FCC PART 15.247

EMI MEASUREMENT AND TEST REPORT

For

NMB TECHNOLOGIES INC.

9730 Independence Ave.,
Chatsworth, CA 91311

FCC ID: AQ6-CP239218

This Report Concerns:	Equipment Type:
☒ Original Report	2.4GHz Transceiver

Test Engineer:	Ming Jing/Snell Leong
Report No.:	R0503012
Report Date:	2005-03-22
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 *NMB Technologies Inc.* product, FCC ID: *AQ6-CP239218,* Model: *CP239218 or* the "EUT" as referred to this report is a 2.4GHz Transceiver which measures approximately 75mmL x 28mmW x 10mmH. The emission designator is 1M10G1D.

** The test data gathered are from typical production sample, serial number: CP239218-1 provided by the manufacturer.*

Objective

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

The objective is to determine compliance with FCC rules for Output Power, Antenna Requirements, 6 dB Bandwidth, power spectral density, 100 kHz Bandwidth of Band Edges Measurement, Spurious Emission, Conducted and Spurious Radiated Emission.

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. The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

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 radiated and AC line conducted test site criteria 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 current scope of accreditations can be found at http://ts.nist.gov/ts/htdocs/210/214/scopes/2001670.htm

SYSTEM TEST CONFIGURATION

Justification

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

Special Accessories

As shown in following test block diagram, all interface cables used for compliance testing are shielded.

Schematics / Block Diagram

Please refer to Appendix A.

Equipment Modifications

No modifications were made to the EUT.

Local Support Equipment

Manufacturer	Description	Model	Serial Number	FCC ID
GQ	Desk top PC	SS-M786	N/A	NONE

Power Supply Information

Manufacturer	Description	Model	Serial Number	FCC ID
GQ	PC power supply	N/A	N/A	N/A

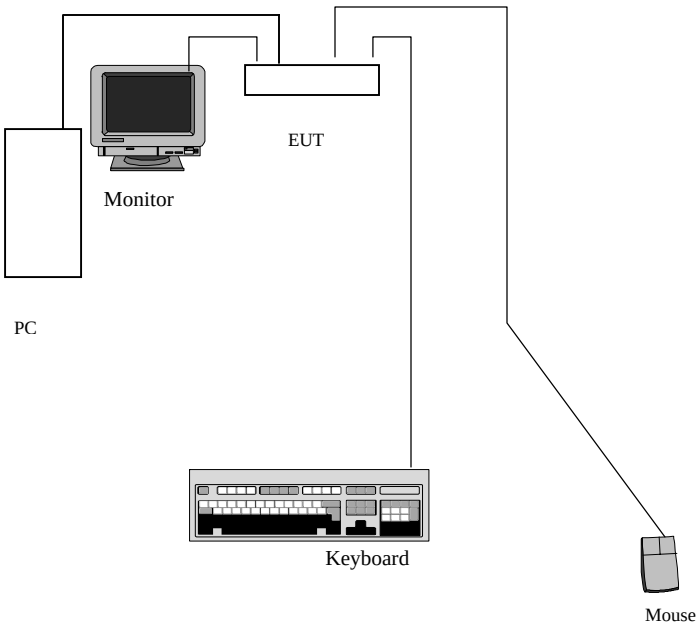
Remote Support Equipment

Manufacturer	Description	Model	Serial Number	FCC ID
NMB	Wireless keyboard	DVT2	00181	N/A

Interface Ports and Cabling

Cable Description	Length (M)	From	To
Shielded Cable	1.0	USB Port / PC	EUT

Configuration of Test System



SUMMARY OF TEST RESULTS

Results reported relate only to the product tested.

FCC RULES	DESCRIPTION OF TEST	RESULT
§2.1091	RF Exposure	Compliant
§15.203	Antenna Requirement	Compliant
§ 15.207 (a)	Conducted Emissions	Compliant
§2.1051	Spurious Emission at Antenna Port	Compliant
§15.209 (a)	Radiated Emission	Compliant
§15.247 (a)(2)	6 dB Bandwidth	Compliant
§15.247 (b)(3)	Maximum Peak Output Power	Compliant
§ 15.247 (d)	100 kHz Bandwidth of Frequency Band Edge	Compliant
§15.247 (e)	Peak Power Spectral Density	Compliant

§1.1307(b)(1) & §2.1091 - RF EXPOSURE

According to §15.247(b)(5) 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.

Test Result

The output power we measured was 0.54 mW, we considered the device met the RF exposure requirement

§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.

And according to § 15.247 (b) (4), 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.

The antenna for this device is an integral antenna with gain of 2 dBi.

§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.

Receiver Setup

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

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
Rohde & Schwarz	LISN	ESH2-Z5	871884/039	2004-08-16
Rohde & Schwarz	EMI Test Receiver	ESCS30	100176	2004-09-15
Fluke	Calibrated Voltmeter	189	18485-38	2004-07-18

* **Statement of Traceability:** BACL attests that all calibrations have been performed per the NVLAP requirements, traceable to 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 dBμV of specification limits). Quasi-peak readings are distinguished with a "**Qp**".

Summary of Test Results

According to the recorded data in following table, the EUT complies with the FCC Conducted margin for a Class B device, with the *worst* margin reading of:

-7.2 dB at 10.100 MHz in the Neutral mode

Environmental Conditions

Temperature:	27° C
Relative Humidity:	37%
ATM Pressure:	1031 mbar

The testing was performed by Ming Jin on 2005-03-07.

Conducted Emissions Test Data

LINE CONDUCTED EMISSIONS				FCC PART 15 CLASS B	
Frequency MHz	Amplitude dBμV	Detector Qp/Ave/Peak	Phase Line/Neutral	Limit dBμV	Margin dB
10.100	42.8	AVE	Neutral	50	-7.2
10.100	39.9	AVE	Line	50	-10.1
4.260	35.4	AVE	Line	46	-10.6
0.185	39.1	AVE	Neutral	54	-14.9
4.170	30.3	AVE	Neutral	46	-15.7
10.100	44.2	QP	Neutral	60	-15.8
10.100	42.4	QP	Line	60	-17.6
0.185	44.8	QP	Neutral	64	-19.2
0.185	34.6	AVE	Line	54	-19.4
0.185	43.9	QP	Line	64	-20.1
4.260	35.3	QP	Line	56	-20.7
4.170	30.3	QP	Neutral	56	-25.7

Plot of Conducted Emissions Test Data

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

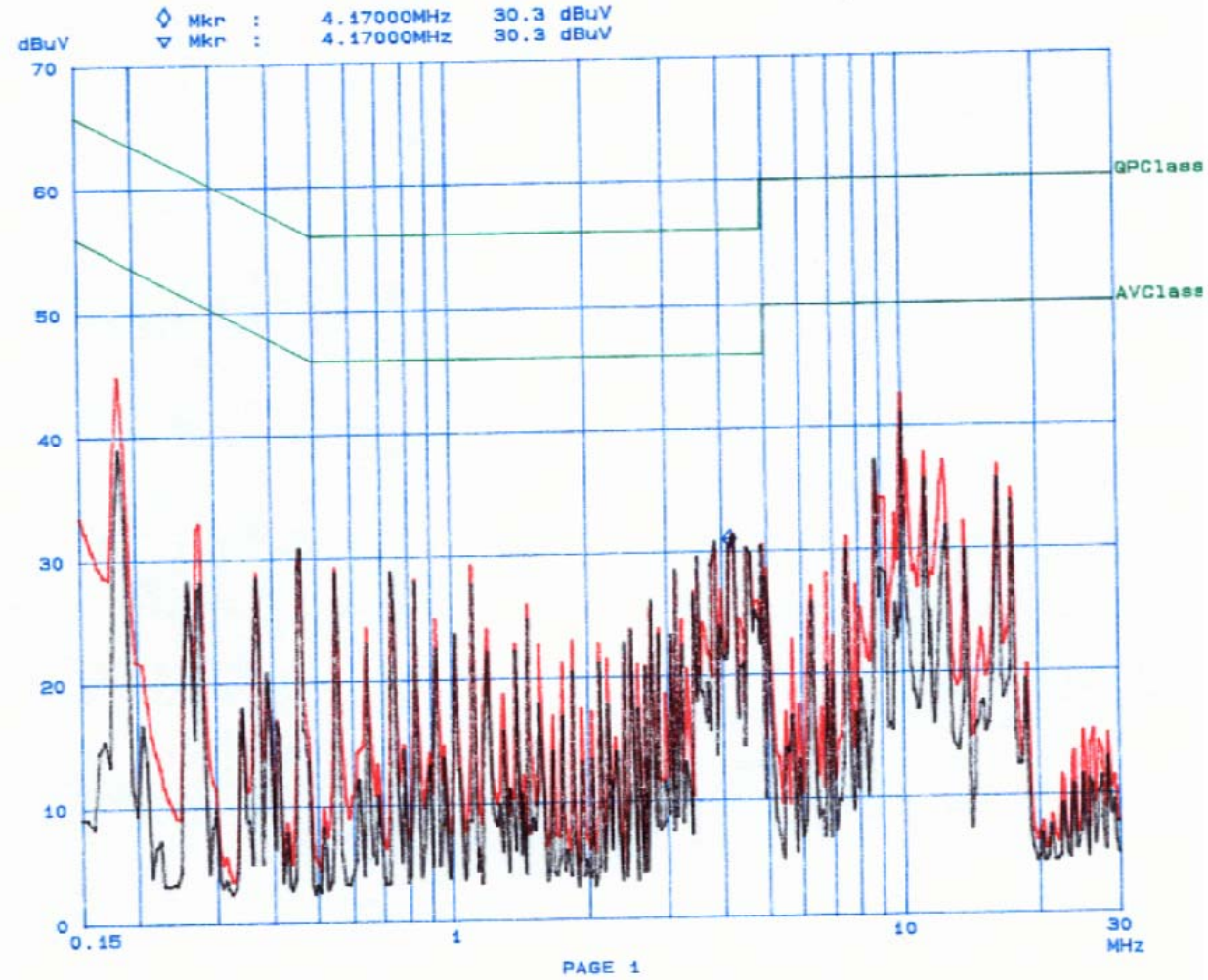
Bay Area Compliance Laboratory Corp 07. Mar 05 11:45

