Lab Code: 200167-0

FCC PART 15.247

INDUSTRY CANADA RSS-210, ISSUE 7, JUNE 2007

MEASUREMENT AND TEST REPORT

For

Darim Vision Corporation

4511 Willow Road Suite 4
Pleasanton, CA 94588, USA

FCC ID: QTF-PVE4006300
IC ID: 7271A-PVE400M
Model: PVE400M24

Report Type: ☒ Original Report	**Product Type:** Portable Wireless IP Camera
Test Engineer(s):	James Ma
Report Number:	R0707302
Report Date:	2007-09-27
Reviewed By:	Hans Mellberg, VP of Engineering
Prepared By:	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Ave. Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732-9164

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1 GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

The Darim Vision Corporation product, *FCCID: QTF-PVE4006300, IC: 7271A-PVE400M, model: PVE400M24* or the "EUT" as referred to in this report, MEA (Motorola's Mobility Enhanced Access) portable wireless IP camera. The EUT is a Class 2 product, frequency range 2410 MHz – 2470 MHz. This EUT operates on Motorola's Mobility Enhanced Access (MEA®) wireless technology supported in the MOTOMESH™ Solo and MOTOMESH™ Quattro product platforms. MEA is a purpose-built private mobile broadband solution that delivers IP applications into the field at highway speeds and allows to form ad-hoc networks amongst peers.
It can be managed and monitored from either an Incident Response Command Post or from Central Operations Control Centre- delivering real-time video and audio information from outdoor environments back to a centrally managed control location in order to communicate true "Point-of-View" situational awareness.

1.2 Mechanical Description of EUT

The *Darim Vision Corporation* product, *FCCID: QTF-PVE4006300, IC: 7271A-PVE400M, model: PVE400M24*, measures approximately 135mm L x 113mm W x 37mm H, and weighs approximately *750g*.

**The test data gathered are from production sample, serial number:* 00:01:98:05:00:59*, provided by the manufacturer.*

1.3 Antenna Description

The antenna used is a dual band straight RPSMA compact, portable, center fed, whip antenna. It has a linear, vertical polarization.

Number	Model/Type	
Antenna	Part number:	GCP 24549-30-10S
	Manufacturer:	GC Protronics Inc.
	Frequency Range:	2.4-2.5 GHz, 4.9-5.35 GHz
	Connector Type / Maximum Gain	Reverse Polarity SMA Plug / 2.0 dBi
	Antenna Type / Pattern:	Monopole / Omni-directional
	Measurement:	Length: 7.8 mm x 76 mm; Weight: 20g

1.4 EUT Photograph

Please refer to Exhibit C for more EUT photographs.

1.5 Objective

This type approval report is prepared on behalf of *Darim Vision Corporation.* 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, and power spectral density, 100 kHz Bandwidth of Band Edges Measurement, Spurious Emissions, Conducted and Radiated Spurious Emissions.

1.6 Related Submittal(s)/Grant(s)

EUT included certified Motorola Inc. - Mesh Networks Product Group product: PCMCIA Card, FCC ID: QJEWMC6300704. Please refer to MET Lab test report: EMCS15416-FCC247.

1.7 Test Methodology

All measurements contained in this report were conducted in accordance 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.

1.8 Measurement Uncertainty

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

Based on NIS 81, The Treatment of Uncertainty in EMC Measurements, the values range from $\pm$2.0 for Conducted Emissions tests and $\pm$4.0 dB for Radiated Emissions tests are the most accurate estimates pertaining to uncertainty of EMC measurements at BACL.

Detailed instrumentation measurement uncertainties can be found in BACL report QAP-018.

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.

1.9 Test Facility

The test site used by BACL Corp. to collect radiated and conducted emissions measurement data is located at its facility in Sunnyvale, California, USA.

The test site at BACL Corp. 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 have been found to be in compliance with the requirements of Section 2.948 of the FCC Rules on February 11, 1997 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 & TIA/EIA-603.

The Federal Communications Commission and Voluntary Control Council for Interference have the reports on file and they are listed under FCC registration number: 90464 and VCCI Registration No.: R-2463 and C-2698. 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 Corp. 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.

2 SYSTEM TEST CONFIGURATION

2.1 Justification

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

The EUT was tested in the testing mode to represent *worst*-case results during the final qualification test.

The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the average power, peak power and PPSD across all data rates bandwidths, and modulations.

2.2 EUT Exercise Software

The EUT is programmed with the following data rate settings that were used during testing:

Channel	Low	Middle	High
Frequency (MHz)	2410	2430	2470

2.3 Special Accessories

There were no special accessories were required, included, or intended for use with EUT during these tests.

2.4 Equipment Modifications

No modifications were made to the EUT.

2.5 Local Support Equipment List and Details

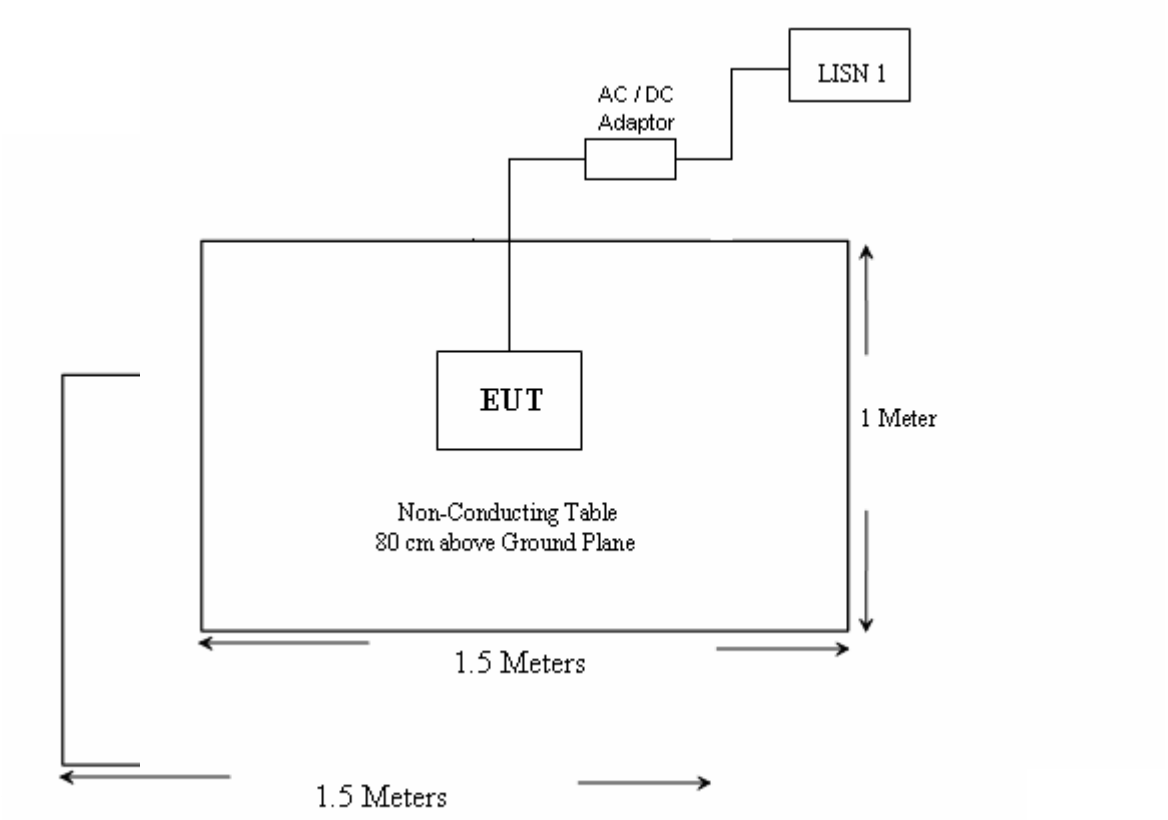
Manufacturer	Description	Model	Serial Number
Dell	Laptop	Inspiron 1300	CN0RJ272-70166-69A-03TC

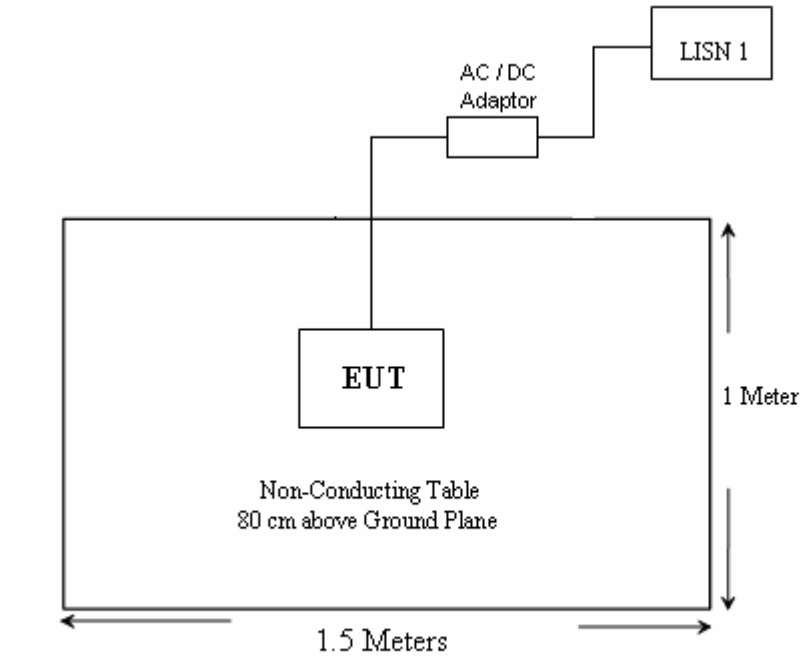
2.6 EUT Power Supply

Manufacturer	Description	Model	Serial Number
HJC HUA JUNG COM. CO.	Switching Power Supply	HASU11FB	N/A

2.7 Test Setup Block Diagrams

Conducted Emissions





3 SUMMARY OF TEST RESULTS

Results reported relate only to the product tested.

