Lab Code: 200167-0

FCC PART 15.249

INDUSTRY CANADA RSS-210, ISSUE 7 JUNE 2007

TEST AND MEASUREMENT REPORT

For

Trimble Navigation Limited

8261 State Route 235, Dayton, OH 45424, USA

FCC ID: PWR-HL750
IC: 4131A-HL750

Report Type:	**Product Type:**
Original Report	Laser Detector

Test Engineer:	Jerry Wang
Report Number:	R0903093
Report Date:	2009-04-06
Reviewed By:	Boni Baniqued Sr. RF Engineer
Prepared By: **(66)**	Bay Area Compliance Laboratories Corp. 1274 Anvilwood Ave Sunnyvale, CA 94089, USA Tel: (408) 732-9162 Fax: (408) 732 9164

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	R0903093	Original	2009-04-06

1 GENERAL INFORMATION

1.1 Product Description for Equipment Under Test (EUT)

This test and measurement report has been prepared on behalf of *Trimble Navigation Limited* and their product *model: HL750, FCC ID: PWR-HL750 & IC ID: 4131A-HL750* (or the EUT as referred to in the rest of this report) is a Laser meter, it detect laser plane position and show indication to customers. Also, it has a two-way radio that operates at 2.4 GHz band.

1.2 Mechanical Description

The EUT measures approximately 170 cm (L) x 7.5 cm (W) x 3.5cm (H) and weighs approximately 1.19 kg.

**The data gathered are from a typical production sample provided by the manufacturer, serial number ESL75000021.*

1.3 EUT Photo

Please refer to Exhibit C for more EUT photographs

1.4 Objective

This type of approval report is prepared on behalf of *Trimble Navigation Limited* in accordance with Part 2, Subpart J, and Part 15, Subparts A, B and C of the Federal Communication Commissions rules and IC Canada RSS 210 Issue 7 June 2007.

The tests were performed in order to determine compliance with FCC Part 15, Subpart C, and section 15.203, 15.205, 15.207, 15.209 and 15.249 rules and IC RSS-210 Issue 7, RSS-Gen rules.

1.5 Related Submittal(s)/Grant(s)

N/A

1.6 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 Laboratories Corp. (Shenzhen). The radiated testing was performed at an antenna-to-EUT distance of 3 meters.

1.7 Test Facility

The test site used by BACL Corp. to collect radiated and conducted test 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.: C-2698 and R-2463. 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 EUT was tested in a testing mode to represent *worst*-case results during the final qualification test.

2.2 Special Accessories

N/A

2.3 Equipment Modifications

No modifications were made to the unit tested.

2.4 Configuration of Test Setup

The EUT was setup in different modes to broadcast in different frequencies as follows:

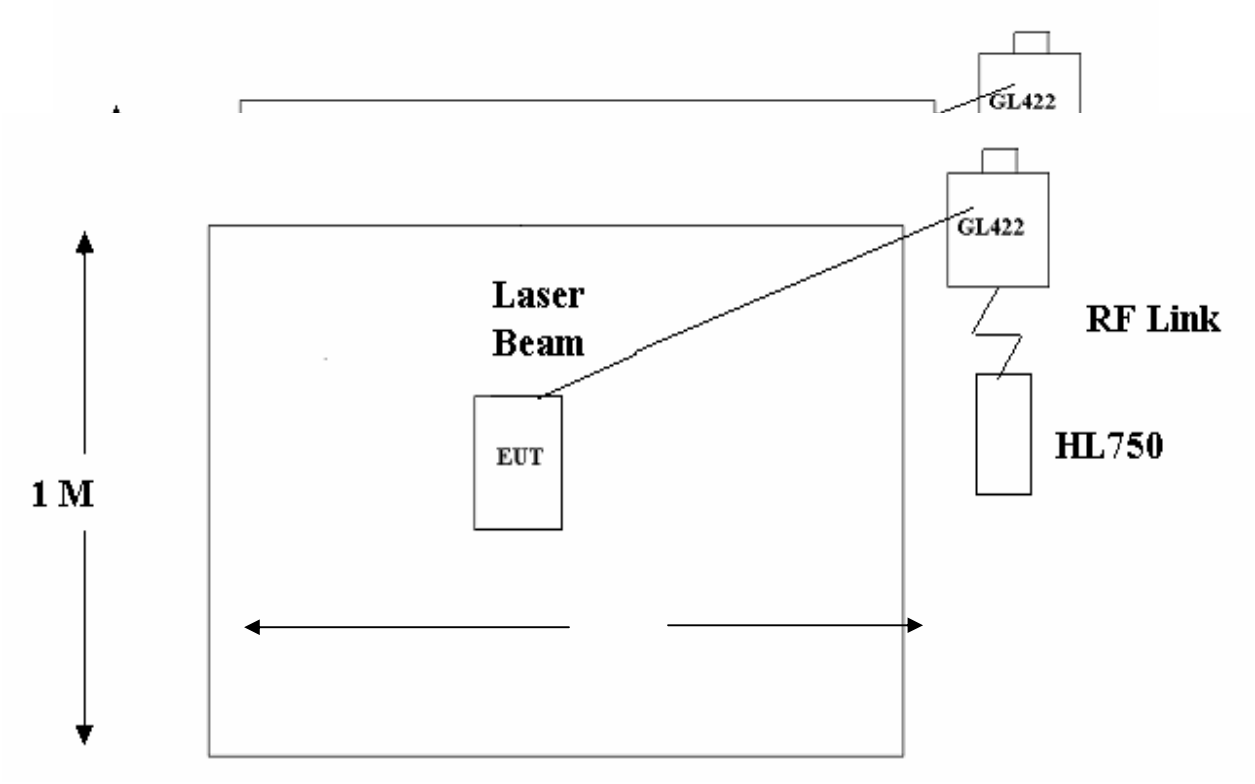
1) In Remote sensor and remote display mode where the two HL750 talk to each other, it uses frequency of 2437 MHz
2) In GL plane Lock mode where the GL5xx is talking to the HL750, it uses frequency of 2410 MHz.
3) In Test HL750 mode, where selecting the test in RDIO menu to test the quality of link between two HL750 it will sends packets back and forth and report in percentage the qualify of link, it uses frequency of 2472 MHz.

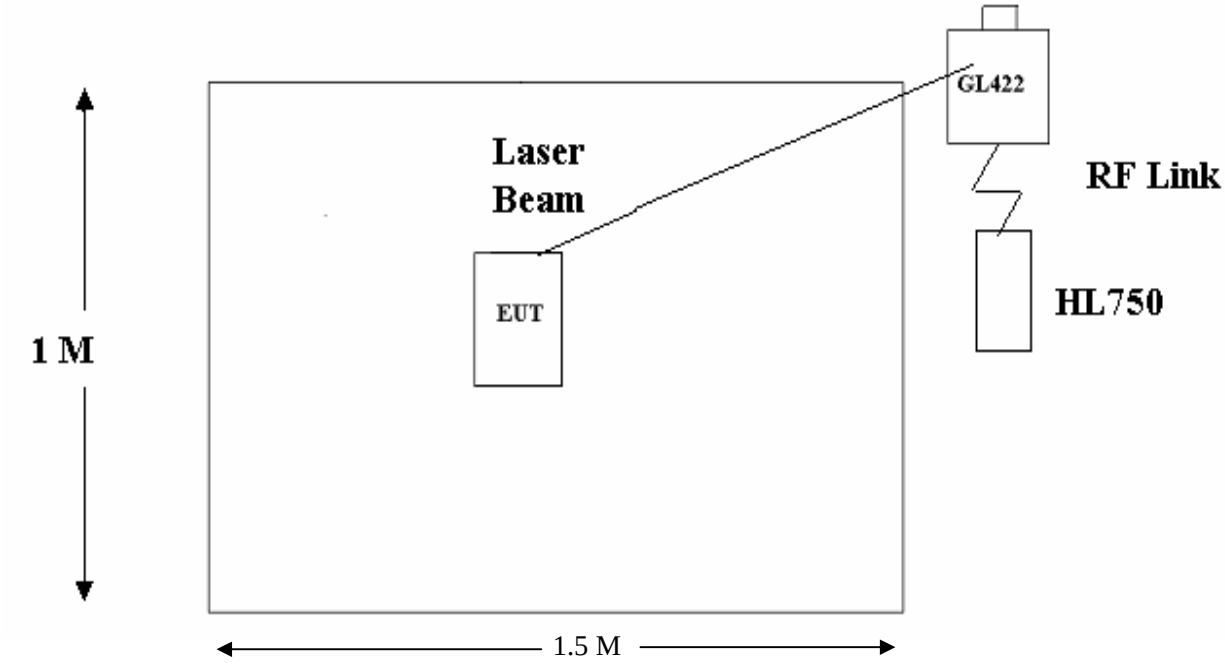
2.5 Local Support Equipment List

Manufacturers	Descriptions	Models	Serial Numbers
Trimble Navigation LTD	Remote Sensor	GL422	06464118
Trimble Navigation LTD	Control	RC402	B2127