Class B

EUT: Wireless USB Transceiver
Manuf: NMB
Op Cond: Normal
Operator: Ming
Comment: N
120VAC

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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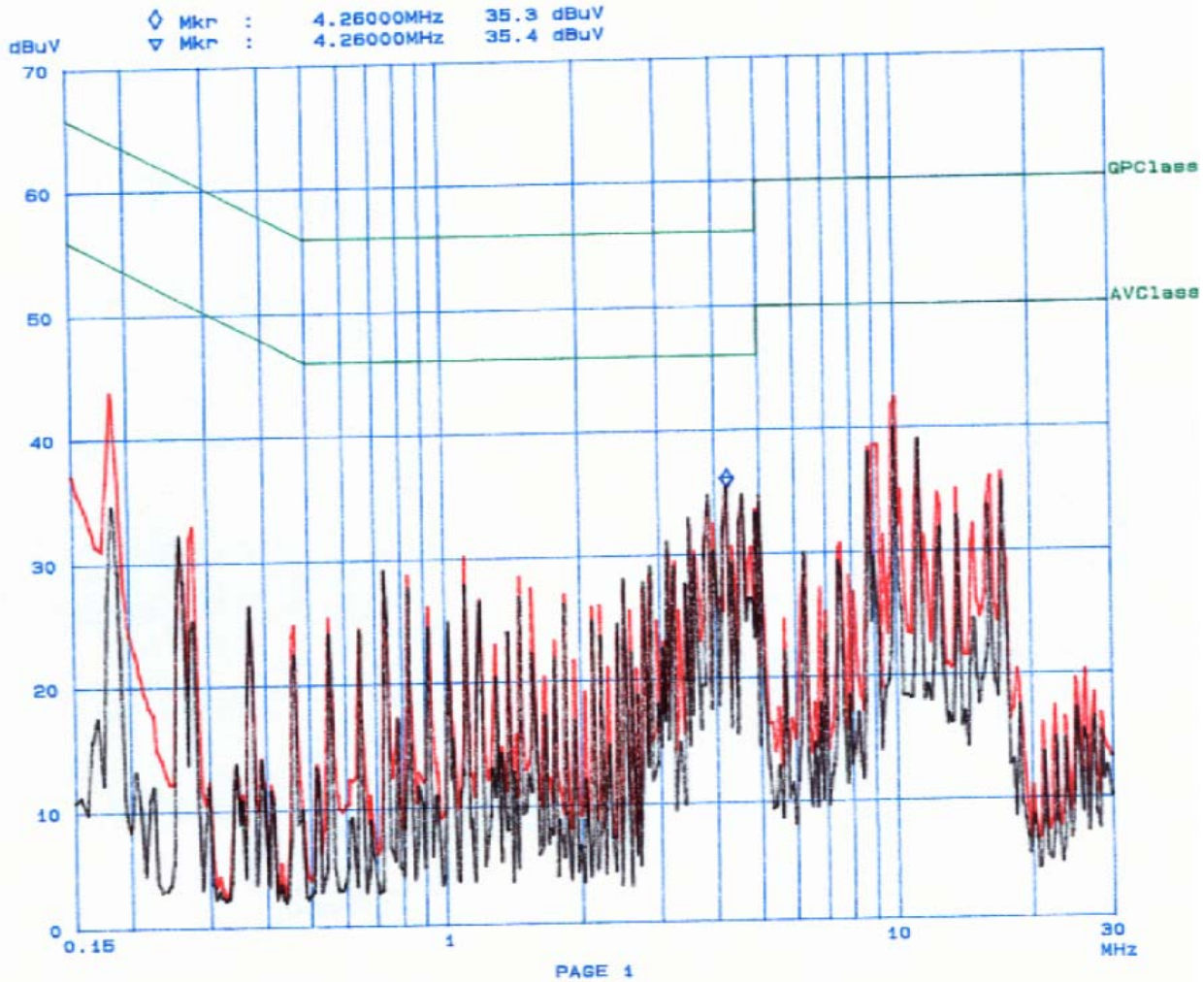
Bay Area Compliance Laboratory Corp 07. Mar 05 10:56

Class B

EUT: Wireless USB Transceiver
Manuf: NMB
Op Cond: Normal
Operator: Ming
Comment: L
120VAC

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



§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	2004-10-04
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.

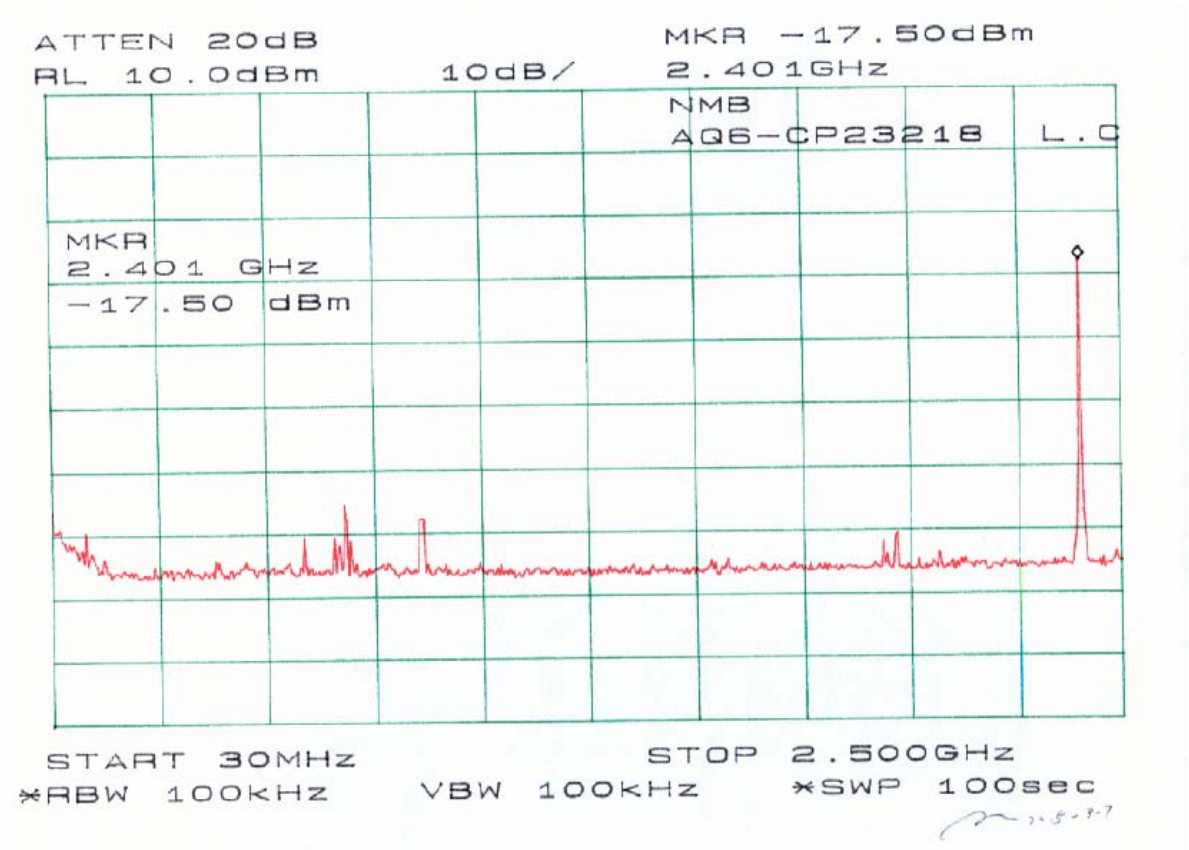
Measurement Result

Please refer to following pages for plots of spurious emission.