FCC 15C & RSS-210 Rules	Description of Test	Result	Note
FCC §15.203, IC RSS-Gen §7.1.4	Antenna Requirement	Compliant	-
FCC §15.247 (i) and §2.1093, IC RSS-Gen 5.5 & RSS-102	RF Exposure	Compliant	Refer to SAR report
§15.247 (b)(3), RSS210 § A8.4	Maximum Peak Output Power	Compliant	-
§15.247 (a)(2), RSS-210 §A8.2 (a)	6 dB Bandwidth & Occupied Bandwidth	Compliant	-
FCC §15.207, IC RSS-Gen §7.2.2	Conducted Emissions	Compliant	-
FCC §15.109, §15.205, §15.209 & §15.247(c), IC RSS-Gen §4.9	Radiated Spurious Emissions	Compliant	-
FCC §15.205	Restricted Band	Compliant	-
RSS-Gen §6(a)	Receiver Spurious Emissions	Compliant	-
FCC §2.1051 & §15.247(d), RSS210 § A8.5 § RSS-Gen §7.2	Spurious Emissions at Antenna Port	Pls. Refer to MET Lab report*	-
§ 15.247 (d), RSS210 § A8.5	100 kHz Bandwidth of Frequency Band Edge	Pls. Refer to MET Lab report*	-
§15.247 (e), RSS-210 §A8.2 (b)	Power Spectral Density	Pls. Refer to MET Lab report*	-

*EUT included certified Motorola Inc. - Mesh Networks Product Group product: PCMCIA Card, FCC ID: QJEWMC6300704. Please refer to MET Lab test report: EMCS15416-FCC247.

4 FCC §15.203, IC RSS-Gen §7.1.4 – ANTENNA REQUIREMENT

4.1 Applicable Standard

According to FCC §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

And according to FCC §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.

As per IC RSS-Gen §7.1.4: Transmitter Antenna, a transmitter can only be sold or operated with antennas with which it was certified. A transmitter may be certified with multiple antenna types. An antenna type comprises antennas having similar in-band and out-of-band radiation patterns. Testing shall be performed using the highest-gain antenna of each combination of transmitter and antenna type for which certification is being sought, with the transmitter output power set at the maximum level. Any antenna of the same type and having equal or lesser gain as an antenna that had been successfully tested for certification with the transmitter, will also be considered certified with the transmitter, and may be used and marketed with the transmitter. The manufacturer shall include with the application for certification a list of acceptable antenna types to be used with the transmitter.

4.2 Result

The antenna, part number: GCP 24549-30-10S for this device is a center fed monopole whip antennae with a maximum gain of 2 dBi that will only provided by Darim Vision Corporation. It features a reverse polarity connection type to ensure that non-OEM antennae cannot be implemented by the end user.

☒ **Compliant** ☐ **N/A**

Please refer to the following antenna photo for details.

Antenna photo

5 FCC §15.247 (i) and §2.1093, IC RSS-Gen 5.5 & RSS-102 - RF EXPOSURE

Please refer to the SAR report.

6 FCC §15.247(b), RSS210 § A8.4 - PEAK OUTPUT POWER MEASUREMENT

6.1 Applicable Standard

§15.247(b) the maximum peak output power of the intentional radiator shall not exceed the following:

§15.247(b) (3) and RSS210 § A8.4 (4) for systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt.

§15.247(b) (4) (i) Systems operating in the 2400–2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum peak output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

6.2 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.

6.3 Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Power Meter	E4419B	MY4121511	2006-09-13*
Agilent	Power Sensor	E4412-60006	MZ42059181	2006-12-13

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

6.4 Environmental Conditions

Temperature:	27 °C
Relative Humidity:	40 %
ATM Pressure:	102.0 kPa

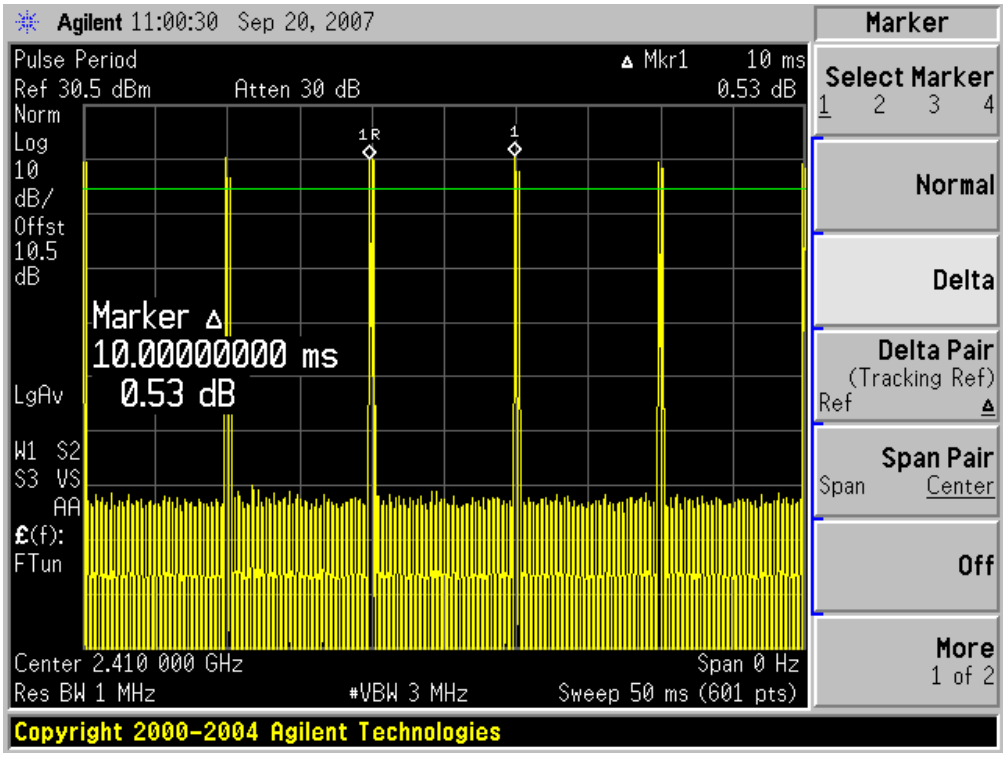
**The testing was performed by James Ma from 2007-09-26.*

6.5 Summary of Test Results

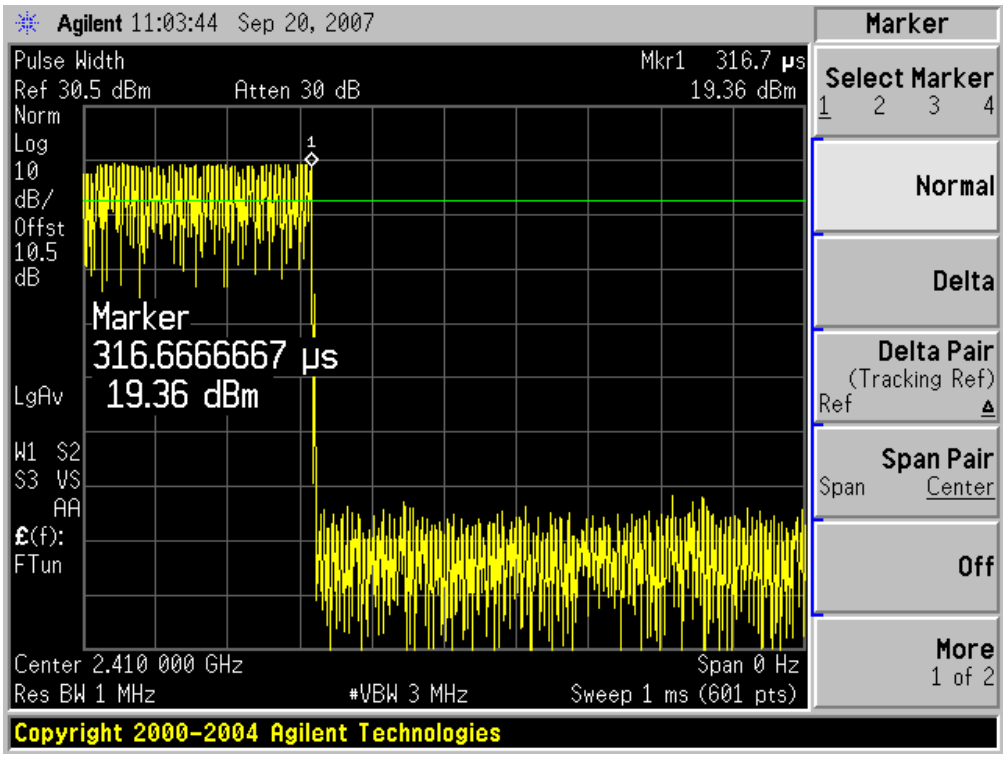
Channel	Frequency (MHz)	Duty Cycle (dB)	Measured Power (dBm)	Max Peak Output Power		Limit (mW)
				(dBm)	(mW)	
Low	2410	15.0	9.81	24.81	302.69	1000
Mid	2430	15.0	9.90	24.90	309.03	1000
High	2470	15.0	9.62	24.62	289.73	1000

