([2])

[1] Until February 1, 1999, this restricted band shall be 0.490-0.510MHz
[2] Above 38.6

Except as provided in paragraph (d) and (e), the filed strength of emissions appearing within these frequency bands shall not exceed the limits shown in Section 15.209. At frequencies equal to or less than 1000MHz, compliance with the limits in Section 15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000MHz, compliance with the emission limits in Section 15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in Section 15.35 apply to these measurements.

According to §15.209, the device shall meet radiated emission general requirements.

Except for Class A device, the filed strength of radiated emissions from unintentional radiators at a distance of 3 meters shall not exceed the following values:

Frequency of Emission (MHz)	Field Strength (Microvolts/meter)	dB (dBμV/meter)
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

EUT Setup

The radiated emission tests were performed in the open area 3-meter test site, using the setup in accordance with ANSI C63.4-2003. The specification used was the FCC 15 Subpart C limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle as required.

The host PC system was connected with 120Vac/60Hz power source.

Spectrum Analyzer Setup

According to FCC CFR 47, Section 15.31, the EUT was tested to 40GHz.

During the radiated emission test, the spectrum analyzer was set with the following configurations:

Frequency Range	***RBW***	***Video B/W***
Below 30MHz	10kHz	10kHz
30 – 1000MHz	100kHz	100kHz
Above 1000MHz	1MHz	1MHz

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Adapter, Quasi-Peak	85650A	3019A05393	6/13/2004
HP	Analyzer, Spectrum, RF	8568B	2601A02165,	7/7/2004
HP	Analyzer, Spectrum, Display	85662A	2542A12015	7/7/2004
HP	Analyzer, Spectrum	8565EC	3946A00131	6/30/2004
Agilent	Amplifier, Pre	8447D	2944A10187	9/23/2004
HP	Amplifier, Pre, microwave	8449B	3147A00400	3/14/2004
EMCO	Antenna, Biconical	3110B	9309-1165	10/11/2003
EMCO	Antenna, Logperiodic	3146	2101	11/8/2003
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	2455-261	8/1/2004

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Procedure

For the radiated emissions test, the PC system power cord was connected to the AC floor outlet since the power supply used in the EUT did not provide an accessory power outlet.

Maximizing procedure was performed on the six (6) highest emissions to ensure EUT compliance is with all installation combinations. All data was recorded in the peak detection mode. Quasi-peak readings was performed only when an emission was found to be marginal (within -4 dBμV of specification limits), and are distinguished with a "**Qp**" in the data table.

For average measurement, the spectrum analyzer was set as RBW = 1MHz, VBW = 10Hz.

Corrected Amplitude & Margin Calculation

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

Corr. Ampl. = Indicated Reading + Antenna Factor + Cable Factor - 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 maximum limit for Subpart C. The equation for margin calculation is as follows:

Margin = Corr. Ampl. – Subpart C Limit

Summary of Test Results

Environmental Conditions

Temperature:	18° C
Relative Humidity:	37%
ATM Pressure:	1032 mbar

The testing was performed by Ming Jing on 2004-11-04.

According to the data in following tables, the EUT measured -1.1dB margin, within the measurement uncertainty of the *worst* margin reading of ±4.0 dB:

802.11b, 15.247

-1.6 dB at **2390 MHz** in the **Vertical** polarization, Low Channel

-11.1 dB at **1056.11 MHz** in the **Vertical** polarization, Middle Channel

-16.6 dB at **4924 MHz** in the **Vertical** polarization, High Channel

-1.3 dB at **396.02 MHz** in the **Vertical** polarization, unintentional emission

802.11g, 15.247

-1.9 dB at **2390.00 MHz** in the **Vertical** polarization, Low Channel

-7.5 dB at **1320.25 MHz** in the **Vertical** polarization, Middle Channel

-1.8 dB at **2483.50 MHz** in the **Vertical** polarization, High Channel

-1.3 dB at **396.02 MHz** in the **Vertical** polarization, unintentional emission

802.11a, Low Band, 15.407

-6.3 dB at **5150 MHz** in the **Vertical** polarization, Low Channel

-12.3 dB at **10400 MHz** in the **Vertical** polarization, Middle Channel

-13.6 dB at **10480 MHz** in the **Vertical** polarization, High Channel

802.11a, Mid Band, 15.407

-12.6 dB at **10520 MHz** in the **Vertical** polarization, Low Channel

-12.9 dB at **10600 MHz** in the **Vertical** polarization, Middle Channel

-1.6 dB at **5350 MHz** in the **Vertical** polarization, High Channel

802.11a, High Band, 15.247

-13.4 dB at **11490 MHz** in the **Vertical** polarization, Low Channel

-13.6 dB at **11570 MHz** in the **Vertical** polarization, Middle Channel

-13.8 dB at **11650 MHz** in the **Vertical** polarization, High Channel

-1.1 dB at **396.02 MHz** in the **Vertical** polarization, unintentional emission

802.11b (15.247)

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15.247	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/V	Antenna dB	Cable dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-25GHz											
2412.00	116.5	Fund/Peak	270	1.8	v	28.1	3.4	35.5	112.5		
2412.00	108.7	Fund/Peak	90	1.5	h	28.1	3.4	35.5	104.7		
2412.00	109.1	Fund/Ave.	270	1.8	v	28.1	3.4	35.5	105.1		
2412.00	101.2	Fund/Ave.	90	1.5	h	28.1	3.4	35.5	97.2		
2390.00	56.5	Ave.	180	1.8	v	28.1	3.4	35.5	52.5	54	-1.6
1188.03	56.3	Ave.	90	1.5	v	23.7	4.2	36.8	47.4	54	-6.6
1731.61	55.1	Ave.	0	1.5	v	25.3	2.6	36.8	46.2	54	-7.8
2390.00	49.2	Ave.	210	1.8	h	28.1	3.4	35.5	45.2	54	-8.8
1731.61	52.7	Ave.	45	1.2	h	25.3	2.6	36.8	43.8	54	-10.2
4824.00	39.3	Ave.	120	1.5	v	32.5	4.9	34.6	42.1	54	-11.9
1188.03	50.8	Ave.	110	1.2	h	23.7	4.2	36.8	41.9	54	-12.1
2390.00	65.7	Peak	180	1.8	v	28.1	3.4	35.5	61.7	74	-12.4
1731.61	65.2	Peak	0	1.5	v	25.3	2.6	36.8	56.3	74	-17.7
1731.61	64.7	Peak	45	1.2	h	25.3	2.6	36.8	55.8	74	-18.2
4824.00	32.8	Ave.	180	1.2	h	32.5	4.9	34.6	35.6	54	-18.4
2390.00	59.0	Peak	210	1.8	h	28.1	3.4	35.5	55.0	74	-19.1
4824.00	50.5	Peak	120	1.5	v	32.5	4.9	34.6	53.3	74	-20.7
1188.03	59.1	Peak	90	1.5	v	23.7	4.2	36.8	50.2	74	-23.8
4824.00	44.9	Peak	180	1.2	h	32.5	4.9	34.6	47.7	74	-26.3
1188.03	55.2	Peak	110	1.2	h	23.7	4.2	36.8	46.3	74	-27.7
Middle Channel, 1-25GHz											
2437.00	117.8	Fund/Peak	90	1.5	v	28.1	3.4	35.2	114.1		
2437.00	106.9	Fund/Peak	110	1.5	h	28.1	3.4	35.2	103.2		
2437.00	110.5	Fund/Ave.	90	1.5	v	28.1	3.4	35.2	106.8		
2437.00	99.5	Fund/Ave.	110	1.5	h	28.1	3.4	35.2	95.8		
1056.11	51.8	Ave.	270	1.2	v	23.7	4.2	36.8	42.9	54	-11.1
1056.11	50.1	Ave.	310	1.8	h	23.7	4.2	36.8	41.2	54	-12.8
4874.00	34.4	Ave.	180	1.5	v	32.5	4.9	34.6	37.2	54	-16.8
4874.00	33.5	Ave.	230	1.2	h	32.5	4.9	34.6	36.3	54	-17.7
4874.00	47.3	Peak	180	1.5	v	32.5	4.9	34.6	50.1	74	-23.9
1056.11	57.2	Peak	270	1.2	v	23.7	4.2	36.8	48.3	74	-25.7
4874.00	45.2	Peak	230	1.2	h	32.5	4.9	34.6	48.0	74	-26.0
1056.11	56.5	Peak	310	1.8	h	23.7	4.2	36.8	47.6	74	-26.4

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15.247	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dB	Cable dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
High Channel, 1-25GHz											
2462.00	117.9	Fund/Peak	90	1.6	v	28.1	3.4	35.2	114.2		
2462.00	107.2	Fund/Peak	90	1.5	h	28.1	3.4	35.2	103.5		
2462.00	110.5	Fund/Ave.	90	1.6	v	28.1	3.4	35.2	106.8		
2462.00	100.1	Fund/Ave.	90	1.5	h	28.1	3.4	35.2	96.4		
4924.00	34.6	Ave.	180	1.5	v	32.5	4.9	34.6	37.4	54	-16.6
3065.87	57.6	Ave.	180	1.2	v	30.3	4.0	35.2	56.7	74.2	-17.5
4924.00	32.8	Ave.	180	1.2	h	32.5	4.9	34.6	35.6	54	-18.4
4924.00	47.5	Peak	180	1.5	v	32.5	4.9	34.6	50.3	74	-23.7
3065.87	69.3	Peak	180	1.2	v	30.3	4.0	35.2	68.4	94.2	-25.8
4924.00	44.9	Peak	180	1.2	h	32.5	4.9	34.6	47.7	74	-26.3
3065.87	38.1	Ave.	270	1.2	h	30.3	4.0	35.2	37.2	63.5	-26.3
3065.87	48.8	Peak	270	1.2	h	30.3	4.0	35.2	47.9	83.5	-35.6

Note:

FUND = Fundamental
AVG = average

Unintentional Emission

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart B	
Frequency MHz	Ampl. dBμV/m	Direction Degree	Height Meter	Polar H/V	Antenna dB	Cable Loss dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
396.02	53.1	180	1.5	v	16.4	2.5	27.3	44.7	46	-1.3
120.18	56.2	180	1.2	v	11.8	1.6	27.7	41.9	43.5	-1.6
264.02	55.3	180	1.2	h	13.4	2.2	26.9	44.0	46	-2.0
132.01	55.4	0	1.5	v	12.2	1.6	27.9	41.3	43.5	-2.2
228.87	46.3	180	1.5	h	12.6	2.2	27.3	33.8	46	-12.2
245.21	45.5	120	1.5	v	13.3	2.2	27.2	33.8	46	-12.2

802.11g (15.247)

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15.247	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dB	Cable dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-25GHz											
2412.00	116.3	Fund/Peak	110	1.5	v	28.1	3.4	35.5	112.3		
2412.00	103.9	Fund/Peak	180	1.5	h	28.1	3.4	35.5	99.9		
2412.00	105.2	Fund/Ave.	110	1.5	v	28.1	3.4	35.5	101.1		
2412.00	93.7	Fund/Ave.	180	1.5	h	28.1	3.4	35.5	89.7		
2390.00	56.2	Ave.	270	1.5	v	28.1	3.4	35.5	52.1	54	-1.9
2390.00	68.7	Peak	270	1.5	v	28.1	3.4	35.5	64.7	74	-9.3
1811.62	47.5	Ave.	30	1.5	v	25.3	2.6	35.5	39.9	54	-14.1
4824.00	35.4	Ave.	45	1.8	v	32.5	4.9	34.6	38.2	54	-15.8
4824.00	32.7	Ave.	90	1.5	h	32.5	4.9	34.6	35.5	54	-18.5
1811.62	60.2	Peak	30	1.5	v	25.3	2.6	35.5	52.6	74	-21.4
4824.00	48.7	Peak	45	1.8	v	32.5	4.9	34.6	51.5	74	-22.5
1811.62	36.3	Ave.	180	1.5	h	25.3	2.6	35.5	28.7	54	-25.3
4824.00	45.2	Peak	90	1.5	h	32.5	4.9	34.6	48.0	74	-26.0
1811.62	48.7	Peak	180	1.5	h	25.3	2.6	35.5	41.1	74	-32.9
2390.00	0.0	Ave.	30	1.5	h	28.1	3.4	35.5	-4.1	54	-58.1
2390.00	0.0	Peak	30	1.5	h	28.1	3.4	35.5	-4.1	74	-78.1
Middle Channel, 1-25GHz											
2437.00	117.5	Fund/Peak	90	1.2	v	28.1	3.4	35.5	113.5		
2437.00	108.8	Fund/Peak	180	1.2	h	28.1	3.4	35.5	104.8		
2437.00	108.6	Fund/Ave.	90	1.2	v	28.1	3.4	35.5	104.6		
2437.00	99.2	Fund/Ave.	180	1.2	h	28.1	3.4	35.5	95.2		
1320.25	55.1	Ave.	0	1.2	v	23.7	4.2	36.5	46.5	54	-7.5
1320.25	53.3	Ave.	310	1.2	h	23.7	4.2	36.5	44.7	54	-9.3
4874.00	34.2	Ave.	30	1.2	v	32.5	4.9	34.6	37.0	54	-17.0
4874.00	33.5	Ave.	270	1.5	h	32.5	4.9	34.6	36.3	54	-17.7
1320.25	58.8	Peak	0	1.2	v	23.7	4.2	36.5	50.2	74	-23.8
4874.00	46.5	Peak	30	1.2	v	32.5	4.9	34.6	49.3	74	-24.7
1320.25	56.9	Peak	310	1.2	h	23.7	4.2	36.5	48.3	74	-25.7
4874.00	45.3	Peak	270	1.5	h	32.5	4.9	34.6	48.1	74	-25.9

Indicated			Table	Antenna		Correction Factor			Corrected Amplitude	FCC 15.247	
Frequency MHz	Ampl. dBμV /m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dB	Cable dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
High Channel, 1-25GHz											
2462.00	117.1	Fund/Peak	180	1.2	v	28.1	3.4	35.5	113.1		
2462.00	106.3	Fund/Peak	210	1.8	h	28.1	3.4	35.5	102.3		
2462.00	107.3	Fund/Ave.	180	1.2	v	28.1	3.4	35.5	103.3		
2462.00	97.1	Fund/Ave.	210	1.8	h	28.1	3.4	35.5	93.1		
2483.50	56.3	Ave.	110	1.2	v	28.1	3.4	35.5	52.3	54	-1.8
2483.50	50.4	Ave.	90	1.5	h	28.1	3.4	35.5	46.4	54	-7.7
2483.50	69.8	Peak	110	1.2	v	28.1	3.4	35.5	65.8	74	-8.3
2483.50	63.7	Peak	90	1.5	h	28.1	3.4	35.5	59.7	74	-14.4
4924.00	33.2	Ave.	90	1.2	v	32.5	4.9	34.6	36.0	54	-18.0
4924.00	32.8	Ave.	30	1.5	h	32.5	4.9	34.6	35.6	54	-18.4
3155.80	63.1	Peak	90	1.6	h	30.3	4.0	34.9	62.5	82.3	-19.8
3155.80	51.5	Ave.	90	1.6	h	30.3	4.0	34.9	50.9	73.1	-22.2
3155.80	69.6	Peak	30	1.8	v	30.3	4.0	34.9	69.0	93.1	-24.1
3155.80	59.3	Ave.	30	1.8	v	30.3	4.0	34.9	58.7	83.3	-24.6
4924.00	45.4	Peak	90	1.2	v	32.5	4.9	34.6	48.2	74	-25.8
4924.00	43.6	Peak	30	1.5	h	32.5	4.9	34.6	46.4	74	-27.6

Note:

FUND = Fundamental
AVG = average

Unintentional Emission

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart B	
Frequency MHz	Ampl. dBμV/m	Direction Degree	Height Meter	Polar H/V	Antenna dB	Cable Loss dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
396.02	53.1	180	1.5	v	16.4	2.5	27.3	44.7	46	-1.3
115.20	56.3	180	1.2	v	11.8	1.6	27.7	42.0	43.5	-1.5
132.01	53.9	210	1.5	v	12.2	1.6	27.9	39.8	43.5	-3.7
264.02	51.8	180	1.2	h	13.4	2.2	26.9	40.5	46	-5.5
245.21	45.7	120	1.5	v	13.3	2.2	27.2	34.0	46	-12.0
228.87	45.5	180	1.5	h	12.6	2.2	27.3	33.0	46	-13.0

802.11a, Low Band (15.407, 5150-5250MHz)

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15.407	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dB	Cable dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-40GHz											
5180.00	108.8	Fund/Peak	180	1.2	v	33.9	5.2	34.4	113.5		
5180.00	98.1	Fund/Peak	270	1.6	h	33.9	5.2	34.4	102.8		
5180.00	97.7	Fund/Ave.	180	1.2	v	33.9	5.2	34.4	102.4		
5180.00	86.9	Fund/Ave.	270	1.6	h	33.9	5.2	34.4	91.6		
5150.00	57.4	Peak	45	1.5	v	33.9	5.2	34.5	62.0	68.3	-6.3
5150.00	51.8	Peak	60	1.5	h	33.9	5.2	34.5	56.4	68.3	-11.9
10360.00	34.5	Ave.	0	1.5	v	35.1	5.6	33.5	41.7	54	-12.3
10360.00	33.9	Ave.	120	1.5	h	35.1	5.6	33.5	41.1	54	-12.9
10360.00	47.7	Peak	0	1.5	v	35.1	5.6	33.5	54.9	74	-19.1
10360.00	45.6	Peak	120	1.5	h	35.1	5.6	33.5	52.8	74	-21.2
Middle Channel, 1-40GHz											
5200.00	109.8	Fund/Peak	210	1.6	v	33.9	5.2	34.4	114.5		
5200.00	98.5	Fund/Peak	45	1.5	h	33.9	5.2	34.4	103.2		
5200.00	98.7	Fund/Ave.	210	1.6	v	33.9	5.2	34.4	103.4		
5200.00	87.3	Fund/Ave.	45	1.5	h	33.9	5.2	34.4	92.0		
10400.00	34.5	Ave.	160	1.2	v	35.1	5.6	33.5	41.7	54	-12.3
10400.00	34.2	Ave.	90	1.5	h	35.1	5.6	33.5	41.4	54	-12.6
10400.00	45.1	Peak	160	1.2	v	35.1	5.6	33.5	52.3	74	-21.7
10400.00	44.7	Peak	90	1.5	h	35.1	5.6	33.5	51.9	74	-22.1
High Channel, 1-40GHz											
5240.00	109.2	Fund/Peak	180	1.2	v	33.9	5.2	34.4	113.9		
5240.00	98.3	Fund/Peak	30	1.8	h	33.9	5.2	34.4	103.0		
5240.00	98.1	Fund/Ave.	180	1.2	v	33.9	5.2	34.4	102.8		
5240.00	87.1	Fund/Ave.	30	1.8	h	33.9	5.2	34.4	91.8		
10480.00	33.2	Ave.	290	1.2	v	35.1	5.6	33.5	40.4	54	-13.6
10480.00	32.8	Ave.	210	1.8	h	35.1	5.6	33.5	40.0	54	-14.0
10480.00	45.7	Peak	290	1.2	v	35.1	5.6	33.5	52.9	74	-21.1
10480.00	44.6	Peak	210	1.8	h	35.1	5.6	33.5	51.8	74	-22.2

Note:

FUND = Fundamental
AVG = average

802.11a, Mid Band (15.407, 5250-5350MHz)

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15.407	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dB	Cable dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-40GHz											
5260.00	108.8	Fund/Peak	180	1.5	v	33.9	5.2	34.5	113.4		
5260.00	96.6	Fund/Peak	210	1.5	h	33.9	5.2	34.5	101.2		
5260.00	98.5	Fund/Ave.	180	1.5	v	33.9	5.2	34.5	103.1		
5260.00	86.3	Fund/Ave.	210	1.5	h	33.9	5.2	34.5	90.9		
10520.00	34.2	Ave.	0	1.8	v	35.1	5.6	33.5	41.4	54	-12.6
10520.00	33.4	Ave.	60	1.5	h	35.1	5.6	33.5	40.6	54	-13.4
10520.00	44.5	Peak	0	1.8	v	35.1	5.6	33.5	51.7	74	-22.3
10520.00	43.9	Peak	60	1.5	h	35.1	5.6	33.5	51.1	74	-22.9
Middle Channel, 1-40GHz											
5300.00	108.5	Fund/Peak	30	1.5	v	33.9	5.2	34.5	113.1		
5300.00	96.2	Fund/Peak	90	1.2	h	33.9	5.2	34.5	100.8		
5300.00	88.4	Fund/Ave.	30	1.5	v	33.9	5.2	34.5	93.0		
5300.00	76.9	Fund/Ave.	90	1.2	h	33.9	5.2	34.5	81.5		
10600.00	33.9	Ave.	270	1.2	v	35.1	5.6	33.5	41.1	54	-12.9
10600.00	33.1	Ave.	230	1.5	h	35.1	5.6	33.5	40.3	54	-13.7
10600.00	44.3	Peak	270	1.2	v	35.1	5.6	33.5	51.5	74	-22.5
10600.00	43.8	Peak	230	1.5	h	35.1	5.6	33.5	51.0	74	-23.0
High Channel, 1-40GHz											
5320.00	106.8	Fund/Peak	45	1.5	v	33.9	5.2	34.5	111.4		
5320.00	99.5	Fund/Peak	120	1.5	h	33.9	5.2	34.5	104.1		
5320.00	95.2	Fund/Ave.	45	1.5	v	33.9	5.2	34.5	99.8		
5320.00	89.3	Fund/Ave.	120	1.5	h	33.9	5.2	34.5	93.9		
5350.00	62.1	Peak	0	1.5	v	33.9	5.2	34.5	66.7	68.3	-1.6
5350.00	56.9	Peak	90	1.2	h	33.9	5.2	34.5	61.5	68.3	-6.8
10640.00	33.5	Ave.	0	1.5	v	35.1	5.6	33.5	40.7	54	-13.3
10640.00	33.0	Ave.	60	1.5	h	35.1	5.6	33.5	40.2	54	-13.8
10640.00	44.1	Peak	0	1.5	v	35.1	5.6	33.5	51.3	74	-22.7
10640.00	43.6	Peak	60	1.5	h	35.1	5.6	33.5	50.8	74	-23.2

Note:

FUND = Fundamental
AVG = average

802.11a, High Band (15.247, 5725-5850MHz)

INDICATED			TABLE	ANTENNA		CORRECTION FACTOR			CORRECTED AMPLITUDE	FCC 15.247	
Frequency MHz	Ampl. dBμV/m	Comments	Angle Degree	Height Meter	Polar H/ V	Antenna dB	Cable dB	Amp. dB	Corr. Ampl. dBμV/m	Limit dBμV/m	Margin dB
Low Channel, 1-40GHz											
5745.00	108.3	Fund/Peak	90	1.5	v	34.1	5.4	34.5	113.3		
5745.00	97.2	Fund/Peak	110	1.6	h	34.1	5.4	34.5	102.2		
5745.00	97.6	Fund/Ave.	90	1.5	v	34.1	5.4	34.5	102.6		
5745.00	86.7	Fund/Ave.	110	1.6	h	34.1	5.4	34.5	91.7		
11490.00	33.4	Ave.	270	1.5	v	35.1	5.6	33.5	40.6	54	-13.4
5725.00	63.8	Peak	110	1.8	h	34.1	5.4	34.5	68.8	83.2	-14.4
11490.00	31.9	Ave.	310	1.5	h	35.1	5.6	33.5	39.1	54	-14.9
5725.00	73.6	Peak	90	1.5	v	34.1	5.4	34.5	78.6	95.9	-17.3
11490.00	44.5	Peak	270	1.5	v	35.1	5.6	33.5	51.7	74	-22.3
11490.00	43.2	Peak	310	1.5	h	35.1	5.6	33.5	50.4	74	-23.6
Middle Channel, 1-40GHz											
5785.00	107.5	Fund/Peak	90	1.5	v	34.1	5.4	34.5	112.5		
5785.00	97.1	Fund/Peak	210	1.2	h	34.1	5.4	34.5	102.1		
5785.00	97.3	Fund/Ave.	90	1.5	v	34.1	5.4	34.5	102.3		
5785.00	88.2	Fund/Ave.	210	1.2	h	34.1	5.4	34.5	93.2		
11570.00	33.2	Ave.	270	1.5	v	35.1	5.6	33.5	40.4	54	-13.6
11570.00	31.7	Ave.	230	1.5	h	35.1	5.6	33.5	38.9	54	-15.1
11570.00	44.3	Peak	270	1.5	v	35.1	5.6	33.5	51.5	74	-22.5
11570.00	43.1	Peak	230	1.5	h	35.1	5.6	33.5	50.3	74	-23.7
High Channel, 1-40GHz											
5825.00	106.2	Fund/Peak	270	1.5	v	34.1	5.4	34.5	111.2		
5825.00	95.2	Fund/Peak	90	1.2	h	34.1	5.4	34.5	100.2		
5825.00	96.2	Fund/Ave.	270	1.5	v	34.1	5.4	34.5	101.2		
5825.00	85.1	Fund/Ave.	90	1.2	h	34.1	5.4	34.5	90.1		
11650.00	33.0	Ave.	210	1.5	v	35.1	5.6	33.5	40.2	54	-13.8
11650.00	31.4	Ave.	60	1.5	h	35.1	5.6	33.5	38.6	54	-15.4
5850.00	57.3	Peak	0	1.2	h	34.1	5.4	34.5	62.3	80.2	-17.9
11650.00	44.1	Peak	210	1.5	v	35.1	5.6	33.5	51.3	74	-22.7
11650.00	42.8	Peak	60	1.5	h	35.1	5.6	33.5	50.0	74	-24.0
5850.00	61.9	Peak	180	1.5	v	34.1	5.4	34.5	66.9	91.2	-24.3

Note:

FUND = Fundamental
AVG = average

Unintentional Emission

Indicated			Table	Antenna		Correction Factor			FCC 15 Subpart B	
Frequency	Ampl.	Direction	Height	Polar	Antenna	Cable Loss	Amp.	Corr. Ampl.	Limit	Margin
MHz	dBμV/m	Degree	Meter	H/V	dB	dB	dB	dBμV/m	dBμV/m	dB
396.02	53.3	180	1.5	v	16.4	2.5	27.3	44.9	46	-1.1
132.01	54.6	0	1.5	v	12.2	1.6	27.9	40.5	43.5	-3.0
264.02	52.9	180	1.2	h	13.4	2.2	26.9	41.6	46	-4.4
120.18	48.3	180	1.2	v	11.8	1.6	27.7	34.0	43.5	-9.5
245.21	45.5	120	1.5	v	13.3	2.2	27.2	33.8	46	-12.2
228.87	45.8	180	1.5	h	12.6	2.2	27.3	33.3	46	-12.7

§15.207(a) - CONDUCTED EMISSIONS

Measurement Uncertainty

All measurements involve certain levels of uncertainties. 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 BACL is ±2.4 dB.

EUT Setup

The measurement was performed in the shield room, using the same setup per ANSI C63.4-2003 measurement procedure. The specification used was FCC 15 Subpart B limits.

The spacing between the peripherals was 10 centimeters.

External I/O cables were draped along the edge of the test table and bundle when necessary.

The notebook PC was connected with 120Vac/60Hz power source.

Spectrum Analyzer Setup

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	Artificial LISN	ESH2-Z5	871884/039	2004-03-28
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2004-05-06

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Procedure

During the conducted emission test, the power cord of the host system was connected to the auxiliary outlet of the first LISN.

Maximizing procedure was performed on the six (6) highest emissions of each modes tested to ensure EUT is compliant with all installation combination.

All data was recorded in the peak detection mode. Quasi-peak readings were only performed when an emission was found to be marginal (within -4 dB of specification limits). Quasi-peak readings are distinguished with a "**Qp**".