Environmental Conditions

Temperature:	27° C
Relative Humidity:	37%
ATM Pressure:	1031 mbar

The testing was performed by Ming Jin on 2005-03-07.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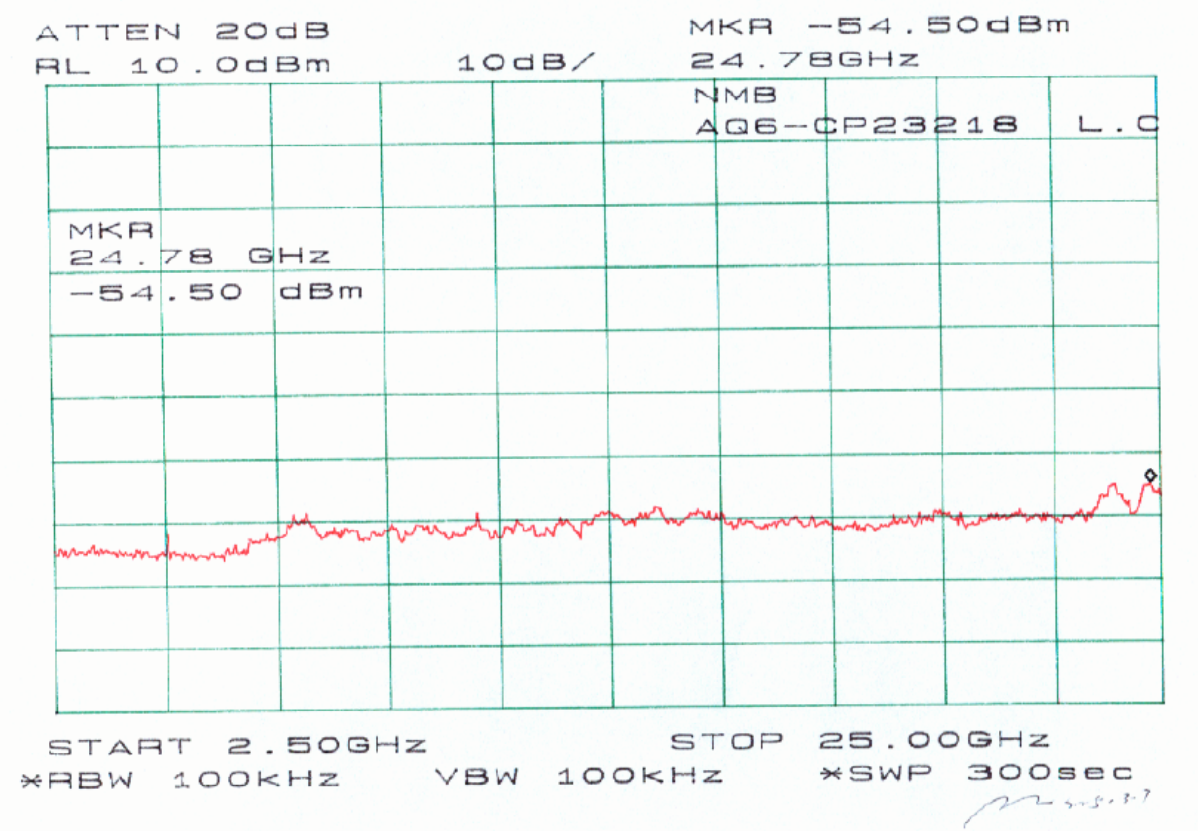
RL 10.0dBm
10dB/
MKR -17.50dBm
2.401GHz
NMB
AQ6-CP23218 L.C
MKR
2.401 GHz
-17.50 dBm
START 30MHz
STOP 2.500GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec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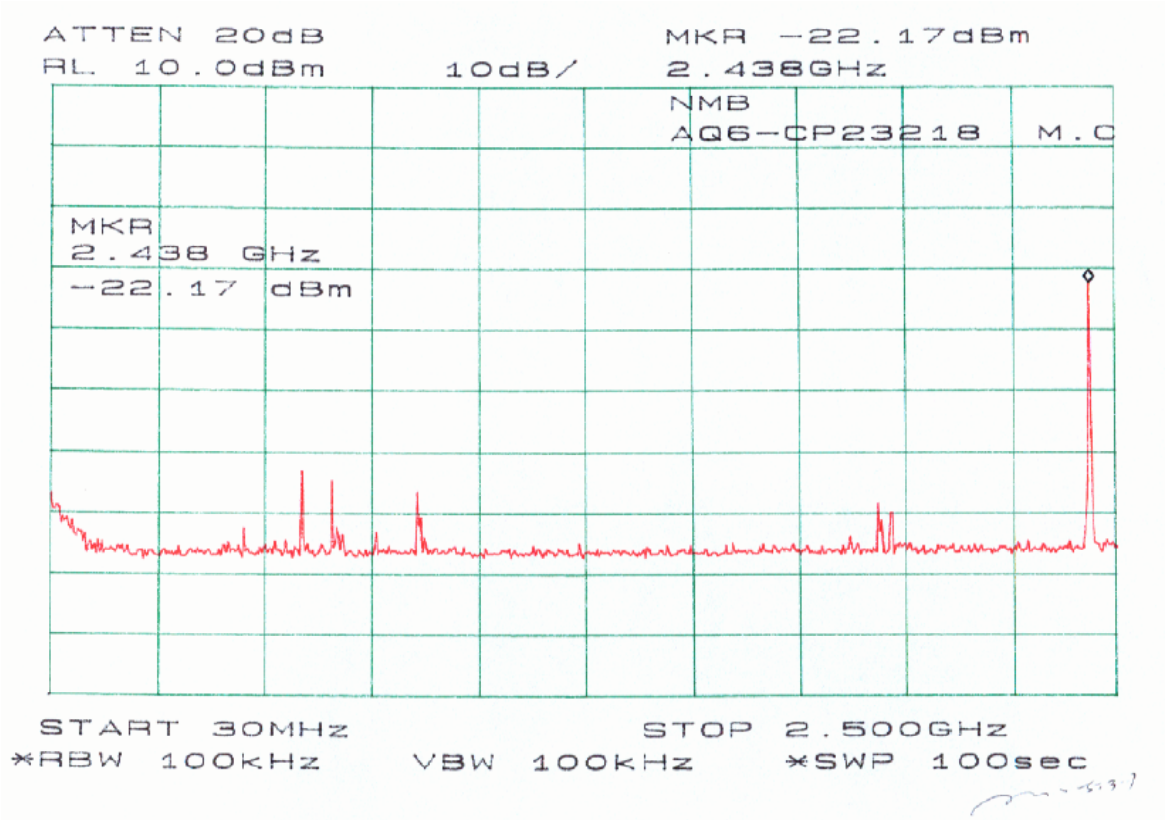
RL 10.0dBm
10dB/
MKR -54.50dBm
24.78GHz
NMB
AQ6-CP23218 L.C
MKR
24.78 GHz
-54.50 dBm
START 2.50GHz