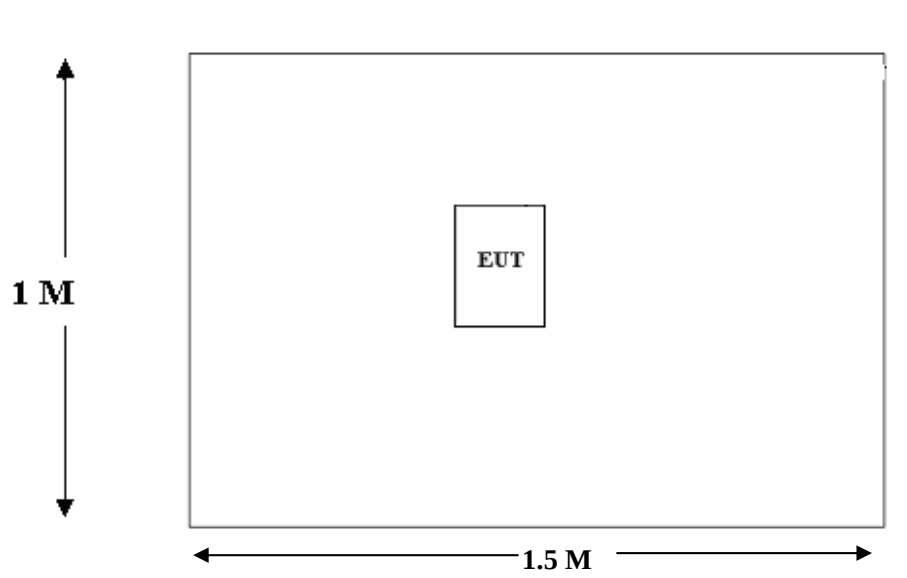
2.6 Test Setup Configuration

Low Channel: 2410 MHz





High Channel: 2472 MHz



3 Summary of Test Results

FCC Part15C & IC RSS-210/RSS-Gen Rules	Description of Tests	Results
FCC §15.203 IC RSS-Gen §7.1.4	Antenna Requirements	Compliant
FCC §15.207(a) IC RSS-Gen §7.2.2	Conduction Emissions	N/A
FCC §15.205, §15.209, §15.249 IC RSS-210 §2.2, §A2.9	Radiated Emissions & Out of Band Emissions	Compliant
FCC §15.215 IC RSS-Gen §4.6	Occupied Bandwidth	Compliant
FCC §15.109 IC RSS-Gen §4.10, §7.2.3	Receiver Spurious Emission	Compliant

4 FCC §15.203 & IC RSS-GEN § 7.1.4 - ANTENNA REQUIREMENT

4.1 Applicable Standard

For intentional device, according to FCC Part §15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used.

Per IC RSS-Gen §7.1.4, A transmitter can only be sold or operated with antennas with which it was certified. A transmitter maybe 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.

When a measurement at the antenna connector is used to determine RF output power, the effective gain of the device's antenna shall be stated, based on measurement or on data from the antenna manufacturer. Any antenna gain in excess of 6 dBi (6 dB above isotropic gain) shall be added to the measured RF output power before using the power limits specified in IC RSS-210 or RSS-310 for devices of RF output powers of 10 milliwatts or less. For devices of output powers greater than 10 milliwatts, except devices subject to IC RSS-210 Annex 8 or RSS-210 Annex 9, the total antenna gain shall be added to the measured RF output power before using the specified power limits. For devices subject to IC RSS-210 Annex 8 or Annex 9, the antenna gain shall not be added.

4.2 Result

The EUT has internal tyco antenna with the antenna gain of 4dBi, which in accordance to sections FCC Part 15.203 and IC RSS-Gen §7.1.4, is considered sufficient to comply with the provisions of these sections.

In addition, the antenna is printed on the same PCB of the radio transceiver, which cannot be altered. No external antenna option is available for this unit.

Result: Compliant.

Internal Tyco Antenna

5 FCC §15.205, §15.209, §15.249 & IC RSS-210 §2.2, §A2.9 - RADIATED EMISSIONS & OUT OF BAND EMISSIONS

5.1 Applicable Standard

As per FCC §15.249 (a) and IC RSS-210 §A2.9 the field strength of emissions from intentional radiators measured at 3 meter within these frequency bands shall comply with the following:

Fundamental Frequency (MHz)	Field Strength of Fundamental (minivolt/meter)	Field Strength of Harmonics (microvolt/meter)
902–928	50	500
2400–2483.5	50	500
5725–5875	50	500

As Per FCC §15.249 (d) and IC RSS-210 §A2.9 (b) Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 50 dB below the level of the fundamental or to the general radiated emission limits in the following table, whichever is the lesser attenuation.

Frequency (MHz)	Field Strength (microvolt/m at 3 meters)
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

5.2 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 bundle when necessary.

5.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
HP	Pre-Amplifier (1 ~ 26.5 GHz)	8449B	3008A1978	2008-10-21
Sunol Science Corp	Combination Antenna	JB3 Antenna	A020106-3	2008-03-24
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100044	2008-03-24
Sunol Science Corp	System Controller	SC99V	113005-1	N/A
Antenna Research Associates, Inc.	Horn Antenna	DRG-118/A	1132	2008-08-07
Agilent	Analyzer, Spectrum	E4446A	US44300386	2008-05-19
Sonoma Instrument	Pre-Amplifier (10 kHz~ 2.5 GHz)	317	260407	2008-04-29

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

5.4 Test Procedure

For the radiated emissions test, the EUT was powered by two 1.5VDC AA battery.

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

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 mete, 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

5.5 Corrected Amplitude & Margin Calculation

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

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

5.6 Environmental Conditions

Temperature:	20 °C
Relative Humidity:	45 %
ATM Pressure:	103.0kPa

The testing was performed by Jerry Wang on 2009-03-20.

5.7 Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.209 & 15.249 & IC RSS-210, the worst margin reading of:

Below 1 GHz:

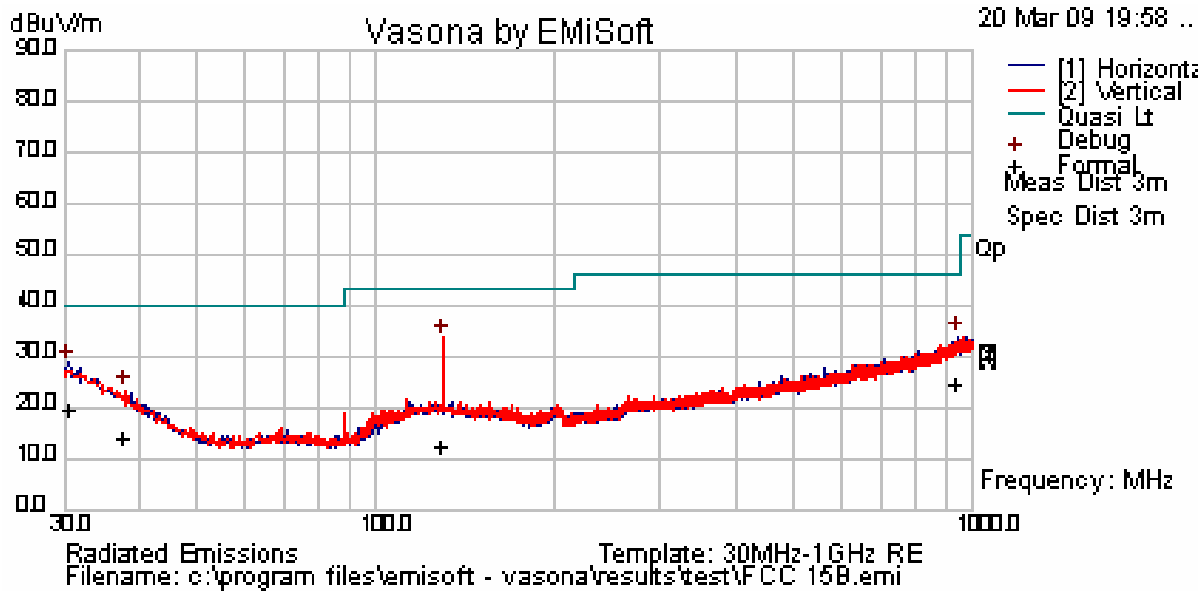
-20.21dB at **30.6194 MHz** in the **Horizontal** polarization.