Summary of Test Results

According to the data in following table, the EUT measured -2.1dB margin, within the measurement uncertainty of the *worst* margin reading of ±2.4 dB:

-2.1 dB at 8.720 MHz in the Neutral mode

Conducted Emissions Test Data

Environmental Conditions

Temperature:	18° C
Relative Humidity:	37%
ATM Pressure:	1032 mbar

The testing was performed by Ming Jing on 2004-11-04.

LINE CONDUCTED EMISSIONS				FCC PART 15 CLASS B	
Frequency MHz	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
8.720	47.9	AVE	Neutral	50	-2.1
7.970	44.2	AVE	Line	50	-5.8
0.150	55.1	QP	Neutral	66	-10.9
0.150	54.8	QP	Line	66	-11.2
8.720	48.3	QP	Neutral	60	-11.7
0.945	44.2	QP	Neutral	56	-11.8
0.930	41.6	QP	Line	56	-14.4
0.935	30.9	AVE	Neutral	46	-15.1
7.970	44.5	QP	Line	60	-15.5
0.930	28.2	AVE	Line	46	-17.8
0.150	27.4	AVE	Neutral	56	-28.6
0.150	27.2	AVE	Line	56	-28.8

Plot of Conducted Emissions Test Data

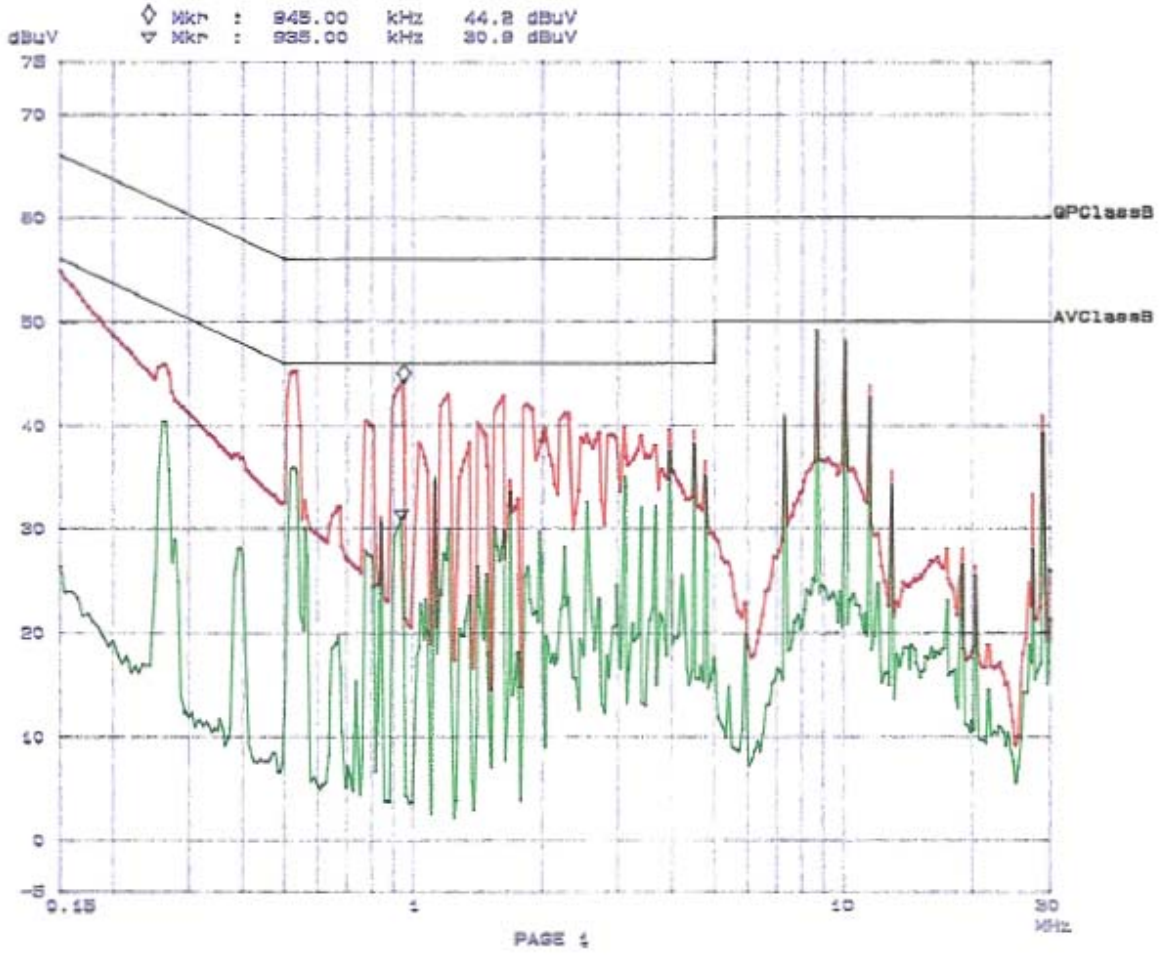
Plot(s) of Conducted Emissions Test Data is presented hereinafter as reference.

Bay Area Compliance Laboratory Corp 11. Nov 04 16:21
Class B

EUT: AP200
Manuf: Meru
Op Cond: Normal
Operator: Ming
Comment: W

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Atten	Preamp
150k	1M	5k	9k	QP+AV	20ms	15dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	15dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	15dBLN	OFF



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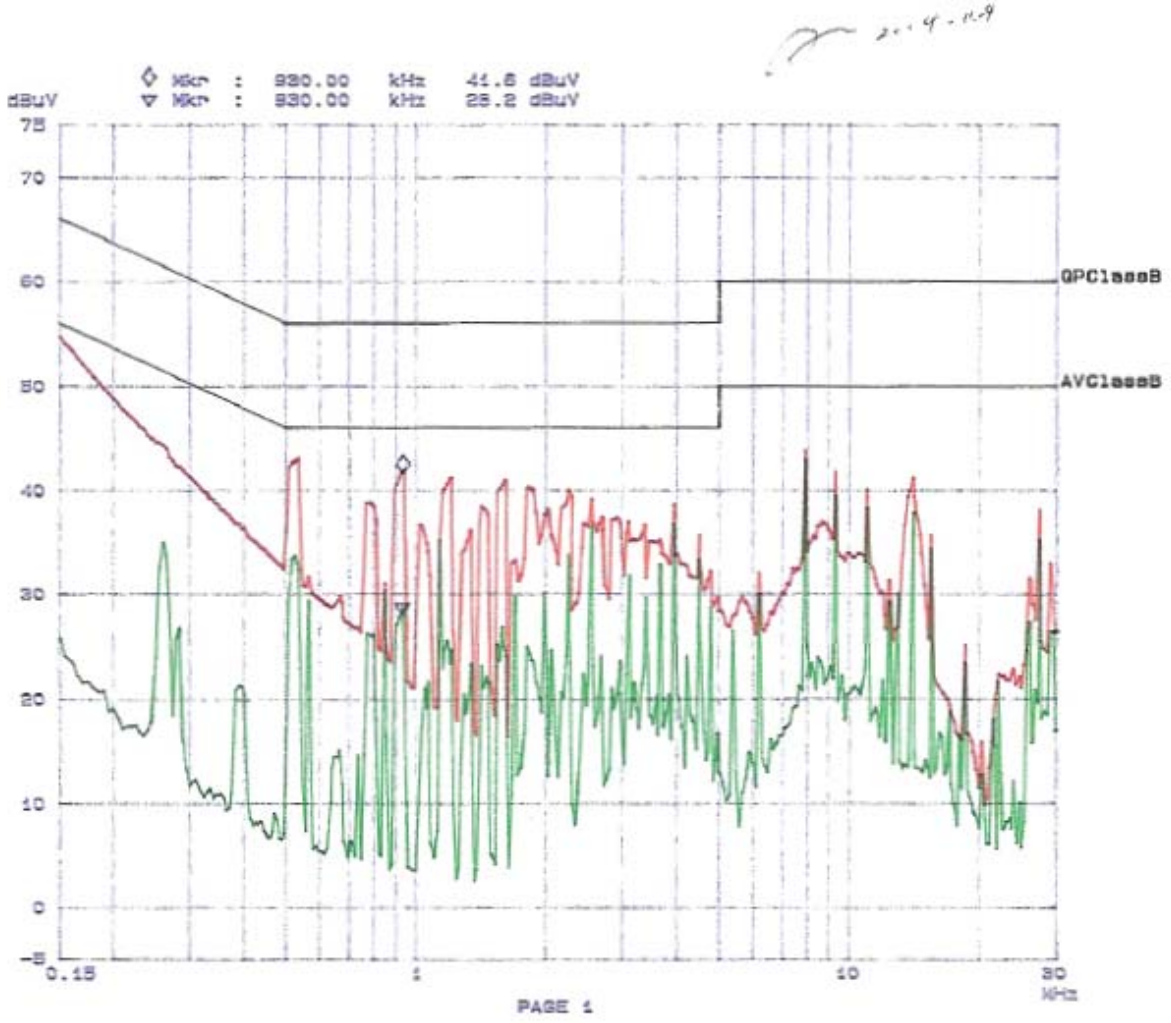
Bay Area Compliance Laboratory Corp 11. Nov 04 15: 48
Class B

EUT: AP200
Manuf: Meru
Op Cond: Normal
Operator: Ming
Comment: L

Scan Settings (3 Ranges)

Frequencies			Receiver Settings				
Start	Stop	Step	IF BW	Detector	M-Time	Attsn	Preamp
150k	1M	5k	9k	QP+AV	20ms	15dBLN	OFF
1M	5M	10k	9k	QP+AV	1ms	15dBLN	OFF
5M	30M	100k	9k	QP+AV	1ms	15dBLN	OFF



§2.1051 - SPURIOUS EMISSIONS AT ANTENNA TERMINALS

Standard Applicable

Requirements: CFR 47, § 2.1051.

The spectrum was to be investigated to the tenth harmonics of the highest fundamental frequency as specified in § 2.1057.

Measurement Procedure

The RF output of the EUT was connected to a spectrum analyzer through appropriate attenuation. The resolution bandwidth of the spectrum analyzer was set at 100 kHz. Sufficient scans were taken to show any out of band emissions up to 10^{th} harmonic.

Equipment Lists

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Spectrum Analyzer	HP8564E	3943A01781	2004-08-01
HP	Plotter	HP7470A	2541A49659	Not Required

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

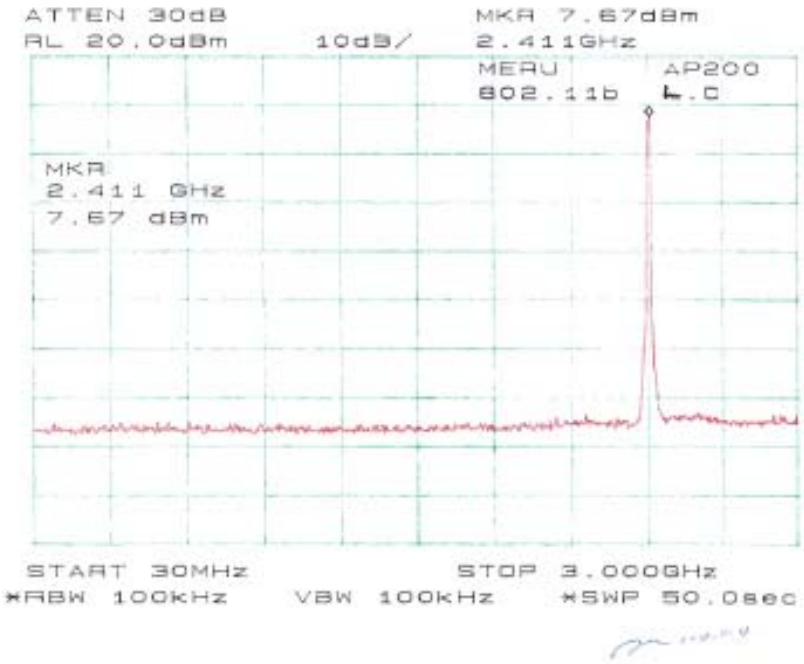
Measurement Result

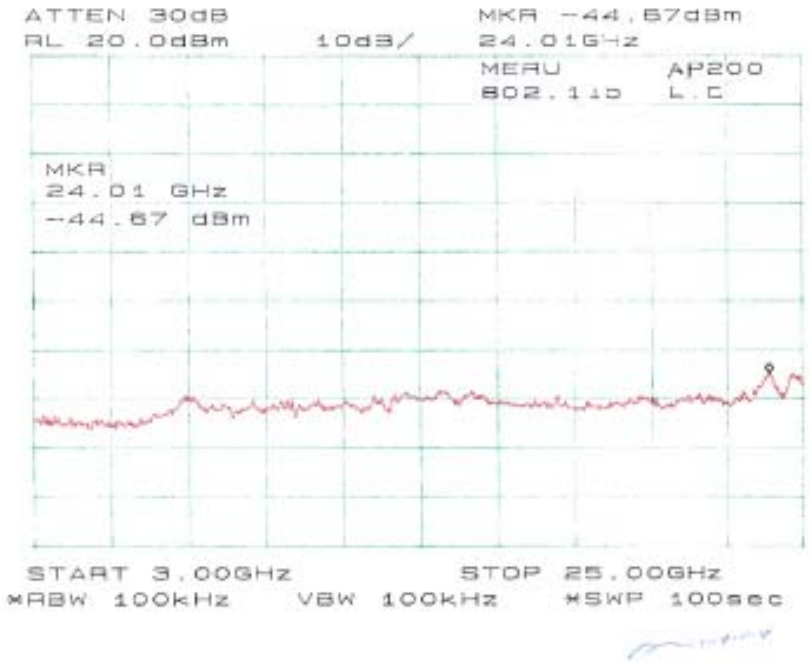
Environmental Conditions

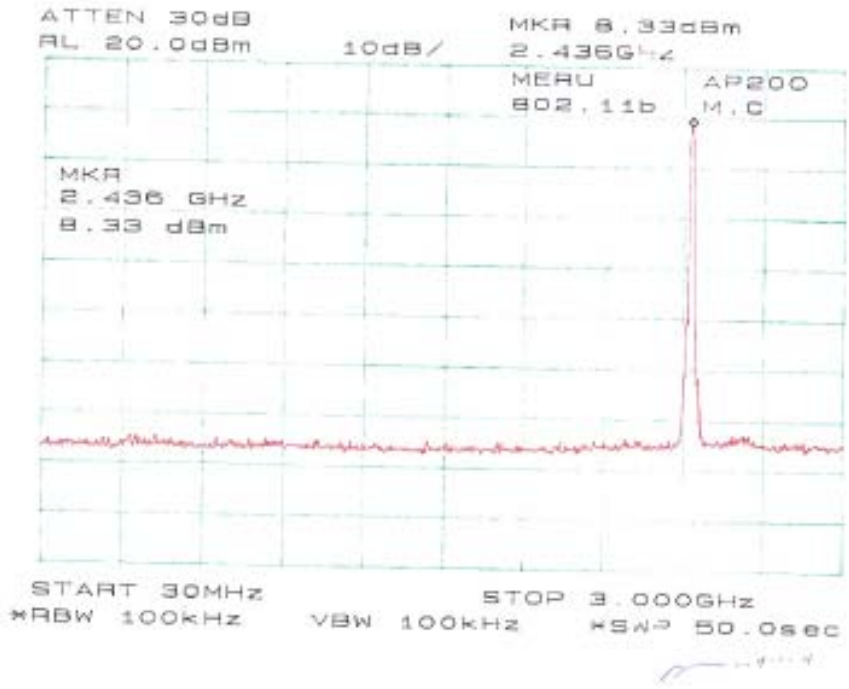
Temperature:	18° C
Relative Humidity:	37%
ATM Pressure:	1032 mbar

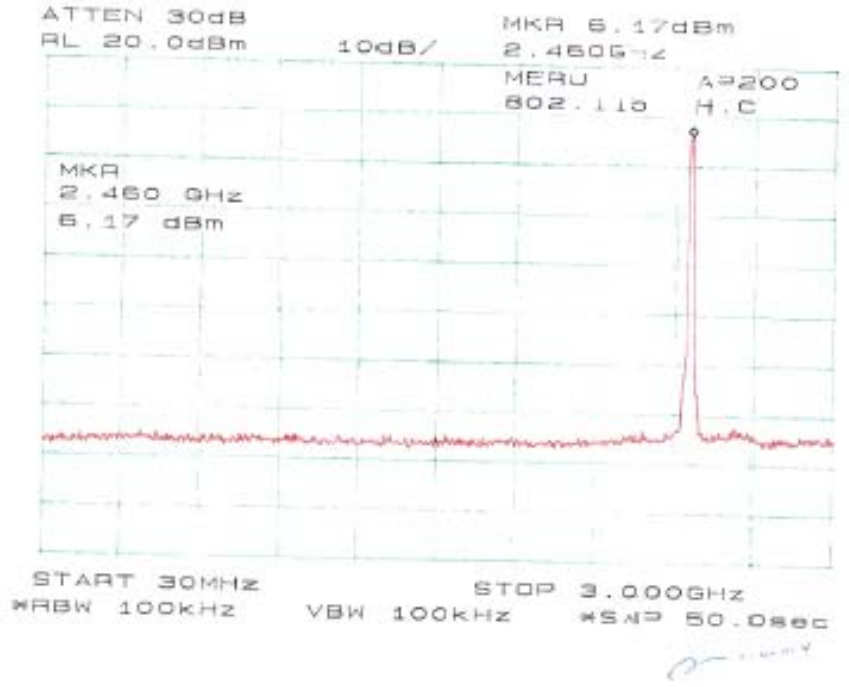
The testing was performed by Ming Jing on 2004-11-04.

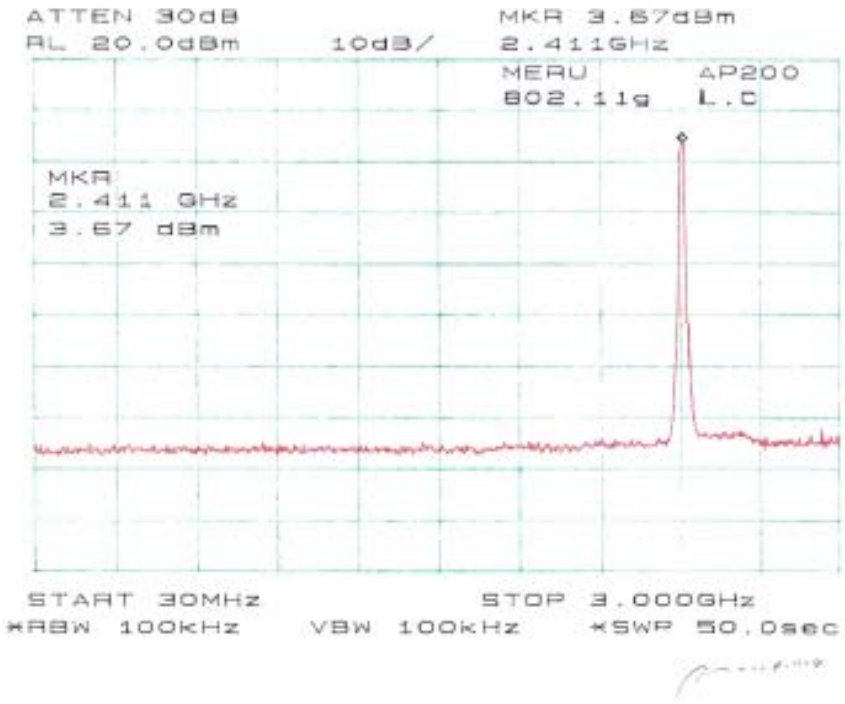
Please refer to following pages for plots of spurious emission.

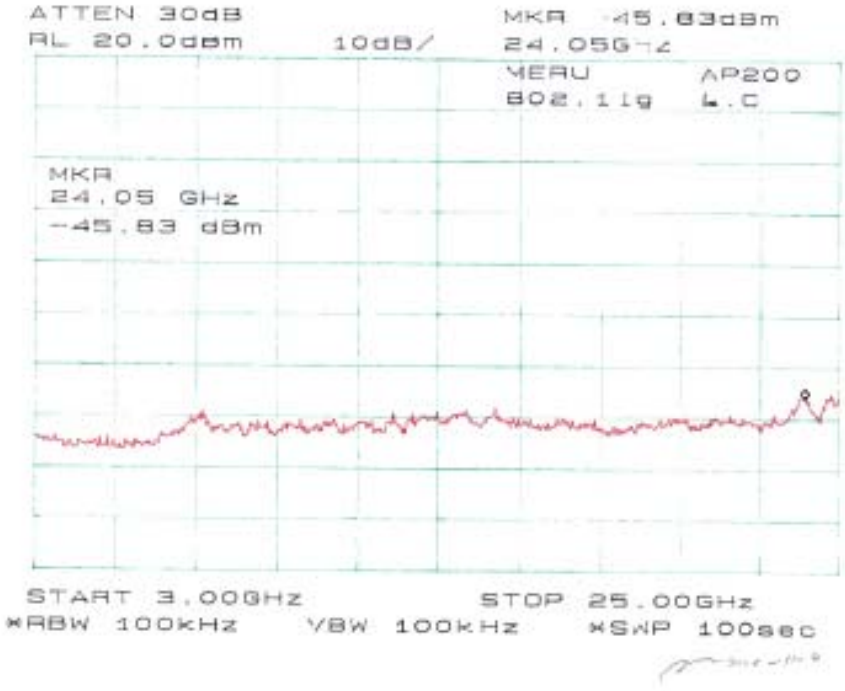

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 7.67dBm
2.411GHz
MERU AP200
802.11b L.C
MKR
2.411 GHz
7.67 dBm
START 30MHz
STOP 3.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec

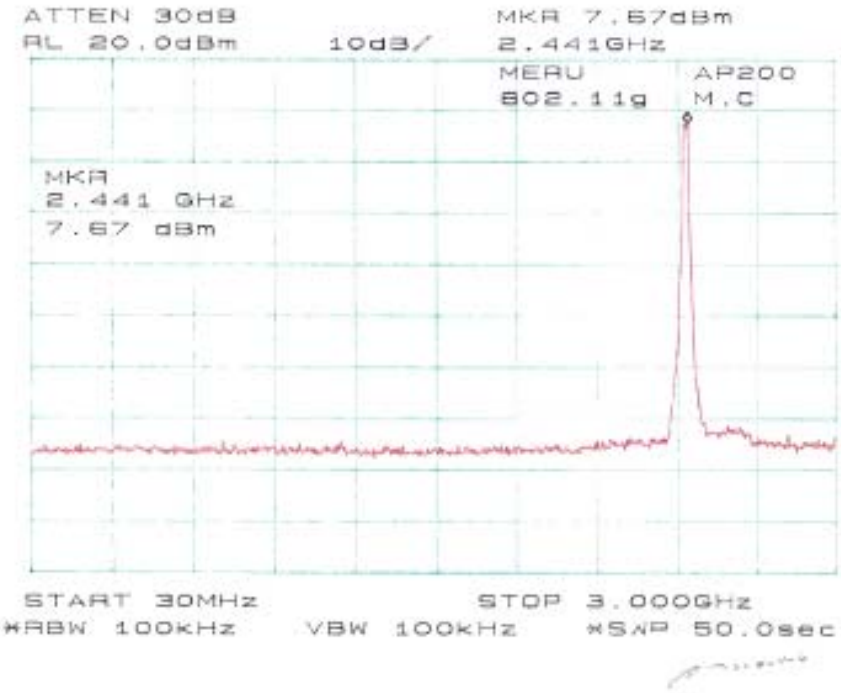

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -44.67dBm
24.01GHz
MERU AP200
802.11b L.C
MKR
24.01 GHz
-44.67 dBm
START 3.00GHz
STOP 25.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec

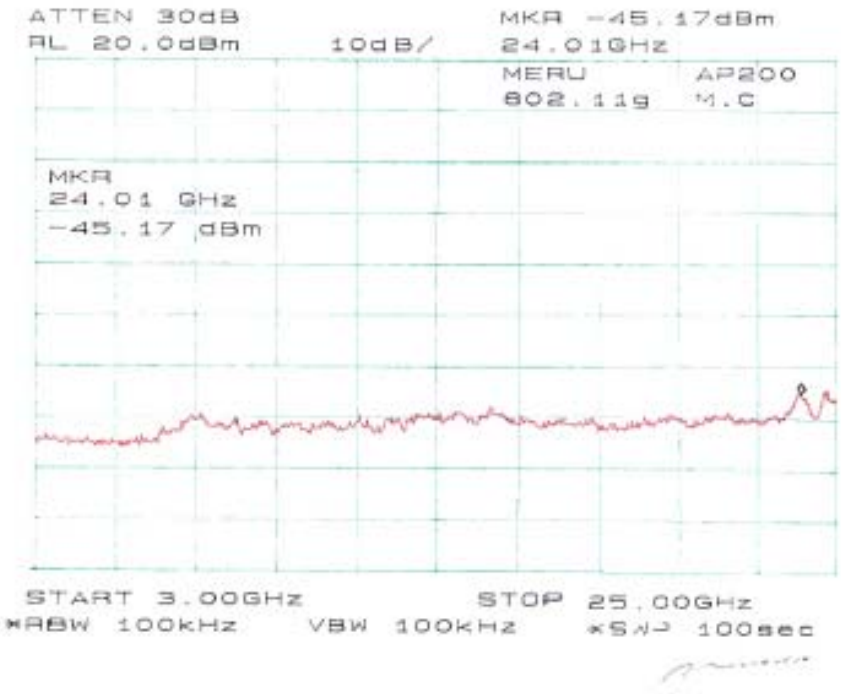

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 8.33dBm
2.436GHz
MERU
802.11b
AP200
M.C
MKR
2.436 GHz
8.33 dBm
START 30MHz
#RBW 100kHz
VBW 100kHz
STOP 3.000GHz
#SWP 50.0sec

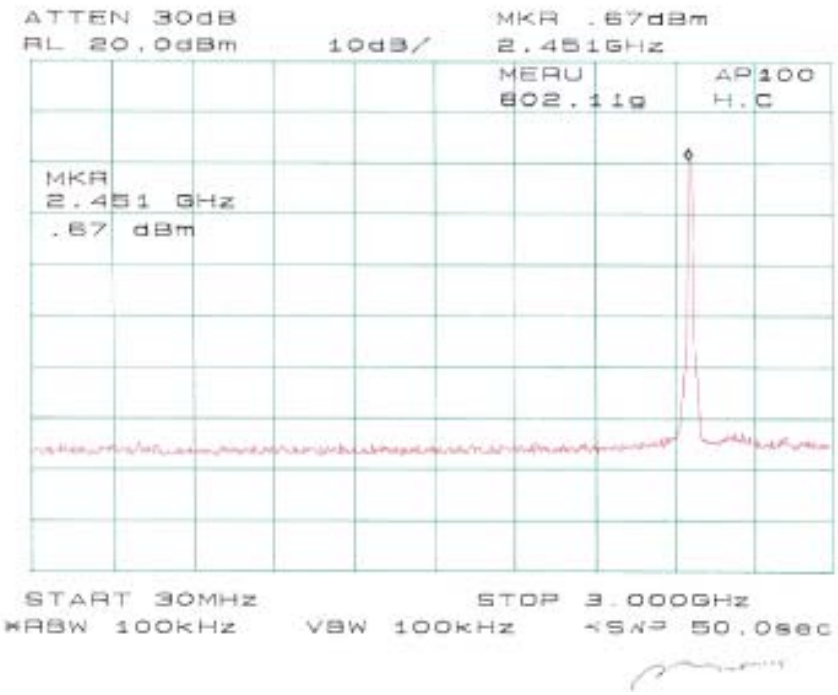

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 6.17dBm
2.460GHz
MERU
802.11b
AP200
M.C
MKR
2.460 GHz
6.17 dBm
START 30MHz
#RBW 100kHz
VBW 100kHz
STOP 3.000GHz
#SWP 50.0sec