STOP 25.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 300sec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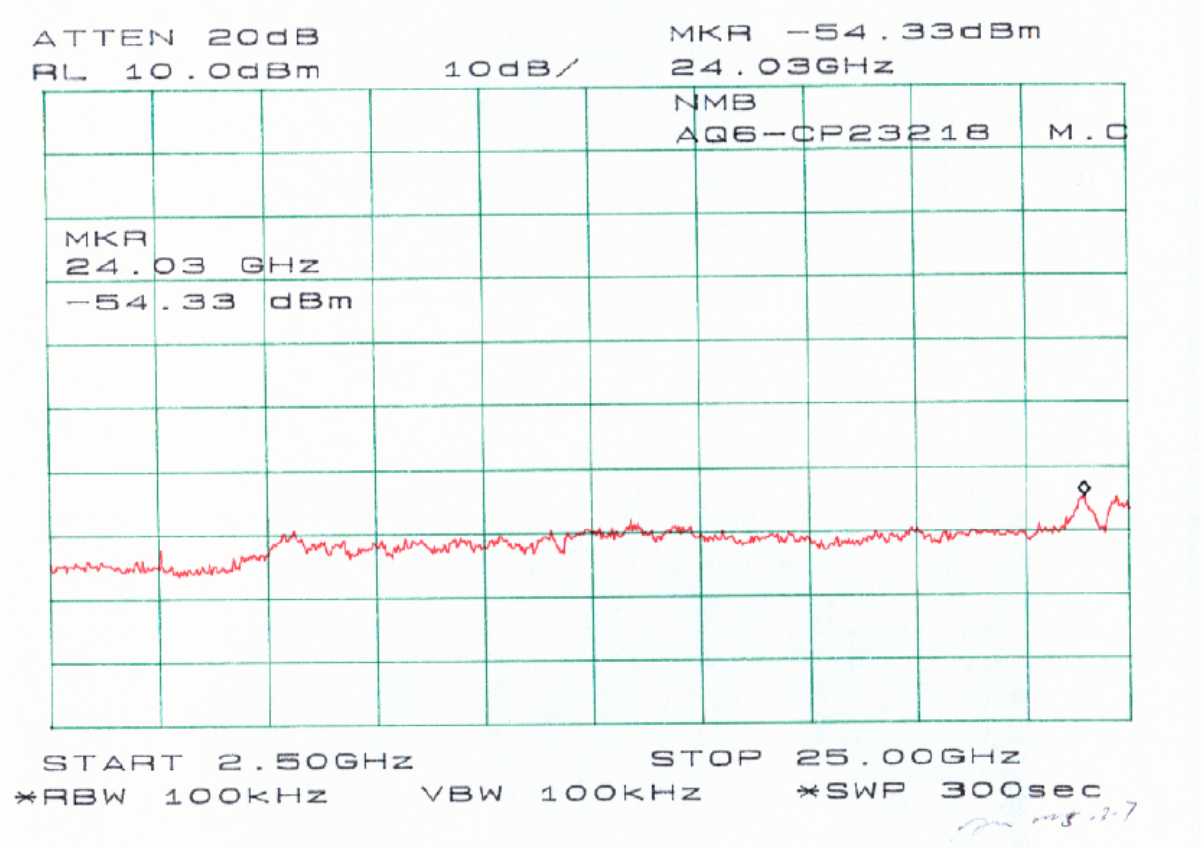
RL 10.0dBm
10dB/
MKR -22.17dBm
2.438GHz
NMB
AQ6-CP23218 M.C
MKR
2.438 GHz
-22.17 dBm
START 30MHz
STOP 2.500GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec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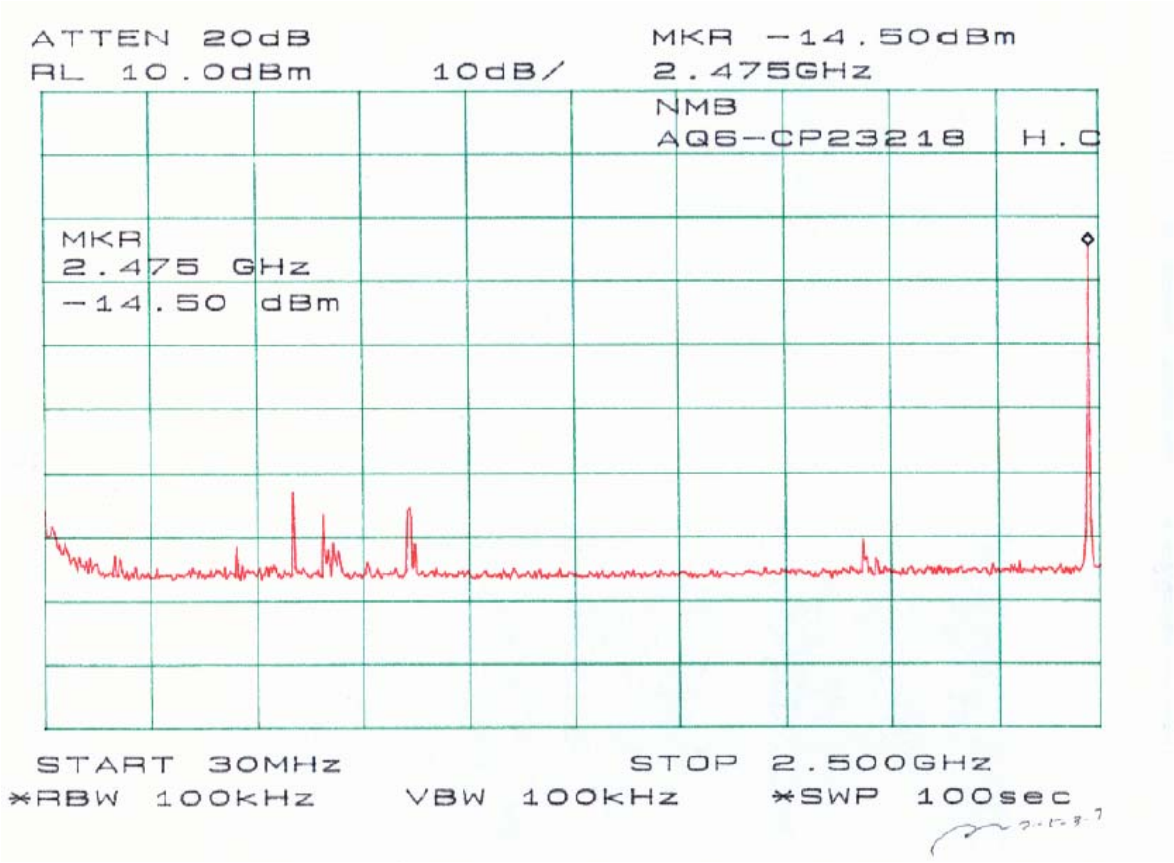
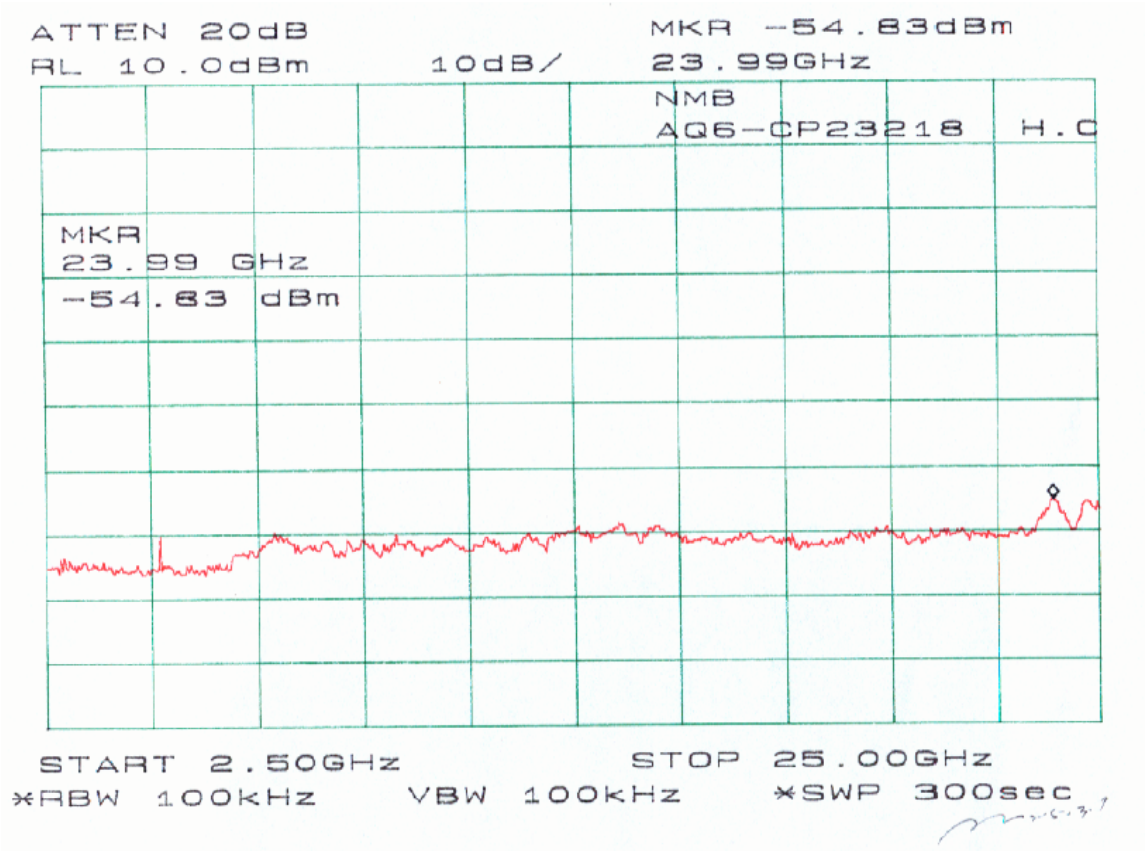
RL 10.0dBm
10dB/
MKR -54.33dBm
24.03GHz
NMB
AQ6-CP23218 M.C
MKR
24.03 GHz
-54.33 dBm
START 2.50GHz
STOP 25.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 300sec


