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## CERTIFICATION TEST REPORT

Report Number: 2010 08154507 FCC


Project Number: 54533-1

Applicant: Avaak  
5405 Morehouse Dr.  
San Diego, CA 92121

Equipment Under Test (EUT): Wireless Camera  
Model: CI2010, CO2080, CM2040  
FCC ID: WD9-G2CAM  
IC: 7764A-G2CAM

In Accordance With: FCC Part 15 Subpart C, 15.247  
RSS-210, Issue 7, June 2007

Tested By: Nemko USA Inc.  
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San Diego, CA 92121

Authorized By:   
Alan Laudani, Wireless/EMC Engineer

Date: August 10, 2010

Total Number of Pages: 38

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## DOCUMENT HISTORY

| REVISION | DATE            | COMMENTS                      |
|----------|-----------------|-------------------------------|
| -        | August 10, 2010 | Prepared By: A. Laudani       |
| -        | August 10, 2010 | Initial Release: Alan Laudani |

NOTE: Nemko USA, Inc. hereby makes the following statements so as to conform to Chapter 10 (Test Reports) Requirements of ANSI C63.4 (2003) "Methods and Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz":

- The unit described in this report was received at Nemko USA, Inc.'s facilities on August 2, 2010.
- Testing was performed on the unit described in this report on August 2, 2010 to .
- The Test Results reported herein apply only to the Unit actually tested, and to substantially identical Units.
- This report does not imply the endorsement of the Federal Communications Commission (FCC), Industry Canada, NVLAP or any other government agency.

This Report is the property of Nemko USA, Inc., and shall not be reproduced, except in full, without prior written approval of Nemko USA, Inc. However, all ownership rights are hereby returned unconditionally to Avaak, and approval is hereby granted to Avaak, and its employees and agents to reproduce all or part of this report for any legitimate business purpose without further reference to Nemko USA, Inc.

## Section 1. Summary of Test Results

### General

All measurements are traceable to national standards

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with Part 15; Subpart C. Radiated tests were conducted in accordance with ANSI C63.4-2003. Radiated emissions are made on an open area test site. A description of the test facility is on file with the FCC.

The assessment summary is as follows:

|                              |   |
|------------------------------|---|
| Apparatus Assessed:          | Wireless Camera<br>Model VUE Camera Gen II  |
| Specification:               | FCC Part 15 Subpart C, 15.247<br>IC RSS-210 Issue 7 June 2007 Annex 8<br>IC RSS-Gen Issue 2 June 2007 |
| Date Received in Laboratory: | August 2, 2010  |
| Compliance Status:           | Complies  |
| Exclusions:                  | None  |
| Non-compliances:             | None  |

## CERTIFICATION

Nemko USA, Inc., an independent Electromagnetic Compatibility (EMC) Test Laboratory, produced this Test Report and performed the Radio Frequency Interference (RFI) testing and data evaluation contained herein.

Nemko USA, Inc.'s measurement facility is currently registered with the United States Federal Communications Commission (FCC) in accordance with the provisions of 47 United States Code (CFR) Part 2, Subpart I, Section 2.948(a). A current description of Nemko USA, Inc.'s measurement facility is on file with the FCC. Nemko USA Inc. has additionally satisfied the FCC that it complies with the requirements set forth in 47 CFR Part 2, Subpart I, Section 2.948(d) regarding the accreditation of EMC laboratories.

The RFI testing, test data collection and test data evaluation were accomplished in accordance with the ANSI C63.4-2003 Standard, and in accordance with the applicable sections of the FCC rules (47 CFR Parts 2 and 15). The testing was also accomplished in accordance with Industry Canada's ICES-003 standard for unintentional radiating device per EMCAB-3, Issue 3 (May 1998). The administrative summary of this test report provides a description of the test sample.

I hereby certify that the test data, test data evaluation, and equipment configurations used to compile this test report are a true and accurate representation of the test sample's radio frequency interference characteristics as of the test date(s), and, for the design of the test sample.

TESTED BY:



Date: August 10, 2010

A. Laudani, EMC Test Engineer

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## Section 2: Equipment Under Test

### 2.1 Product Description

The CI2010, CO2080, CM2040 are Wireless Cameras. The EUT is a wireless device that transmits back to a computer or network. It uses frequency hopping with 16 channels.

| DEVICE                | MANUFACTURER<br>MODEL #<br>SERIAL #                          | POWER CABLE |
|-----------------------|--|-------------|
| EUT - Wireless Camera | Avaak<br>Model: CI2010, CO2080, CM2040<br>Engineering Sample | N/A         |

| CONNECTION | I/O CABLE |
|------------|-----------|
| None       |           |

### 2.2 Technical Specifications of the EUT

|                         |  |
|-------------------------|--|
| Manufacturer:           | Avaak  |
| Operating Frequency:    | 2404 MHz to 2474 MHz in the 2400-2483.5 MHz Band |
| Rated Power:            | 54 mW  |
| Modulation:             | FSK  |
| Antenna Connector/Data: | Integral/ 0 dBi                                  |
| Power Source:           | 3.3 V battery                                    |

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## Section 3: Test Conditions

### 3.1 Specifications

The apparatus was assessed against the following specifications:

FCC Part 15 Subpart C, 15.247

Operation within the bands 902-928 MHz, 2400-2483.5 MHz,  
5725-5850 MHz and 24.0-24.25 GHz bands.