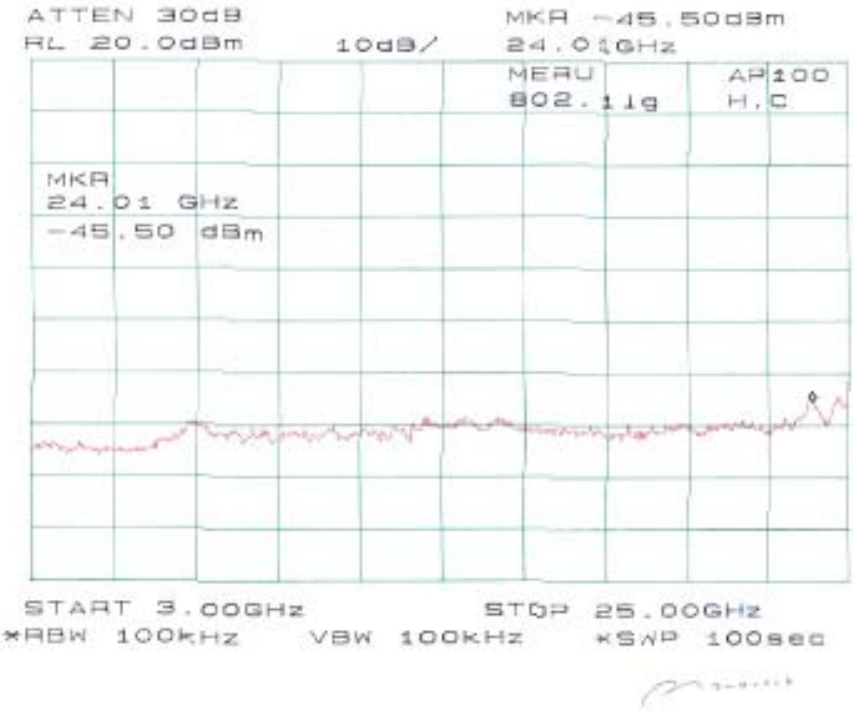

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 3.67dBm
2.411GHz
MERU AP200
802.11g L.C
MKR
2.411 GHz
3.67 dBm
START 30MHz
STOP 3.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec

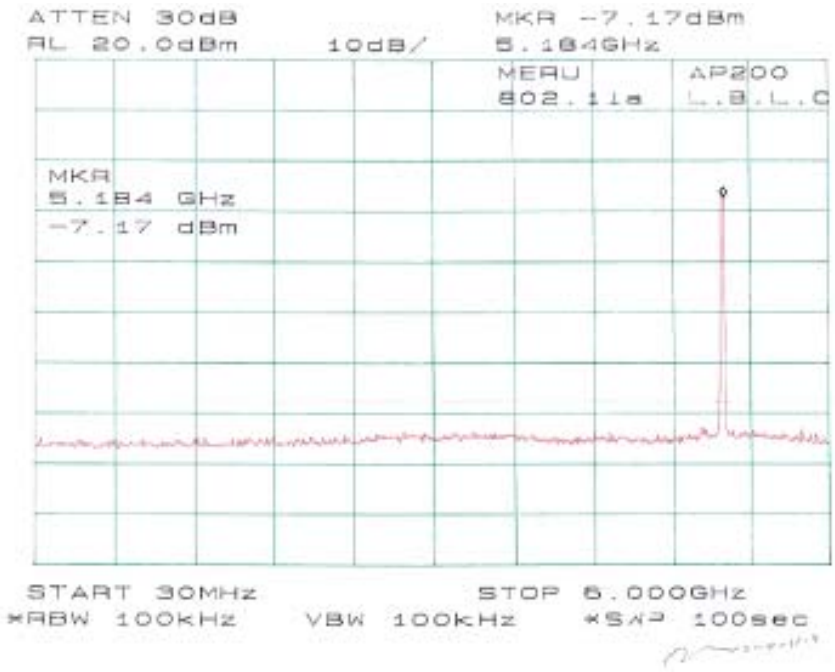

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -45.83dBm
24.05G
MERU AP200
802.11g L.C
MKR
24.05 GHz
-45.83 dBm
START 3.000GHz
STOP 25.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec

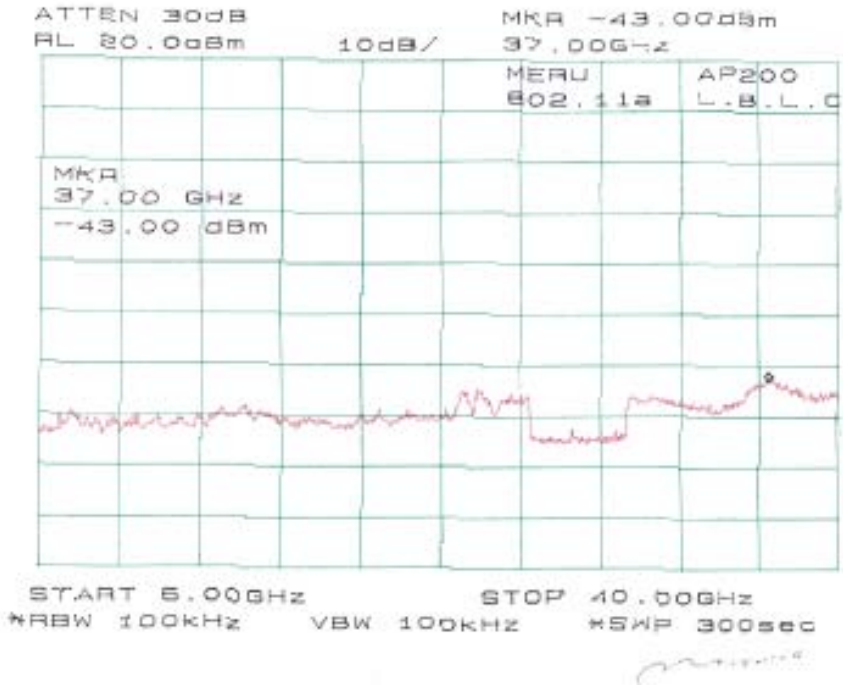

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 7.67dBm
2.441GHz
MERU
802.11g
AP200
M.C
MKR
2.441 GHz
7.67 dBm
START 30MHz
STOP 3.000GHz
#RBW 100kHz
VBW 100kHz
#SWP 50.0sec

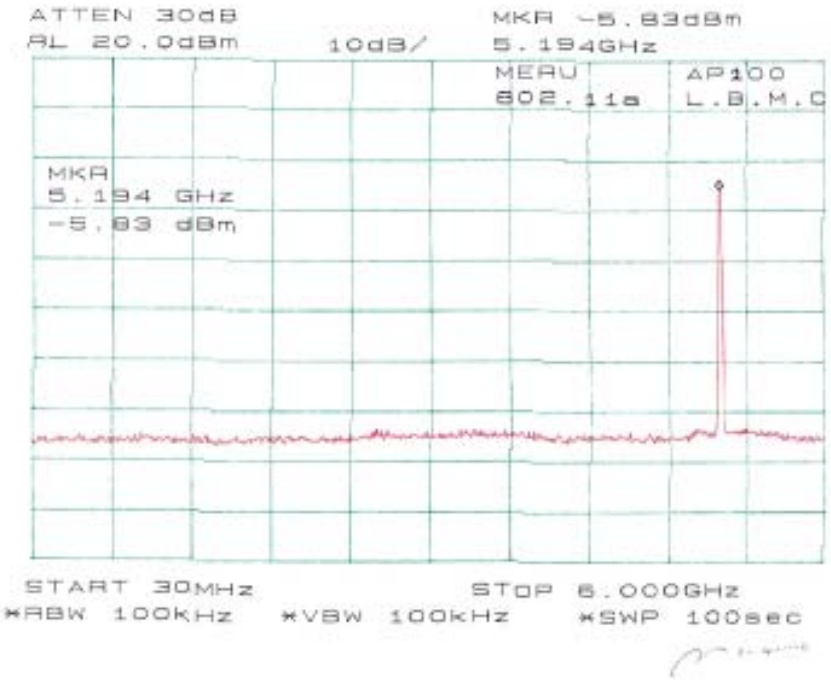

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -45.17dBm
24.01GHz
MERU
802.11g
AP200
M.C
MKR
24.01 GHz
-45.17 dBm
START 3.00GHz
STOP 25.00GHz
#RBW 100kHz
VBW 100kHz
#SWP 100sec

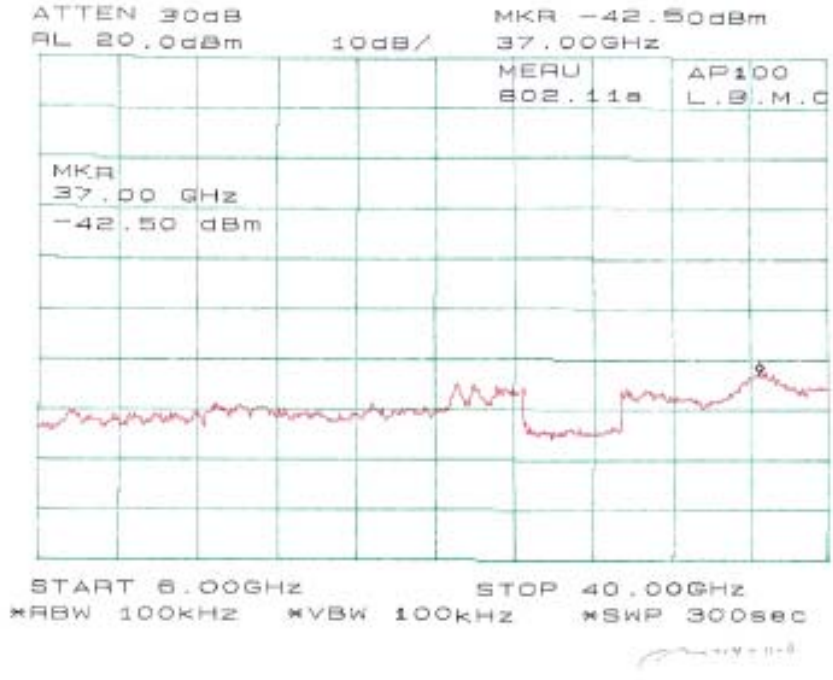

ATTEN 30dB
RL 20.0dBm
10dB/
MKR .67dBm
2.451GHz
MERU
802.11g
AP100
H.C
MKR
2.451 GHz
.67 dBm
START 30MHz
STOP 3.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0sec

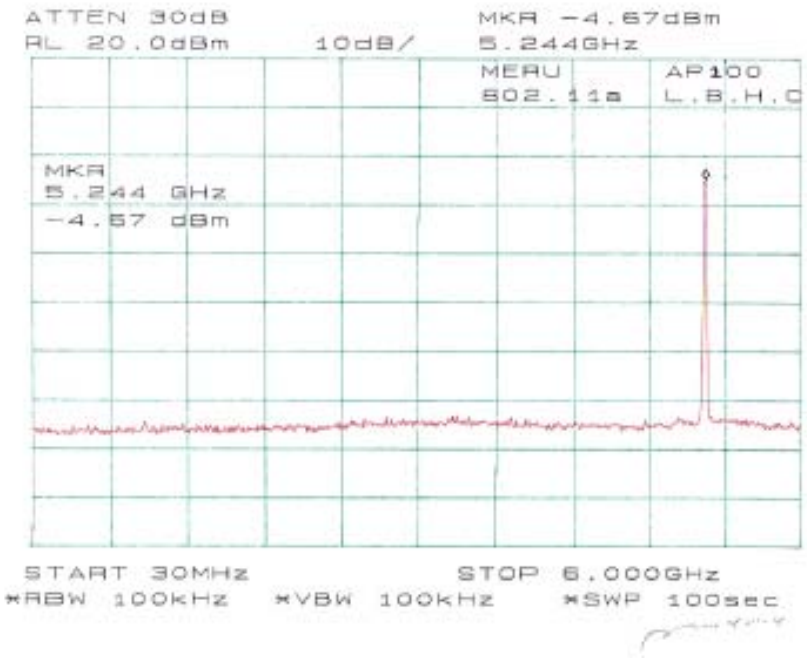

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -45.50dBm
24.01GHz
MERU
802.11g
AP100
H.C
MKR
24.01 GHz
-45.50 dBm
START 3.00GHz
STOP 25.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec

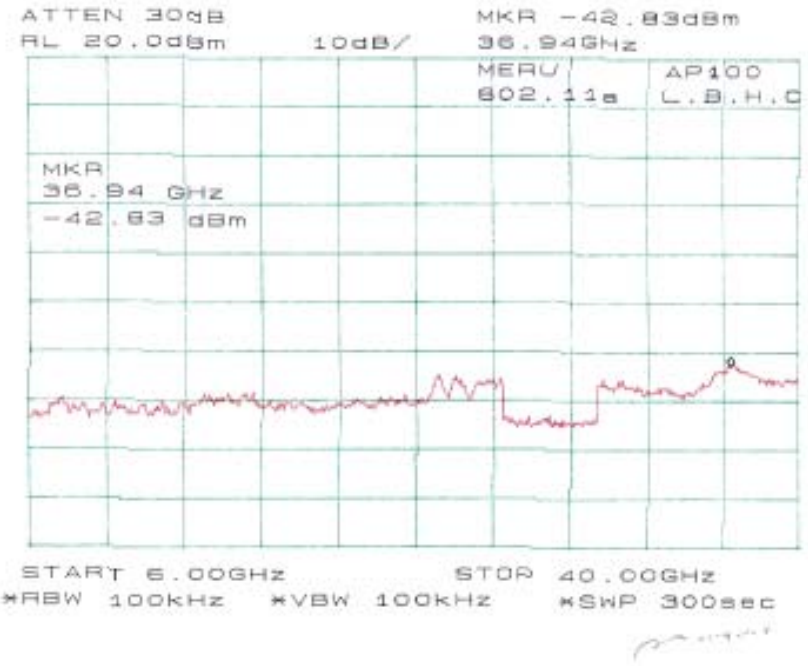

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -7.17dBm
5.184GHz
MERU
802.11a
AP200
MKR
5.184 GHz
-7.17 dBm
START 30MHz
STOP 6.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec

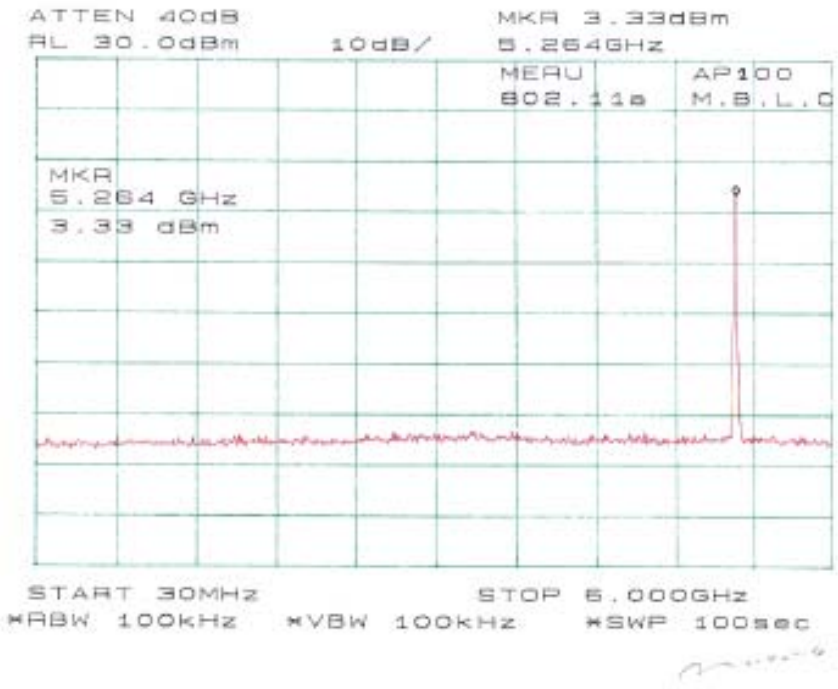

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -43.00dBm
37.000GHz
MERU
802.11a
AP200
MKR
37.00 GHz
-43.00 dBm
START 5.000GHz
STOP 40.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 300sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -5.83dBm
5.194GHz
MERU
802.11a
AP100
L.B.M.C
MKR
5.194 GHz
-5.83 dBm
START 30MHz
STOP 6.000GHz
*RBW 100kHz
*VBW 100kHz
*SWP 100sec

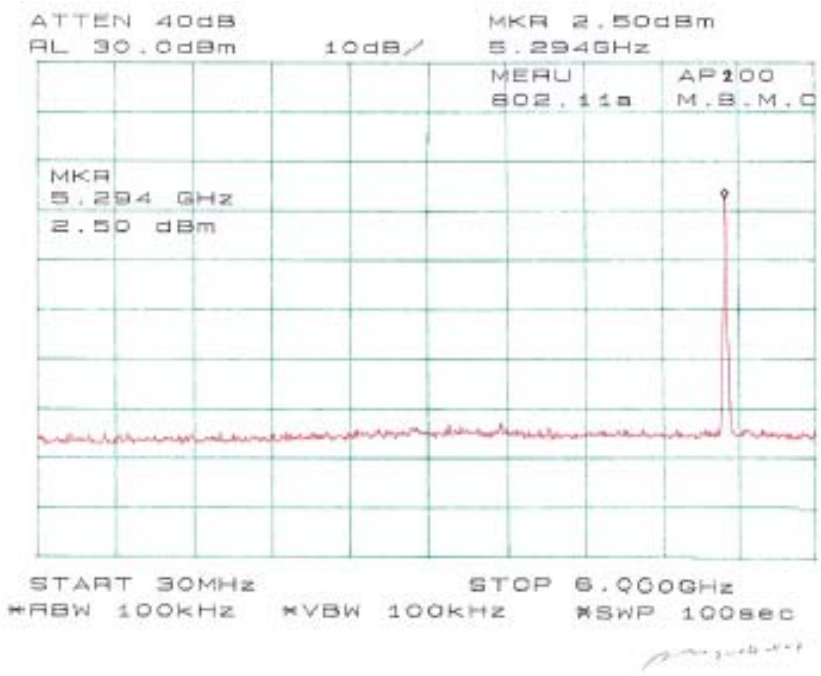

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -42.50dBm
37.00GHz
MERU
802.11a
AP100
L.B.M.C
MKR
37.00 GHz
-42.50 dBm
START 6.00GHz
STOP 40.00GHz
*RBW 100kHz
*VBW 100kHz
*SWP 300sec

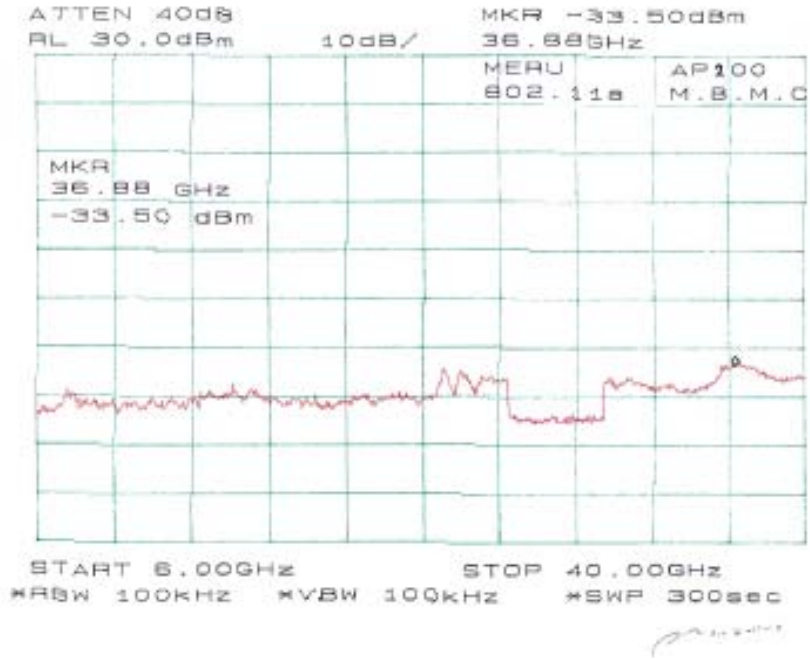

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -4.67dBm
5.244GHz
MERU
802.11a
AP100
L.B.H.C
MKR
5.244 GHz
-4.67 dBm
START 30MHz
STOP 6.000GHz
*RBW 100kHz
*VBW 100kHz
*SWP 100sec

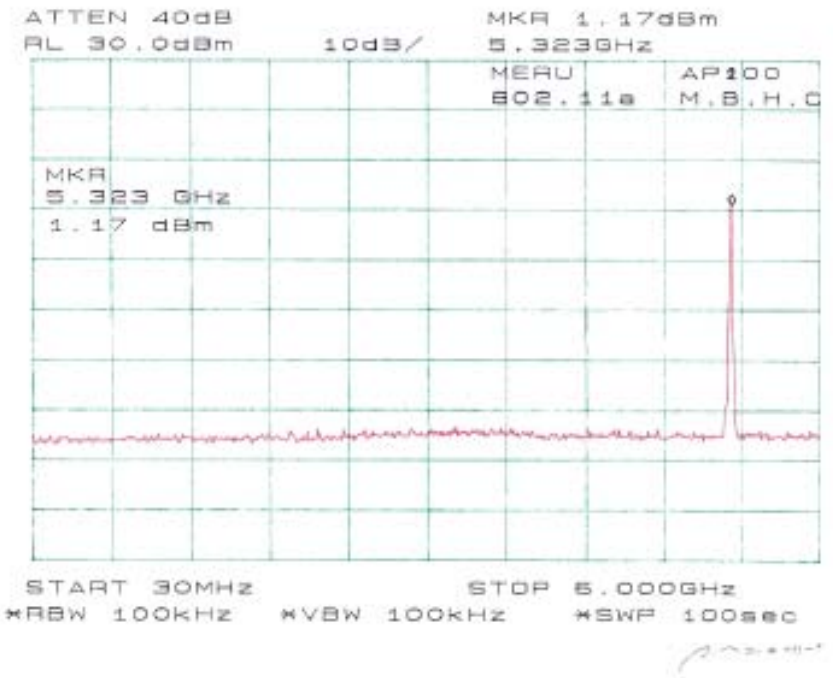

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -42.83dBm
36.94GHz
MERU
802.11a
AP100
L.B.H.C
MKR
36.94 GHz
-42.83 dBm
START 6.00GHz
STOP 40.00GHz
*RBW 100kHz
*VBW 100kHz
*SWP 300sec

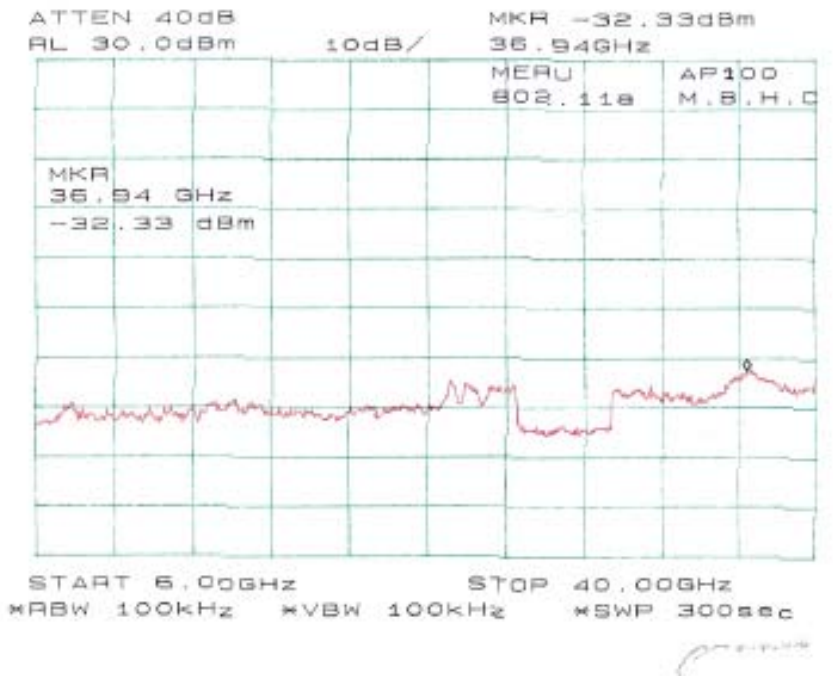

ATTEN 40dB
RL 30.0dBm
10dB/
MKR 3.33dBm
5.264GHz
MERU
802.11a
AP100
M.B.L.C
MKR
5.264 GHz
3.33 dBm
START 30MHz
STOP 6.000GHz
*RBW 100kHz
*VBW 100kHz
*SWP 100sec

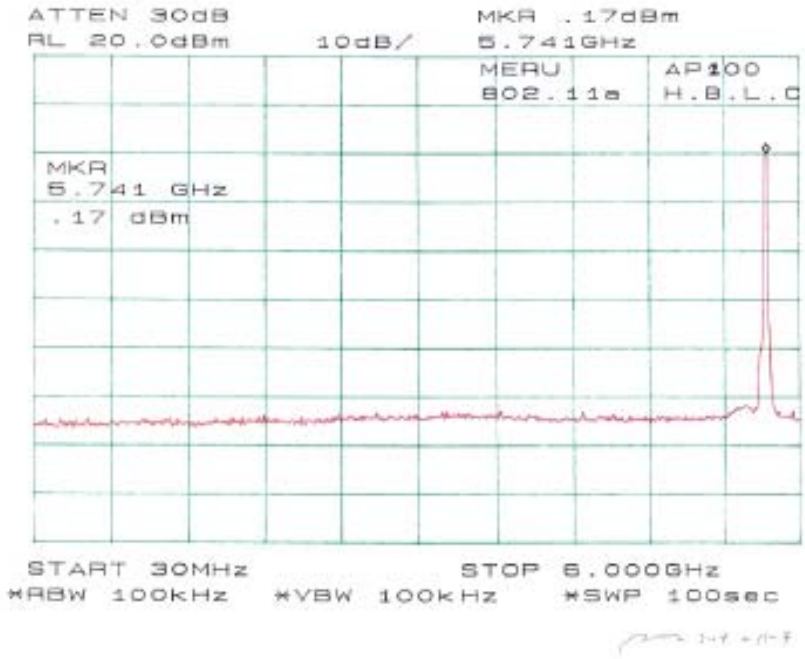

ATTEN 40dB
RL 30.0dBm
10dB/
MKR -31.83dBm
37.28GHz
MERU
802.11a
AP100
M.B.L.C
MKR
37.28 GHz
-31.83 dBm
START 6.00GHz
STOP 40.00GHz
*RBW 100kHz
*VBW 100kHz
*SWP 300sec

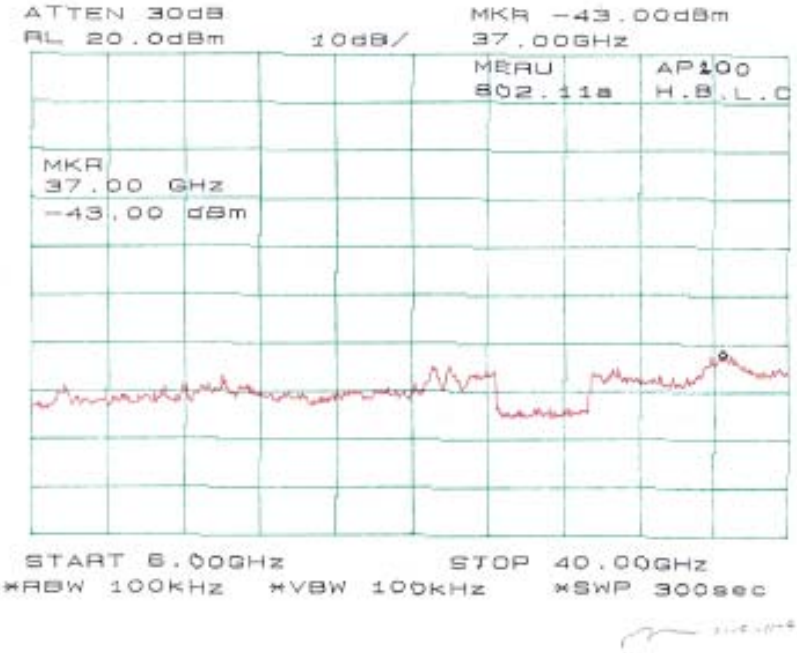

ATTEN 40dB
RL 30.0dBm
10dB/
MKR 2.50dBm
5.294GHz
MERU
802.11a
AP200
M.B.M.C
MKR
5.294 GHz
2.50 dBm
START 30MHz
STOP 6.000GHz
*RBW 100kHz
*VBW 100kHz
*SWP 100sec