Above 1 GHz:

-8.25 dB at **4820 MHz** in the **Horizontal** polarization for Low Channel.
-8.69 dB at **4874 MHz** in the **Horizontal** polarization for Middle Channel.
-8.01 dB at **4944 MHz** in the **Vertical** polarization for High Channel.

Test Mode: Transmitting

Below 1 GHz (Worst Case at Middle channel: 2437 MHz):



Quasi-Peak Measurement

Frequency (MHz)	Corrected Reading (dBuV/m)	Measurement Type (QP/AV)	Antenna Polarization (V/H)	Antenna Height (cm)	Table Azimuth (Degree)	Limit (dBuV/m)	Margin (dB)
30.6194	19.79	QP	H	148	180	40	-20.21
943.5049	24.53	QP	H	254	153	46	-21.47
37.79562	14.20	QP	V	293	125	40	-25.80
129.7120	12.65	QP	V	148	312	43.5	-30.85

Above 1 GHz:

Low Channel: 2410 MHz

Fundamental measured at 3 meters:

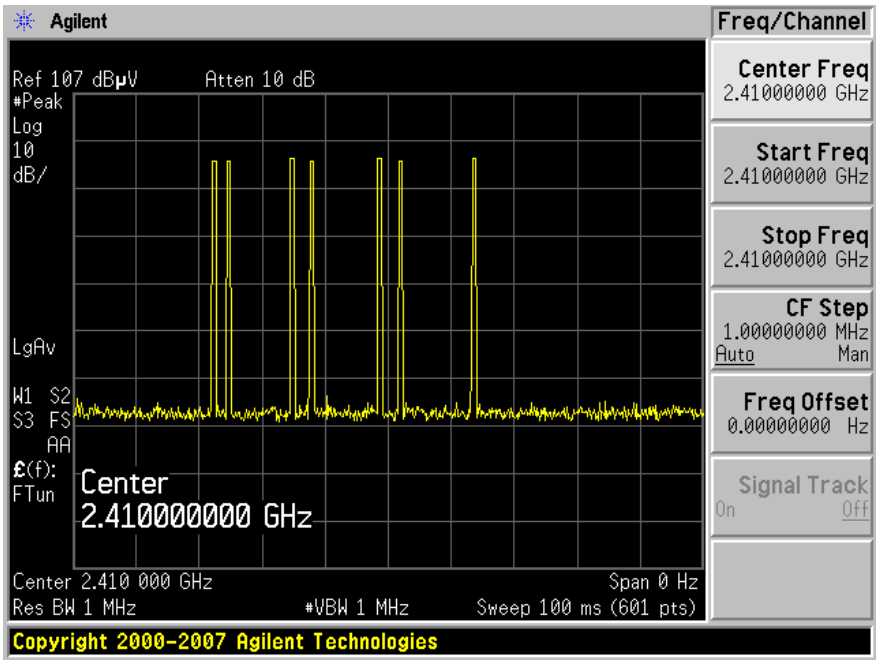
Frequency (MHz)	S.A. Reading (dBuV)	Detector (PK/AV)	Table Azimuth (Degree)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Duty Cycle Factor (dB)	Cord. Amp. (dBuV/m)	FCC & IC	
				Height (m)	Polarity (H/V)	Factor (dB/m)					Limit (dBuV/m)	Margin (dB)
2410	101.51	PK	170	110	H	28.2	6.5	35.74	0	100.47	114	-13.53
2410	98.78	PK	120	112	V	28.2	6.5	35.74	0	97.74	114	-16.26
2410	101.51	PK	170	118	H	28.2	6.5	35.74	-27.29	73.18 *	94	-20.82
2410	98.78	PK	120	120	V	28.2	6.5	35.74	-27.29	70.45 *	94	-23.55

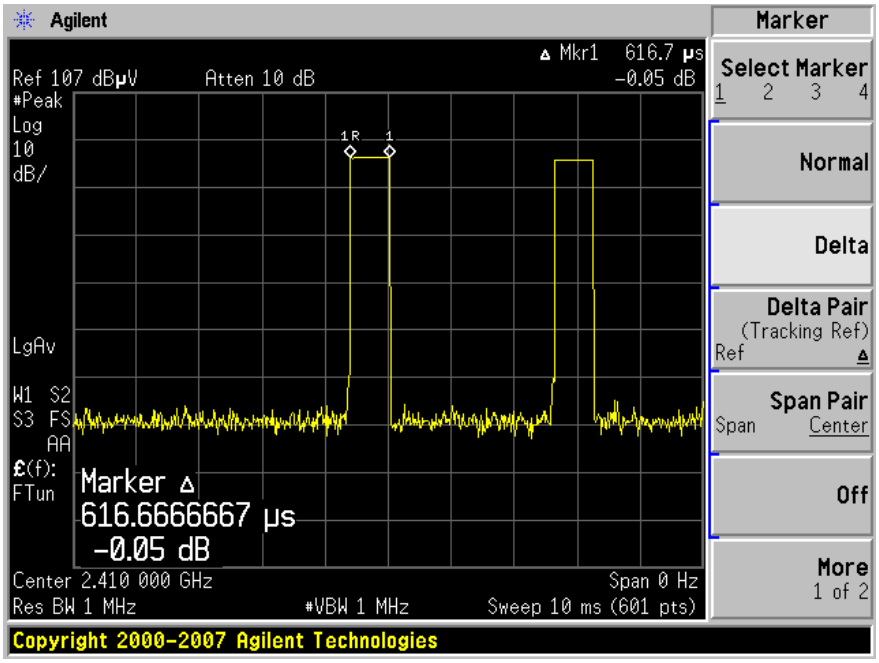
Spurious/Harmonics Emissions measured at 3 meters (Above 1 GHz)

Frequency (MHz)	S.A. Reading (dBuV)	Detector (PK/AV)	Table Azimuth (Degree)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Duty Cycle Factor (dB)	Cord. Amp. (dBuV/m)	FCC & IC	
				Height (m)	Polarity (H/V)	Factor (dB/m)					Limit (dBuV/m)	Margin (dB)
4820	57.89	PK	125	180	H	33.1	9.75	34.99	0	65.75	74	-8.25
4820	55.78	PK	108	200	V	33.1	9.75	34.99	0	63.64	74	-10.36
4820	57.89	PK	130	140	H	33.1	9.75	34.99	-27.29	38.46 *	54	-15.54
4820	55.78	PK	119	160	V	33.1	9.75	34.99	-27.29	36.35 *	54	-17.65

Note: • Average Value (*) is calculated based on Peak Reading + Duty Cycle Factor
• Duty Cycle Factor (DCF) = 20 $\log_{10}$ (Ton/Tp) = 20 $\log_{10}$ (7*0.6167ms/100 ms) = -27.29 dB

Please refer to the following plot for the Duty cycle calculation:


Agilent
Freq/Channel
Ref 107 dBµV
Atten 10 dB
#Peak
Log
10
dB/
LgAv
W1 S2
S3 FS
AA
£(f):
FTun
Center
2.410000000 GHz
Center Freq
2.41000000 GHz
Start Freq
2.41000000 GHz
Stop Freq
2.41000000 GHz
CF Step
1.00000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Center 2.410 000 GHz
Res BW 1 MHz
#VBW 1 MHz
Span 0 Hz
Sweep 100 ms (601 pts)
Copyright 2000-2007 Agilent Technologies


Agilent
Marker
Δ Mkr1 616.7 µs
-0.05 dB
Ref 107 dBµV
Atten 10 dB
#Peak
Log
10
dB/
1R 1
LgAv
W1 S2
S3 FS
AA
£(f):
FTun
Marker Δ
616.6666667 µs
-0.05 dB
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref Δ
Span Pair
Span Center
Off
More
1 of 2
Center 2.410 000 GHz
Res BW 1 MHz
#VBW 1 MHz
Span 0 Hz
Sweep 10 ms (601 pts)
Copyright 2000-2007 Agilent Technologies