Please See the Following Plots for Duty Cycle

Pulse Period



Pulse Width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Norm
Log
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dB/
Offst
10.5
dB
Marker
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19.36 dBm
LgAv
W1 S2
S3 VS
AA
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Sweep 1 ms (601 pts)
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Select Marker
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Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
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7 FCC §15.247(a) (2), RSS-210 § A8.2 (a) – 6 dB BANDWIDTH & OCCUPIED BANDWIDTH

7.1 Applicable Standard

According to §15.247(a)(2), RSS-210 §A8.2 systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz, and 5725 - 5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

7.2 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 emissions bandwidth. (6 dB bandwidth for DTS)
4. Repeat above procedures until all frequencies measured were complete.

7.3 Equipment List

Manufacturer	Description	Model	Serial Number	Calibration Date
Agilent	Spectrum Analyzer	E4446A	US44300386	2007-04-26

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

7.4 Environmental Conditions

Temperature:	27 °C
Relative Humidity:	40 %
ATM Pressure:	102.0 kPa

**The testing was performed by James Ma from 2007-09-26.*

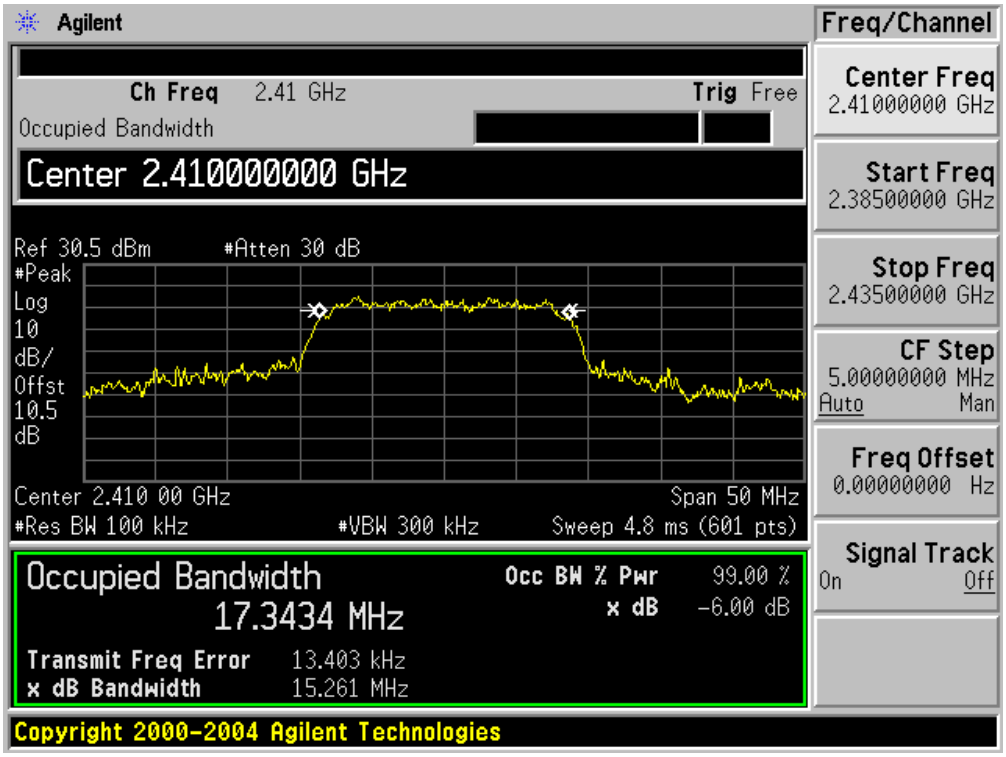
7.5 Summary of Test Results

Channel	Frequency (MHz)	6 dB BW (kHz)	Limit (kHz)	Result
Low	2410	15261	>500	Compliant
Middle	2430	15312	>500	Compliant
High	2470	15210	>500	Compliant

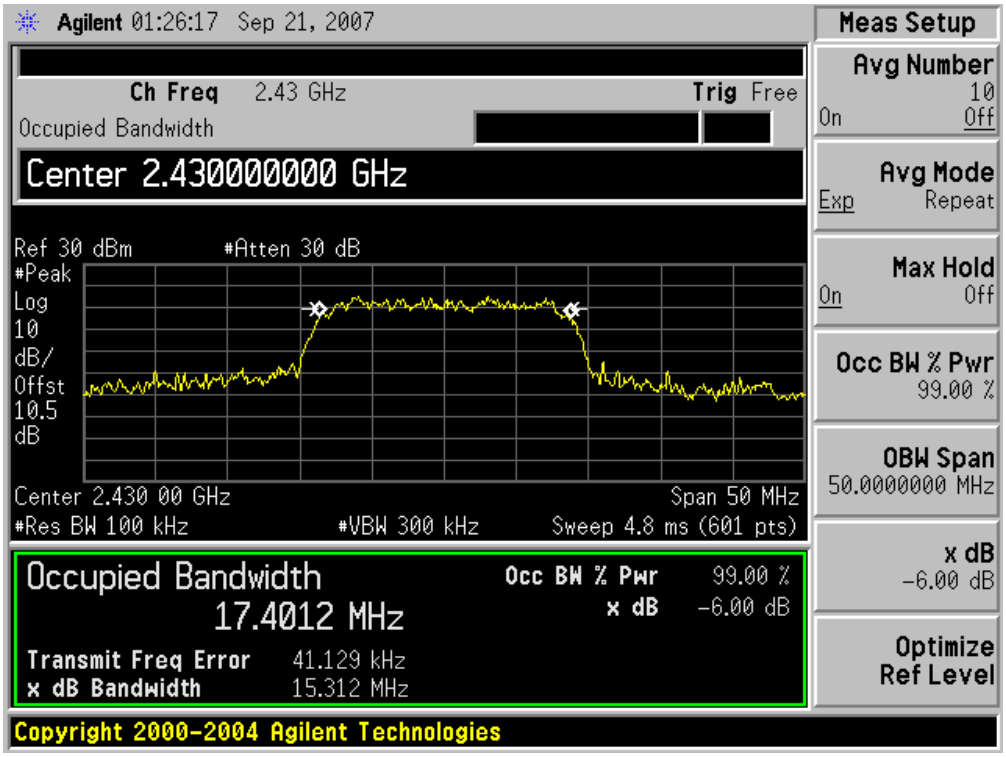
Channel	Frequency (MHz)	99% BW (kHz)
Low	2410	17343
Middle	2430	17401
High	2470	17387

Please refer to the following plots for detailed test results

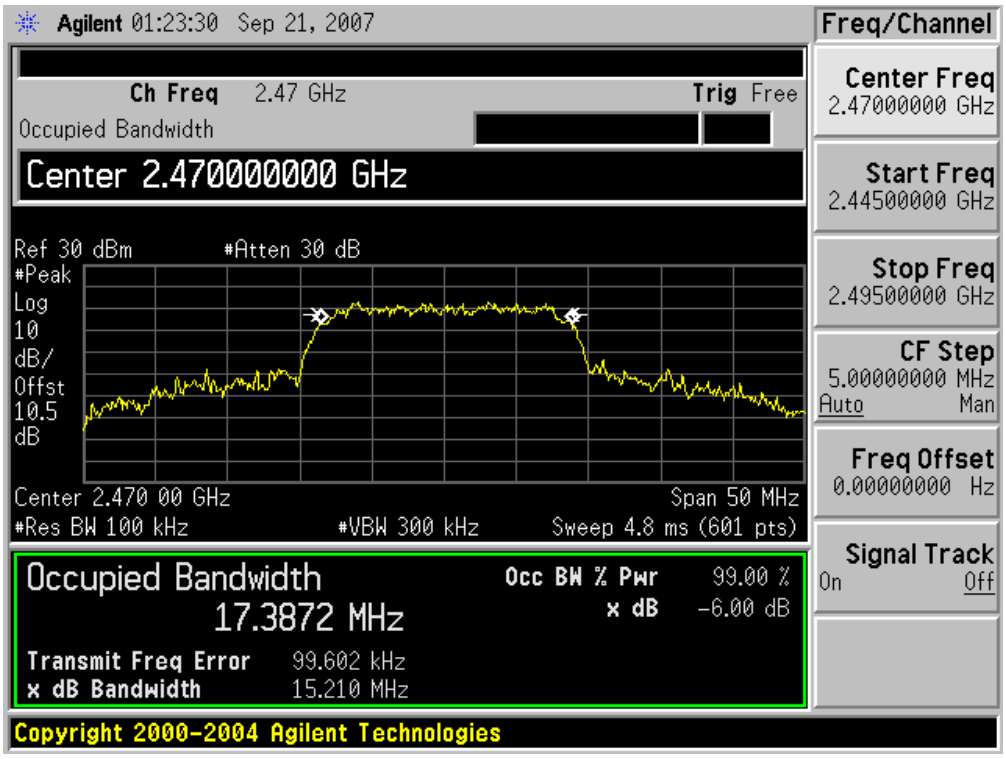
Low Channel



Mid Channel



High Channel



8 FCC §15.207, IC RSS-Gen §7.2.2 - CONDUCTED EMISSIONS

8.1 Section 15.207 & RSS-Gen 7.2.2 Conducted limits:

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

** Decreases with the logarithm of the frequency.*

8.2 Test Setup

The measurement was performed at shielded room, using the setup per ANSI C63.4 – 2003 measurement procedure. The specification used was FCC Class B limits.