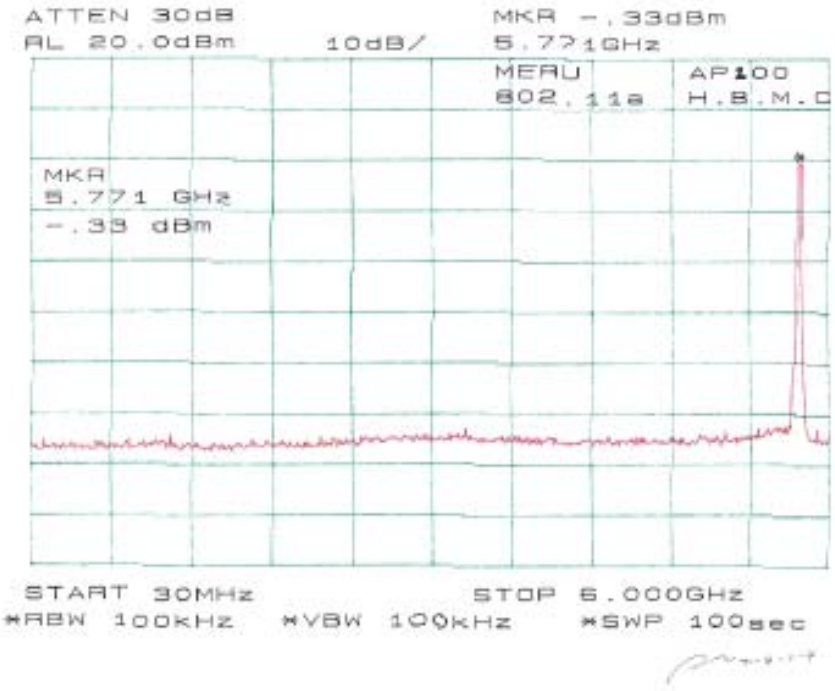

ATTEN 40dB
RL 30.0dBm
10dB/
MKR -33.50dBm
36.88GHz
MERU
802.11a
AP200
M.B.M.C
MKR
36.88 GHz
-33.50 dBm
START 6.00GHz
STOP 40.00GHz
*RBW 100kHz
*VBW 100kHz
*SWP 300sec

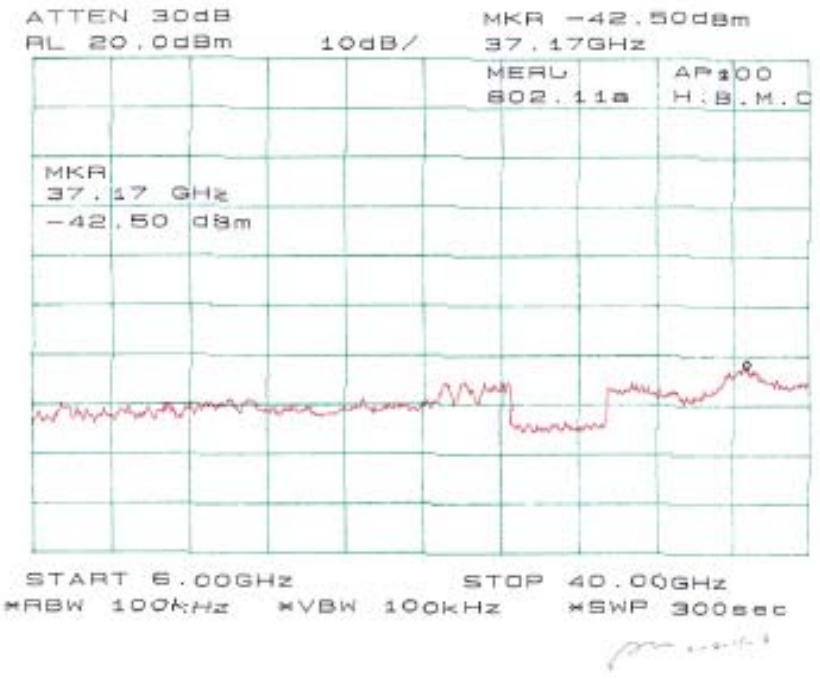

ATTEN 40dB
RL 30.0dBm
10dB/
MKR 1.17dBm
5.323GHz
MERU
802.11a
AP100
M.B.H.C
MKR
5.323 GHz
1.17 dBm
START 30MHz
STOP 6.000GHz
*RBW 100kHz
*VBW 100kHz
*SWP 100sec

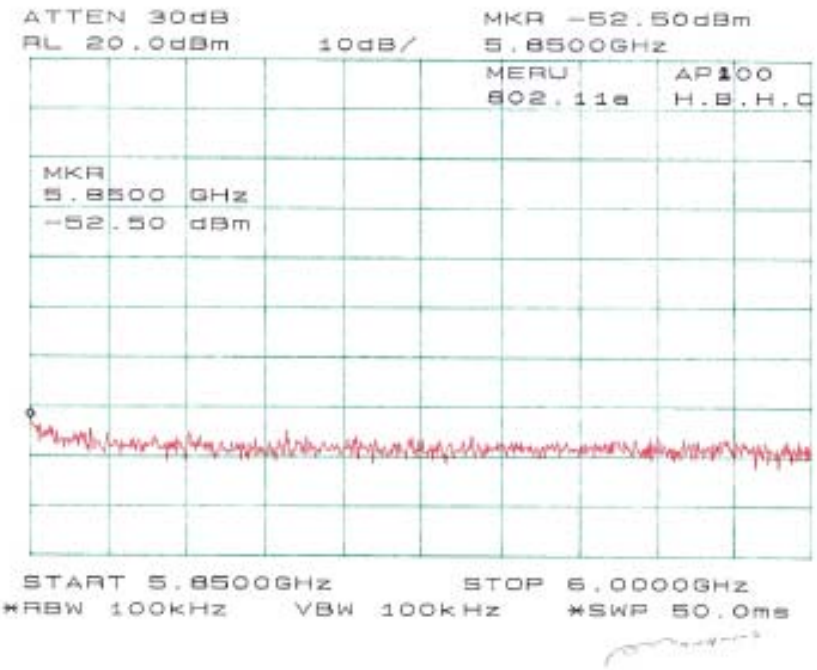

ATTEN 40dB
RL 30.0dBm
10dB/
MKR -32.33dBm
36.94GHz
MERU
802.11a
AP100
M.B.H.C
MKR
36.94 GHz
-32.33 dBm
START 6.00GHz
STOP 40.00GHz
*RBW 100kHz
*VBW 100kHz
*SWP 300sec

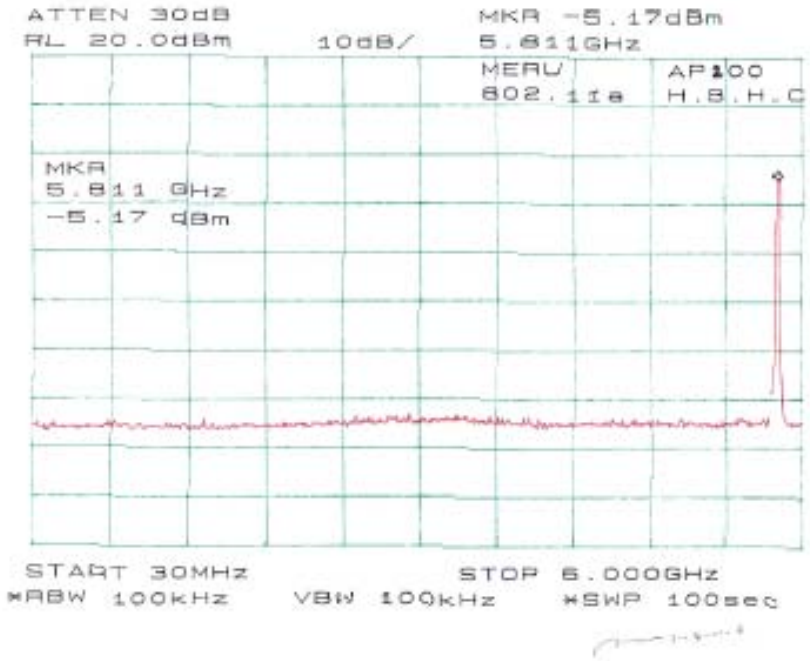

ATTEN 30dB
RL 20.0dBm
10dB/
MKR .17dBm
5.741GHz
MERU
802.11a
AP100
H.B.L.C
MKR
5.741 GHz
.17 dBm
START 30MHz
STOP 6.000GHz
*RBW 100kHz
*VBW 100kHz
*SWP 100sec

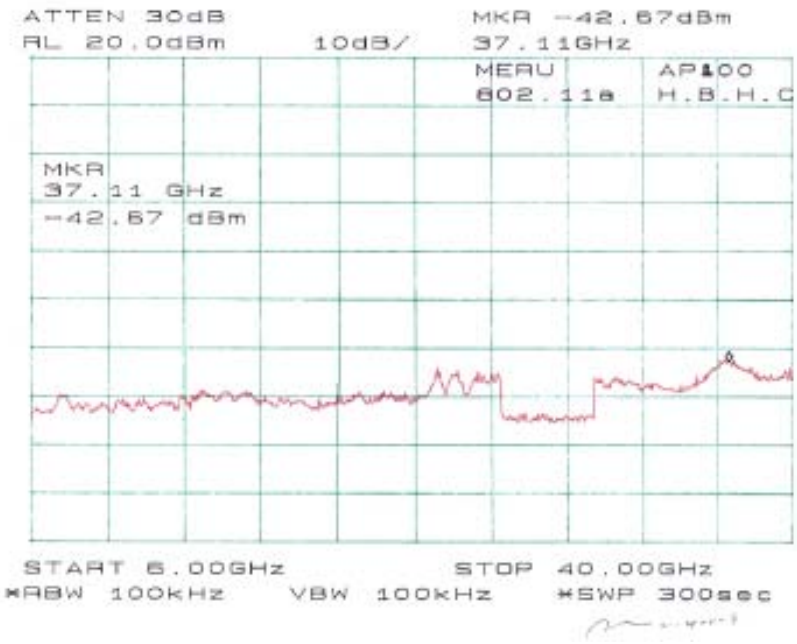

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -43.00dBm
37.00GHz
MERU
802.11a
AP100
H.B.L.C
MKR
37.00 GHz
-43.00 dBm
START 6.00GHz
STOP 40.00GHz
*RBW 100kHz
*VBW 100kHz
*SWP 300sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -.33dBm
5.771GHz
MERU
802.11a
AP100
H.B.M.C
MKR
5.771 GHz
-.33 dBm
START 30MHz
STOP 6.000GHz
*RBW 100kHz
*VBW 100kHz
*SWP 100sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -42.50dBm
37.17GHz
MERU
802.11a
AP100
H.B.M.C
MKR
37.17 GHz
-42.50 dBm
START 6.00GHz
STOP 40.00GHz
*RBW 100kHz
*VBW 100kHz
*SWP 300sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -52.50dBm
5.8500GHz
MERU
802.11a
AP100
H.B.H.C
MKR
5.8500 GHz
-52.50 dBm
START 5.8500GHz
STOP 6.0000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -5.17dBm
5.811GHz
MERU
802.11a
AP100
H.B.H.C
MKR
5.811 GHz
-5.17 dBm
START 30MHz
STOP 6.000GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -42.67dBm
37.11GHz
MERU
802.11a
AP100
H.B.H.C
MKR
37.11 GHz
-42.67 dBm
START 6.00GHz
STOP 40.00GHz
#RBW 100kHz
VBW 100kHz
#SWP 300sec

§15.247(a)(2) & §15.407 – 6 DB BANDWIDTH and 26 DB BANDWIDTH

Standard Applicable

According to §15.247(a)(2), for direct sequence systems, the minimum 6dB bandwidth shall be at least 500 kHz. According to §15.407, 26dB Bandwidth should be shown.

Measurement 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. (6 dB bandwidth for DTS)
4. Same as (3) except 26 dB. (26dB bandwidth for UNII)
5. Repeat above procedures until all frequencies measured were complete.

Equipment Lists

Manufacturer	Model No.	Description	Calibration Date
HP	8565EC	Spectrum Analyzer	2004-01-22

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Measurement Result

Environmental Conditions

Temperature:	18° C
Relative Humidity:	37%
ATM Pressure:	1032 mbar

The testing was performed by Ming Jing on 2004-11-04.

Test Result for 802.11b (15.247)

Channel	Frequency (MHz)	Measured (MHz)	Standard (kHz)	Result
Low	2412	11.42 MHz	≥ 500	Compliant
Mid	2437	11.92 MHz	≥ 500	Compliant
High	2462	11.83 MHz	≥ 500	Compliant

Test Result for 802.11g (15.247)

Channel	Frequency (MHz)	Measured (MHz)	Standard (kHz)	Result
Low	2412	16.83	≥ 500	Compliant
Mid	2437	16.83	≥ 500	Compliant
High	2462	16.75	≥ 500	Compliant

Test Result for 802.11a

Low Band

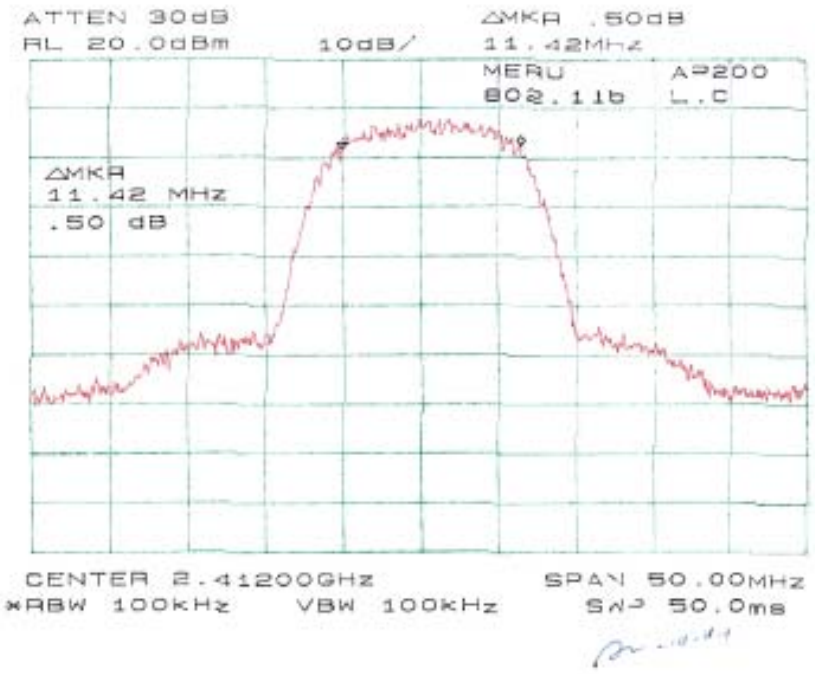
Channel	Frequency (MHz)	Measured (MHz)	Standard (kHz)	Result
Low	5180	20.83	≥ 500	Compliant
Mid	5200	20.50	≥ 500	Compliant
High	5240	20.58	≥ 500	Compliant

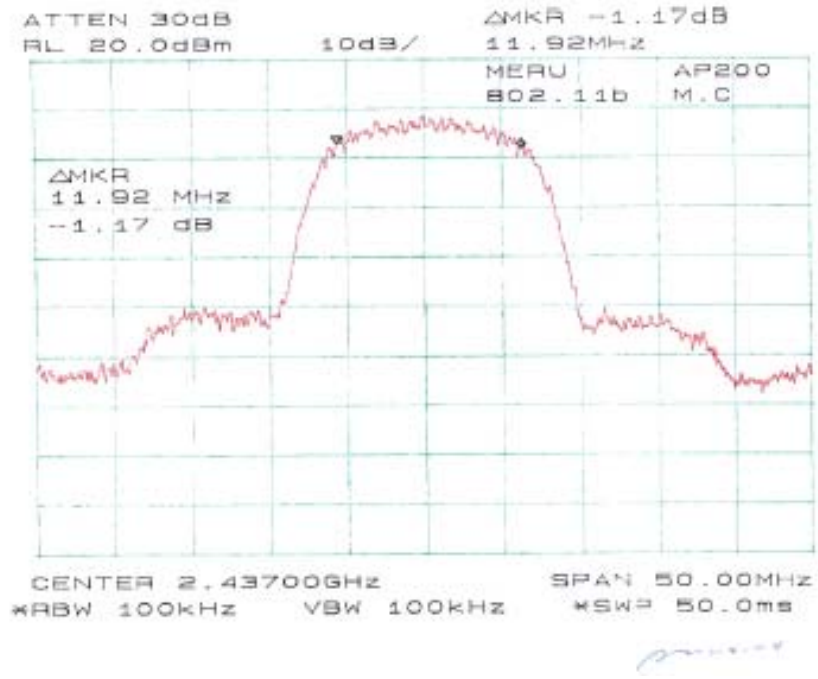
Mid Band

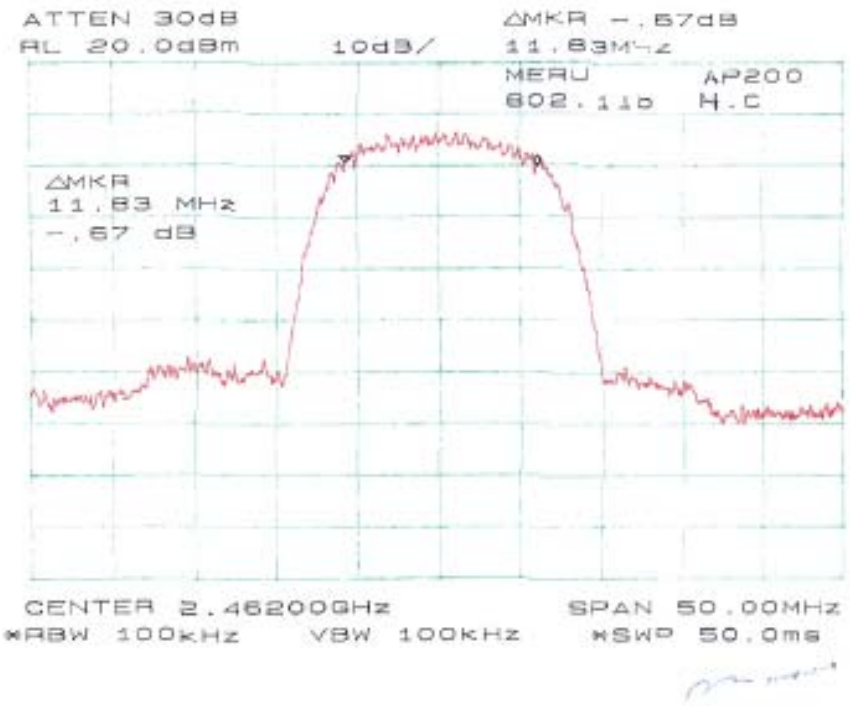
Channel	Frequency (MHz)	Measured (MHz)	Standard (kHz)	Result
Low	5260	22.33	≥ 500	Compliant
Mid	5300	23.08	≥ 500	Compliant
High	5320	21.33	≥ 500	Compliant

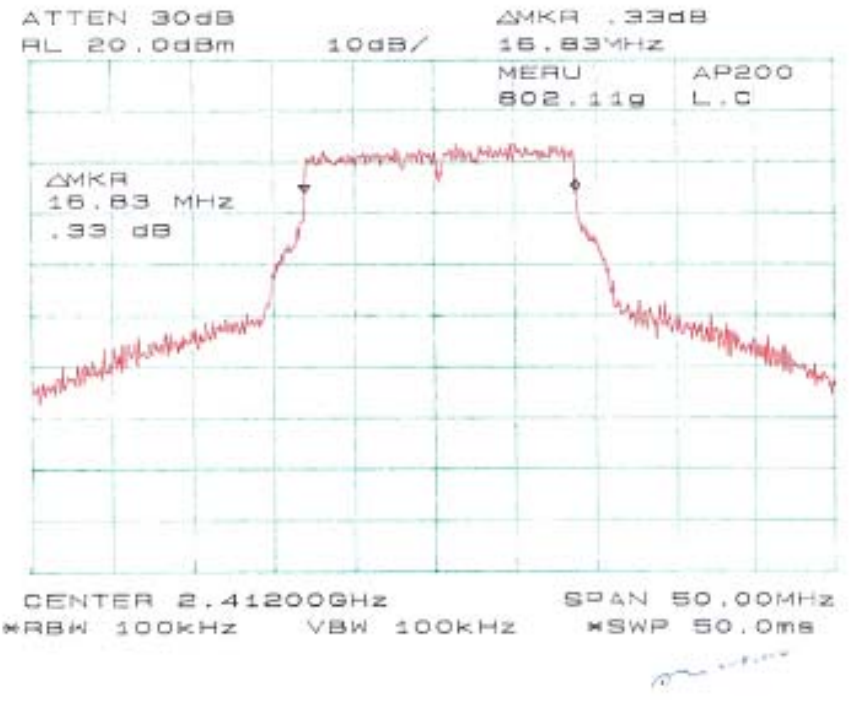
High Band

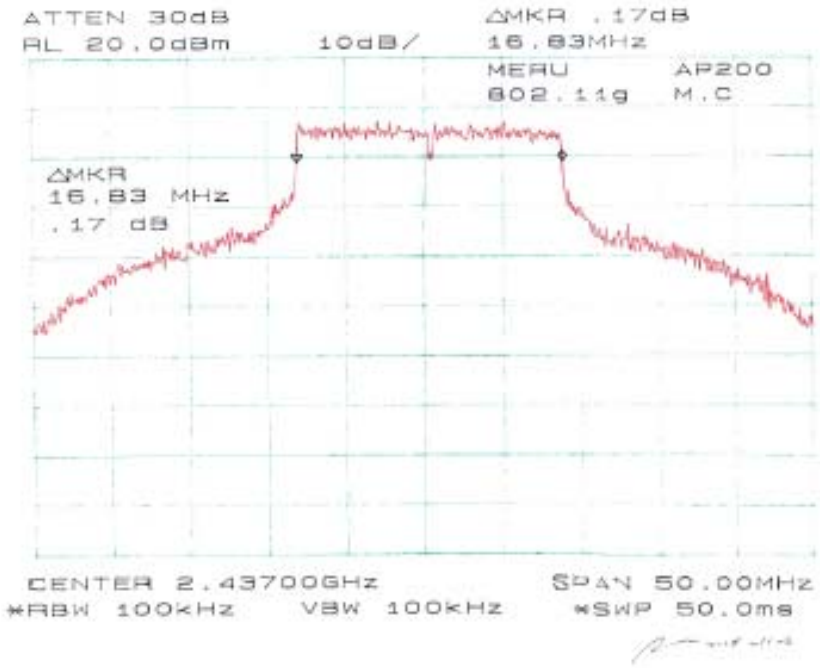
Channel	Frequency (MHz)	Measured (MHz)	Standard (kHz)	Result
Low	5745	16.75	≥ 500	Compliant
Mid	5785	16.83	≥ 500	Compliant
High	5825	16.67	≥ 500	Compliant

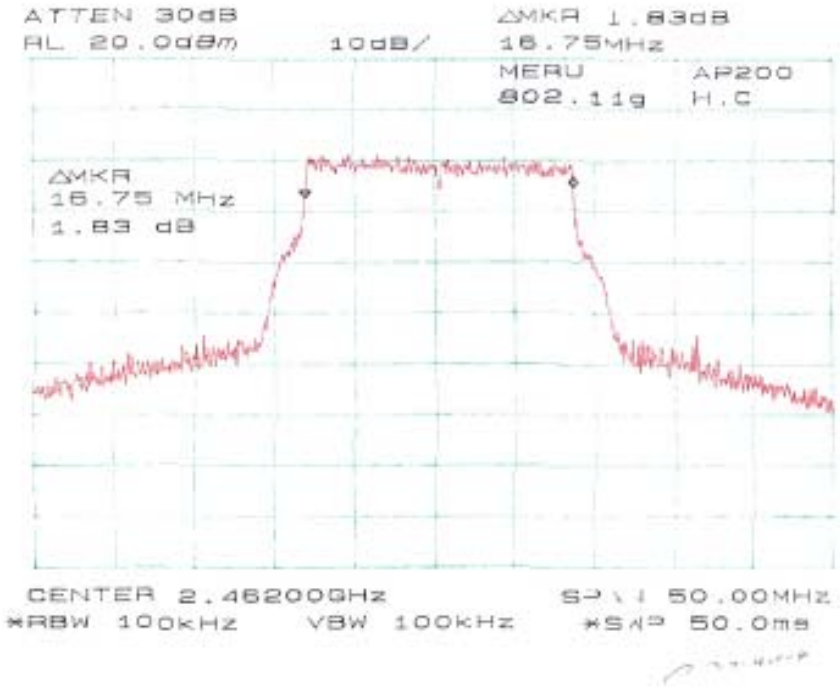

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR .50dB
11.42MHz
MERU
802.11b
AP200
L.C
ΔMKR
11.42 MHz
.50 dB
CENTER 2.41200GHz
SPAN 50.00MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

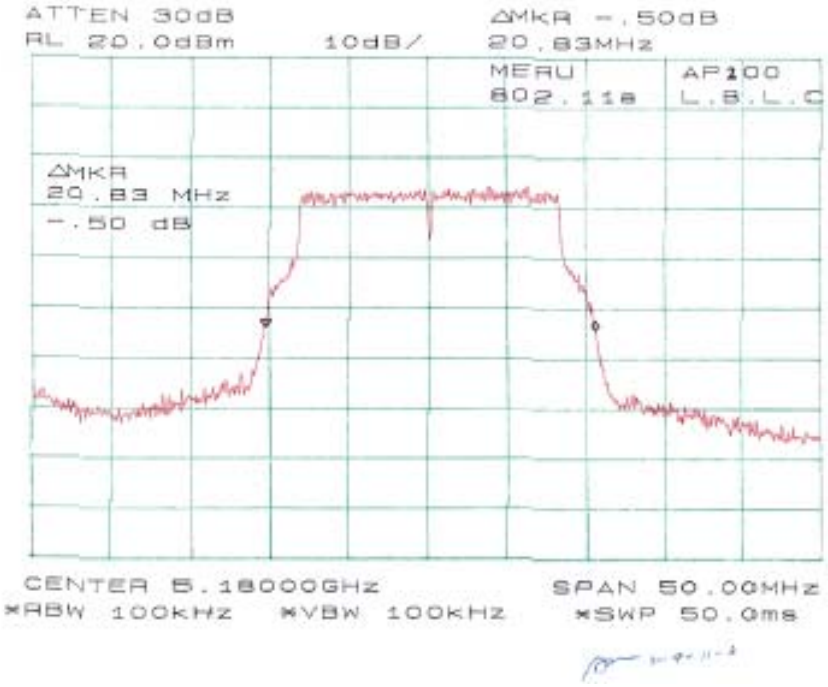

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -1.17dB
11.92MHz
MERU
802.11b
AP200
M.C
ΔMKR
11.92 MHz
-1.17 dB
CENTER 2.43700GHz
SPAN 50.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms

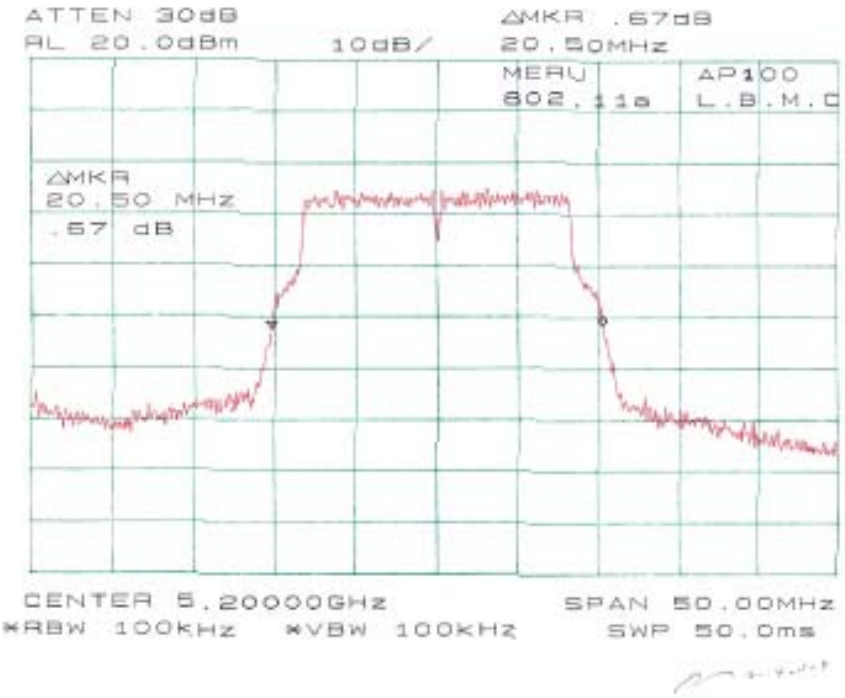

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -.67dB
11.83MHz
MERU AP200
802.11b H.C
ΔMKR
11.83 MHz
-.67 dB
CENTER 2.462000GHz
SPAN 50.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms

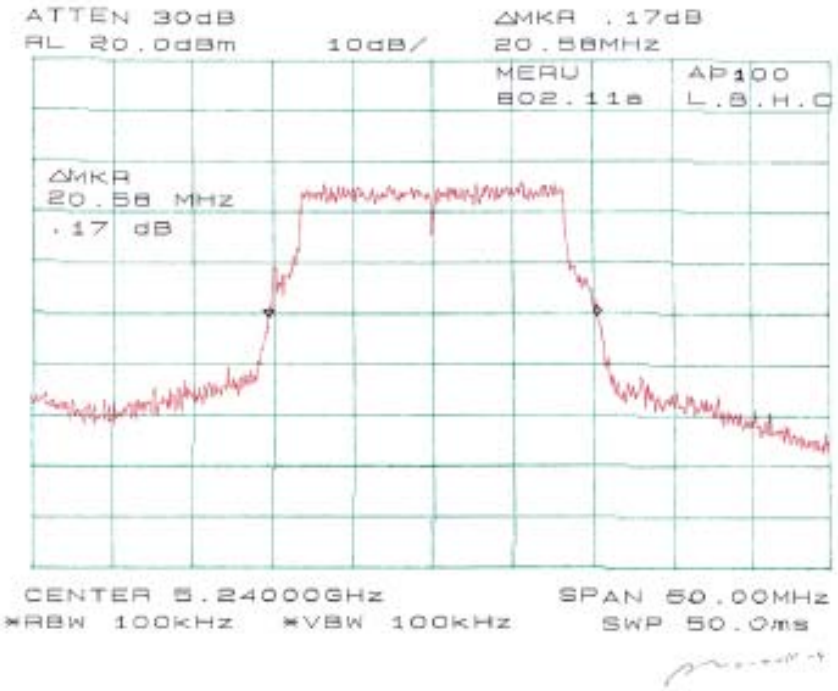

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR .33dB
16.83MHz
MERU AP200
802.11g L.C
ΔMKR
16.83 MHz
.33 dB
CENTER 2.412000GHz
SPAN 50.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms

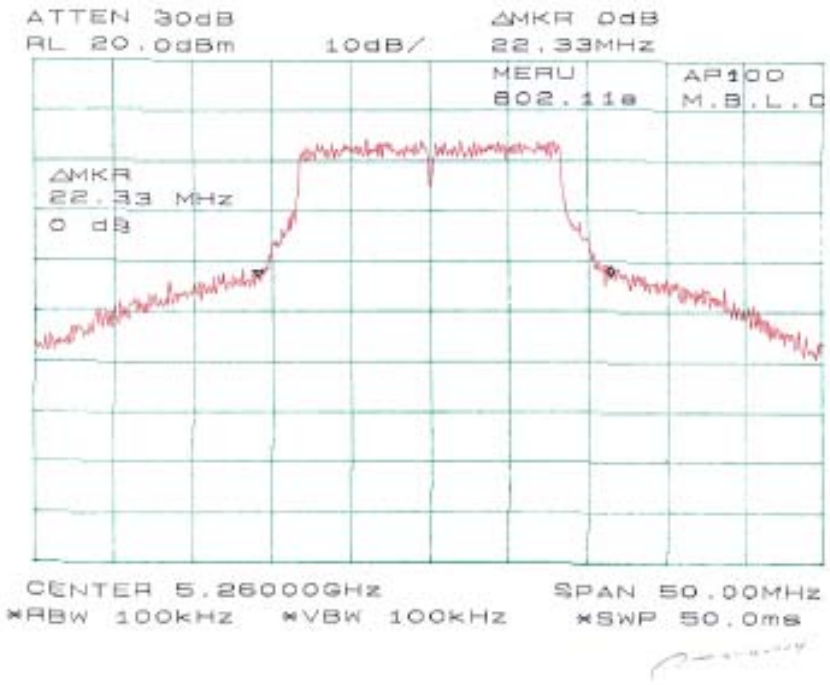

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR .17dB
16.83MHz
MERU AP200
802.11g M.C
ΔMKR
16.83 MHz
.17 dB
CENTER 2.437000GHz
SPAN 50.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms

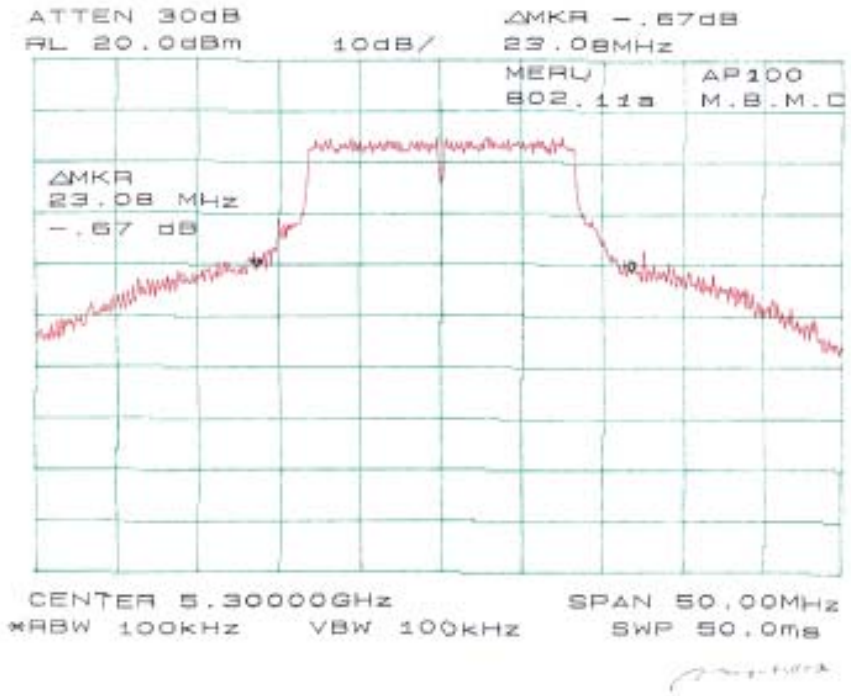

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 1.83dB
16.75MHz
MERU AP200
802.11g H.C
ΔMKR
16.75 MHz
1.83 dB
CENTER 2.462000GHz
*RBW 100kHz
VBW 100kHz
50.00MHz
*SWP 50.0ms

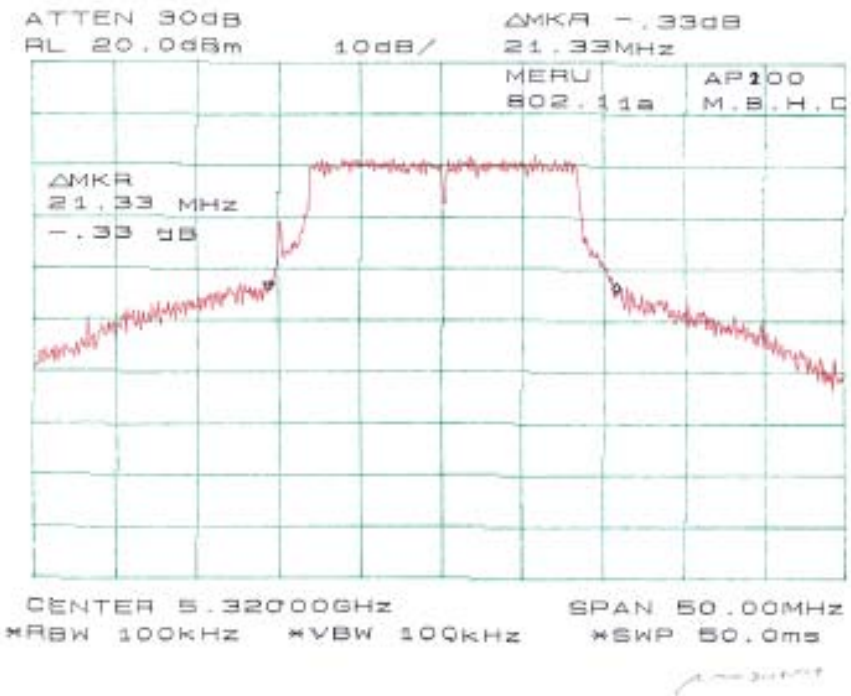

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -.50dB
20.83MHz
MERU
802.11a
AP100
L.B.L.C
ΔMKR
20.83 MHz
-.50 dB
CENTER 5.18000GHz
SPAN 50.00MHz
*RBW 100kHz
*VBW 100kHz
*SWP 50.0ms

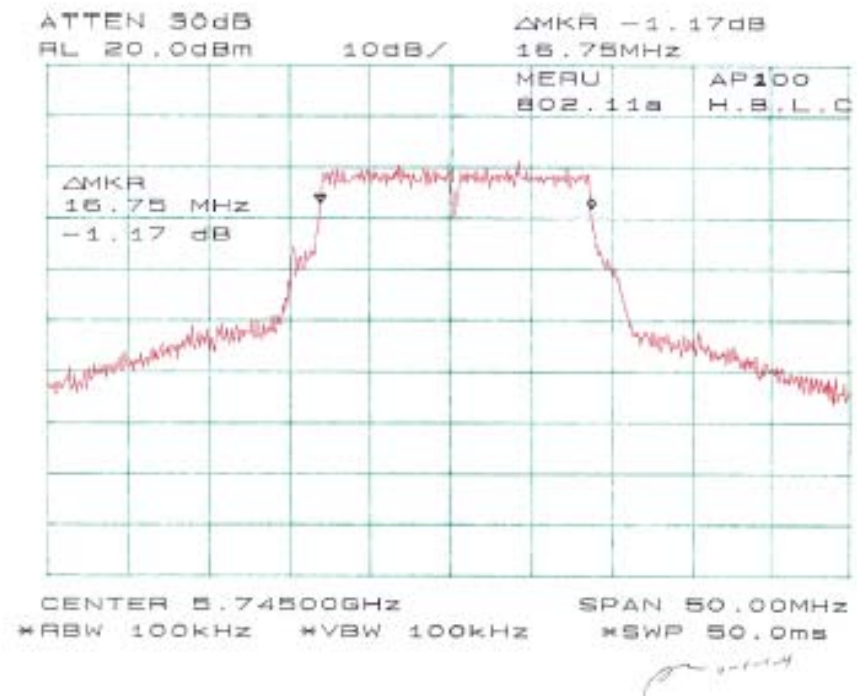

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR .67dB
20.50MHz
MERU
802.11a
AP100
L.B.M.C
ΔMKR
20.50 MHz
.67 dB
CENTER 5.20000GHz
SPAN 50.00MHz
*RBW 100kHz
*VBW 100kHz
SWP 50.0ms

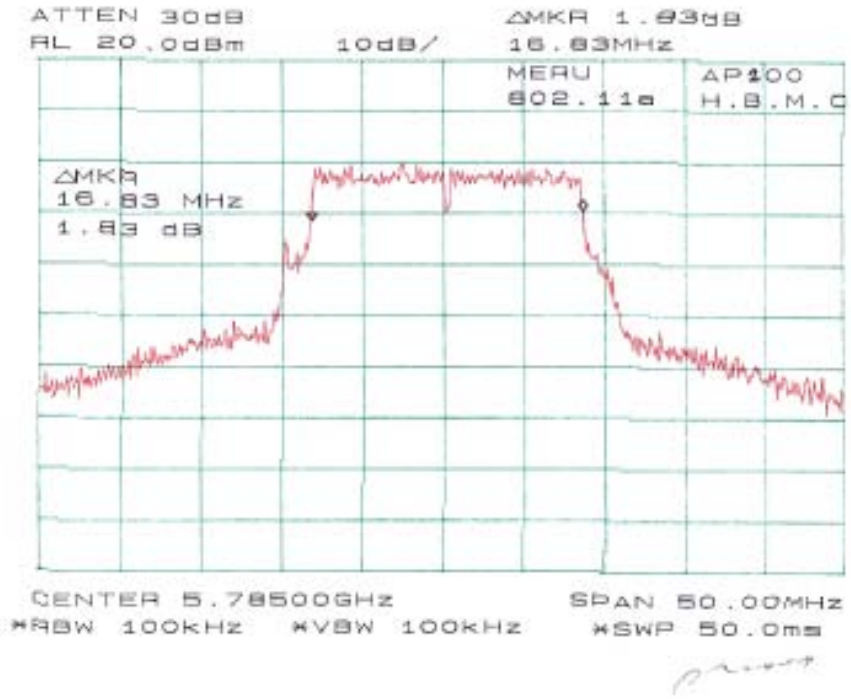

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR .17dB
20.58MHz
MERU
802.11a
AP100
L.B.H.C
ΔMKR
20.58 MHz
.17 dB
CENTER 5.240000GHz
SPAN 50.00MHz
*RBW 100kHz
*VBW 100kHz
SWP 50.0ms

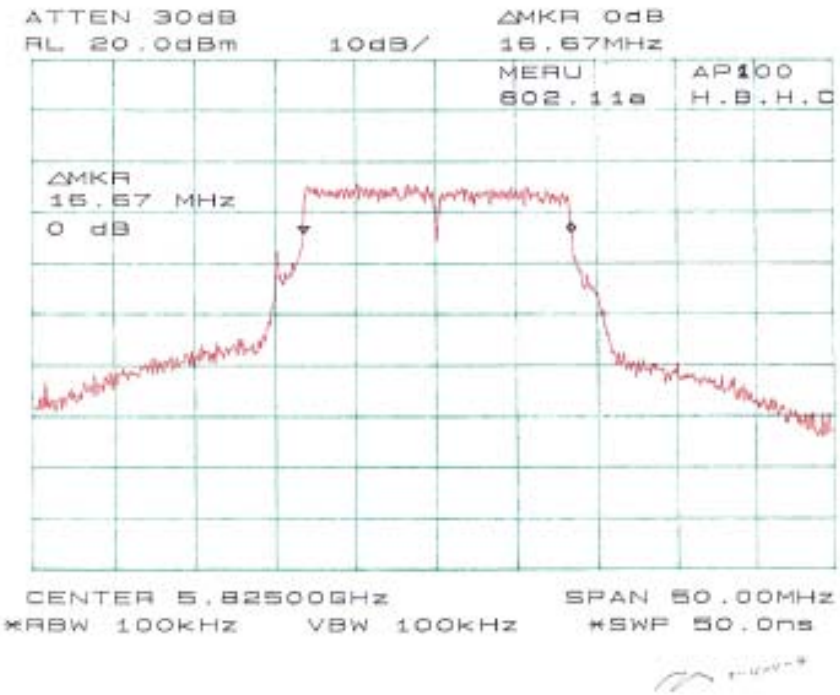

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 0dB
22.33MHz
MERU
802.11a
AP100
M.B.L.C
ΔMKR
22.33 MHz
0 dB
CENTER 5.260000GHz
SPAN 50.00MHz
*RBW 100kHz
*VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -.67dB
23.08MHz
MERU
802.11a
AP100
M.B.M.C
ΔMKR
23.08 MHz
-.67 dB
CENTER 5.30000GHz
SPAN 50.00MHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -.33dB
21.33MHz
MERU
802.11a
AP100
M.B.H.C
ΔMKR
21.33 MHz
-.33 dB
CENTER 5.32000GHz
SPAN 50.00MHz
*RBW 100kHz
*VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -1.17dB
16.75MHz
MERU
802.11a
AP100
H.B.L.C
ΔMKR
16.75 MHz
-1.17 dB
CENTER 5.745000GHz
SPAN 50.00MHz
*RBW 100kHz
*VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 1.83dB
16.83MHz
MERU
802.11a
AP100
H.B.M.C
ΔMKR
16.83 MHz
1.83 dB
CENTER 5.785000GHz
SPAN 50.00MHz
*RBW 100kHz
*VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 0dB
16.67MHz
MERU
802.11a
AP100
H.B.H.C
ΔMKR
16.67 MHz
0 dB
CENTER 5.825000GHz
SPAN 50.00MHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms

§15.247(b)(3), §15.407(a)(2) - PEAK OUTPUT POWER MEASUREMENT

Standard Applicable

According to §15.247(b) (3), for systems using digital modulation in 2400-2483.5 MHz: 1 Watt

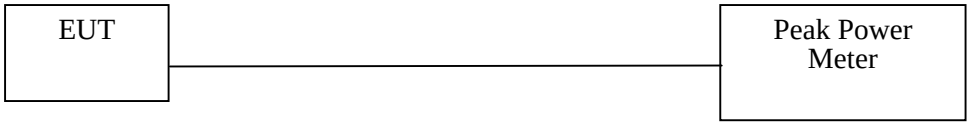
According to §15.407(a)(1), for the band 5.15-5.25 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 50 mW or 4 dBm + 10logB, where B is the 26-dB emission bandwidth in MHz.

According to §15.407(a)(2), for the band 5.25-5.35 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10logB, where B is the 26-dB emission bandwidth in MHz.

According to §15.407(a)(3), for the band 5.725-5.825 GHz, the peak transmit power over the frequency band of operation shall not exceed the lesser of 1 W or 17 dBm + 10logB, where B is the 26-dB emission bandwidth in MHz.

Measurement 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 a Peak Power Meter.



Equipment Lists

Manufacturer	Model No.	Description	Calibration Date
HP	432A	Peak Power Meter	2004-09-26

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Measurement Result

Environmental Conditions

Temperature:	18° C
Relative Humidity:	37%
ATM Pressure:	1032 mbar

The2.4GHz testing was performed by Ming Jing on 2004-11-08.

802.11b (FCC.15.247)

Channel	Frequency MHz	Peak RF Power dBm	Peak RF Power mW	Limit
Low	2412	17.84	60.8	1W (30dBm)
Mid	2442	18.25	66.8	1W (30dBm)
High	2462	16.71	46.9	1W (30dBm)

802.11g (FCC.15.247)

Channel	Frequency MHz	Peak RF Power dBm	Peak RF Power mW	Limit
Low	2412	16.64	46.1	1W (30dBm)
Mid	2442	18.59	72.3	1W (30dBm)
High	2462	17.48	56.1	1W (30dBm)

802.11a Low Band 5150 - 5250 MHz (FCC.15.407)

Channel	Frequency MHz	Peak RF Power dBm	Peak RF Power mW	Limit
Low	5180	6.35	4.32	250mW (24dBm)
Mid	5220	6.74	4.72	250mW (24dBm)
High	5240	6.83	4.82	250mW (24dBm)

802.11a Mid Band 5250 - 5350 MHz (FCC.15.407)

Channel	Frequency MHz	Peak RF Power dBm	Peak RF Power mW	Limit
Low	5280	15.24	33.4	250mW (24dBm)
Mid	5300	16.33	42.9	250mW (24dBm)
High	5320	15.05	32	250mW (24dBm)

802.11a High Band 5725 - 5850 MHz (FCC.15.247)

Channel	Frequency MHz	Peak RF Power dBm	Peak RF Power mW	Limit
Low	5745	11.73	14.9	1W (30dBm)
Mid	5785	12.94	19.7	1W (30dBm)
High	5825	12.29	16.9	1W (30dBm)

§15.247(c) - 100 KHZ BANDWIDTH OF BAND EDGES

Standard Applicable

According to §15.247(c), in *any* 100 kHz bandwidth outside the frequency bands in which the spread spectrum 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. 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)).

Measurement 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 both RBW and VBW of spectrum analyzer to 100 kHz with a convenient frequency span including 100kHz 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.

Equipment Lists

Manufacturer	Model No.	Description	Calibration Date
Agilent	8564E	Spectrum Analyzer	2004-08-26

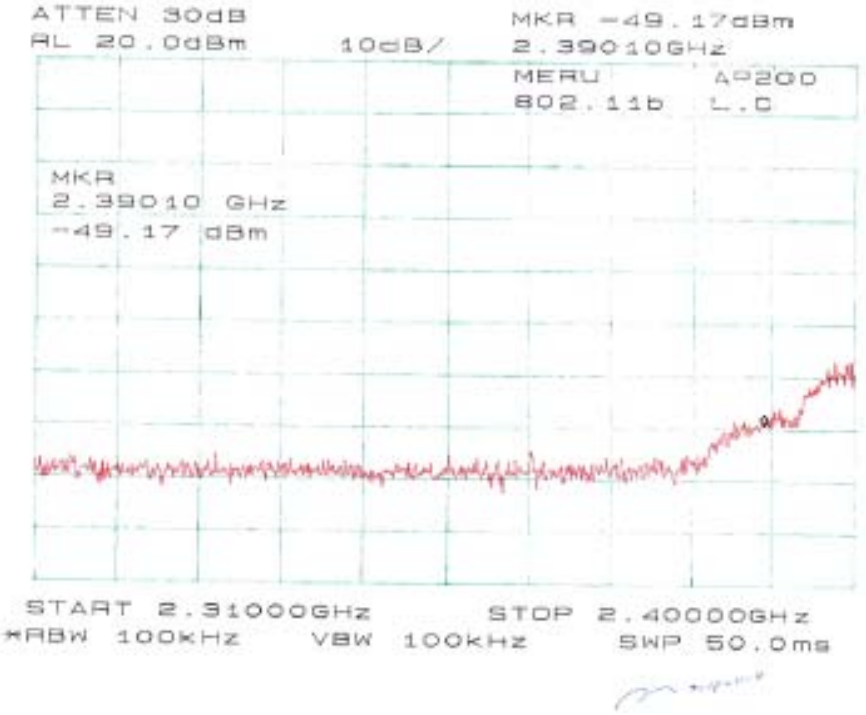
*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

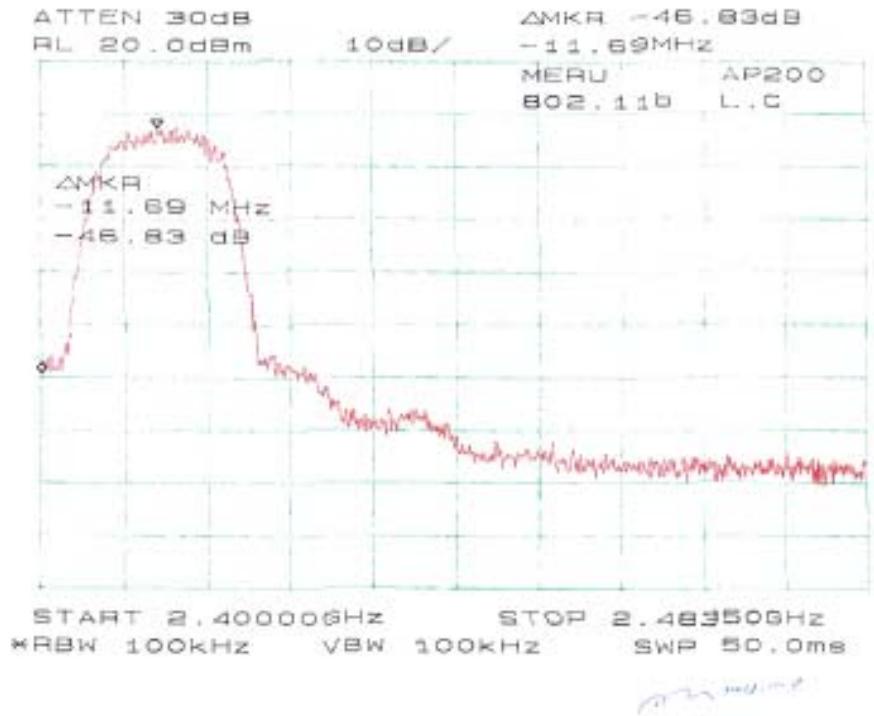
Measure Results

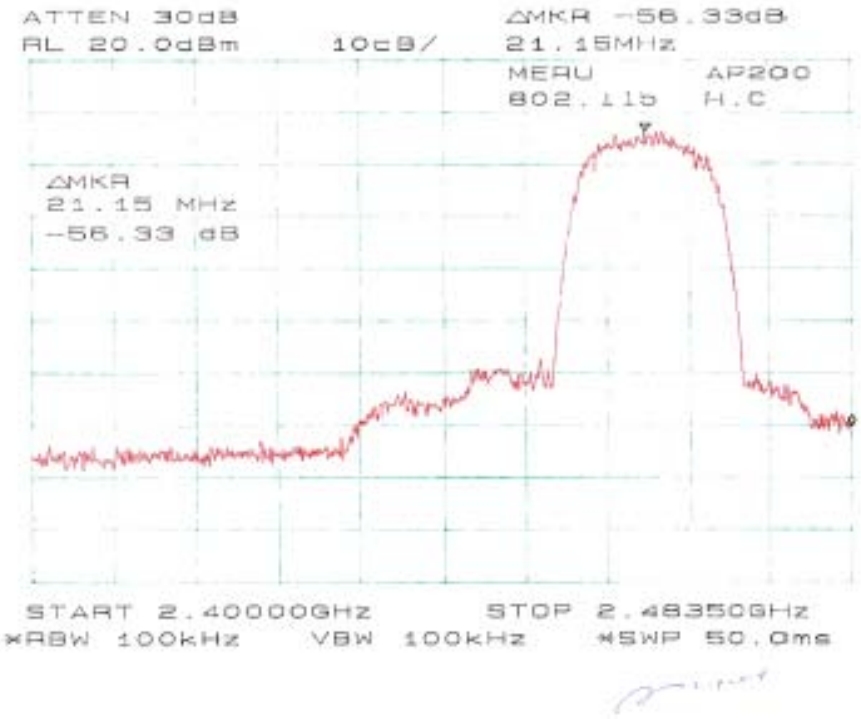
Environmental Conditions

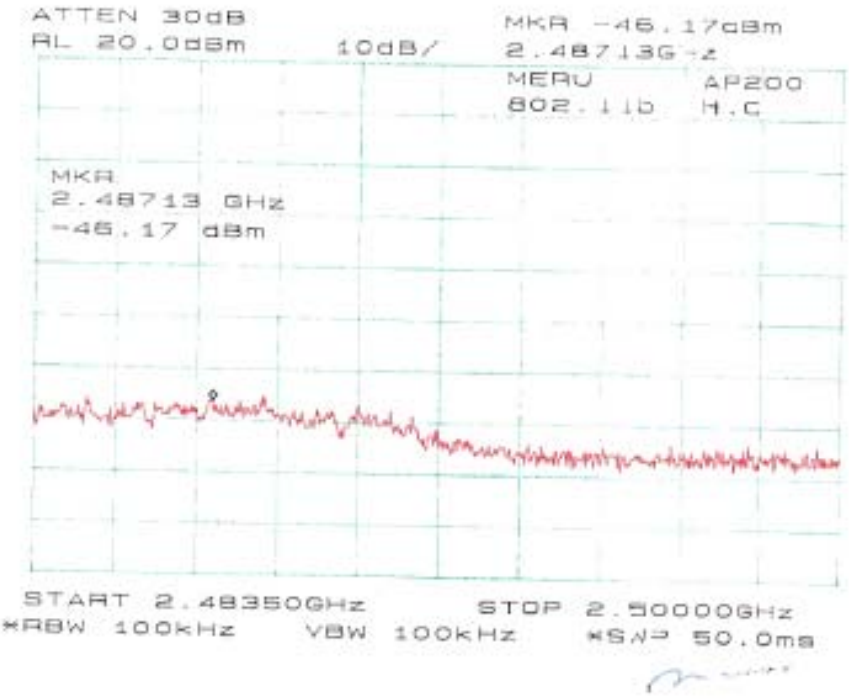
Temperature:	18° C
Relative Humidity:	37%
ATM Pressure:	1032 mbar

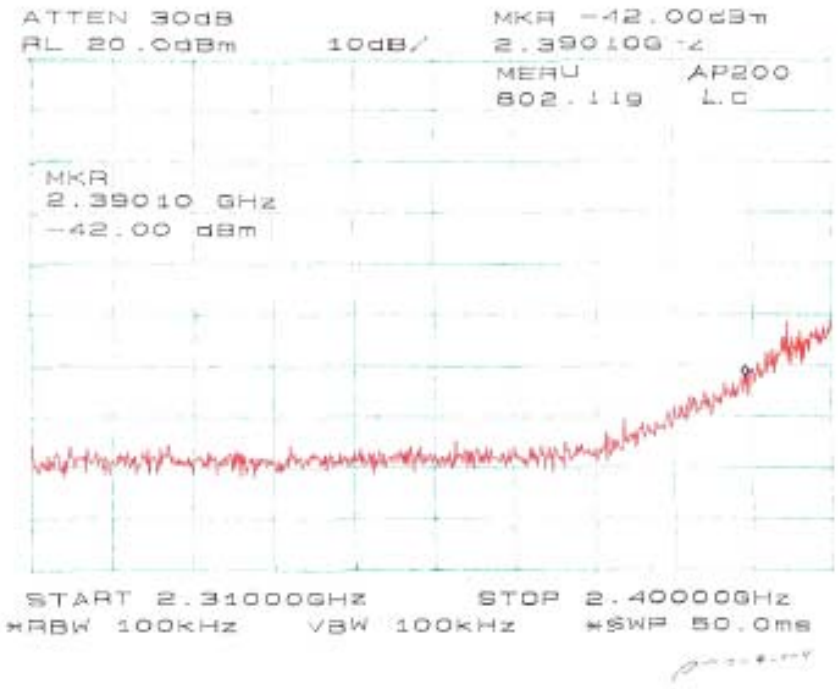
The testing was performed by Ming Jing on 2004-11-04.