Middle Channel: 2437 MHz

Fundamental measured at 3 meters:

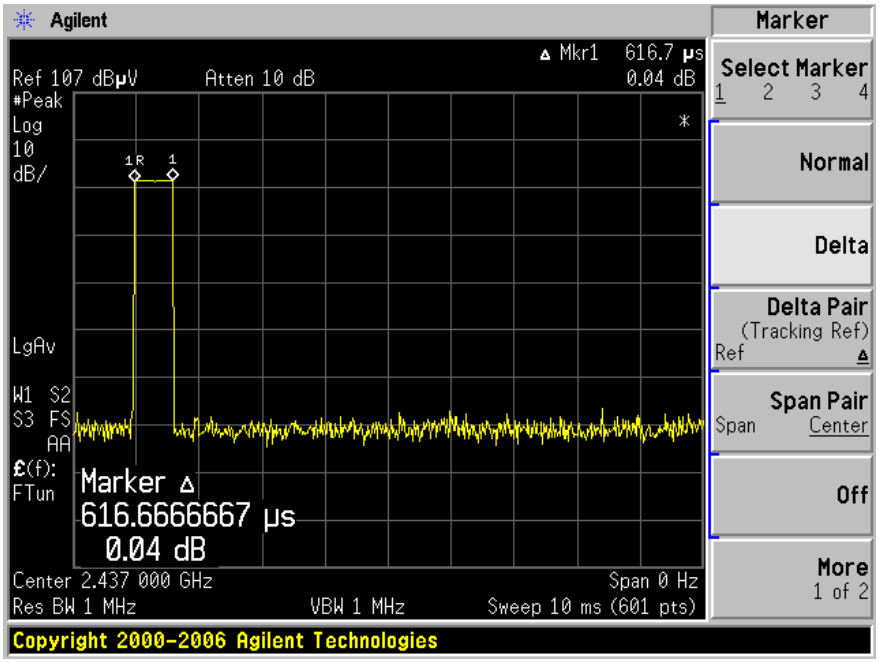
Frequency (MHz)	S.A. Reading (dBuV)	Detector (PK/AV)	Table Azimuth (Degree)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Duty Cycle Factor (dB)	Cord. Amp. (dBuV/m)	FCC & IC	
				Height (m)	Polarity (H/V)	Factor (dB/m)					Limit (dBuV/m)	Margin (dB)
2437	101.56	Peak	145	180	H	28.2	6.5	35.74	0	100.52	114	-13.48
2437	97.89	Peak	119	200	V	28.2	6.5	35.74	0	96.85	114	-17.15
2437	101.56	Ave	145	180	H	28.2	6.5	35.74	-44.2	56.32 *	94	-37.68
2437	97.89	Ave	119	200	V	28.2	6.5	35.74	-44.2	52.65 *	94	-41.35

Spurious/Harmonics Emissions measured at 3 meters (Above 1 GHz)

Frequency (MHz)	S.A. Reading (dBuV)	Detector (PK/AV)	Table Azimuth (Degree)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Duty Cycle Factor (dB)	Cord. Amp. (dBuV/m)	FCC & IC	
				Height (m)	Polarity (H/V)	Factor (dB/m)					Limit (dBuV/m)	Margin (dB)
4874	57.45	Peak	120	200	H	33.1	9.75	34.99	0	65.31	74	-8.69
4874	55.34	Peak	122	187	V	33.1	9.75	34.99	0	63.20	74	-10.80
4874	57.45	Ave	130	201	H	33.1	9.75	34.99	-44.2	21.11 *	54	-32.89
4874	55.34	Ave	110	180	V	33.1	9.75	34.99	-44.2	19.00 *	54	-35.00

Note: • Average Value (*) is calculated based on Peak Reading + Duty Cycle Factor
• Duty Cycle Factor (DCF) = 20 $\log_{10}$ (Ton/Tp) = 20 $\log_{10}$ (0.6167ms/100 ms) = -44.2 dB

Please refer to the following plot for the Duty cycle calculation:


Agilent
Marker
Mkr1 616.7 µs
0.04 dB
Ref 107 dBµV
Atten 10 dB
#Peak
Log
10
dB/
1R 1
LgAv
W1 S2
S3 FS
AA
£(f):
FTun
Marker Δ
616.6666667 µs
0.04 dB
Center 2.437 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 10 ms (601 pts)
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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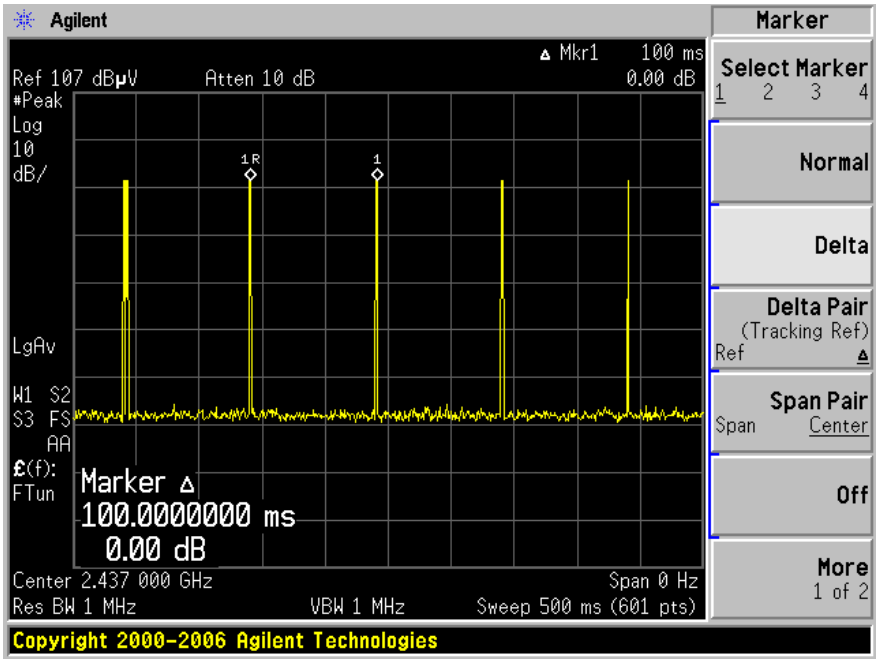
Agilent
Marker
Mkr1 100 ms
0.00 dB
Ref 107 dBµV
Atten 10 dB
#Peak
Log
10
dB/
1R 1
LgAv
W1 S2
S3 FS
AA
£(f):
FTun
Marker Δ
100.0000000 ms
0.00 dB
Center 2.437 000 GHz
Span 0 Hz
Res BW 1 MHz
VBW 1 MHz
Sweep 500 ms (601 pts)
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
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High Channel: 2472MHz

Fundamental measured at 3 meters:

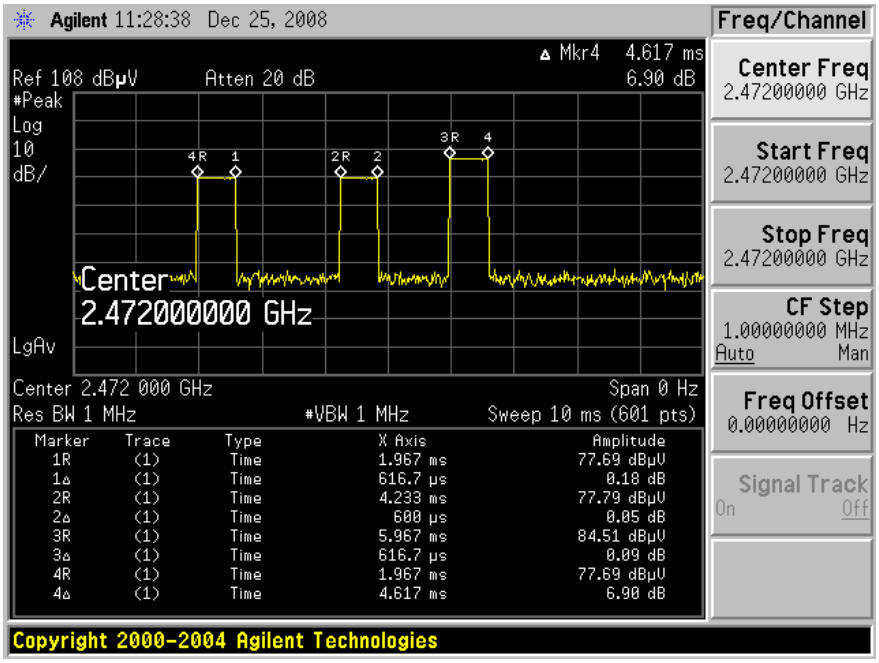
Frequency (MHz)	S.A. Reading (dBuV)	Detector (PK/AV)	Table Azimuth (Degree)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Duty Cycle Factor (dB)	Cord. Amp. (dBuV/m)	FCC & IC	
				Height (m)	Polarity (H/V)	Factor (dB/m)					Limit (dBuV/m)	Margin (dB)
2472	101.34	Peak	256	176	H	28.2	6.5	35.74	0	100.3	114	-13.70
2472	99.45	Peak	300	125	V	28.2	6.5	35.74	0	98.41	114	-15.59
2472	97.14	Ave	256	176	H	28.2	6.5	35.74	-17.83	78.27 *	94	-15.73
2472	91.13	Ave	300	125	V	28.2	6.5	35.74	-17.83	72.26 *	94	-21.74

Spurious/Harmonics Emissions measured at 3 meters (Above 1 GHz)

Frequency (MHz)	S.A. Reading (dBuV)	Detector (PK/AV)	Table Azimuth (Degree)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Duty Cycle Factor (dB)	Cord. Amp. (dBuV/m)	FCC & IC	
				Height (m)	Polarity (H/V)	Factor (dB/m)					Limit (dBuV/m)	Margin (dB)
4944	56.75	Ave	120	110	V	33.3	9.75	34.99	-18.82	45.99 *	54	-8.01
4944	56.75	Peak	200	134	V	33.3	9.75	34.99	0	64.81	74	-9.19
4944	54.34	Ave	129	200	H	33.3	9.75	34.99	-18.82	43.58 *	54	-10.42
4944	54.34	Peak	180	168	H	33.3	9.75	34.99	0	62.40	74	-11.60

Note: • Average Value (*) is calculated based on Peak Reading + Duty Cycle Factor
• Duty Cycle Factor (DCF) = 20 $\log_{10}$ (Ton/Tp) = 20 $\log_{10}$ ((0.6167+0.6+0.6167)ms/16 ms) = -18.82 dB

Please refer to the following plot for the Duty cycle calculation: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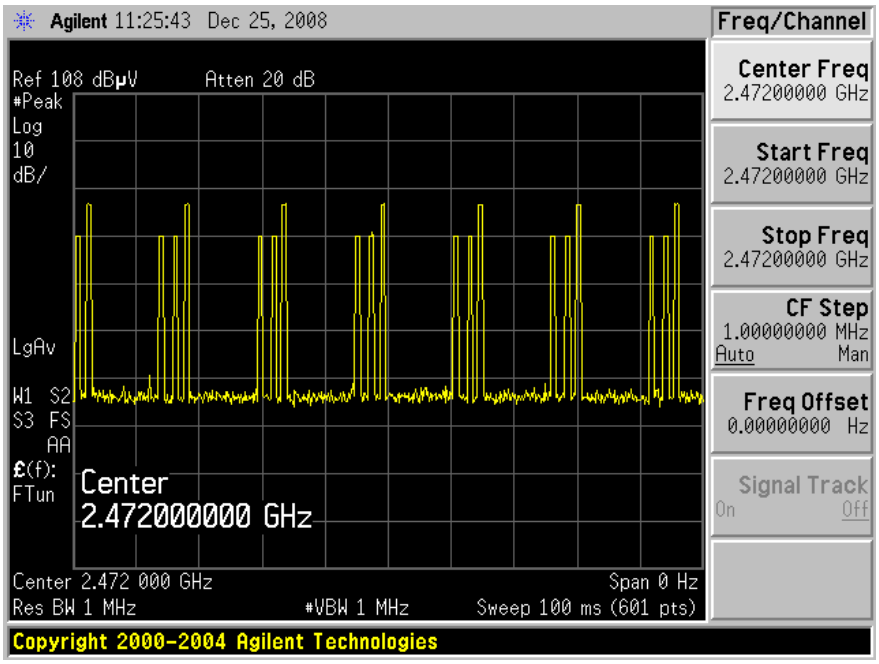
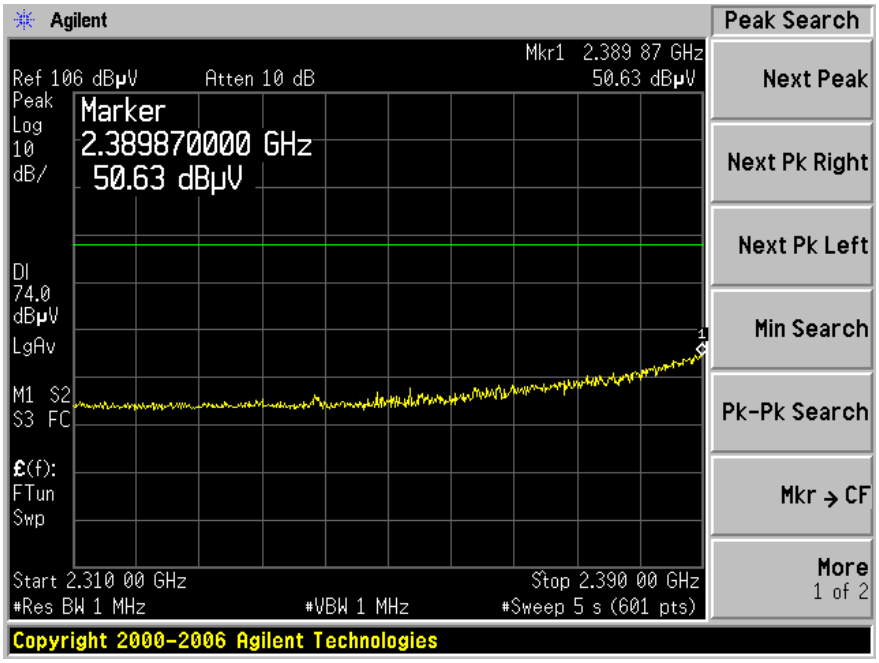
Freq/Channel
Mkr4 4.617 ms
Ref 108 dBµV
Atten 20 dB
6.90 dB
#Peak
Log
10
dB/
4R 1
2R 2
3R 4
Center
2.472000000 GHz
LgAv
Center 2.472 000 GHz
Span 0 Hz
Res BW 1 MHz
#VBW 1 MHz
Sweep 10 ms (601 pts)
Marker Trace Type X Axis Amplitude
1R (1) Time 1.967 ms 77.69 dBµV
1Δ (1) Time 616.7 µs 0.18 dB
2R (1) Time 4.233 ms 77.79 dBµV
2Δ (1) Time 600 µs 0.05 dB
3R (1) Time 5.967 ms 84.51 dBµV
3Δ (1) Time 616.7 µs 0.09 dB
4R (1) Time 1.967 ms 77.69 dBµV
4Δ (1) Time 4.617 ms 6.90 dB
Center Freq
2.47200000 GHz
Start Freq
2.47200000 GHz
Stop Freq
2.47200000 GHz
CF Step
1.00000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2004 Agilent Technologies