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Annex 8 - Frequency Hopping and Digital Modulation Systems Operating in the  
Bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

### 3.2 Deviations From Laboratory Test Procedures

No deviations from Laboratory Test Procedure

### 3.3 Test Environment

All tests were performed under the following environmental conditions:

|                    |   |                          |
|--------------------|---|--------------------------|
| Temperature range  | : | 24 – 25 °C               |
| Humidity range     | : | 42 - 76 %                |
| Pressure range     | : | 87 - 105 kPa             |
| Power supply range | : | +/- 1% of rated voltages |

### 3.4 Test Equipment

| Nemko ID | Device                    | Manufacturer                 | Model     | Serial Number | Cal Date   | Cal Due Date |
|----------|---------------------------|------------------------------|-----------|---------------|------------|--------------|
| 110      | Antenna, LPA              | EMCO                         | 3146      | 1217          | 1/10/2009  | 2/10/2011    |
| 114      | Antenna, Bicon            | EMCO                         | 3104      | 2997          | 3/5/2010   | 3/5/2012     |
| 317      | Preamplifier              | HP                           | 8449A     | 2749A00167    | 5/7/2010   | 5/7/2011     |
| 625      | Antenna, Dbl Ridge Horn   | EMCO                         | 3116      | 2325          | 2/1/2010   | 2/1/2012     |
| 813      | Multimeter                | Fluke                        | 111       | 78130060      | 9/1/2009   | 9/1/2010     |
| 752      | Antenna, DRWG             | EMCO                         | 3115      | 4943          | 11/12/2008 | 11/12/2010   |
| 835      | Spectrum Analyzer         | Rohde & Schwarz              | RHDFSEK   | 829058/005    | 7/12/2010  | 7/12/2011    |
| 897      | Spectrum Analyzer         | Rohde & Schwarz              | FSP7      | 837620/009    | 10/14/2009 | 10/14/2010   |
| 898      | EMI Receiver & filter set | HP                           | 8546A     | 3625A00348    | 6/22/2010  | 6/22/2011    |
| 899      | Filter Section            | HP                           | 85460A    | 3448A00288    | 6/22/2010  | 6/22/2011    |
| 901      | pre amp                   | Sonoma                       | 310 N     | 130607        | 4/20/2010  | 4/20/2011    |
| NA       | Regulating Transformer    | TDGC                         | 0-250 Vac | NA            | NCR        | NCR          |
| N/A      | 2040B-1 OATS              | SOATS IC Registration Number |           |               |            |              |

Registration of the OATS are on file with the Federal Communications Commission, under Registration Number 90579, the VCCI under registration number R-3027, and are also registered with Industry Canada under Site Numbers 2040B-1 and 2040B-2.



## Section 4: Observations

### 4.1 Modifications Performed During Assessment

No modifications were performed during assessment.

### 4.2 Record Of Technical Judgements

No technical judgements were made during the assessment.

### 4.3 EUT Parameters Affecting Compliance

The user of the apparatus could not alter parameters that would affect compliance.

### 4.4 Test Deleted

No Tests were deleted from this assessment.

## Section 5: Results Summary

This section contains the following:

### FCC Part 15 Subpart C: Test Results

§ 15.247 Operation within the bands 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz.

### RSS-210, Issue 7, June 2007

Annex 8 - Frequency Hopping and Digital Modulation Systems Operating in the Bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

### RSS-Gen Issue 2 June 2007

General Requirements and Information for the Certification of Radiocommunication Equipment

The column headed “Required” indicates whether the associated clauses were invoked for the apparatus under test. The following abbreviations are used:

N No: not applicable / not relevant

Y Yes: Mandatory i.e. the apparatus shall conform to these test.

N/T Not Tested, mandatory but not assessed. (See section 4.4 Test deleted)

The results contained in this section are representative of the operation of the apparatus as originally submitted.