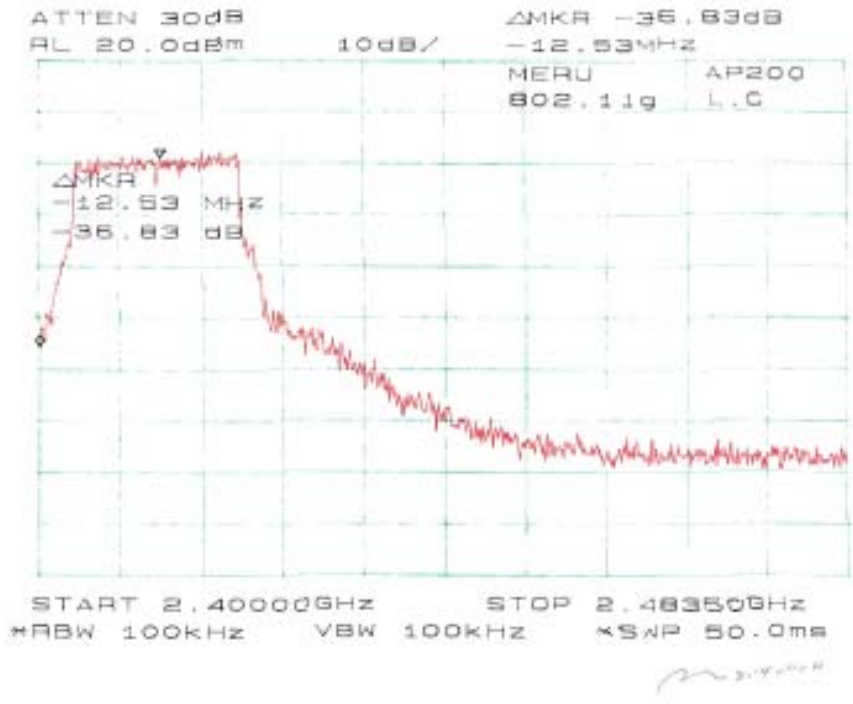

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -49.17dBm
2.39010GHz
MERU AP200
802.11b L.C
MKR
2.39010 GHz
-49.17 dBm
START 2.31000GHz
STOP 2.40000GHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

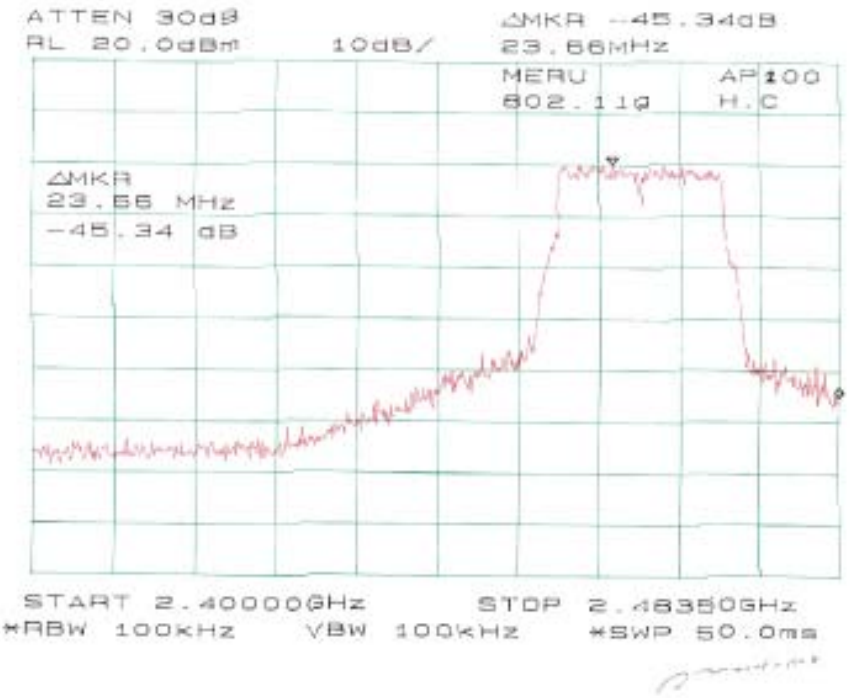

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -46.83dB
-11.69MHz
MERU AP200
802.11b L.C
ΔMKR
-11.69 MHz
-46.83 dB
START 2.40000GHz
STOP 2.48350GHz
*RBW 100kHz
VBW 100kHz
SWP 50.0ms

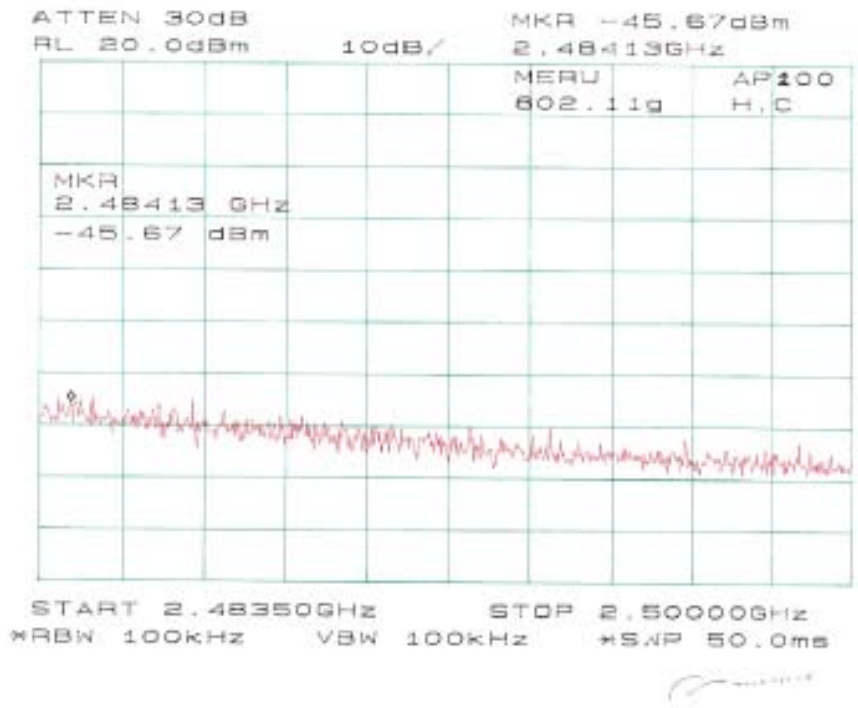

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -56.33dB
21.15MHz
MERU
802.11b
AP200
H.C
ΔMKR
21.15 MHz
-56.33 dB
START 2.400000GHz
STOP 2.483500GHz
#RBW 100kHz
VBW 100kHz
#SWP 50.0ms

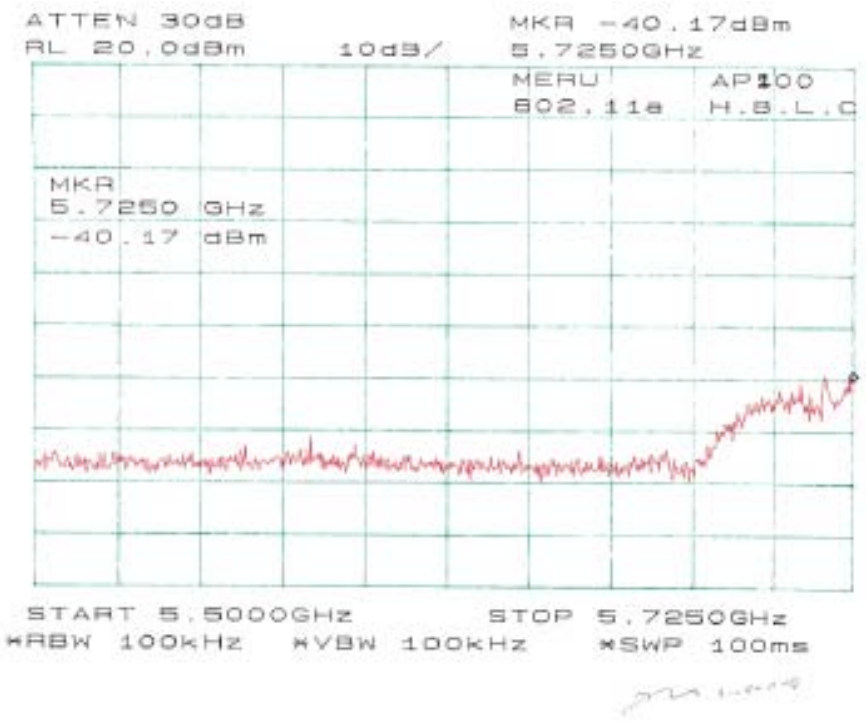

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -46.17dBm
2.48713GHz
MERU
802.11b
AP200
H.C
MKR
2.48713 GHz
-46.17 dBm
START 2.483500GHz
STOP 2.500000GHz
#RBW 100kHz
VBW 100kHz
#SWP 50.0ms

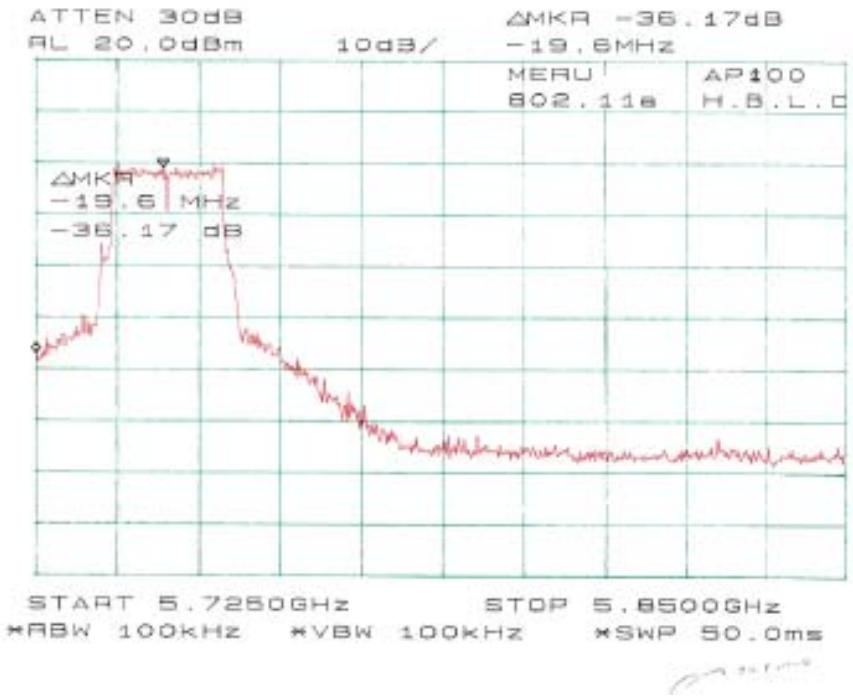

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -42.00dBm
2.39010G Hz
MERU AP200
802.11g L.C
MKR
2.39010 GHz
-42.00 dBm
START 2.31000GHz
STOP 2.40000GHz
#RBW 100kHz
VBW 100kHz
#SWP 50.0ms

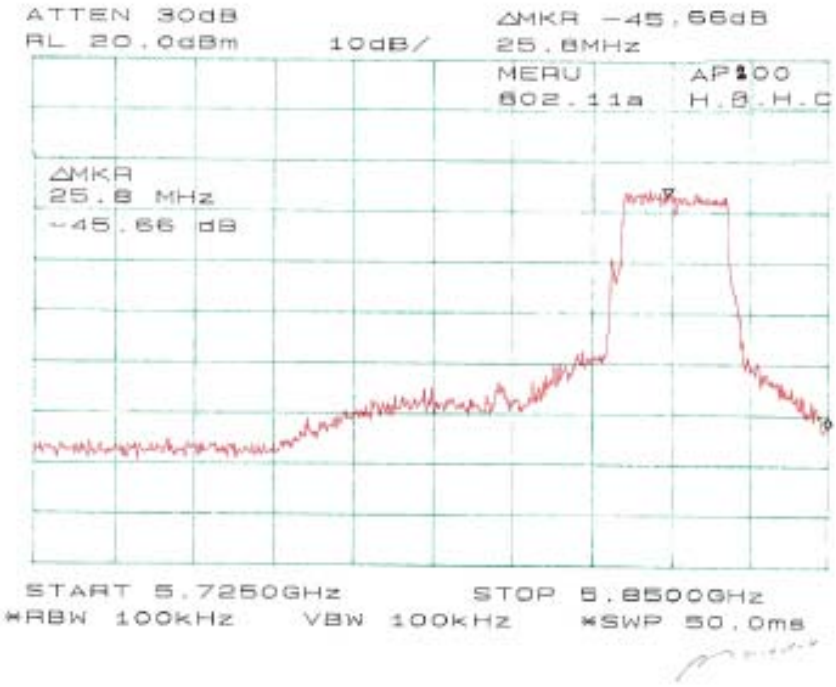

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -36.83dB
-12.53MHz
MERU AP200
802.11g L.C
ΔMKR
-12.53 MHz
-36.83 dB
START 2.40000GHz
STOP 2.48350GHz
#RBW 100kHz
VBW 100kHz
#SWP 50.0ms

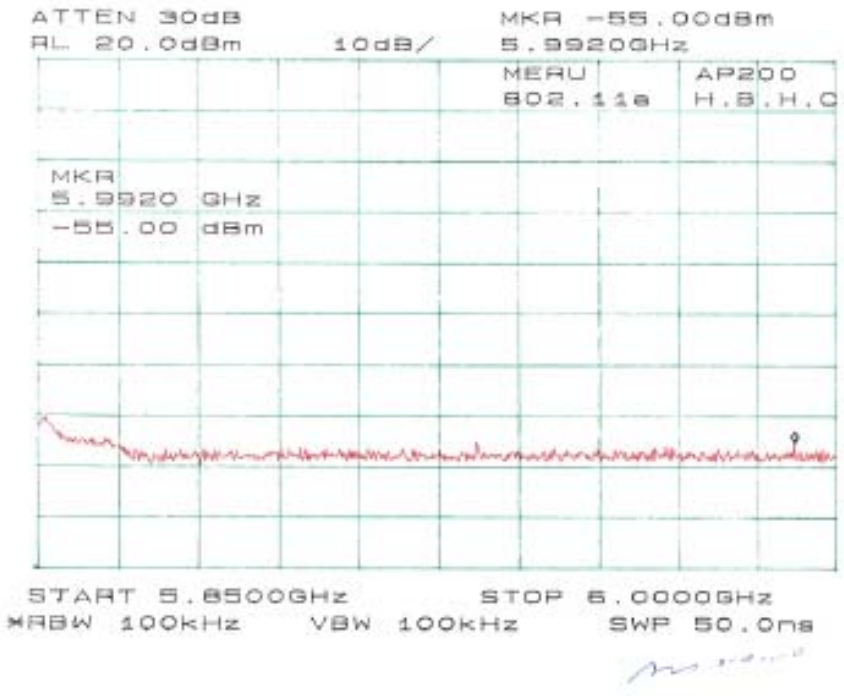

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -45.34dB
23.66MHz
MERU
802.11g
AP100
H.C
ΔMKR
23.66 MHz
-45.34 dB
START 2.40000GHz
STOP 2.48350GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -45.67dBm
2.48413GHz
MERU
802.11g
AP100
H.C
MKR
2.48413 GHz
-45.67 dBm
START 2.48350GHz
STOP 2.50000GHz
*RBW 100kHz
VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -40.17dBm
5.7250GHz
MERU
802.11a
AP100
H.B.L.C
MKR
5.7250 GHz
-40.17 dBm
START 5.5000GHz
STOP 5.7250GHz
*RBW 100kHz
*VBW 100kHz
*SWP 100ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -36.17dB
-19.6MHz
MERU
802.11a
AP100
H.B.L.C
ΔMKR
-19.6 MHz
-36.17 dB
START 5.7250GHz
STOP 5.8500GHz
*RBW 100kHz
*VBW 100kHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR -45.66dB
25.8MHz
MERU
802.11a
AP200
H.B.H.C
ΔMKR
25.8 MHz
-45.66 dB
START 5.7250GHz
STOP 5.8500GHz
#RBW 100kHz
VBW 100kHz
#SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -55.00dBm
5.9920GHz
MERU
802.11a
AP200
H.B.H.C
MKR
5.9920 GHz
-55.00 dBm
START 5.8500GHz
STOP 6.0000GHz
#RBW 100kHz
VBW 100kHz
SWP 50.0ms

§15.247(d) & §15.407(a)(2) - POWER SPECTRAL DENSITY

Standard Applicable

According to §15.247 (d), for direct sequence systems, the peak 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.

According to §15.407(a) (1), for the band 5.15-5.25 GHz, the peak power spectral density shall not exceed 4 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

According to §15.407(a) (2), for the band 5.25-5.35 GHz, the peak power spectral density shall not exceed 11 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceed 6 dBi.

According to §15.407(a) (3), for the band 5.725-5.825 GHz, the peak power spectral density shall not exceed 17 dBm in any 1-MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the peak transmit power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Measurement 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 6MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value. (DTS)
4. Adjust the center frequency of SA on any frequency be measured and set SA to 50MHz span mode. And then, set RBW and VBW of spectrum analyzer to proper value. (UNII)
5. Repeat above procedures until all frequencies measured were complete.

Equipment Lists

Manufacturer	Model No.	Description	Calibration Date
Agilent	8564E	Spectrum Analyzer	2004-08-26

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Measurement Results

Environmental Conditions

Temperature:	18° C
Relative Humidity:	37%
ATM Pressure:	1032 mbar

The testing was performed by Ming Jing on 2004-11-04.

Test Result for 802.11b (15.247)

Channel	Frequency (MHz)	Peak Power Spectral Density (dBm)	Standard (dBm)	Result
Low	2412	-4.17	≤ 8	Compliant
Mid	2437	-3.83	≤ 8	Compliant
High	2462	-5.67	≤ 8	Compliant

Test Result for 802.11g (15.247)

Channel	Frequency (MHz)	Peak Power Spectral Density (dBm)	Standard (dBm)	Result
Low	2412	-6.83	≤ 8	Compliant
Mid	2437	-3.50	≤ 8	Compliant
High	2462	-9.17	≤ 8	Compliant

Test Result for 802.11a, Low Band (15.407)

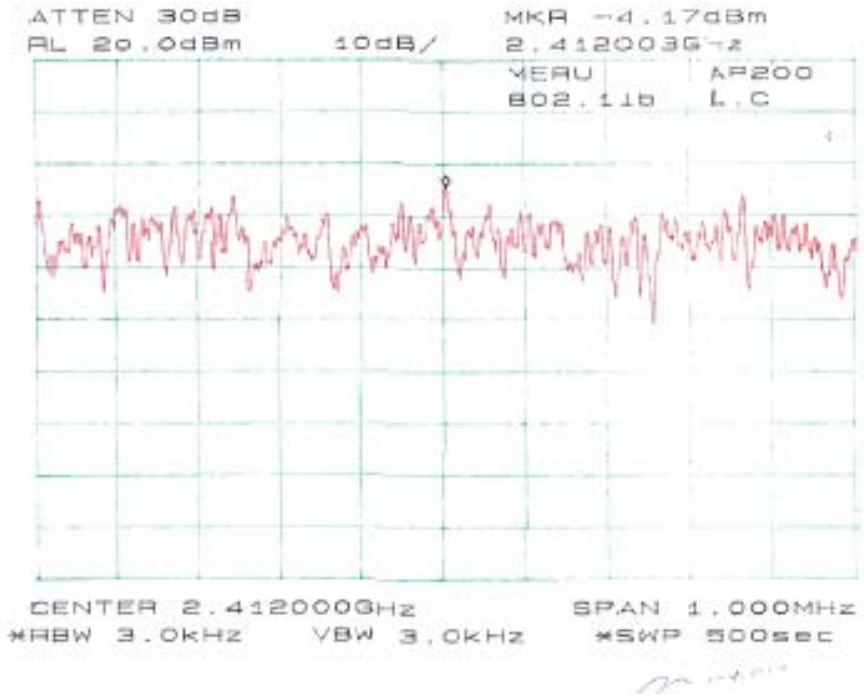
Channel	Frequency (MHz)	Peak Power Spectral Density (dBm)	Standard (dBm)	Result
Low	5180	3.17	≤ 4	Compliant
Mid	5200	3.00	≤ 4	Compliant
High	5240	3.50	≤ 4	Compliant

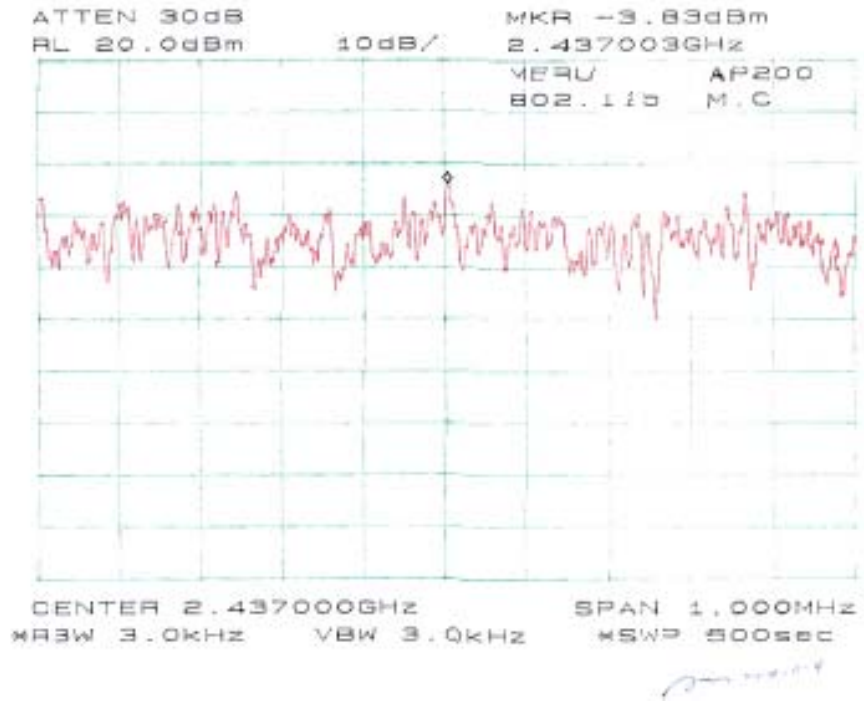
Test Result for 802.11a, Mid Band (15.407)

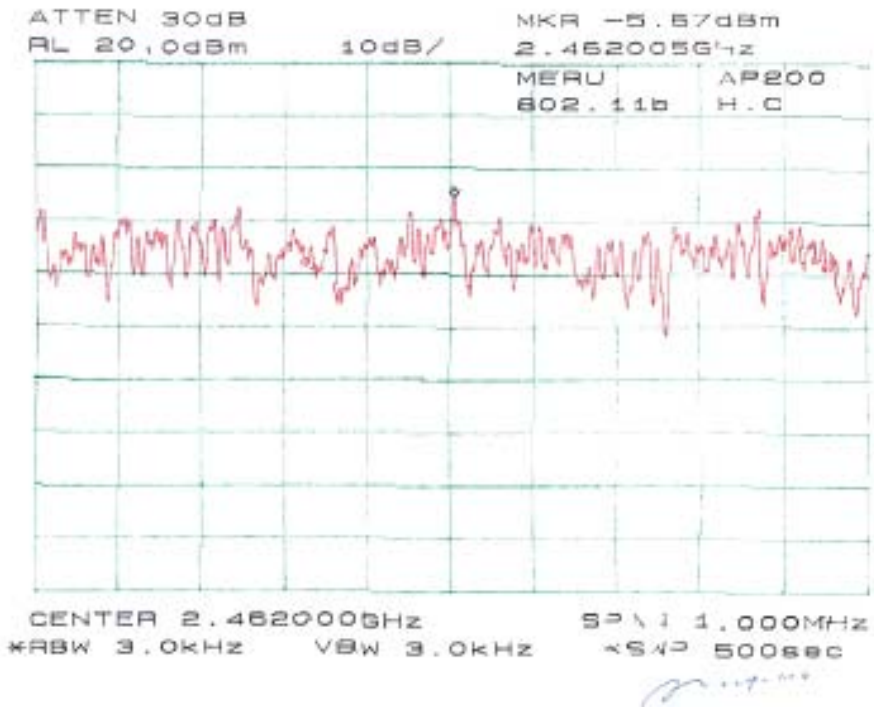
Channel	Frequency (MHz)	Peak Power Spectral Density (dBm)	Standard (dBm)	Result
Low	5260	10.33	≤ 11	Compliant
Mid	5300	10.17	≤ 11	Compliant
High	5320	10.33	≤ 11	Compliant