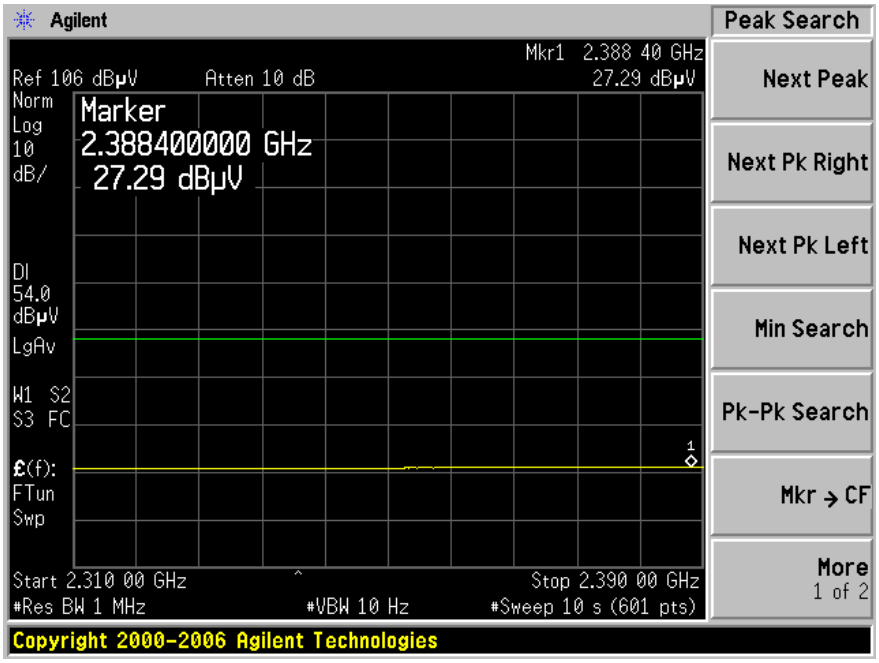

Agilent 11:25:43 Dec 25, 2008
Freq/Channel
Ref 108 dBµV
Atten 20 dB
#Peak
Log
10
dB/
LgAv
W1 S2
S3 FS
AA
£(f):
FTun
Center
2.472000000 GHz
Center 2.472 000 GHz
Span 0 Hz
Res BW 1 MHz
#VBW 1 MHz
Sweep 100 ms (601 pts)
Center Freq
2.47200000 GHz
Start Freq
2.47200000 GHz
Stop Freq
2.47200000 GHz
CF Step
1.00000000 MHz
Auto Man
Freq Offset
0.00000000 Hz
Signal Track
On Off
Copyright 2000-2004 Agilent Technologies

Out of Band Emissions:

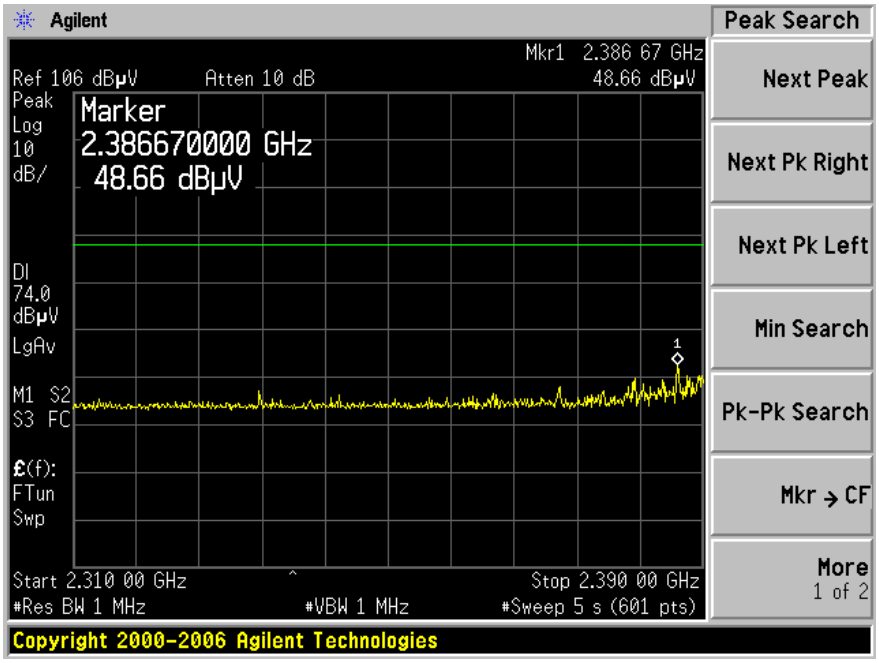
Lowest Channel: 2410 MHz



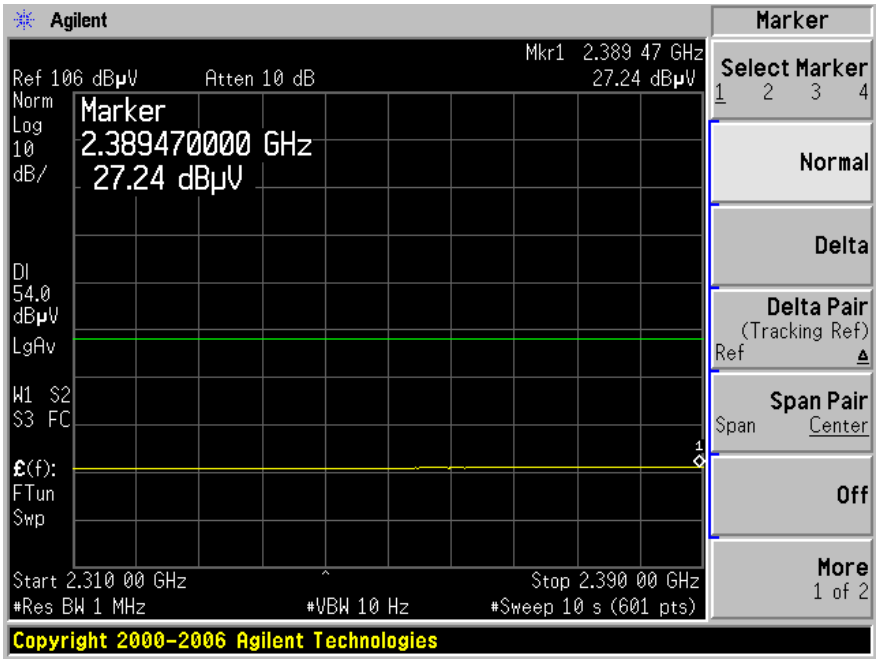
Vertical - Peak



Vertical - Ave

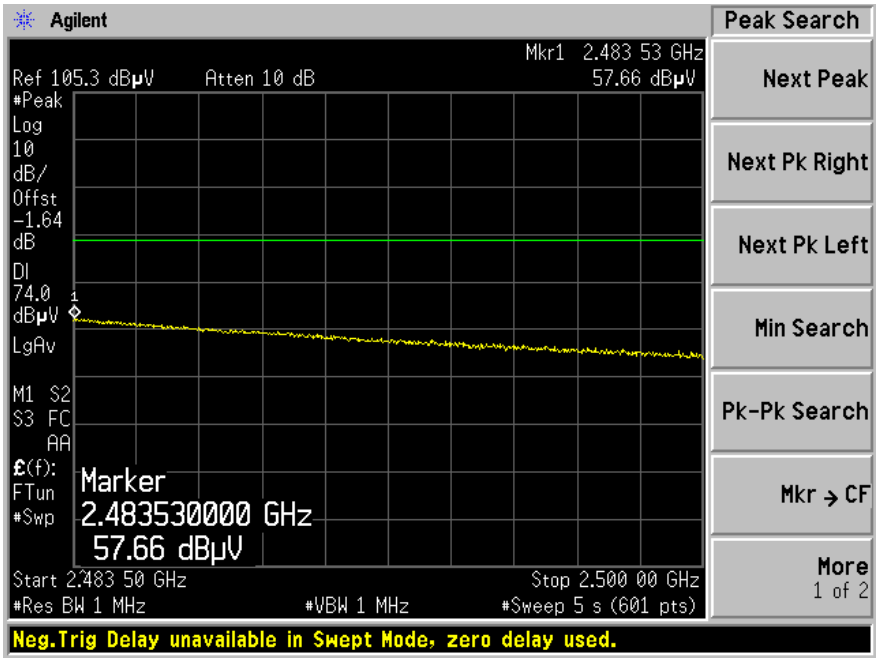


Horizontal – Peak

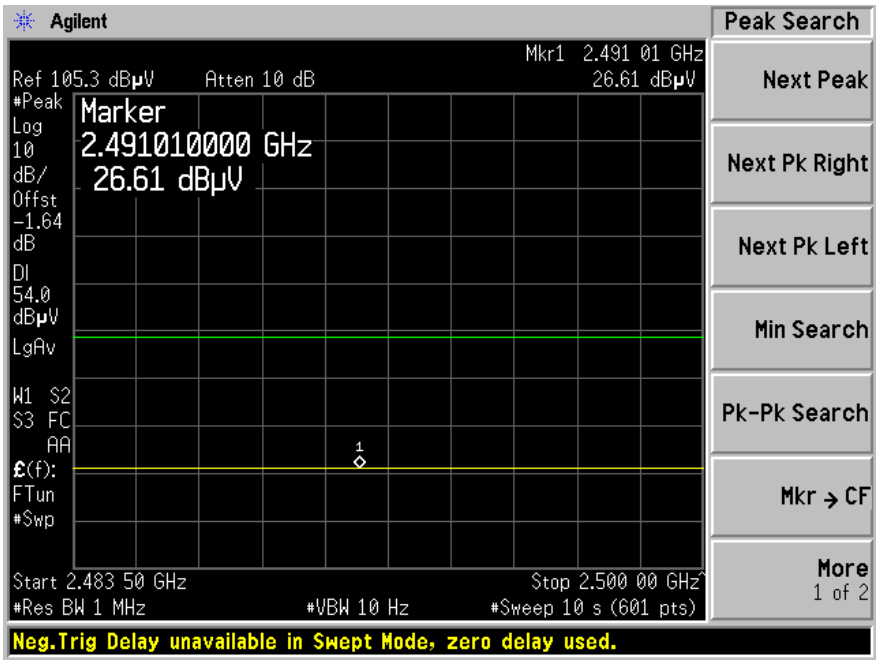


Horizontal - Ave

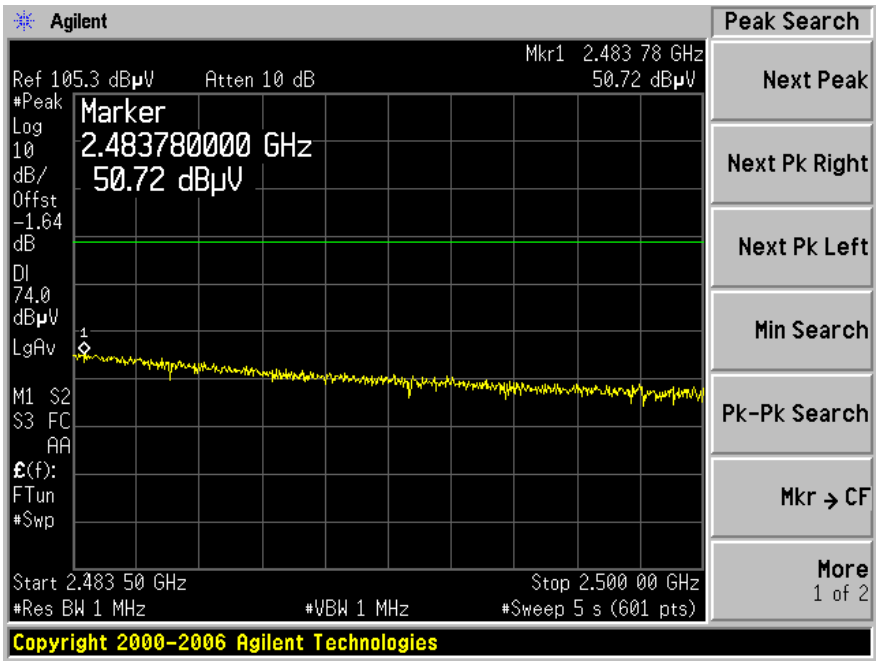
Highest Channel: 2472 MHz



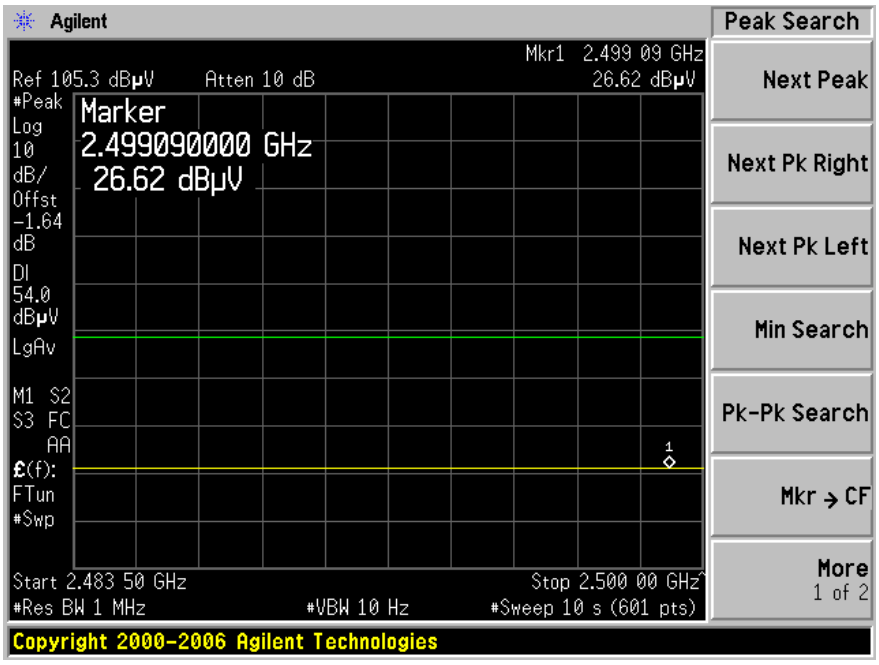
Vertical - Peak



Vertical - Ave



Horizontal - Peak



Horizontal - Ave

6 FCC §15.109 & IC RSS-GEN §4.6, §7.2.3 – RECEIVER SPURIOUS EMISSIONS

6.1 Applicable Standard

As per FCC §15.109 and IC RSS-Gen §4.6, §7.2.3, the receiver spurious limits measured at 3 meters shall be complied with the following table.

Frequency (MHz)	Field Strength (microvolts/m at 3 metres)
30 - 88	100
88 - 216	150
216 - 960	200
Above 960	500

6.2 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 bundle when necessary.

6.3 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
HP	Pre-Amplifier (1 ~ 26.5 GHz)	8449B	3008A1978	2008-10-21
Sunol Science Corp	Combination Antenna	JB3 Antenna	A020106-3	2008-03-24
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100044	2008-03-24
Sunol Science Corp	System Controller	SC99V	113005-1	NA
Antenna Research Associates, Inc.	Horn Antenna	DRG-118/A	1132	2008-08-07
Agilent	Analyzer, Spectrum	E4446A	US44300386	2008-05-19
Sonoma Instrument	Pre-Amplifier (10 kHz~ 2.5 GHz)	317	260407	2008-04-29

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

6.4 Test Procedure

For the radiated emissions test, the EUT was powered by two 1.5VDC AA battery.

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

The EUT is set 3 meter away from the testing antenna, which is varied from 1-4 mete, 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

6.5 Corrected Amplitude & Margin Calculation

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

Corrected Amplitude = Meter Reading + Antenna Factor + Cable Loss - Amplifier Gain

The "**Margin**" column of the following data tables indicates the degree of compliance with the applicable limit. For example, a margin of -7dB means the emission is 7dB below the limit. The equation for margin calculation is as follows:

Margin = Corrected Amplitude - Limit

6.6 Environmental Conditions

Temperature:	20 °C
Relative Humidity:	45%
ATM Pressure:	103.0kPa

The testing was performed by Jerry Wang on 2009-03-20.

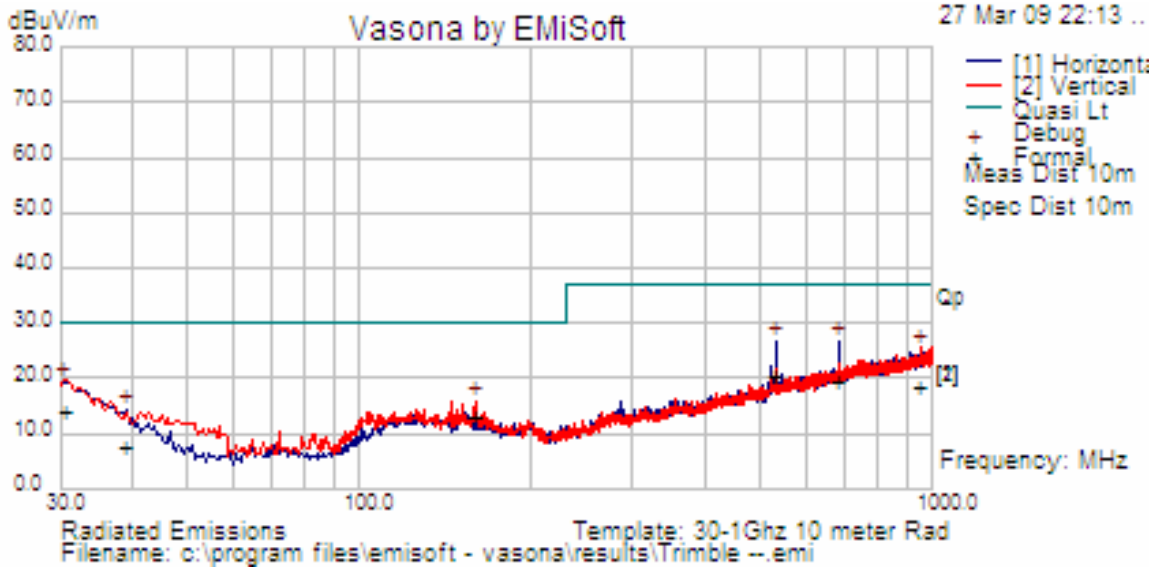
6.7 Test Results Summary

According to the data in the following table, the EUT complied with the FCC Part 15.109 & IC RSS-Gen, the worst margin reading of:

-16.14 dB at **30.55004 MHz** in the **Vertical** polarization.