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

The EUT was powered via connection to AC/DC adapter which was plugged into the LISN.

8.3 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Solar Electronics	LISN	9252-R-24-BNC	511205	2007-07-07
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.595 0K03	100338	2007-04-05

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

8.4 Test Procedure

During the conducted emissions test, the power cord of the system was connected to the main outlet of the LISN-1.

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

All data was recorded in the peak detection mode, quasi-peak and average. Quasi-Peak readings are distinguished with a "QP". Average readings are distinguished with an "Ave".

8.5 Environmental Conditions

Temperature:	27 °C
Relative Humidity:	40 %
ATM Pressure:	102.0 kPa

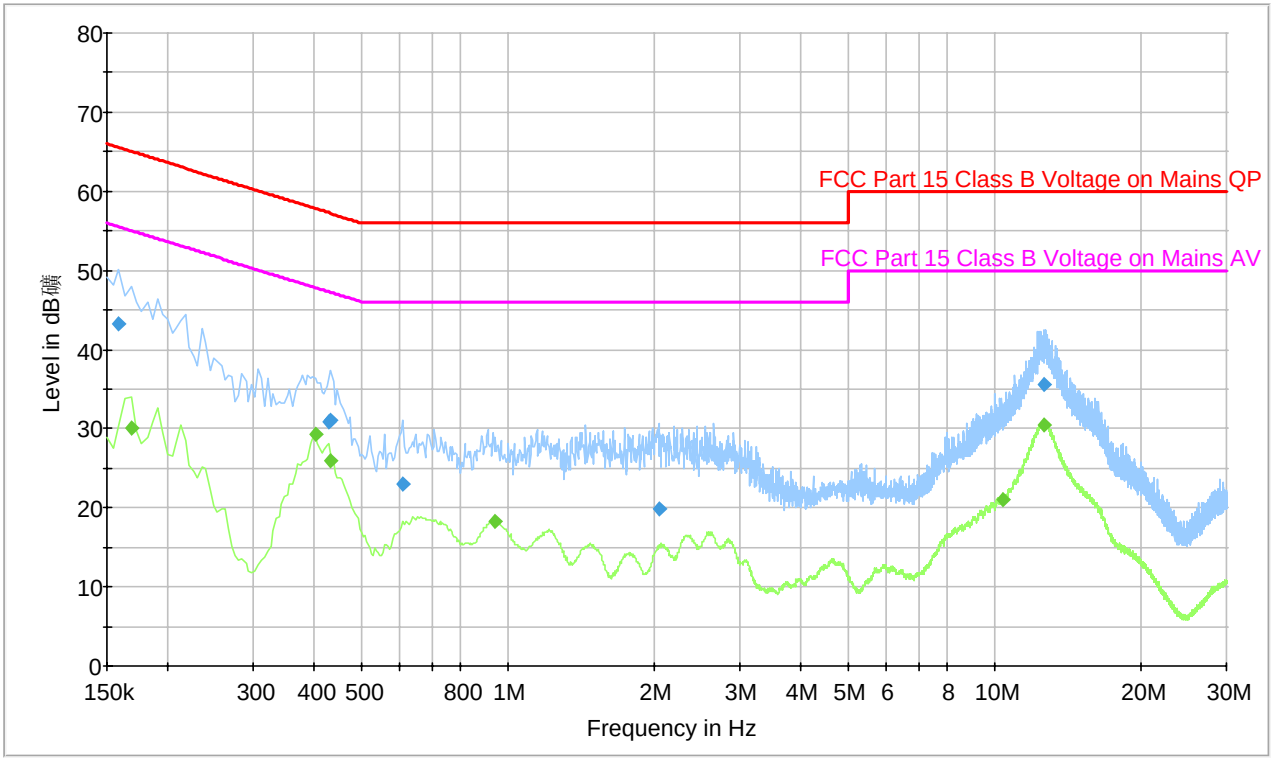
**The testing was performed by James Ma from 2007-09-26.*

8.6 Summary of Test Results

According to the recorded data in following table, the EUT complied with the FCC & IC standard's conducted emissions limits for Class B devices, with the *worst* margin reading of:

Connection: AC/DC Adapter			
Margin (dB)	**Frequency (MHz)**	**Conductor Mode (Hot / Neutral)**	**Range (MHz)**
-18.4	0.402000	Hot	0.150 to 30 MHz

120V/60 Hz Hot:



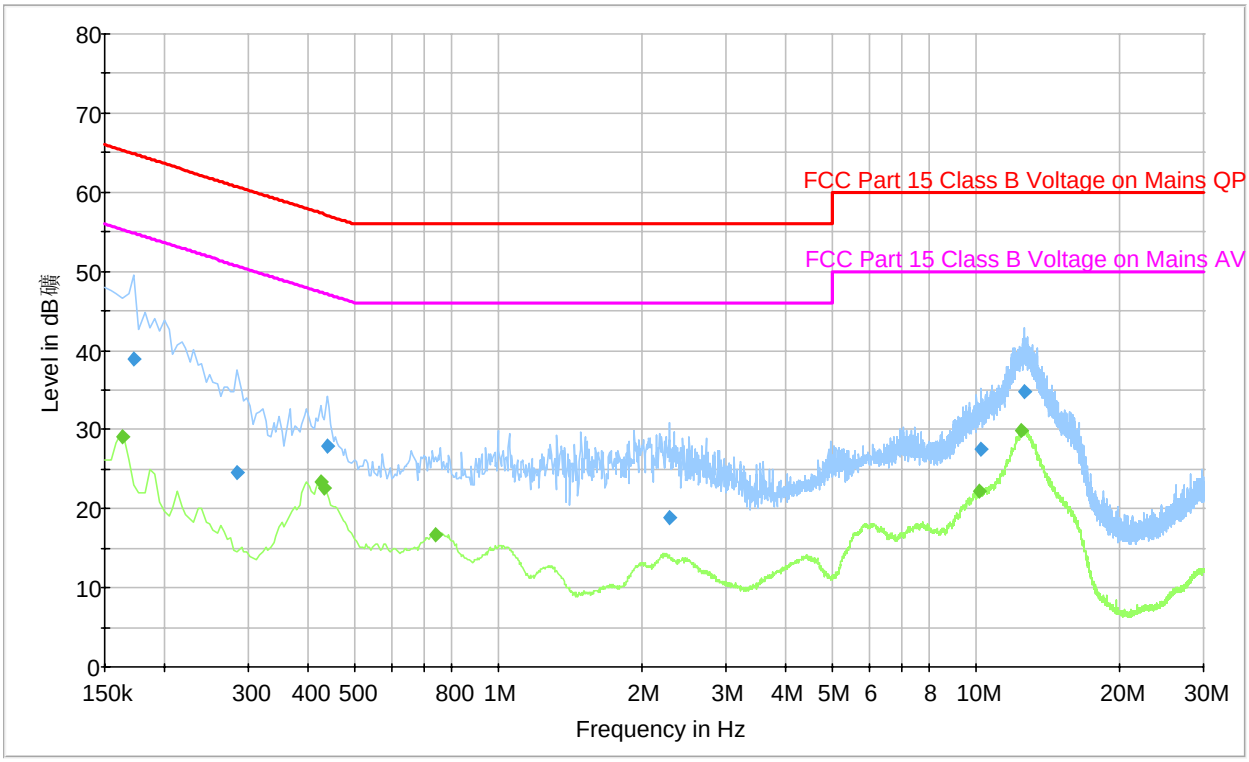
Final Measurement Quasi-Peak Detector

Frequency (MHz)	Quasi-Peak (dBµV)	Conductor (Hot/Neutral)	Corrected Reading (dB)	Limit (dBµV)	Margin (dB)
2.044500	19.8	Hot	10.0	56.0	36.2
0.609000	23.0	Hot	10.0	56.0	33.0
0.429000	30.8	Hot	10.0	57.3	26.5
0.433500	31.1	Hot	10.0	57.2	26.1
12.678000	35.5	Hot	10.0	60.0	24.5
0.159000	43.2	Hot	10.0	65.5	22.3