ATTEN 20dB
RL 10.0dBm
10dB/
MKR -14.50dBm
2.475GHz
NMB
AQ6-CP23218 H.C
MKR
2.475 GHz
-14.50 dBm
START 30MHz
STOP 2.500GHz
*RBW 100kHz
VBW 100kHz
*SWP 100sec


ATTEN 20dB
RL 10.0dBm
10dB/
MKR -54.83dBm
23.99GHz
NMB
AQ6-CP23218 H.C
MKR
23.99 GHz
-54.83 dBm
START 2.50GHz
STOP 25.00GHz
*RBW 100kHz
VBW 100kHz
*SWP 300sec

§15.209 - 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)	(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 accordance with the ANSI C63.4-2003. The specification used was the FCC 15.209 limits.

The spacing between the peripherals was 10 centimeters.

Spectrum Analyzer Setup

According to FCC Rules, 47 CFR, Section 15.33, the frequency was investigated from 30 to 25000 MHz.

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

For Average measurement: RBW = 1MHz, VBW = 10Hz (above 1000MHz)

Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Amplifier, Pre (1~26.5GHz)	8449B	3147A00400	2004-10-05
Sunol Science	Antenna	JB1	A013105-3	2005-02-11
HP	Analyzer, Spectrum	8565EC	3946A00131	2005-08-06
HP	Pre, Amplifier (1~1300MHz)	8447D	2944A10198	2005-08-20
A.H, Systems	Antenna, Horn, DRG	SAS-200/571	261	2005-04-20

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

For Unintentional Emission

Manufacturer	Description	Model	Serial Number	Cal. Date
HP	Amplifier, Pre, microwave	8449B	3147A00400	2004-03-14
HP	Amplifier, Pre	8447E	1937A01057	2004-08-04
HP	Analyzer, Spectrum	8565EC	3946A00131	2004-08-06
ETS	Antenna, Biconical	3110B	9603-2315	2004-12-14
A.R.A.	Antenna, Horn, DRG	DRG-118/A	1132	2004-09-30
A. H. Systems	Antenna, Horn, DRG	SAS-200/571	2455-261	2004-08-01
ETS	Antenna, logperiodic	3148	0004-1155	2004-10-11

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

Test Procedure

For the radiated emissions test, the EUT, and all support equipment power cords was connected to the AC floor outlet.

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

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

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 -7dBμV means the emission is 7dBμV below the maximum limit for Class B. The equation for margin calculation is as follows:

Margin = Corr. Ampl. - FCC 15.209 Limit

Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC Title 47, Part 15, Subpart C, section 15.205, 15.209 and 15.247, and had the worst margin of:

Environmental Conditions

-25.1 dB at **4804.04 MHz** in the **Vertical** polarization, Low Channel

-26.3 dB at **4880.04 MHz** in the **Vertical** polarization, Middle Channel

-8.9 dB at **4958.08 MHz** in the **Vertical** polarization, High Channel

-26.0 dB at **53.17MHz** in the **Vertical** polarization, Unintentional Emission

Temperature:	25° C
Relative Humidity:	50%
ATM Pressure:	1020 mbar

The testing was performed by Snell Leong on 2005-10-06.

For Unintentional Emission

Temperature:	27° C
Relative Humidity:	37%
ATM Pressure:	1031 mbar

The testing was performed by Ming Jin on 2005-03-07.

Radiated Emission Test Result

Low Channel 1-25GHz

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	FCC		Comment
MHz	dBuV	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB	
2402.0200	95.3	110	1.5	V	28.1	2.0	35.5	89.9			Fund/Peak
2402.0200	94.4	60	1.6	H	28.1	2.0	35.5	89.0			Fund/Peak
2402.0200	41.6	110	1.5	V	28.1	2.0	35.5	36.2			Fund/Ave.
2402.0200	40.5	60	1.6	H	28.1	2.0	35.5	35.1			Fund/Ave.
4804.0400	54.3	110	1.5	V	28.1	2.0	35.5	48.9	74	-25.1	Peak
4804.0400	26.9	210	1.6	V	32.5	3.1	34.6	27.9	54	-26.1	Ave.
4804.0400	53.1	60	1.6	H	28.1	2.0	35.5	47.7	74	-26.3	Peak
4804.0400	25.7	290	1.5	H	32.5	3.1	34.6	26.7	54	-27.3	Ave.
7206.0600	28.4	110	1.5	V	28.1	2.0	35.5	23.0	54	-31.0	Ave.
7206.0600	25.9	60	1.6	H	28.1	2.0	35.5	20.5	54	-33.5	Ave.
7206.0600	38.8	210	1.6	V	32.5	3.1	34.6	39.8	74	-34.2	Peak
7206.0600	37.5	290	1.5	H	32.5	3.1	34.6	38.5	74	-35.5	Peak

Middle Channel 1-25GHz

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	FCC		Comment
MHz	dBuV	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB	
2440.0200	95.2	0	1.5	V	28.1	2.0	35.5	89.8			Fund/Peak
2440.0200	94.1	30	1.6	H	28.1	2.0	35.5	88.7			Fund/Peak
2440.0200	41.4	0	1.5	V	28.1	2.0	35.5	36.0			Fund/Ave.
2440.0200	40.3	30	1.6	H	28.1	2.0	35.5	34.9			Fund/Ave.
4880.0400	26.7	90	1.6	V	32.5	3.1	34.6	27.7	54	-26.3	Ave.
4880.0400	25.5	120	1.5	H	32.5	3.1	34.6	26.5	54	-27.5	Ave.
4880.0400	38.6	90	1.6	V	32.5	3.1	34.6	39.6	74	-34.4	Peak
4880.0400	37.3	120	1.5	H	32.5	3.1	34.6	38.3	74	-35.7	Peak

High Channel 1-25GHz

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	FCC		Comment
MHz	dBuV	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB	
2479.0400	92.7	0	1.5	V	28.1	2.0	35.5	87.3			Fund/Peak
2479.0400	91.3	45	1.6	H	28.1	2.0	35.5	85.9			Fund/Peak
2479.0400	41.1	0	1.5	V	28.1	2.0	35.5	35.7			Fund/Ave.
2479.0400	40.2	45	1.6	H	28.1	2.0	35.5	34.8			Fund/Ave.
4958.0800	61.4	0	1.5	V	34.4	3.5	34.2	65.1	74	-8.9	Peak
4958.0800	59.7	45	1.6	H	34.4	3.5	34.2	63.4	74	-10.6	Peak
4958.0800	31.5	0	1.5	V	34.4	3.5	34.2	35.2	54	-18.8	Ave.
4958.0800	29.6	45	1.6	H	34.4	3.5	34.2	33.3	54	-20.7	Ave.
7437.1200	26.5	90	1.6	V	32.5	3.1	34.6	27.5	54	-26.5	Ave.
7437.1200	25.2	60	1.5	H	32.5	3.1	34.6	26.2	54	-27.8	Ave.
7437.1200	38.4	90	1.6	V	32.5	3.1	34.6	39.4	74	-34.6	Peak
7437.1200	37.1	60	1.5	H	32.5	3.1	34.6	38.1	74	-35.9	Peak

Unintentional Emission

Frequency	Reading	Direction	Height	Polar	Antenna Loss	Cable loss	Amplifier	Correction Factor	FCC	
MHz	dBuV	Degree	Meter	H / V	dB	dB	dB	dBuV/m	Limit dBuV/m	Margin dB
53.17	31.1	180	1.5	V	10.2	1.1	28.4	14.0	40.0	-26.0
61.09	28.8	0	1.5	V	9.4	1.3	28.2	11.3	40.0	-28.7
181.72	29.3	60	1.6	H	13.4	2.1	28.9	15.9	43.5	-27.6
364.53	27.5	90	1.5	V	14.2	2.3	28.3	15.7	46.0	-30.3

FUND = Fundamental
AVG = average

§15.247(a)(2) – 6 dB BANDWIDTH

Standard Applicable

According to §15.247(a)(2), for digital modulation techniques, the minimum 6dB bandwidth shall be at least 500 kHz.