Test Mode: Receiving

Below 1 GHz:



Quasi-Peak Measurement

Frequency (MHz)	Corrected Reading (dBuV/m)	Measurement Type (QP/AV)	Antenna Polarization (V/H)	Antenna Height (cm)	Table Azimuth (Degree)	Limit (dBuV/m)	Margin (dB)
30.55004	13.86	QP	V	327	312	30	-16.14
532.9748	20.34	QP	H	118	350	37	-16.66
159.0496	13.19	QP	V	104	350	30	-16.81
685.5081	19.45	QP	H	394	104	37	-17.55
957.6048	18.32	QP	V	140	139	37	-18.68
39.0770	7.42	QP	H	133	34	30	-22.58

Above 1 GHz:

Frequency (MHz)	S.A. Reading (dBuV)	Detector (PK/AV)	Table Azimuth (Degree)	Test Antenna			Cable Loss (dB)	Pre-Amp. Gain (dB)	Duty Cycle Factor (dB)	Cord. Amp. (dBuV/m)	FCC & IC	
				Height (m)	Polarity (H/V)	Factor (dB/m)					Limit (dBuV/m)	Margin (dB)
-	-	-	-	-	-	-	-	-	-	-	-	-

Note: The Spurious emissions above 1 GHz are on the noise floor level.

7 FCC §15.215 & IC RSS-GEN §4.6 – OCCUPIED BANDWIDTH

7.1 Standard Applicable

Per FCC §15.215, 20 dB occupied bandwidth should be provided.

Per IC RSS-Gen §4.6, When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured.

7.2 Test Equipment List and Details

Manufacturers	Descriptions	Models	Serial Numbers	Calibration Dates
HP	Pre-Amplifier (1 ~ 26.5 GHz)	8449B	3008A1978	2008-10-21
Sunol Science Corp	Combination Antenna	JB3 Antenna	A020106-3	2008-03-24
Rohde & Schwarz	EMI Test Receiver	ESCI 1166.5950K03	100044	2008-03-24
Sunol Science Corp	System Controller	SC99V	113005-1	NA
Antenna Research Associates, Inc.	Horn Antenna	DRG-118/A	1132	2008-08-07
Agilent	Analyzer, Spectrum	E4446A	US44300386	2008-05-19
Sonoma Instrument	Pre-Amplifier (10 kHz~ 2.5 GHz)	317	260407	2008-04-29

*** Statement of Traceability:** Bay Area Compliance Laboratories Corp. (Shenzhen) attests that all calibrations have been performed per the NVLAP requirements, traceable to NIST.

7.3 Test Procedure

The tests were performed in 5 meter chamber, using the setup and method of measurement in accordance with ANSI C63.4-2003.

External I/O cables are draped over edge of test table or bundled when necessary.

Device is powered up by two 1.5V Lithium Batteries.

7.4 Environmental Conditions

Temperature:	20 ° C
Relative Humidity:	45 %
ATM Pressure:	103 kPa

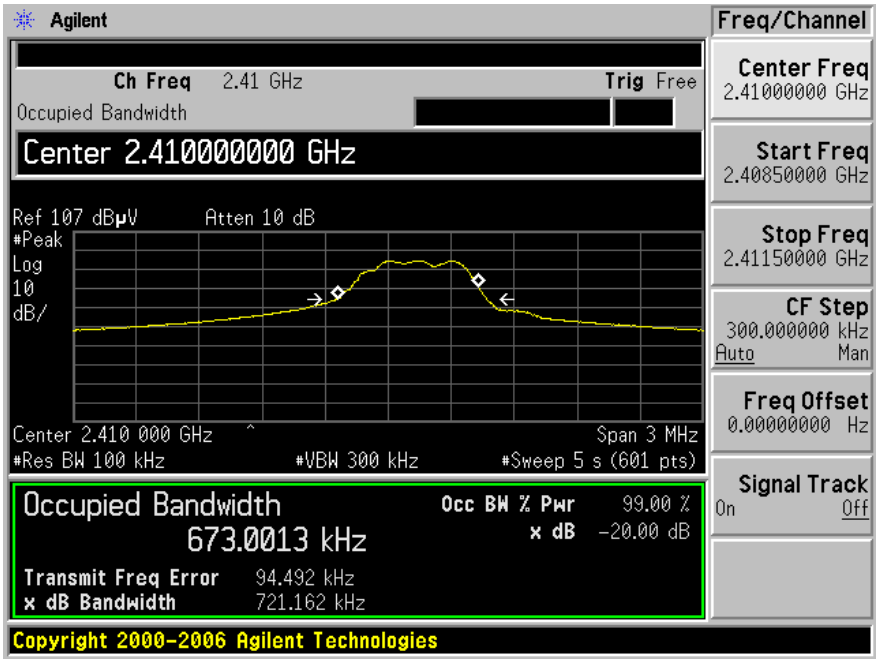
The testing was performed by Jerry Wang on 2009-03-23.

7.5 Test Result:

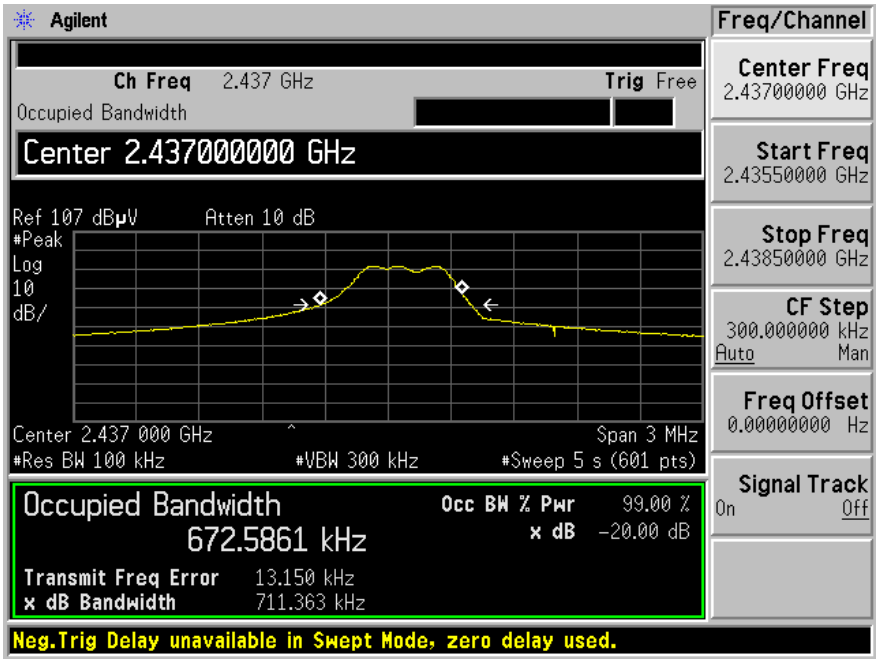
Please refer to the following table and plots.

Channel	Frequency (MHz)	20 dB Occupied Bandwidth (kHz)	99% Occupied Bandwidth (kHz)
Low	2410	721.16	673.00
Middle	2437	711.36	672.58
High	2472	722.47	672.55

Low Channel: 2410 MHz



Middle Channel: 2437 MHz



High Channel: 2472 MHz