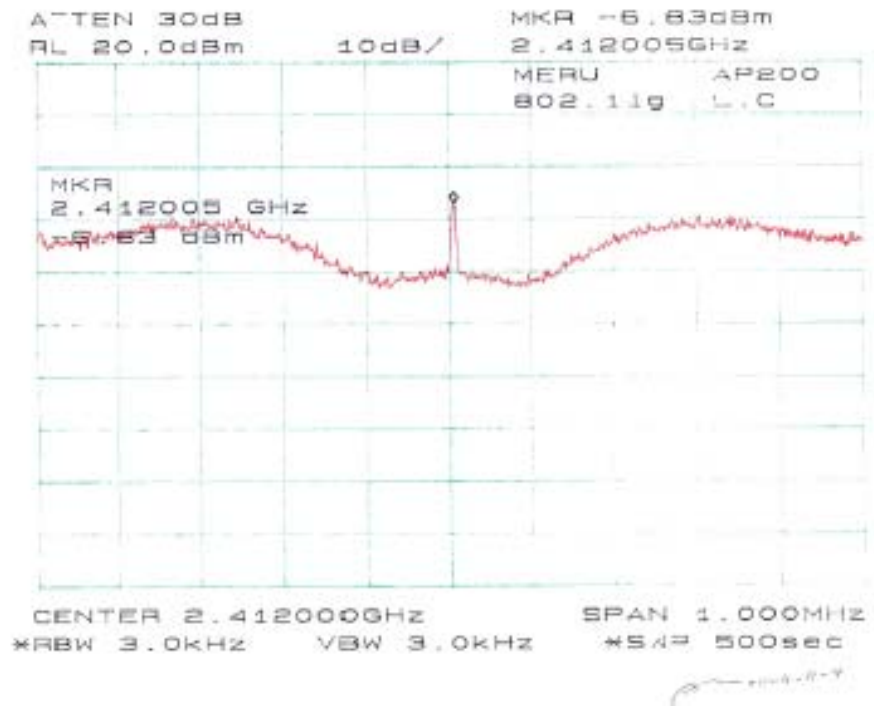
Test Result for 802.11a, High Band (15.247)

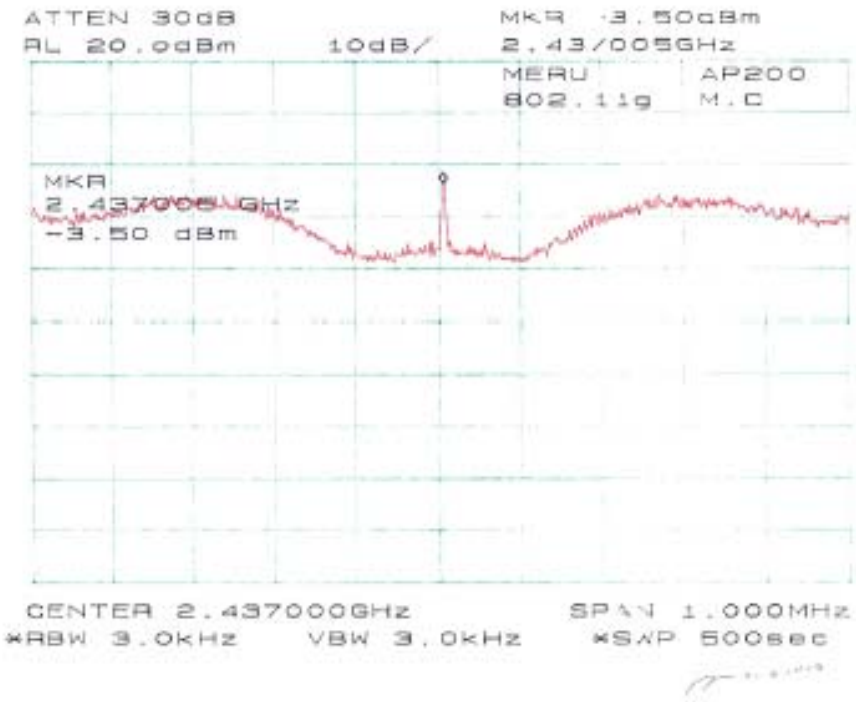
Channel	Frequency (MHz)	Peak Power Spectral Density (dBm)	Standard (dBm)	Result
Low	5745	-12.17	≤ 8	Compliant
Mid	5785	-12.83	≤ 8	Compliant
High	5825	-18.17	≤ 8	Compliant

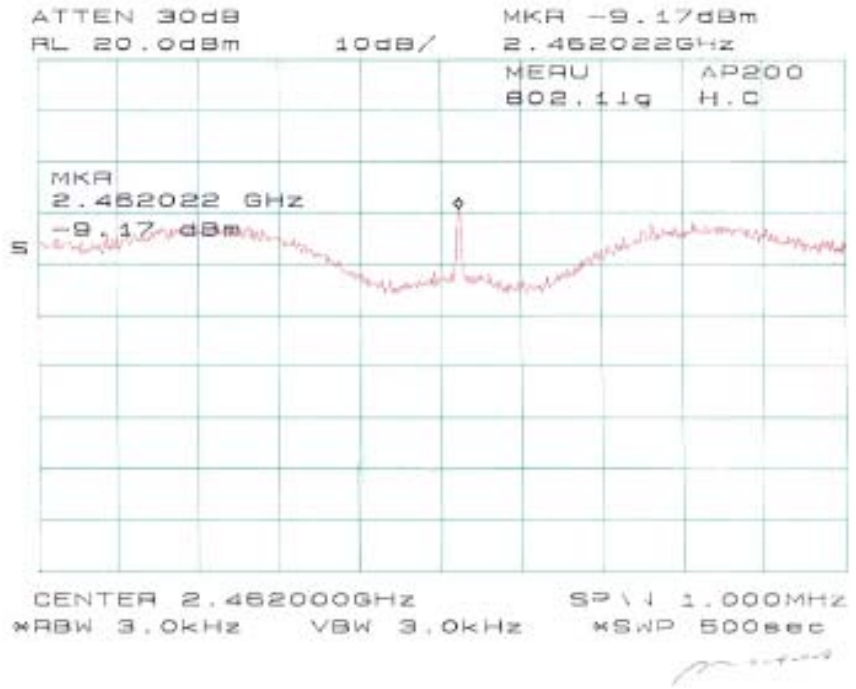

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -4.17dBm
2.412003GHz
MERU AP200
802.11b L.C
CENTER 2.412000GHz
SPAN 1.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 500sec

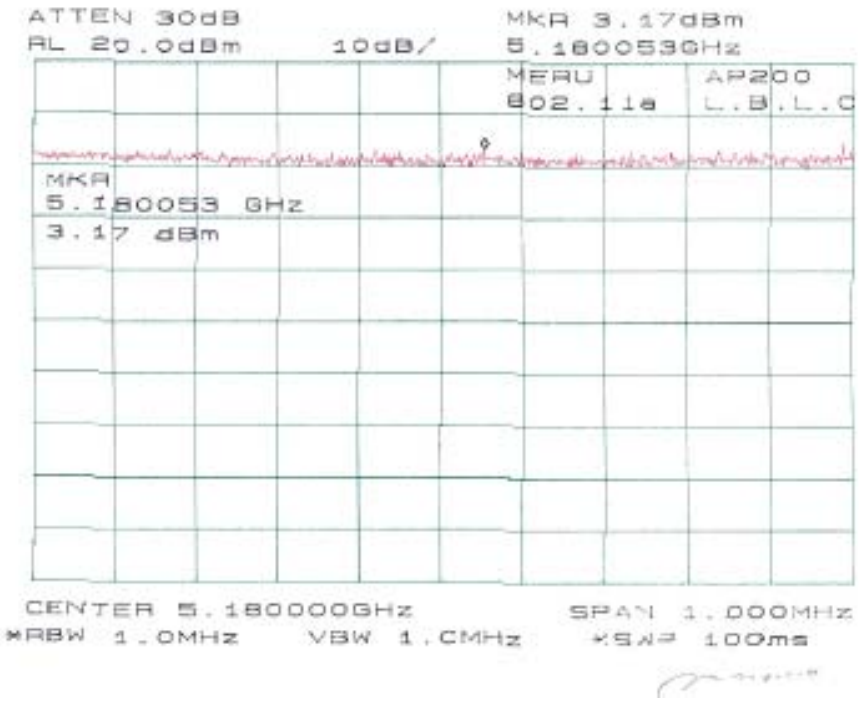

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -3.83dBm
2.437003GHz
MERU AP200
802.11b M.C
CENTER 2.437000GHz
SPAN 1.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 500sec

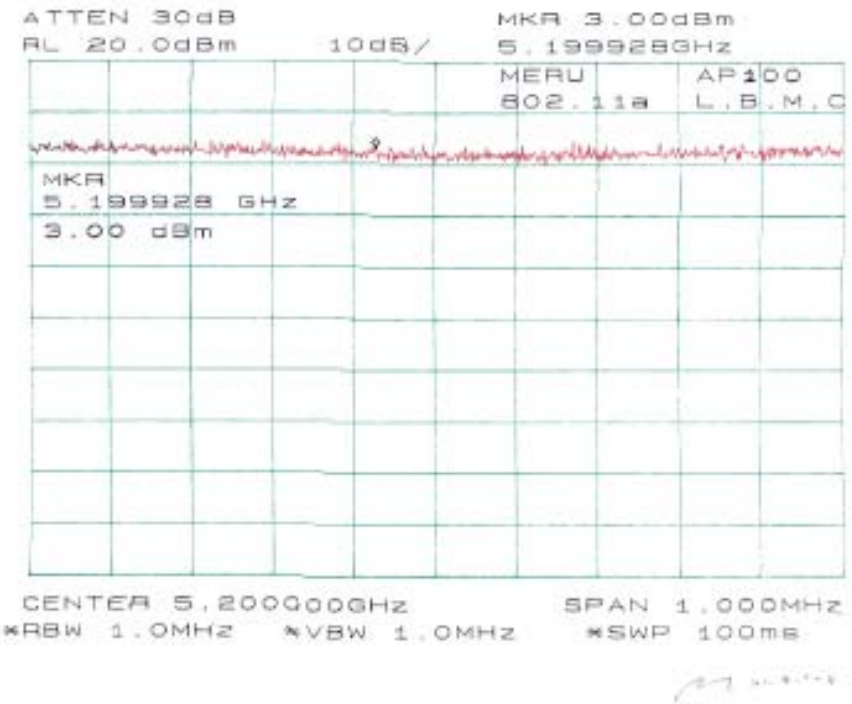

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -5.57dBm
2.462005GHz
MERU AP200
802.11b H.C
CENTER 2.462000GHz
SPAN 1.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 500sec

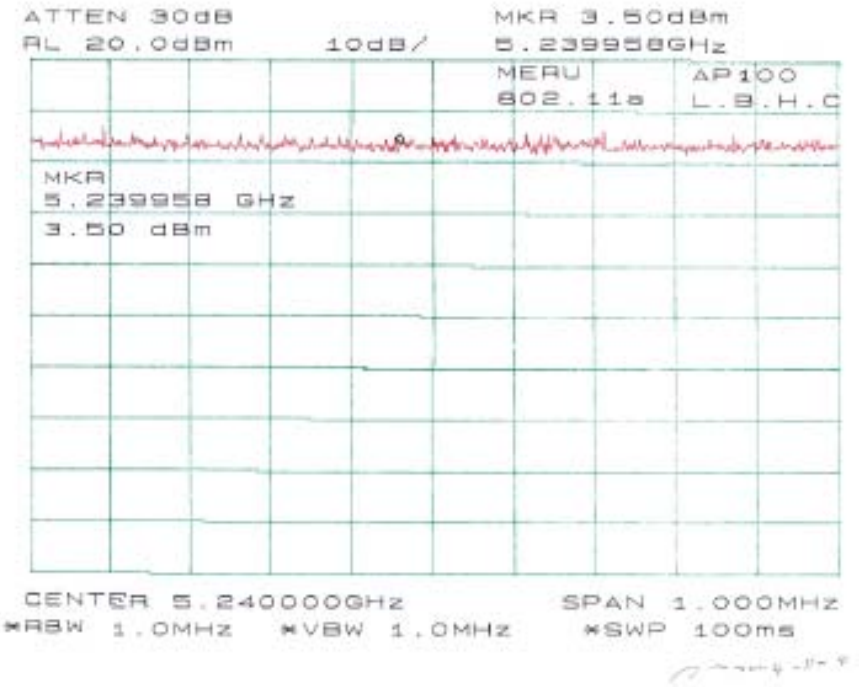

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -6.83dBm
2.412005GHz
MERU AP200
802.11g L.C
MKR
2.412005 GHz
CENTER 2.412000GHz
SPAN 1.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 500sec

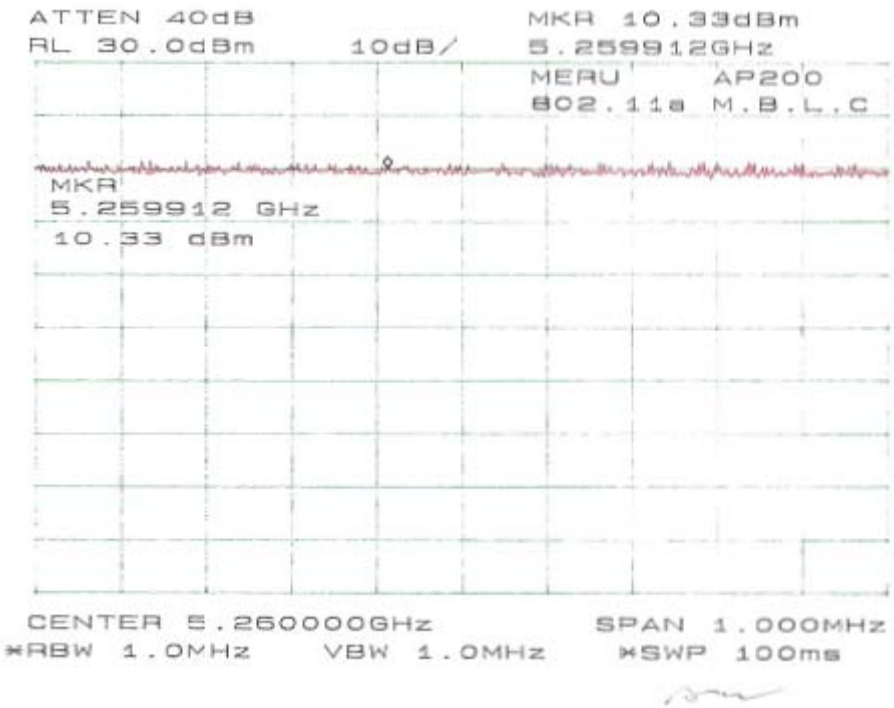

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -3.50dBm
2.437005GHz
MERU
802.11g
AP200
M.C
MKR
2.437000 GHz
-3.50 dBm
CENTER 2.437000GHz
SPAN 1.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 500sec

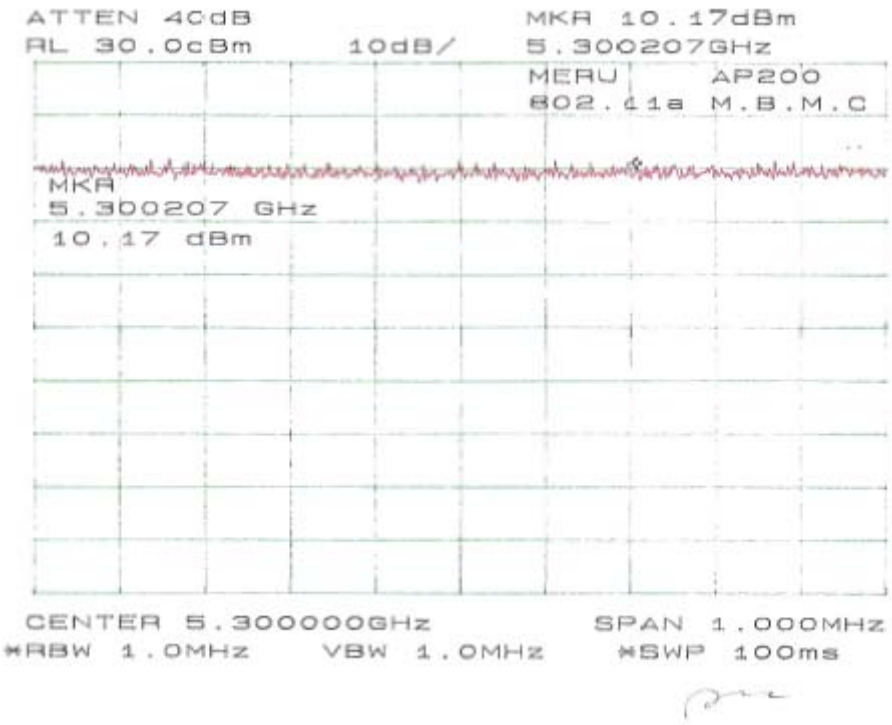

ATTEN 30dB
RL 20.0dBm
10dB/
MKR -9.17dBm
2.462022GHz
MERU
802.11g
AP200
H.C
MKR
2.462022 GHz
-9.17 dBm
CENTER 2.462000GHz
SPAN 1.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 500sec

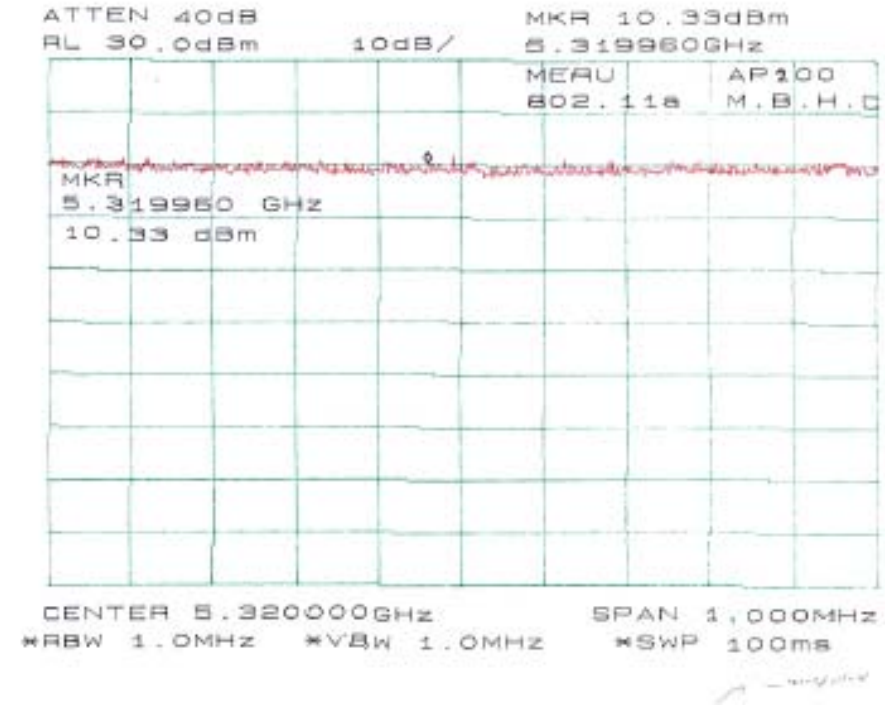

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 3.17dBm
5.180053GHz
MERU
802.11a
AP200
L.B.L.C
MKR
5.180053 GHz
3.17 dBm
CENTER 5.180000GHz
SPAN 1.000MHz
*RBW 1.0MHz
VBW 1.0MHz
*SWP 100ms

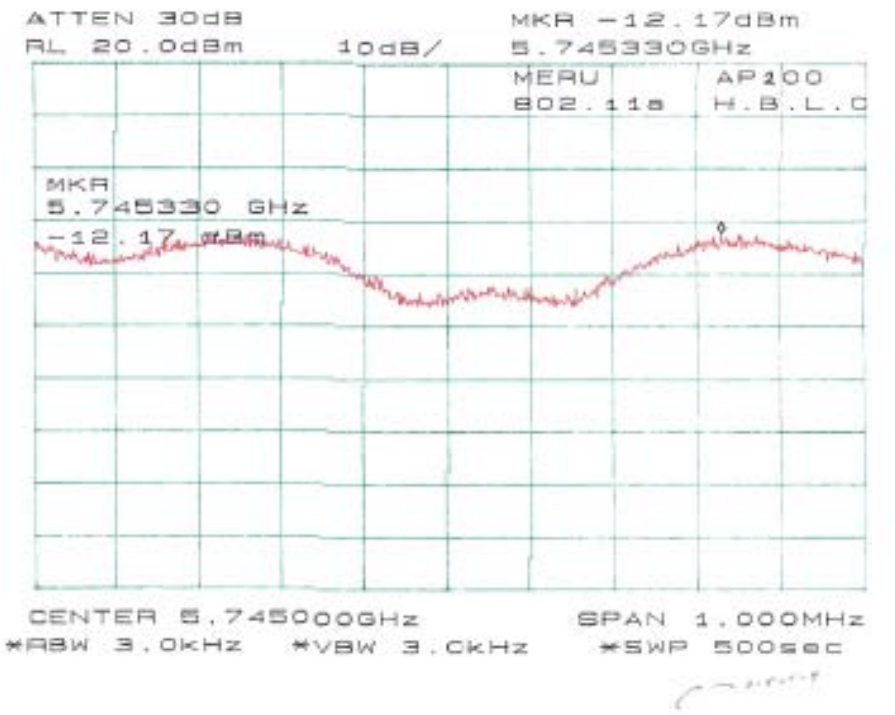

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 3.00dBm
5.199928GHz
MERU
802.11a
AP100
L.B.M.C
MKR
5.199928 GHz
3.00 dBm
CENTER 5.200000GHz
SPAN 1.000MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 100ms

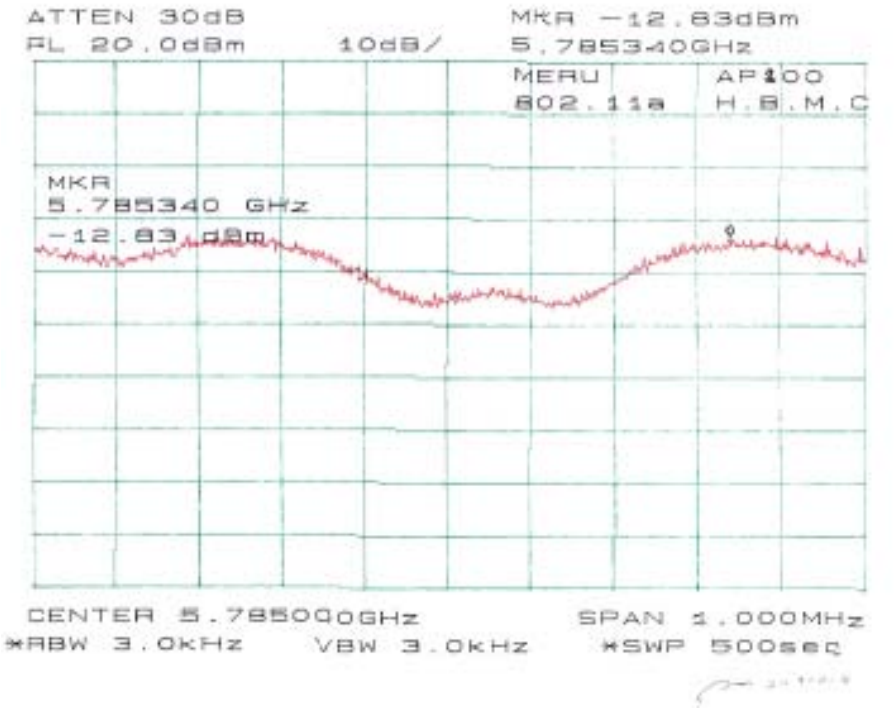

ATTEN 30dB
RL 20.0dBm
10dB/
MKR 3.50dBm
5.239958GHz
MERU
802.11a
AP100
L.B.H.C
MKR
5.239958 GHz
3.50 dBm
CENTER 5.240000GHz
SPAN 1.000MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 100ms

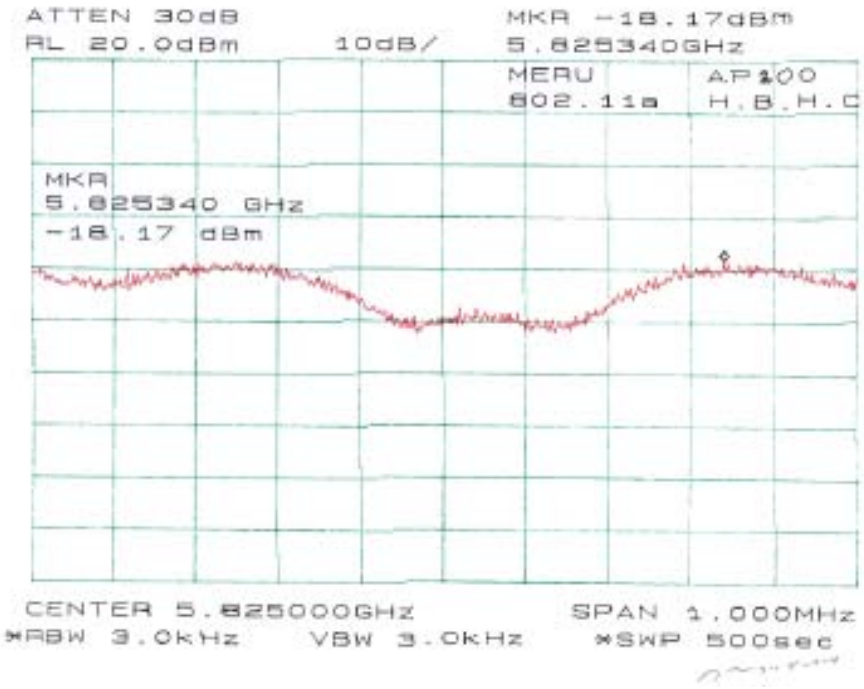

ATTEN 40dB
RL 30.0dBm
10dB/
MKR 10.33dBm
5.259912GHz
MERU
802.11a
AP200
M.B.L.C
MKR
5.259912 GHz
10.33 dBm
CENTER 5.260000GHz
SPAN 1.000MHz
*RBW 1.0MHz
VBW 1.0MHz
*SWP 100ms


ATTEN 40dB
RL 30.0dBm
10dB/
MKR 10.17dBm
5.300207GHz
MERU AP200
802.11a M.B.M.C
MKR
5.300207 GHz
10.17 dBm
CENTER 5.300000GHz
SPAN 1.000MHz
*RBW 1.0MHz
VBW 1.0MHz
*SWP 100ms


ATTEN 40dB
RL 30.0dBm
10dB/
MKR 10.33dBm
5.319960GHz
MERU AP200
802.11a M.B.H.C
MKR
5.319960 GHz
10.33 dBm
CENTER 5.320000GHz
SPAN 1.000MHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 100ms


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -12.17dBm
5.745330GHz
MERU
802.11a
AP200
H.B.L.C
MKR
5.745330 GHz
-12.17 dBm
CENTER 5.745000GHz
SPAN 1.000MHz
*RBW 3.0kHz
*VBW 3.0kHz
*SWP 500sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -12.83dBm
5.785340GHz
MERU
802.11a
AP200
H.B.M.C
MKR
5.785340 GHz
-12.83 dBm
CENTER 5.785000GHz
SPAN 1.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 500sec


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -18.17dBm
5.825340GHz
MERU
802.11a
AP200
H.B.H.C
MKR
5.825340 GHz
-18.17 dBm
CENTER 5.825000GHz
SPAN 1.000MHz
*RBW 3.0kHz
VBW 3.0kHz
*SWP 500sec

§15.407(a)(6) - Peak Excursion To Average Ratio

Standard Applicable

According to §15.407(a)(6), the ratio of the peak excursion of the modulation envelope (measured using a peak hold function) to the peak transmit power (measured as specified above) shall not exceed 13dB across any 1MHz bandwidth or the emission bandwidth whichever is less.

Test Procedure

For this test, the EUT's antenna was removed and replaced with a SMA jack to UMP2.0 plug test cable, so output power levels were calculated from conducted emission levels.

The analyzer center frequency was set to the EUT carrier frequency. For the peak value trace A, the analyzer resolution and video bandwidth were set to 1MHz. Do a MAX HOLD, then VIEW. For the average value trace B, the analyzer resolution bandwidth was set to 1MHz, the video bandwidth was set to 30kHz. MAX HOLD then VIEW trace B also.

The delta from the peak value trace and the Average should not exceed 13dBm across any 1MHz bandwidth.