Final Measurement Average Detector

Frequency (MHz)	Average (dBµV)	Conductor (Hot/Neutral)	Corrected Reading (dB)	Limit (dBµV)	Margin (dB)
0.402000	29.4	Hot	10.0	47.8	18.4
12.615000	30.5	Hot	10.0	50.0	19.5
0.433500	25.9	Hot	10.0	47.2	21.3
0.168000	30.2	Hot	10.0	55.1	24.9
0.942000	18.3	Hot	10.0	46.0	27.7
10.378500	21.1	Hot	10.0	50.0	28.9

120V/60 Hz Neutral:



Final Measurement Quasi-Peak Detector

Frequency (MHz)	Quasi-Peak (dBµV)	Conductor (Hot/Neutral)	Corrected Reading (dB)	Limit (dBµV)	Margin (dB)
12.669000	34.8	Neutral	10.0	60.0	25.2
0.172500	38.9	Neutral	10.0	64.8	26.0
0.438000	27.9	Neutral	10.0	57.1	29.2
10.261500	27.4	Neutral	10.0	60.0	32.6
0.285000	24.5	Neutral	10.0	60.7	36.1
2.287500	18.9	Neutral	10.0	56.0	37.1

Final Measurement Average Detector

Frequency (MHz)	Average (dBµV)	Conductor (Hot/Neutral)	Corrected Reading (dB)	Limit (dBµV)	Margin (dB)
12.489000	29.8	Neutral	10.0	50.0	20.2
0.424500	23.3	Neutral	10.0	47.4	24.0
0.433500	22.6	Neutral	10.0	47.2	24.6
0.163500	29.2	Neutral	10.0	55.3	26.1
10.194000	22.1	Neutral	10.0	50.0	27.9
0.739500	16.6	Neutral	10.0	46.0	29.4

9 FCC §15.109, §15.205, §15.209 & §15.247(c), IC RSS-Gen §4.9 - SPURIOUS RADIATED EMISSIONS

9.1 Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1 MHz.

As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table

Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per FCC §15.247(c)(1)(i): Systems operating in the 2400-2483.5 MHz band that are used exclusively for fixed, point-to-point operations may employ transmitting antennas with directional gain greater than 6 dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6 dBi.

As Per FCC §15.205(a) except as show 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 0.495 – 0.505 2.1735 – 2.1905 4.125 – 4.128 4.17725 – 4.17775 4.20725 – 4.20775 6.215 – 6.218 6.26775 – 6.26825 6.31175 – 6.31225 8.291 – 8.294 8.362 – 8.366 8.37625 – 8.38675 8.41425 – 8.41475 12.29 – 12.293 12.51975 – 12.52025 12.57675 – 12.57725 13.36 – 13.41	16.42 – 16.423 16.69475 – 16.69525 25.5 – 25.67 37.5 – 38.25 73 – 74.6 74.8 – 75.2 108 – 121.94 123 – 138 149.9 – 150.05 156.52475 – 156.52525 156.7 – 156.9 162.0125 –167.17 167.72 – 173.2 240 – 285 322 – 335.4 399.9 – 410 608 – 614	960 – 1240 1300 – 1427 1435 – 1626.5 1645.5 – 1646.5 1660 – 1710 1718.8 – 1722.2 2200 – 2300 2310 – 2390 2483.5 – 2500 2690 – 2900 3260 – 3267 3.332 – 3.339 3 3458 – 3 358 3.600 – 4.400	4. 5 – 5. 15 5. 35 – 5. 46 7.25 – 7.75 8.025 – 8.5 9.0 – 9.2 9.3 – 9.5 10.6 – 12.7 13.25 – 13.4 14.47 – 14.5 15.35 – 16.2 17.7 – 21.4 22.01 – 23.12 23.6 – 24.0 31.2 – 31.8 36.43 – 36.5 Above 38.6

As per FCC §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

IC RSS-GEN §4.9 the measurement method shall be described in the test report. The same parameter, peak power or average power, used for the transmitter output power measurement shall be used for unwanted emission measurements. The search for unwanted emissions shall be from the lowest frequency internally generated or used in the device (local oscillator, intermediate or carrier frequency), or from 30 MHz, whichever is the lower, to the 5th harmonic of the highest frequency generated without exceeding 40 GHz.

9.2 Test Setup

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

9.3 EUT Setup

The radiated emissions tests were performed using the setup accordance with the ANSI C63.4-2003. The specification used was the FCC 15C limits.

The spacing between the peripherals was 10 centimeters.

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

9.4 Test Equipment List and Details

Manufacturer	Description	Model	Serial Number	Calibration Date
Sonoma Instruments	Pre amplifier	317	260407	2007-04-26
HP	Pre amplifier	8449B	3147A00400	2006-11-02
Sunol Science Corp	Combination Antenna	JB3 Antenna	A020106-3	2007-03-05
A.R.A	Antenna Horn	DRG-118/A	1132	2007-06-18

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

9.5 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.

The EUT is set 3 meters away from the testing antenna, which is varied from 1-4 meters, and the EUT is placed on a turntable, which is 0.8 meter above ground plane, the table shall be rotated for 360 degrees to find out the highest emission. The receiving antenna should be changed the polarization both of horizontal and vertical.

The spectrum analyzer or receiver is set as:

Below 1000MHz:

RBW = 100 kHz / VBW = 300 kHz / Sweep = Auto

Above 1000MHz:

(1) Peak: RBW = 1MHz / VBW = 1MHz / Sweep = Auto
(2) Average: RBW = 1MHz / VBW = 10Hz / Sweep = Auto

9.6 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:

Corrected Amplitude = 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.
The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

9.7 Environmental Conditions

Temperature:	27 °C
Relative Humidity:	40 %
ATM Pressure:	102.0 kPa

**The testing was performed by James Ma from 2007-09-26.*

9.8 Summary of Test Results

According to the data hereinafter, the EUT complied with the FCC and IC requirements, and had the worst margin readings of:

Unintentional Emissions, (30-1000 MHz):

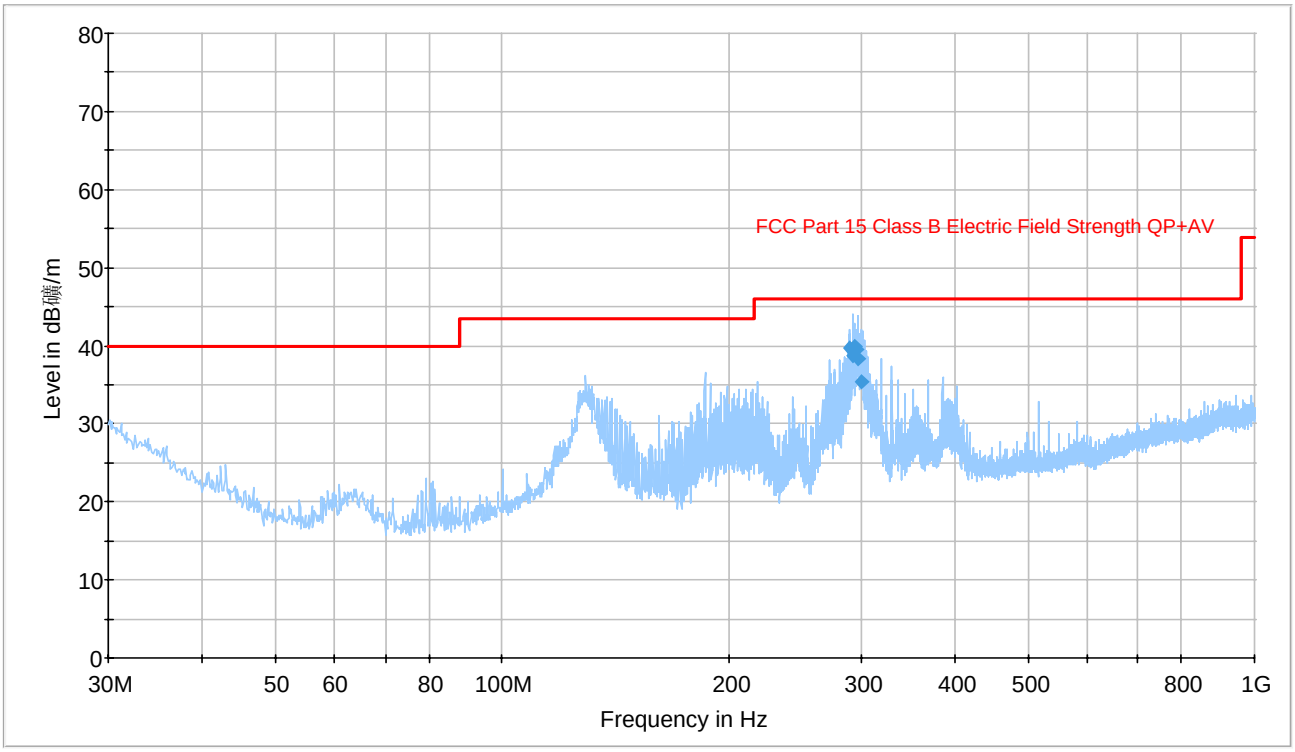
Mode: Receiver			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Range (MHz)**
-6.1	293.516250	Horizontal	30 to 1000 MHz