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. Repeat above procedures until all frequencies measured were complete.

Equipment Lists

Manufacturer	Description	Model	Serial Number	Cal. Date
Agilent	Analyzer, Spectrum	8565EC	3946A00131	2005-08-06

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

Measurement Result

Environmental Conditions

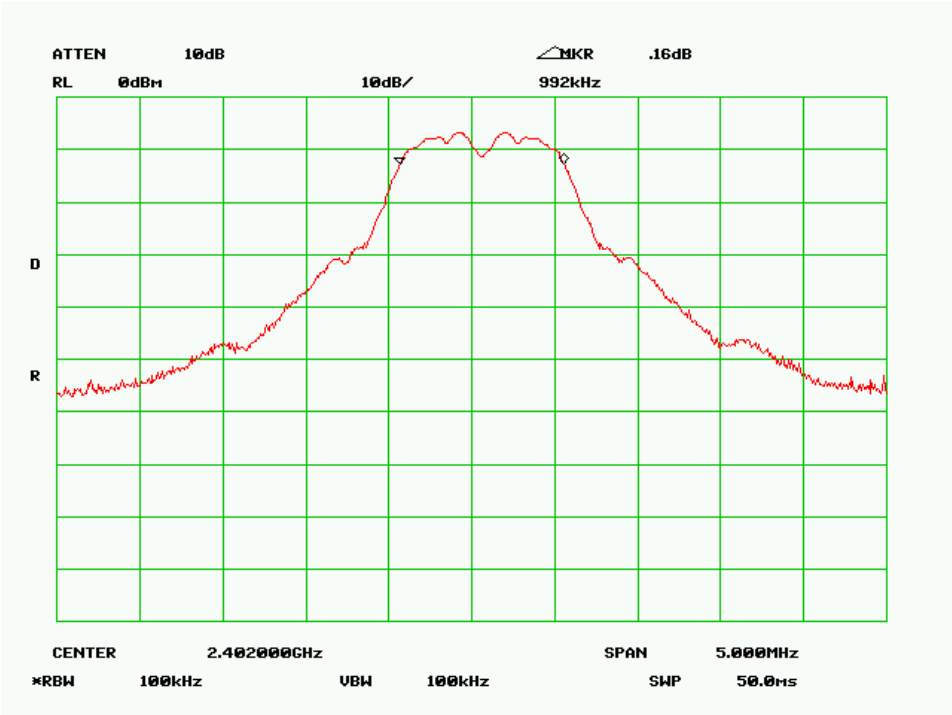
Temperature:	25° C
Relative Humidity:	50%
ATM Pressure:	1020 mbar

The testing was performed by Snell Leong on 2005-10-06.

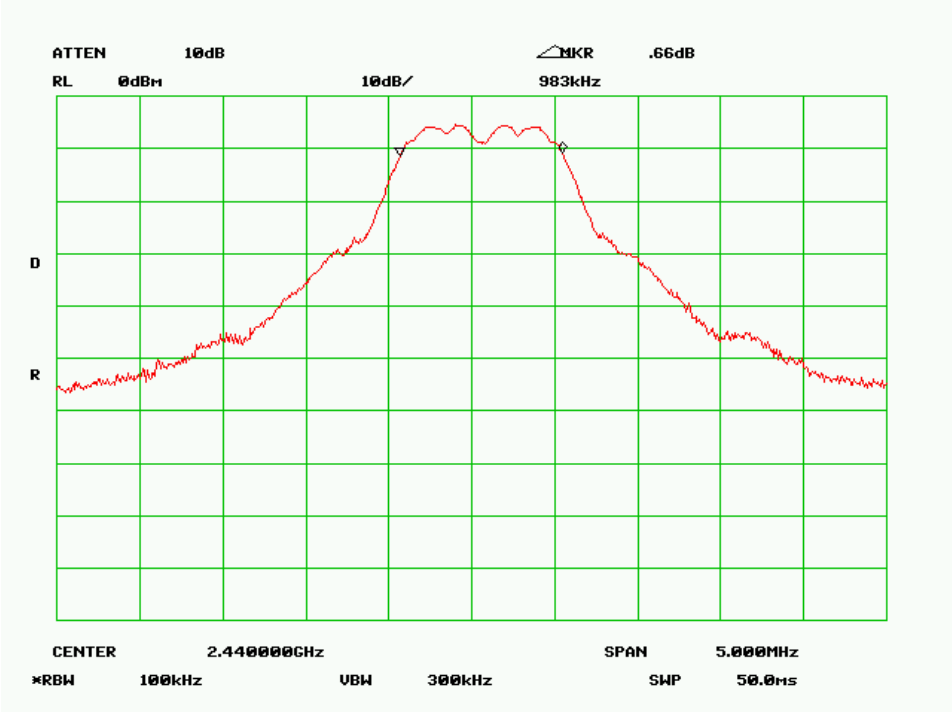
Test Result

Channel	Frequency (MHz)	Measured (KHz)	Standard (kHz)	Result
Low	2402.02	992	≥ 500	Pass
Mid	2440.02	983	≥ 500	Pass
High	2479.04	975	≥ 500	Pass

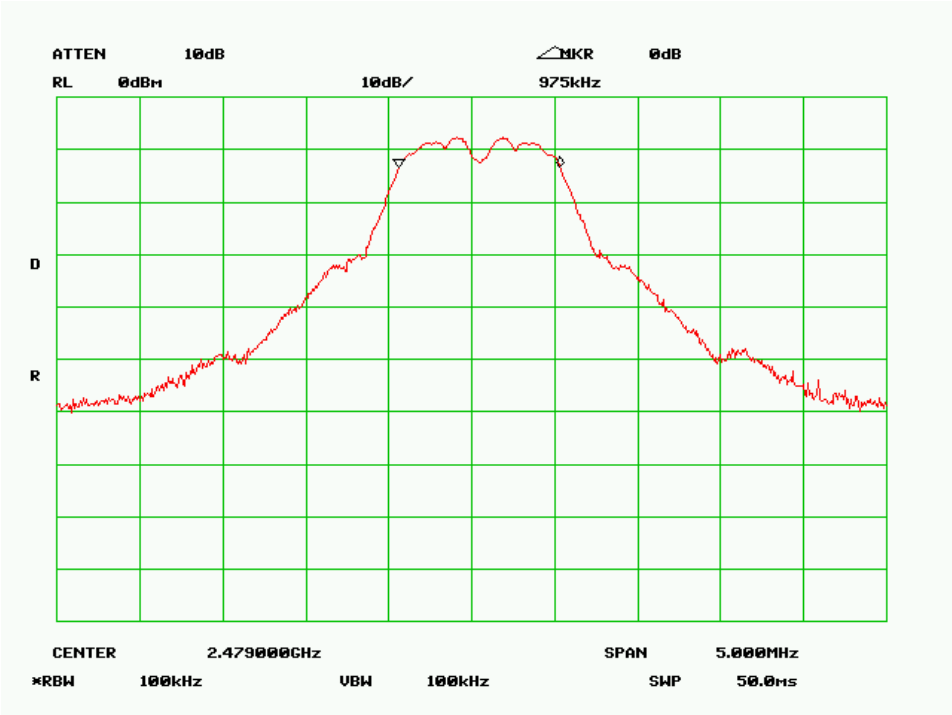
Low Channel



Middle Channel



High Channel



§15.247(b)(3) - PEAK OUTPUT POWER MEASUREMENT

Standard Applicable

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

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 spectrum analyzer.
3. Add a correction factor to the display.