Equipment Lists

Manufacturer	Model No.	Description	Calibration Date
Agilent	8564E	Spectrum Analyzer	2004-08-26

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Test Result for

Environmental Conditions

Temperature:	18° C
Relative Humidity:	37%
ATM Pressure:	1032 mbar

The testing was performed by Ming Jing on 2004-11-08.

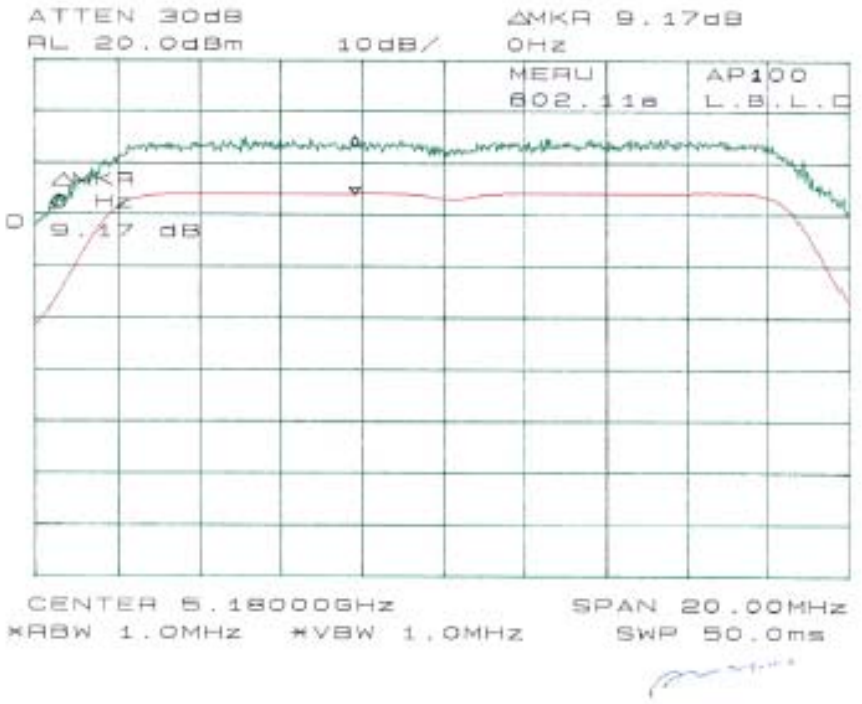
802.11a Low Band

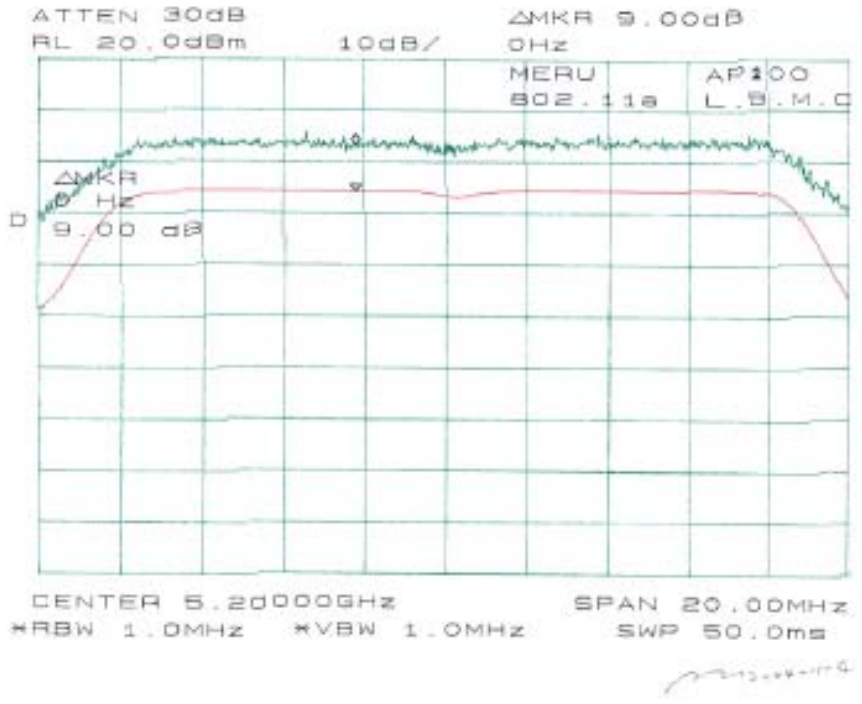
Channel	Frequency (MHz)	Reading (dB)	Limit (dBm)	Result
Low	5180	9.17	13	Compliant
Mid	5200	9.00	13	Compliant
High	5240	8.33	13	Compliant

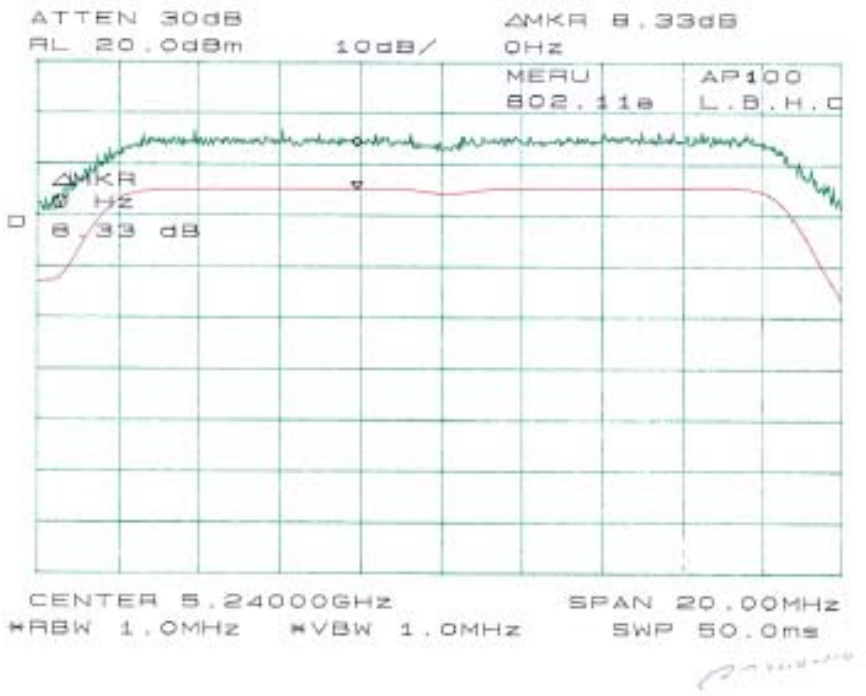
802.11a Mid Band

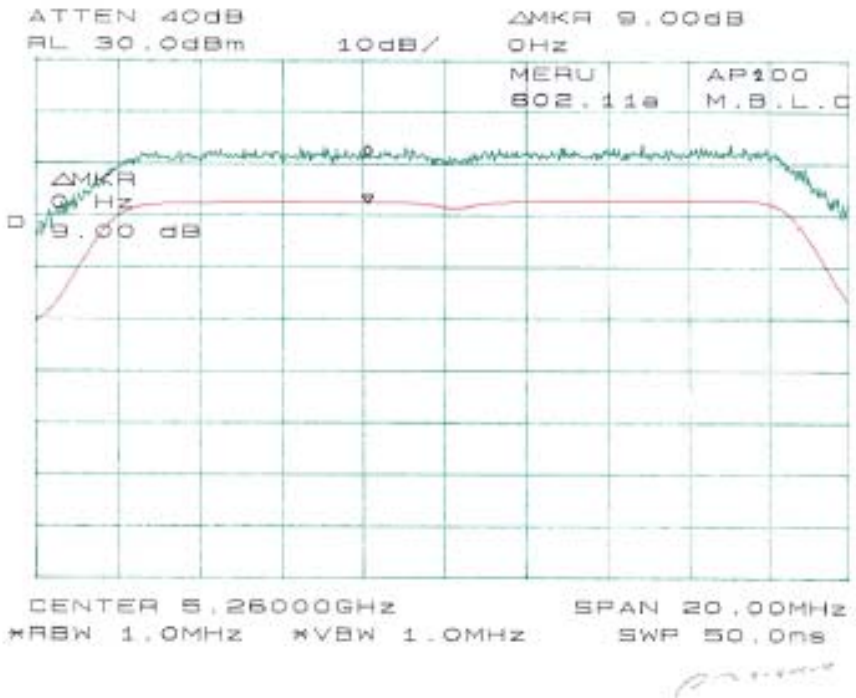
Channel	Frequency (MHz)	Reading (dB)	Limit (dBm)	Result
Low	5260	9.00	13	Compliant
Mid	5300	8.67	13	Compliant
High	5320	10.83	13	Compliant

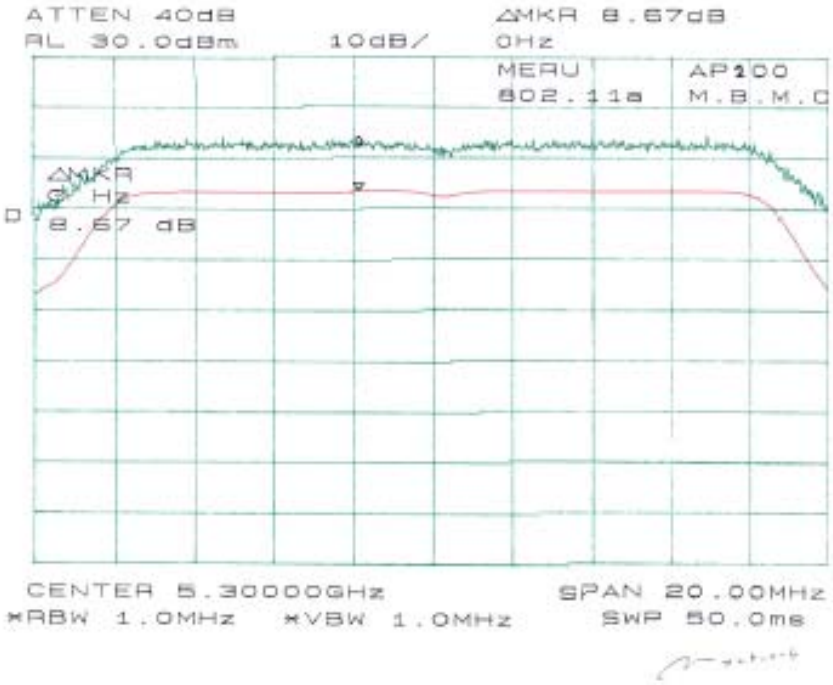
Please see the hereinafter plots for more detail.

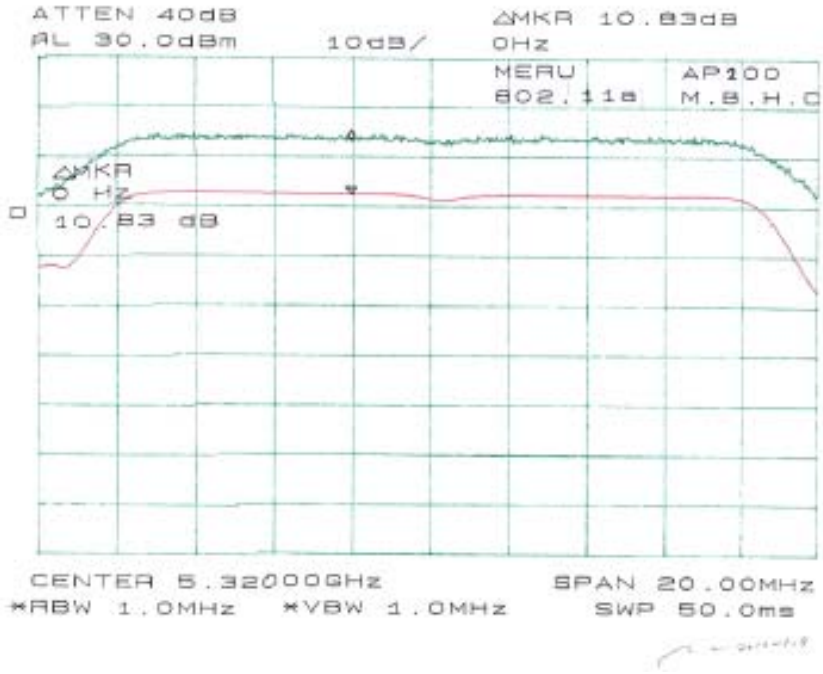

ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 9.17dB
0Hz
MERU
802.11a
AP100
L.B.L.C
ΔMKR
Hz
9.17 dB
CENTER 5.180000GHz
SPAN 20.00MHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 9.00dB
0Hz
MERU
802.11a
AP100
L.B.M.C
ΔMKR
Hz
9.00 dB
CENTER 5.200000GHz
SPAN 20.00MHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
ΔMKR 8.33dB
0Hz
MERU
802.11a
AP100
L.B.H.C
ΔMKR
0 Hz
8.33 dB
CENTER 5.24000GHz
SPAN 20.00MHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR 9.00dB
0Hz
MERU
802.11a
AP100
M.B.L.C
ΔMKR
0 Hz
9.00 dB
CENTER 5.26000GHz
SPAN 20.00MHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR 8.67dB
0Hz
MERU
802.11a
AP100
M.B.M.C
ΔMKR
0 Hz
8.67 dB
CENTER 5.300000GHz
SPAN 20.00MHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
ΔMKR 10.83dB
0Hz
MERU
802.11a
AP100
M.B.M.C
ΔMKR
0 Hz
10.83 dB
CENTER 5.320000GHz
SPAN 20.00MHz
*RBW 1.0MHz
*VBW 1.0MHz
SWP 50.0ms

§15.407(b) - Out Of Band Emission

Standard Applicable

§15.407 (b), undesirable emission limits: except as shown in paragraph (b)(6) of this section, the peak emission outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

§15.407 (b)(1), for transmitters operating in the 5.15-5.25 GHz band: all emissions outside of the 5.15-5.35 GHz band shall not exceed an EIRP of -27 dBm/MHz.

§15.407 (b)(2), for transmitters operating in the 5.25 – 5.35 GHz band: all emissions outside of the 5.15 – 5.25 GHz band shall not exceed an EIRP of –27 dBm/MHz. Devices operating in the 5.25 – 5.35 GHz band that generate emissions in the 5.15 – 5.25 GHz band must meet all applicable technical requirements for operation in the 5.15 – 5.25 GHz band (including indoor use) or alternatively meet an out-of-band emission EIRP limit of –27 dBm/MHz in the 5.15 – 5.25 GHz band.

§15.407 (b)(3), for transmitters operating in the 5.725 – 5.825 GHz band: all emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an EURP of –17dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emission shall not exceed an EIRP of –27 dBm/MHz.

Test Procedure

For this test, the EUT's antenna was removed and replaced with a low loss cable, so output power levels were calculated from conducted emission levels.

The analyzer center frequency was set to the EUT carrier frequency. The analyzer resolution and video bandwidth were set to 1MHz. The entire band from 30kHz to 40GHz was investigated.

Every suspected signal was also investigated through radiated emission. Refer to section 15.205 restricted bands of operation.

Equipment Lists

Manufacturer	Model No.	Description	Calibration Date
Agilent	8564E	Spectrum Analyzer	2004-08-26

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

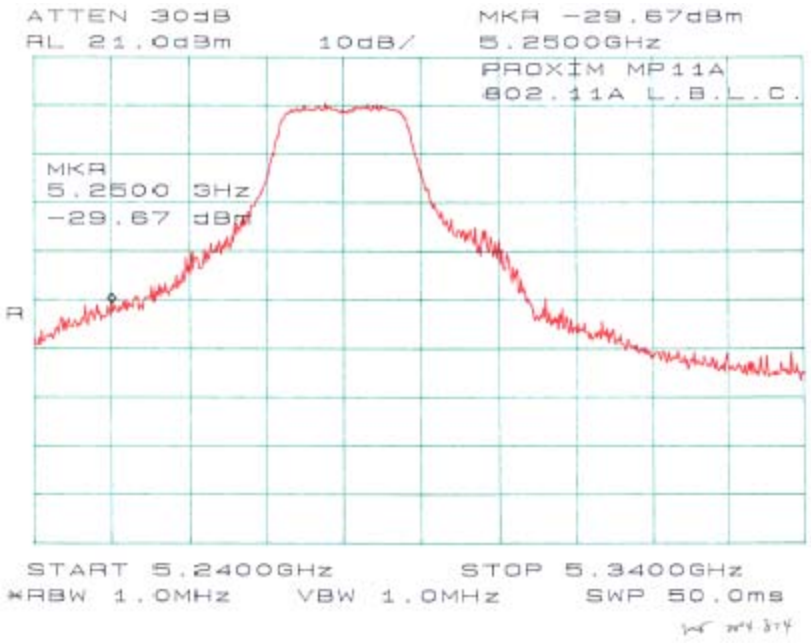
Test Result

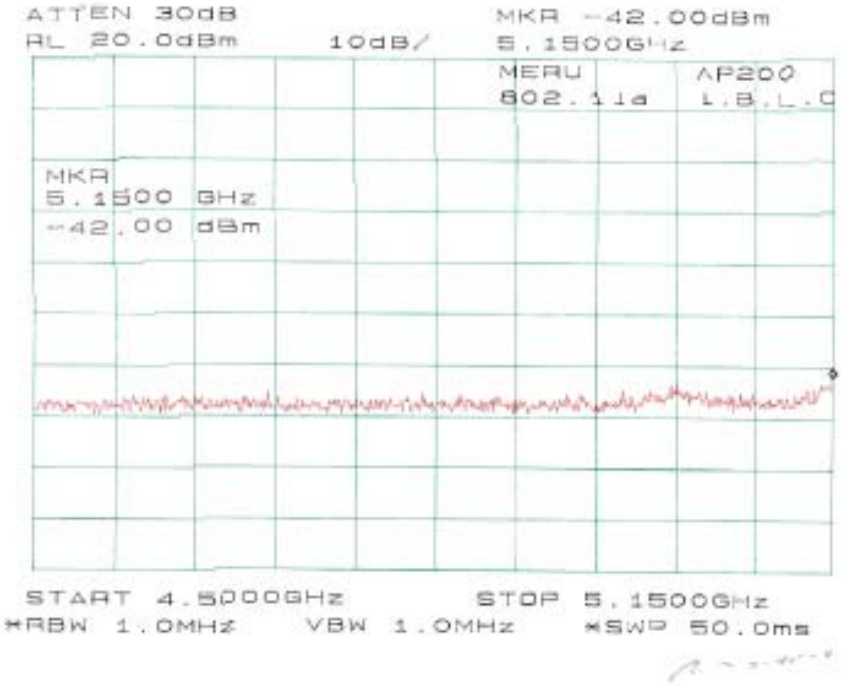
Environmental Conditions

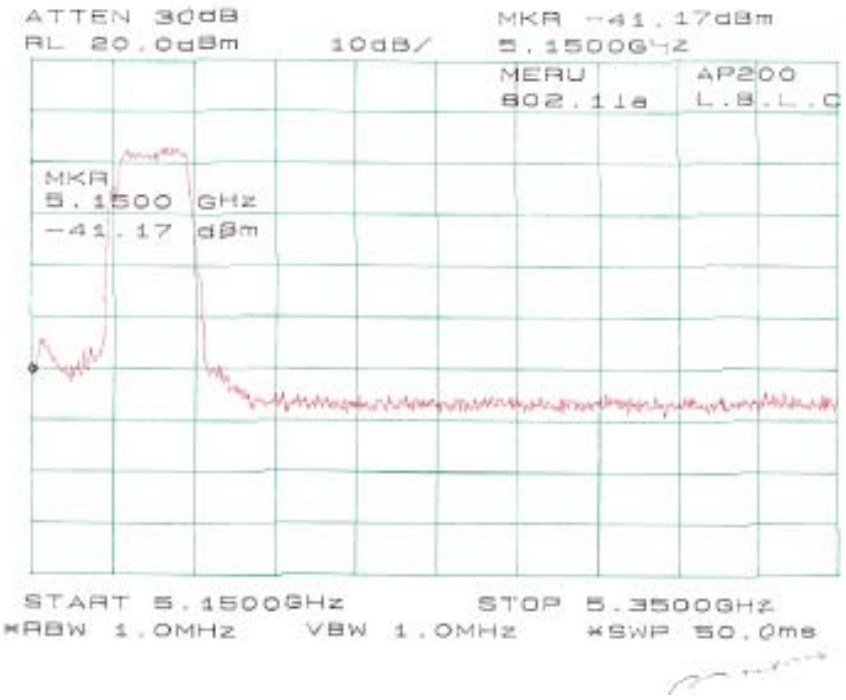
Temperature:	18° C
Relative Humidity:	35%
ATM Pressure:	1031 mbar

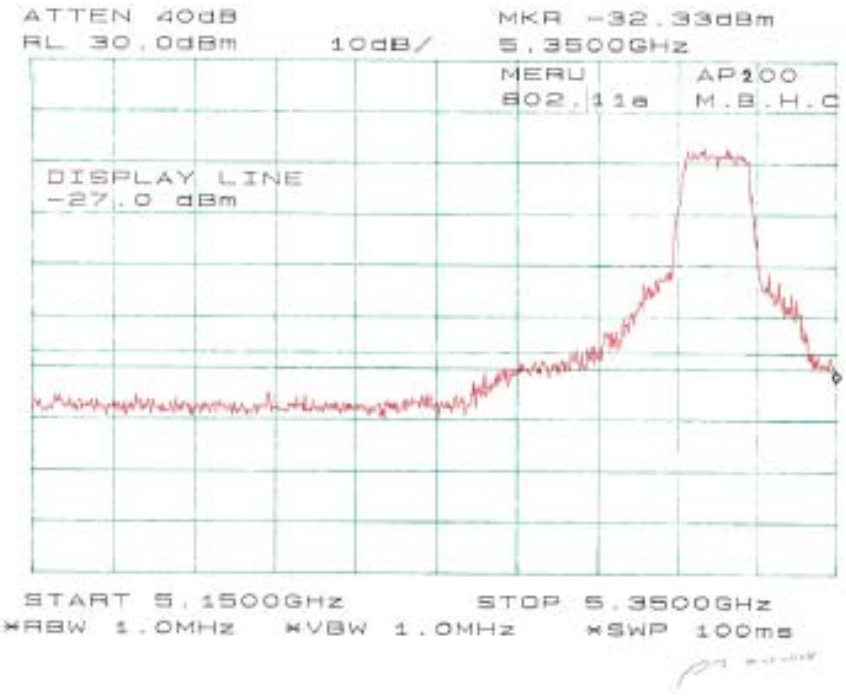
The testing was performed by Ming Jing on 2004-11-04.

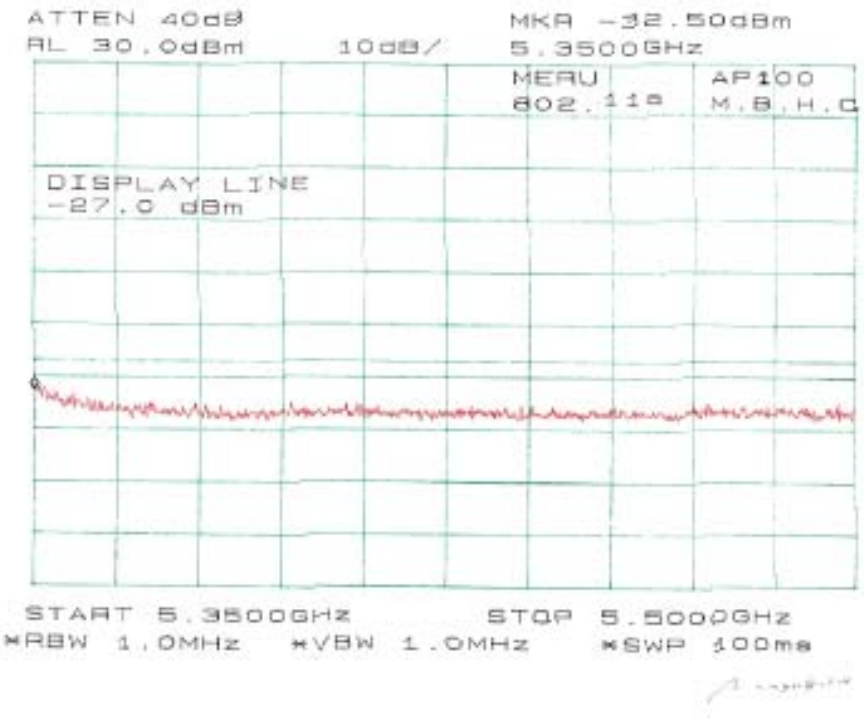
Please refer to the following plots.


ATTEN 30dB
RL 21.0dBm
10dB/
MKR -29.67dBm
5.2500GHz
PROXIM MP11A
802.11A L.B.L.C.
MKR
5.2500 GHz
-29.67 dBm
START 5.2400GHz
STOP 5.3400GHz
*RBW 1.0MHz
VBW 1.0MHz
SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -42.00dBm
5.1500GHz
MERU
802.11a
AP200
MKR
5.1500 GHz
-42.00 dBm
START 4.5000GHz
STOP 5.1500GHz
*RBW 1.0MHz
VBW 1.0MHz
*SWP 50.0ms


ATTEN 30dB
RL 20.0dBm
10dB/
MKR -41.17dBm
5.1500GHz
MERU
802.11a
AP200
L.B.L.C
MKR
5.1500 GHz
-41.17 dBm
START 5.1500GHz
STOP 5.3500GHz
*RBW 1.0MHz
VBW 1.0MHz
*SWP 50.0ms


ATTEN 40dB
RL 30.0dBm
10dB/
MKR -32.33dBm
5.3500GHz
MERU
802.11a
AP200
M.B.H.C
DISPLAY LINE
-27.0 dBm
START 5.1500GHz
STOP 5.3500GHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 100ms


ATTEN 40dB
RL 30.0dBm
10dB/
MKA -32.50dBm
5.3500GHz
MERU
802.11a
AP100
M.B.H.C
DISPLAY LINE
-27.0 dBm
START 5.3500GHz
STOP 5.5000GHz
*RBW 1.0MHz
*VBW 1.0MHz
*SWP 100ms

15.407(c) - Discontinue Transmitting With Absence Of Data Or Operational Failure

According to § 15.407 (c), the device shall automatically discontinue transmission in case of either absence of information to transmit or operational failure. These provisions are not intended to preclude the transmission of control or signaling information or the user of repetitive codes used by certain digital technologies to complete frame or burst intervals. Applicants shall include in their application a description of how this requirement is met.

Please refer to respective technical description.

§15.407(g) - Frequency Stability

Standard Applicable

According to §15.407 (g), manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation .

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Analyzer, Spectrum	8565EC	3946A00131	6/30/2004
HP	Amplifier, Pre, microwave	8449B	3147A00400	3/14/2004
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	2455-261	8/1/2004
Tenney	Oven, Temperature	VersaTenn	12222-193	4/23/2004
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	2455-261	8/1/2004

*** Statement of Traceability: BACL Corp.** attests that all calibrations have been performed per the NVLAP requirements, traceable to the NIST.

Measurement Result

Environmental Conditions

Temperature:	18° C
Relative Humidity:	37%
ATM Pressure:	1032 mbar

The testing was performed by Ming Jing on 2004-11-08.

Reference Frequency : 5300.0000 MHz, Limit : +/- 0.02%			
		Frequency Measure with Time Elapsed	
Temperature C	Power supplied Vdc	MCF (MHz)	Error %
50	110	5300.0071	0.00013
40	110	5300.0024	0.00005
30	110	5300.0018	0.00003
20	110	5300	0
10	110	5300	0
0	110	5299.9997	-0.00001
-10	110	5299.9997	-0.00001
-20	110	5299.9991	-0.00002
-30	110	5299.9991	-0.00002

Reference Frequency : 5300.0000 MHz, Limit : +/- 0.02%		
	Frequency Measure with Time Elapsed	
Power supplied Vac	Frequency (MHz)	Error %
126.5	5299.9997	-0.00001
110	5300	0
93.5	5300.0009	0.00002