Out of Band Emissions:

Mode: Transmission (2410-2470 MHz)			
Margin (dB)	**Frequency (MHz)**	**Polarization (Horizontal/Vertical)**	**Channel, Range (GHz)**
-2.3	4820.0000	Vertical	Low, 1 GHz – 25GHz
-6.9	4860.0000	Vertical	Middle, 1 GHz – 25GHz
-12.6	4940.0000	Vertical	High, 1 GHz – 25GHz

9.9 Radiated Emissions Test plot & data:

30MHz -1GHz



Frequency (MHz)	Quasi-Peak (dBµV/m)	Antenna Height (cm)	Polarity (H/V)	Turntable Position (deg)	Corrected Reading (dB)	Limit (dBµV/m)	Margin (dB)
293.516250	39.9	100.0	H	146.0	-0.5	46.0	-6.1
289.151250	39.6	100.0	H	138.0	-0.5	46.0	-6.4
295.660000	39.5	119.0	H	152.0	-0.5	46.0	-6.5
292.465000	38.7	100.0	H	148.0	-0.5	46.0	-7.3
296.750000	38.4	124.0	H	149.0	-0.5	46.0	-7.6
300.023750	35.3	130.0	V	337.0	-0.5	46.0	-10.7

9.10 Radiated Spurious Emissions Test Data

Regular Antenna (2.0 dBi)

802.11, 2410 - 2470 MHz, Measured at 3 meters, 1 GHz – 25 GHz

Low Channel 2410 MHz

Freq. (MHz)	Reading (dBµV)	Azimuth Degrees	Height (m)	Polar. (H / V)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-Amp. (dB)	Corrected Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Comments
2410.0000	120.9	30	1.2	V	28.7	1.5	35.8	115.2			Fund/Peak
2410.0000	114.6	280	1.0	H	28.7	1.5	35.8	109.0			Fund/Peak
2410.0000	90.9	30	1.2	V	28.7	1.5	35.8	85.2			Ave
2410.0000	84.6	280	1.0	H	28.7	1.5	35.8	79.0			Ave
4820.0000	72.1	120	2.4	V	32.5	1.9	34.8	71.7	74	-2.3	Peak
4820.0000	42.1	120	2.4	V	32.5	1.9	34.8	41.7	54	-12.3	Ave
4820.0000	58.2	180	2.3	H	32.5	1.9	34.8	57.8	74	-16.2	Peak
7230.0000	48.6	90	2.0	V	36.7	4.2	34.9	54.6	74	-19.4	Peak
7230.0000	42.4	180	2.0	H	36.7	4.2	34.9	48.4	74	-25.6	Peak
4820.0000	28.2	180	2.3	H	32.5	1.9	34.8	27.8	54	-26.2	Ave
7230.0000	18.6	180	2.0	V	36.7	4.2	34.9	24.6	54	-29.4	Ave
7230.0000	12.4	90	2.0	H	36.7	4.2	34.9	18.4	54	-35.6	Ave

PW = 0.317 ms
PP = 10 ms
Duty Cycle = 3.17 % (See Plot in the following page)

Middle channel 2430 MHz

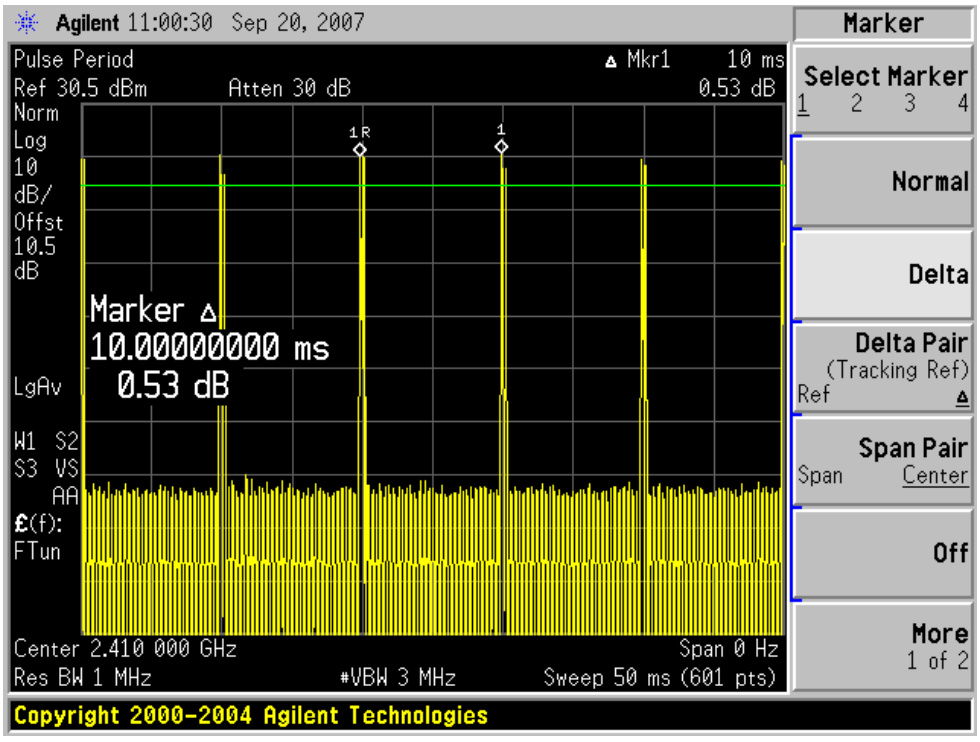
Freq. (MHz)	Reading (dBµV)	Azimuth Degrees	Height (m)	Polar. (H / V)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-Amp. (dB)	Corrected Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Comments
2430.0000	121.3	180	1.3	V	28.7	1.5	35.8	115.7			Fund/Peak
2430.0000	114.8	320	1.2	H	28.7	1.5	35.8	109.2			Fund/Peak
2430.0000	91.3	180	1.3	V	28.7	1.5	35.8	85.7			Ave
2430.0000	84.8	320	1.2	H	28.7	1.5	35.8	79.2			Ave
4860.0000	67.5	270	2.4	V	32.5	1.9	34.8	67.1	74	-6.9	Peak
7290.0000	60.0	270	2.4	V	36.7	4.2	34.9	66.0	74	-8.0	Peak
4860.0000	37.5	270	2.4	V	32.5	1.9	34.8	37.1	54	-16.9	Ave
7290.0000	30.0	270	2.4	V	36.7	4.2	34.9	36.0	54	-18.0	Ave
7290.0000	48.9	180	2.3	H	36.7	4.2	34.9	54.9	74	-19.1	Peak
4860.0000	52.6	180	2.2	H	32.5	1.9	34.8	52.2	74	-21.8	Peak
7290.0000	18.9	180	2.1	H	36.7	4.2	34.9	24.9	54	-29.1	Ave
4860.0000	22.6	180	2.2	H	32.5	1.9	34.8	22.2	54	-31.8	Ave

High channel 2470 MHz

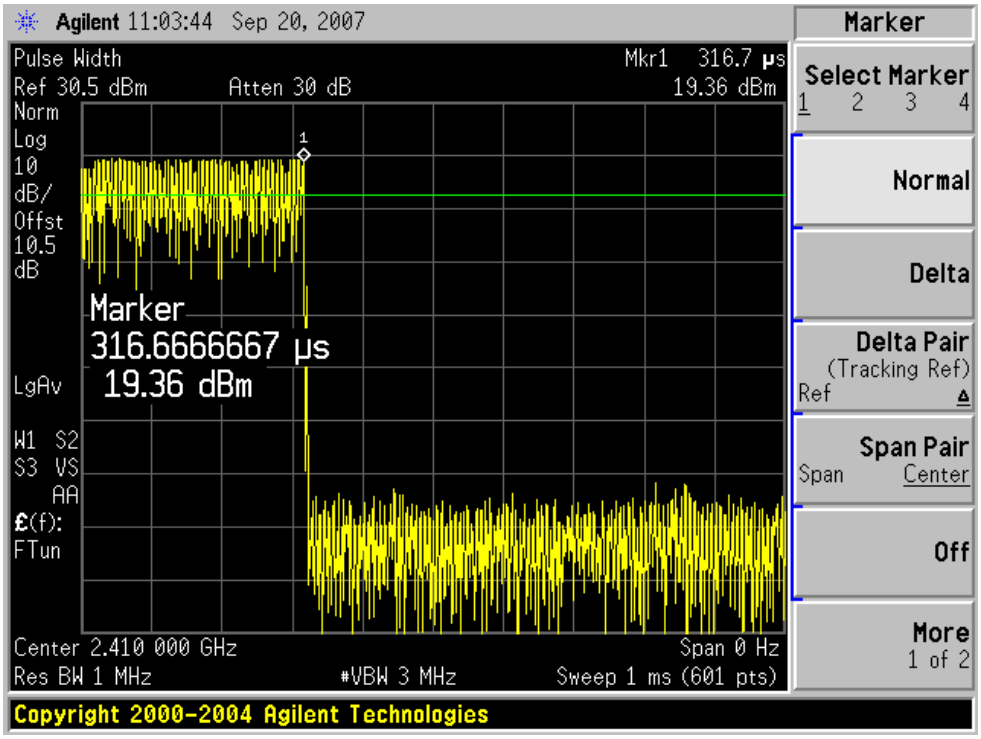
Freq. (MHz)	Reading (dBµV)	Azimuth Degrees	Height (m)	Polar. (H / V)	Antenna Factor (dB/m)	Cable Loss (dB)	Pre-Amp. (dB)	Corrected Reading (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Comments
2470.0000	119.6	320	1.0	V	28.7	1.5	35.8	114.0			Fund/Peak
2470.0000	113.8	270	1.2	H	28.7	1.5	35.8	108.2			Fund/Peak
2470.0000	89.6	320	1.0	V	28.7	1.5	35.8	84.0			Ave
2470.0000	83.8	270	1.2	H	28.7	1.5	35.8	78.2			Ave
4940.0000	62.0	270	2.4	V	32.5	1.9	35.0	61.4	74	-12.6	Peak
7410.0000	48.5	270	2.4	V	36.7	4.2	35.6	53.8	74	-20.2	Peak
4940.0000	32.0	270	2.4	V	32.5	1.9	35.0	31.4	54	-22.6	Ave
7410.0000	41.8	90	2.1	H	36.7	4.2	35.6	47.1	74	-26.9	Peak
4940.0000	46.3	90	2.1	H	32.5	1.9	35.0	45.7	74	-28.3	Peak
7410.0000	18.5	270	2.4	V	36.7	4.2	35.6	23.8	54	-30.2	Ave
7410.0000	11.8	90	2.1	H	36.7	4.2	35.6	17.1	54	-36.9	Ave
4940.0000	16.3	90	2.1	H	32.5	1.9	35.0	15.7	54	-38.3	Ave