Equipment Lists

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Agilent	Analyzer, Spectrum	8565EC	3946A00131	2005-08-06

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

Measurement Result

Environmental Conditions

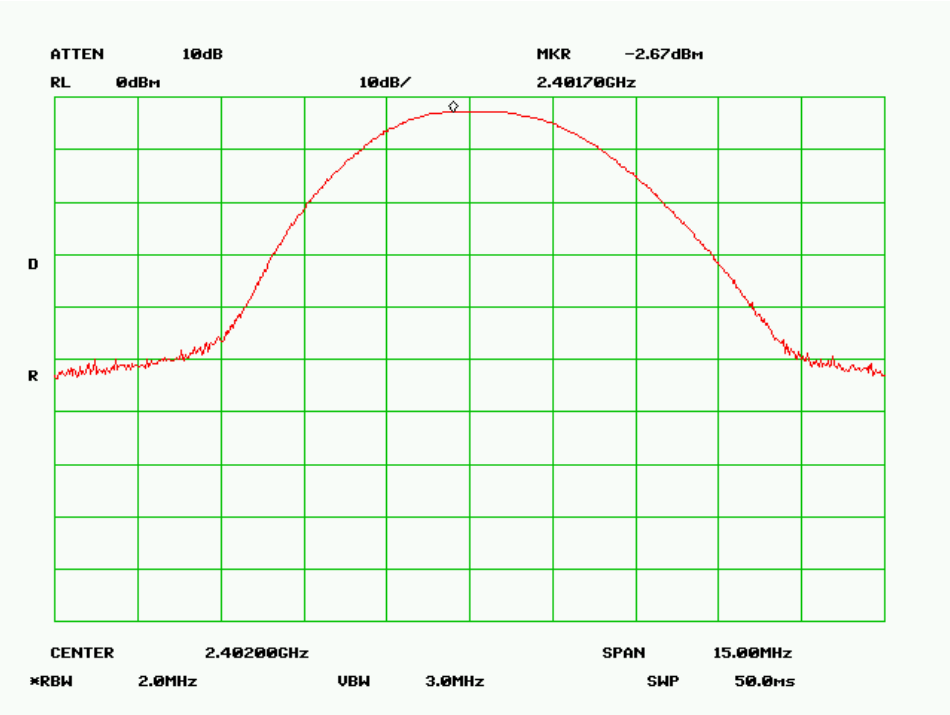
Temperature:	25° C
Relative Humidity:	50%
ATM Pressure:	1020 mbar

The testing was performed by Snell Leong on 2005-10-06.

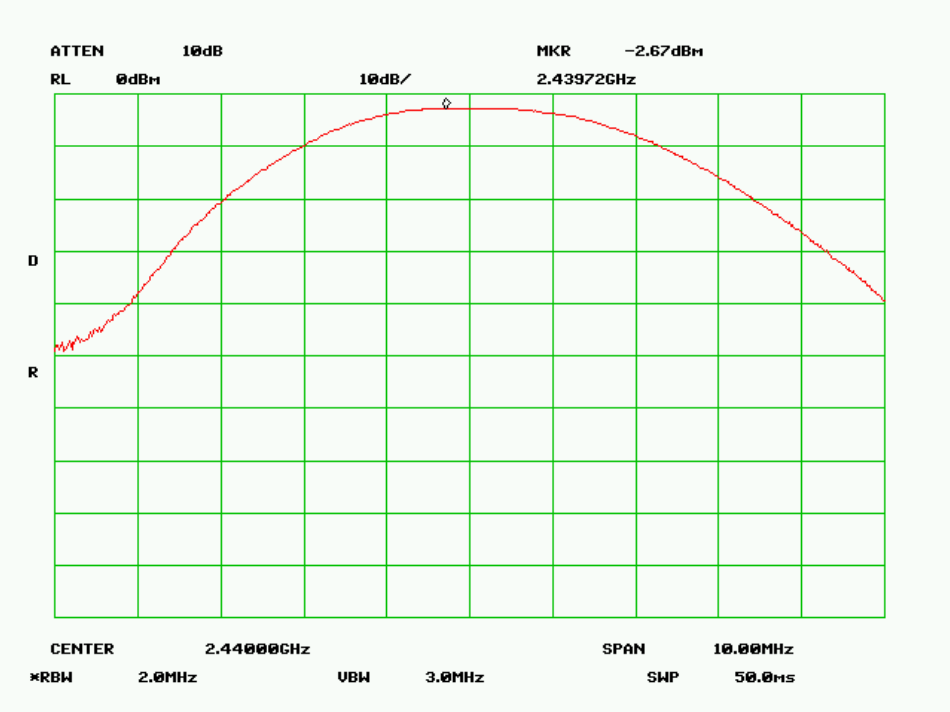
Output Power

Channel	Frequency MHz	RF Power dBm	RF Power m W	Limit m W
Low	2402.02	-2.67	0.54	1000
Mid	2440.02	-2.67	0.54	1000
High	2479.04	-3.83	0.41	1000

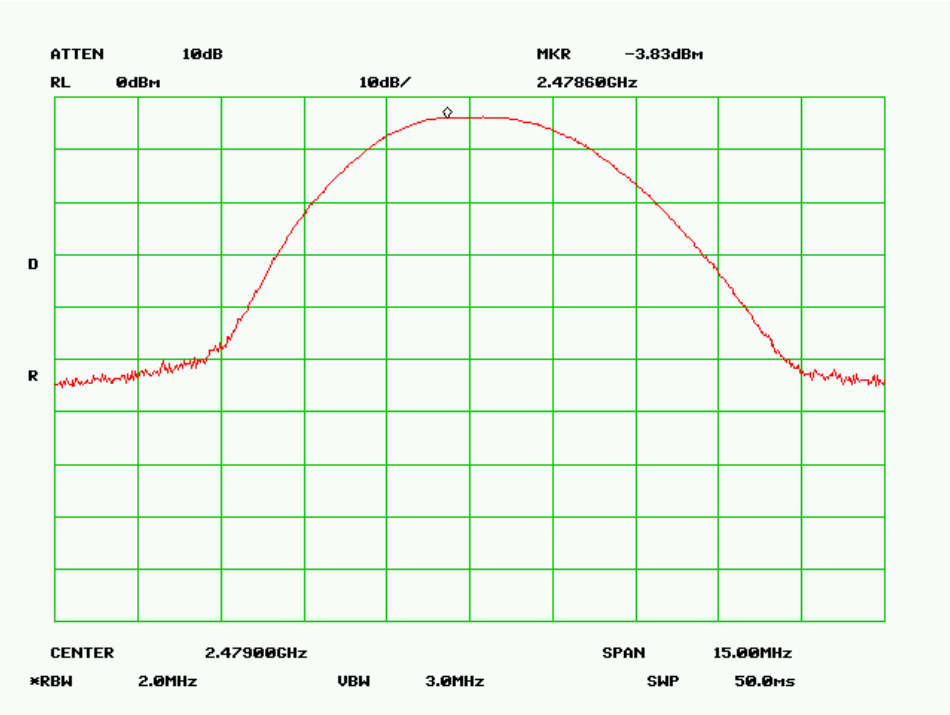
Low Channel



Middle Channel



High Channel



§15.247(d) - 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	Description	Model No.	Serial No.	Calibration Date
Agilent	Analyzer, Spectrum	8565EC	3946A00131	2005-08-06