## 5.1 Test Results

| Part 15C          | RSS-210          | Test Description   | Required | Result |
|-------------------|------------------|--|----------|--------|
| 15.247 (a)(1)     | RSS-210 A8.1 (a) | 20% & 99% Bandwidth  | Y        | Pass   |
| 15.257 (b)(1)     | A8.4(2)          | Maximum peak output power  | Y        | Pass   |
| 15.247 (d)        | RSS-210 2.2(b)   | Radiated Emissions within Restricted Bands                       | Y        | Pass   |
| 15.247(a)(1)      | A8.1(b)          | Carrier Frequency Separation                                     | Y        | Pass   |
| 15.247(d)         | A8.5             | Out-of-band Emissions  | Y        | Pass   |
| 15.247(a)(1)(iii) | A8.1(d)          | Number of Hopping Frequencies                                    | Y        | Pass   |
| 15.207            | RSS-GEN 7.2.2    | Transmitter and Receiver AC Power Lines Conducted Emission Limit |          | NA     |
| 15.247(a)(1)(iii) | A8.1(d)          | Time of Occupancy (Dwell Time)                                   | Y        | Pass   |
|                   | RSS-GEN 4.8      | Receiver Spurious Emissions                                      | Y        | Pass   |

### Notes:

Spurious Emissions was measured when the unit is in receive mode to show compliance with IC RSS General Receiver requirements.

EUT is battery powered—except from power lines conducted emissions.

## Appendix A: Test Results

### Conducted Limits

#### 15.207 (a)

Except as shown in paragraphs (b) and (c) of this section, 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  $\mu$ H/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 frequency ranges.

| Frequency of emission (MHz) | Conducted limit (dB $\mu$ V) |           |
|-----------------------------|------------------------------|-----------|
|                             | Quasi-peak                   | Average   |
| 0.15–0.5                    | 66 to 56*                    | 56 to 46* |
| 0.5–5                       | 56                           | 46        |
| 5–30                        | 60                           | 50        |

#### RSS-Gen 7.2.2

The purpose of this test is to measure unwanted radio frequency currents induced in any AC conductor external to the equipment which could conduct interference to other equipment via the AC electrical network. Except when the requirements applicable to a given device state otherwise, for any licence-exempt radio communication device equipped to operate from the public utility AC power supply, either directly or indirectly, the radio frequency voltage that is conducted back onto the AC power lines in the frequency range of 0.15 MHz to 30 MHz shall not exceed the limits shown in Table 2. The tighter limit applies at the frequency range boundaries.

The conducted emissions shall be measured with a 50 ohm/50 microhenry line impedance stabilization network. A description of the method of measurement that is acceptable to Industry Canada is found in RSS-212.

#### Test Conditions:

|                     |                      |              |               |
|---------------------|----------------------|--------------|---------------|
| Sample Number:      | VUE Camera Gen II    | Temperature: | 25            |
| Date:               | August 2, 2010       | Humidity:    | 73%           |
| Modification State: | Lo/Mid/High Channels | Tester:      | A. Laudani    |
|                     |                      | Laboratory:  | Shield Room 2 |

Test Results: EUT is battery powered, not applicable for testing.

#### Additional Observations:

- Green limit line is Average limit and blue limit line is Quasi-peak limit.
- Instrumentation settings are 9kHz RBW/30kHz VBW for Average measurements and 100kHz RBW/100kHz VBW for Peak measurements.

**20dB Bandwidth/ 99% Bandwidth****15.247 (a)(1)**

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

**RSS-210 A8.1 (a)**

The bandwidth of a frequency hopping channel is the 20 dB emission bandwidth, measured with the hopping stopped. The system RF bandwidth is equal to the channel bandwidth multiplied by the number of channels in the hop set. The hop set shall be such that the near-term distribution of frequencies appears random, with sequential hops randomly distributed in both direction and magnitude of change in the hop set while the long-term distribution appears evenly distributed.

**Test Conditions:**

|                     |                      |              |                |
|---------------------|----------------------|--------------|----------------|
| Sample Number:      | VUE Camera Gen II    | Temperature: | 25             |
| Date:               | August 4, 2010       | Humidity:    | 44             |
| Modification State: | Lo/Mid/High Channels | Tester:      | A. Laudani     |
|                     |                      | Laboratory:  | Ground plane 2 |

**Test Results:**

See Attached Plots.

**Additional Observations:**

This is a conducted test.