Please See the Following Plots for Duty Cycle

Pulse Period



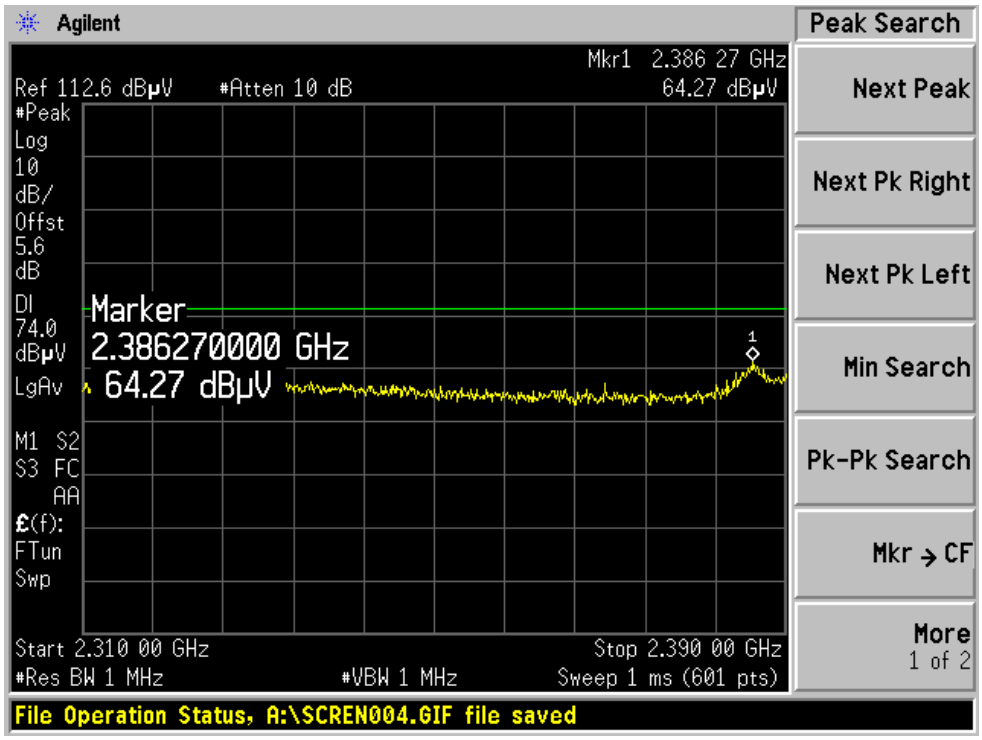
Pulse Width


Agilent 11:03:44 Sep 20, 2007
Pulse Width
Mkr1 316.7 µs
Ref 30.5 dBm
Atten 30 dB
19.36 dBm
Norm
Log
10
dB/
Offst
10.5
dB
Marker
316.6666667 µs
19.36 dBm
LgAv
W1 S2
S3 VS
AA
£(f):
FTun
Center 2.410 000 GHz
Span 0 Hz
Res BW 1 MHz
#VBW 3 MHz
Sweep 1 ms (601 pts)
Marker
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
Copyright 2000-2004 Agilent Technologies