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

Measure Results

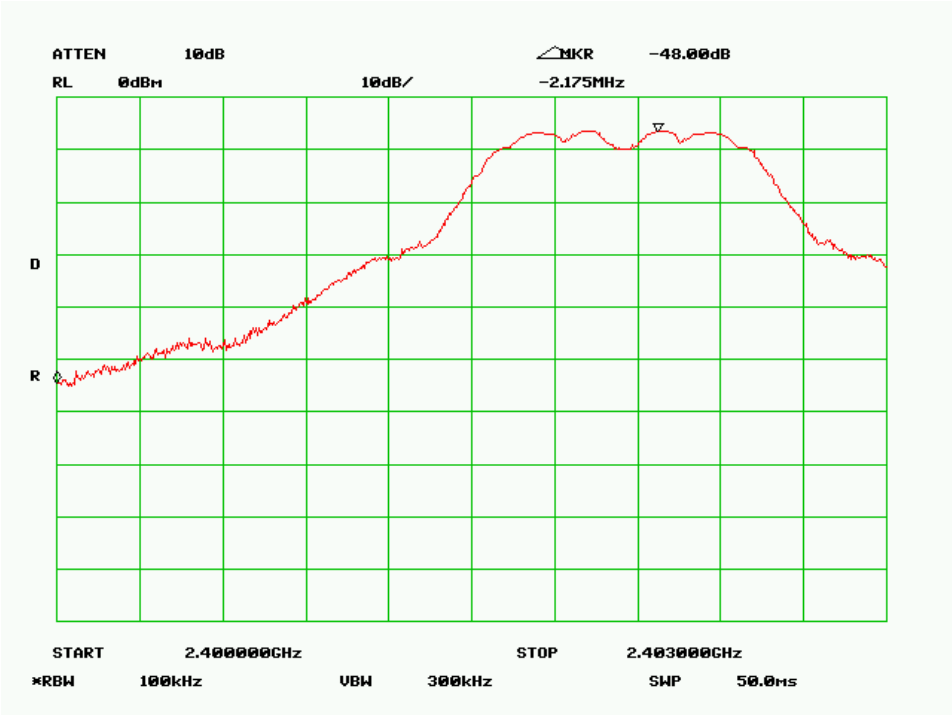
Environmental Conditions

Temperature:	25° C
Relative Humidity:	50%
ATM Pressure:	1020 mbar

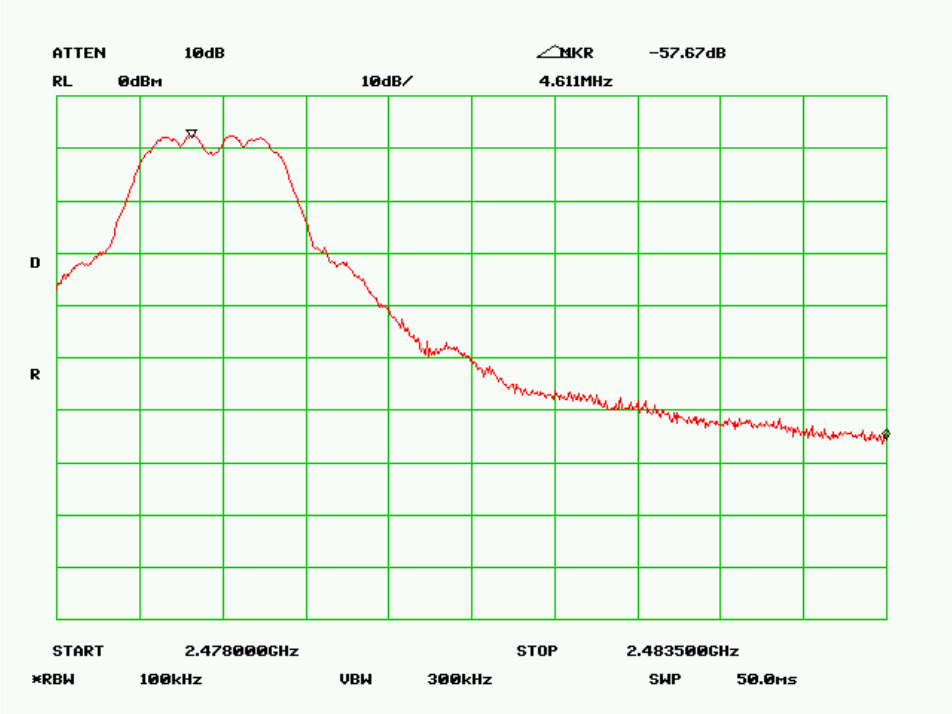
The testing was performed by Snell Leong on 2005-10-06.

Please refer to following pages for plots of band edge.

Low Channel



High Channel



§15.247(e) - 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.

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 1MHz 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.

Equipment Lists

Manufacturer	Description	Model No.	Serial No.	Calibration Date
Agilent	Analyzer, Spectrum	8565EC	3946A00131	2005-08-06

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

Measurement Results

Environmental Conditions

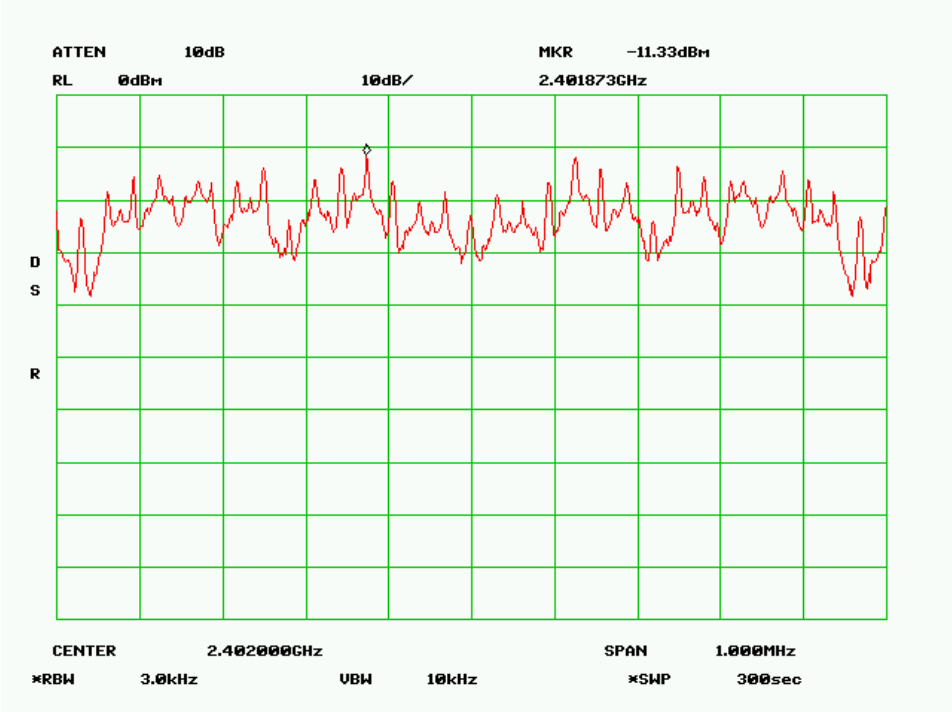
Temperature:	25° C
Relative Humidity:	50%
ATM Pressure:	1020 mbar

The testing was performed by Snell Leong on 2005-10-06.

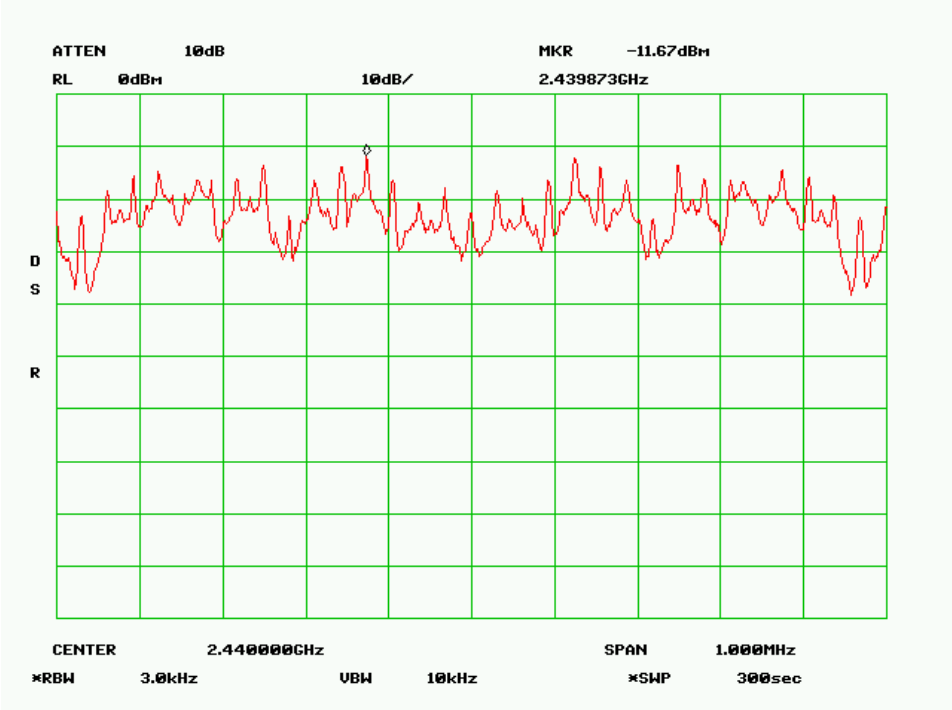
Test Result

Channel	Frequency (MHz)	Peak Power Spectral Density (dBm)	Standard (dBm)	Result
Low	2402.02	-11.33	8	Pass
Mid	2440.02	-11.67	8	Pass
High	2479.04	-12.67	8	Pass

Low Channel



Middle Channel



High Channel