Restricted Band Edge

Low Channel

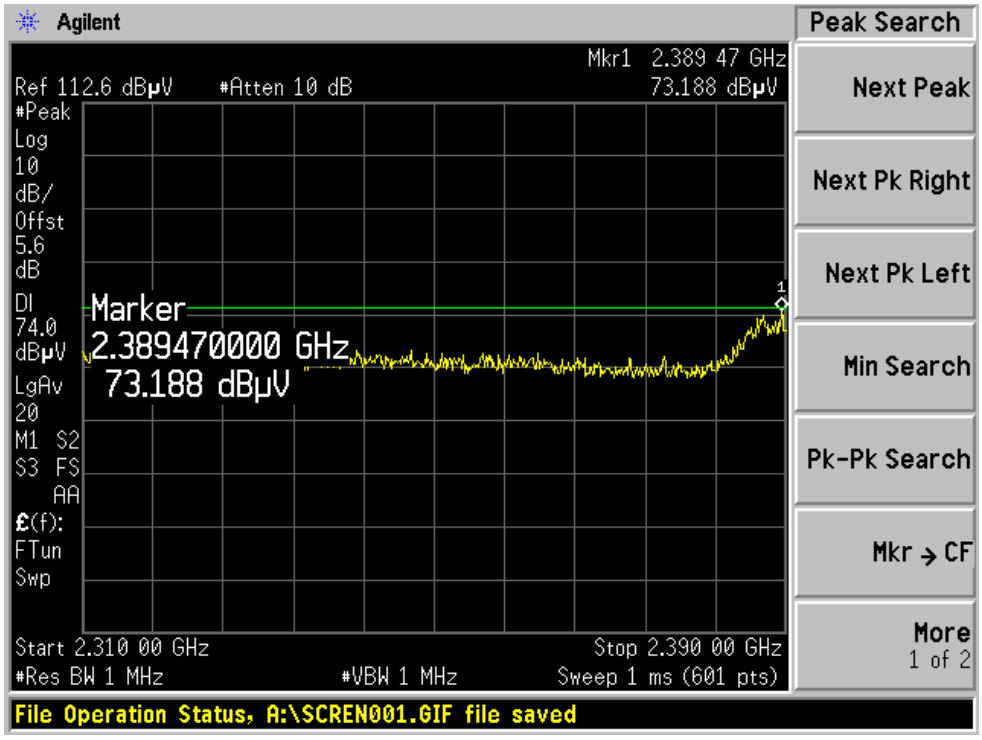
Peak, Horizontal



Average, Horizontal

Correction from the average: 64.27 dBuV – 30 = 34.27 dBuV
Limit is 54 dBuV

Peak, Vertical

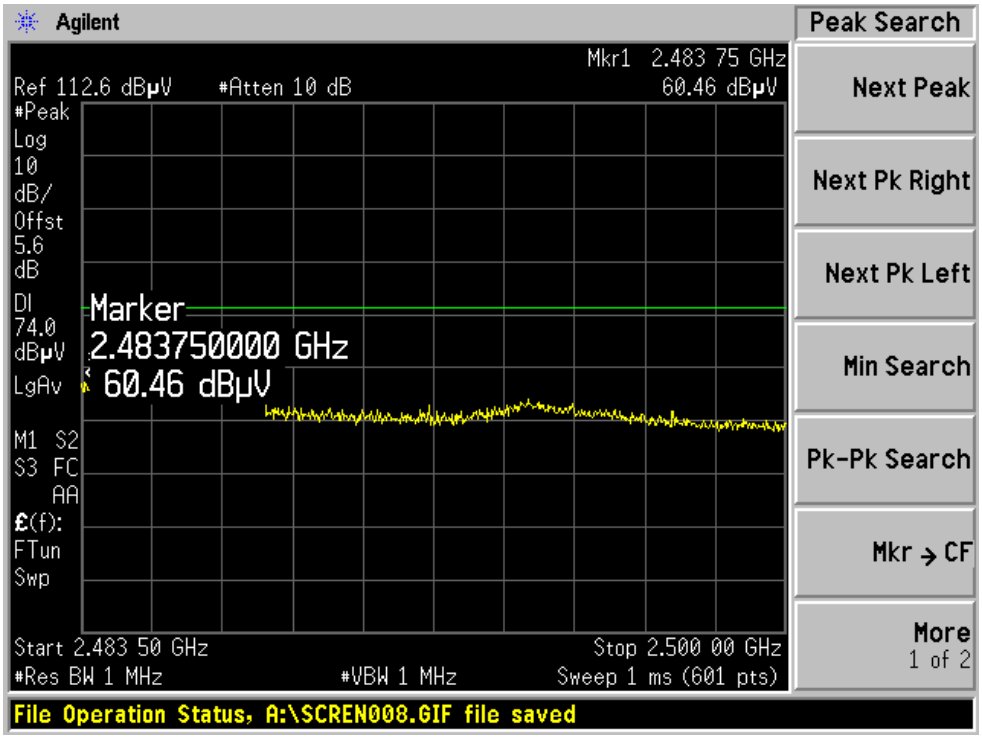


Average, Vertical

Correction from the average: 73.188 dBuV – 30 = 43.188 dBuV
Limit is 54 dBuV

High Channel

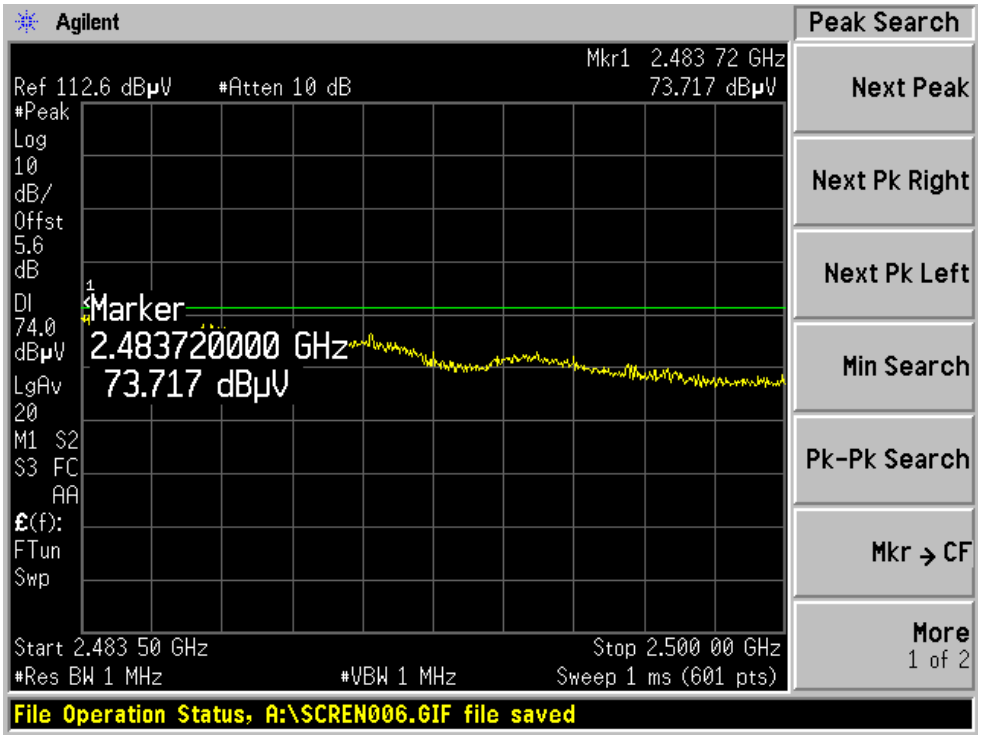
Peak, Horizontal



Average, Horizontal

Correction from the average: 60.46 dBuV – 30 = 30.46 dBuV
Limit is 54 dBuV

Peak, Vertical



Average, Vertical

Correction from the average: 73.717 dBuV – 30 = 43.717 dBuV
Limit is 54 dBuV

10 EXHIBIT A – FCC & IC EQUIPMENT LABELING REQUIREMENTS

10.1 FCC § 2.925 Identification of equipment

(a) Each equipment covered in an application for equipment authorization shall bear a nameplate or label listing the following:

(1) FCC Identifier consisting of the two elements in the exact order specified in §2.926. The FCC Identifier shall be preceded by the term *FCC ID* in capital letters on a single line, and shall be of a type size large enough to be legible without the aid of magnification.

Example: FCC ID XXX123. XXX—Grantee Code 123—Equipment Product Code

10.2 FCC ID Labeling Requirements as per FCC § 15.19

(a) In addition to the requirements in part 2 of this chapter, a device subject to certification, or verification shall be labeled as follows:

(3) All other devices shall bear the following statement in a conspicuous location on the device:

> This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

(4) Where a device is constructed in two or more sections connected by wires and marketed together, the statement specified above is required to be affixed only to the main control unit. If the EUT is integrated within another device then a label affixed to the host shall also state, “Contains FCC ID:XXXXXX”

(5) When the device is so small or for such use that it is not practicable to place the statement specified under paragraph (a) of this section on it, the information required by this paragraph shall be placed in a prominent location in the instruction manual or pamphlet supplied to the user or, alternatively, shall be placed on the container in which the device is marketed. However, the FCC identifier or the unique identifier, as appropriate, must be displayed on the device.

IC: XXXXXX-YYYYYYYY Where:

- "XXXXXX-YYYYYYYY" is the certification number
- "XXXXXX" is the Certificate Holder Number (CHN), made of at most 6 alphanumeric characters (A-Z, 0-9), assigned by Industry Canada; and
- "YYYYYYYY" is the Unique Product Number (UPN), made of at most 8 alphanumeric characters (A-Z, 0-9) assigned by the applicant.
- Note 1: The term "IC" before the equipment certification number only signifies that the Industry Canada technical specifications were met.
- Note 2: Note 1 shall be conspicuously placed in the equipment user manual.
- Note 3: Permitted alphanumeric characters used in the CHN and UPN are limited to capital letters (A-Z) and digits (0-9). Other characters, such as "#", "/" or "-", shall not be used.

10.3 Specifications: As per RSS GEN 5.2 Equipment Labeling:

Equipment subject to certification under the applicable RSS, shall be permanently labeled on each item, or as an inseparable combination. The label must contain the following information for full compliance:
(a) the certification number, prefixed by the term "IC:";
(b) the manufacturer's name, trade name or brand name; and
(c) a model name or number.
Equipment for which a certificate has been issued is not considered certified if it is not properly labeled.
The information on the Canadian label can be combined with the manufacturer's other labeling requirements.
If the device size is too small to put a label, the label can be included in the user's manual, upon agreement with Industry Canada.

10.4 Suggested FCC ID & IC Label

10.5 Suggested Label Location

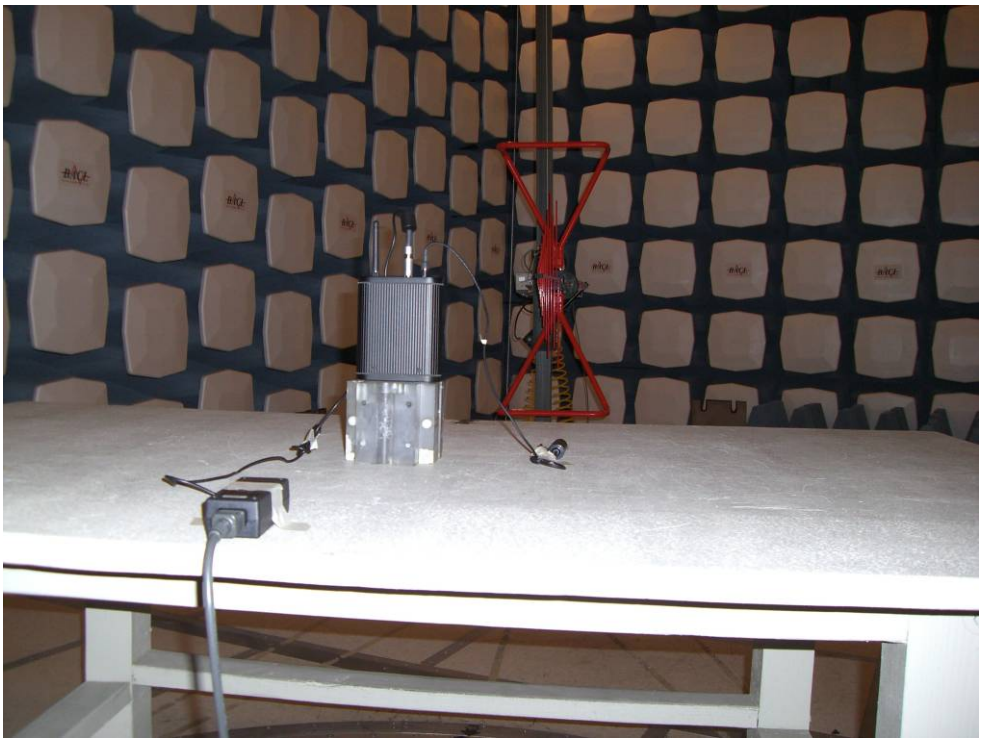
11 EXHIBIT B - TEST SETUP PHOTOGRAPHS

11.1 Conducted Emissions –Front View

11.2 Conducted Emissions – Side View

11.3 Receiver Radiated Emissions – Front View

11.4 Receiver Radiated Emissions – Rear View



11.5 Transmitter Radiated Spurious Emissions – Front View

11.6 Transmitter Radiated Spurious Emissions – Rear View