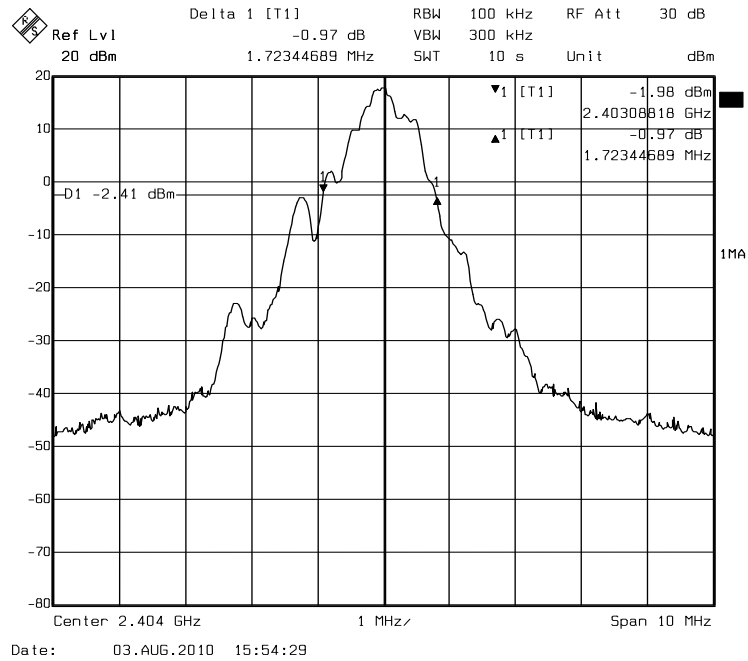
The EUT with the integral antenna removed and replaced with a SMA connector is connected directly to the input of the spectrum analyzer.

RBW set to 100kHz and VBW to 300kHz. Detector function is set to Peak and the trace to Max Hold.

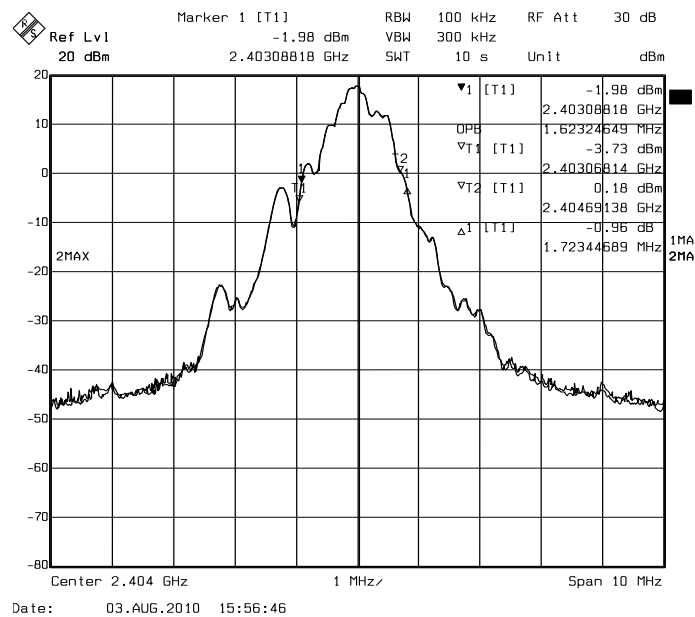
While the EUT is transmitting at it's maximum data rate and allowed to stabilize, emission peak is determined.

A display line is drawn 20dB from this point. The points where the line intersects the emission determined the bandwidth for each channel investigated.

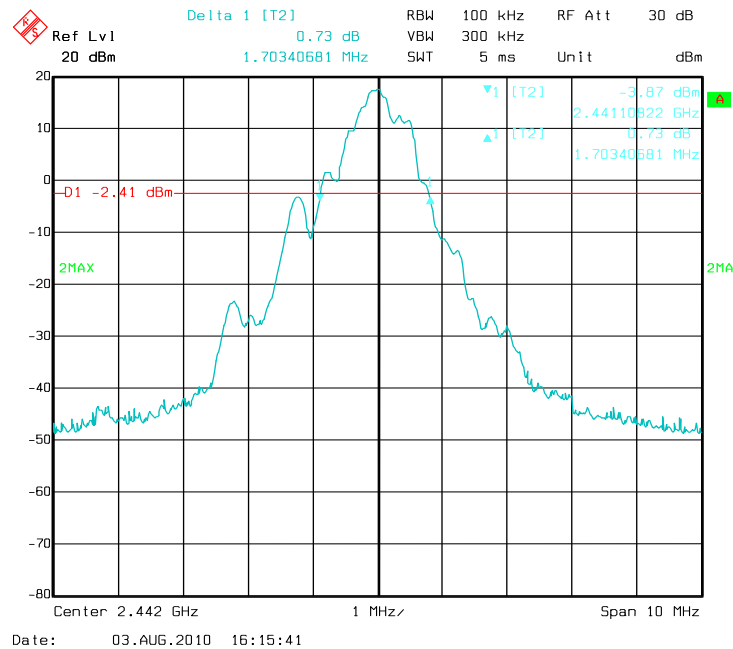
For 99% bandwidth, the client is asked for the declared necessary bandwidth and this is entered into the Spectrum Analyzer for the channel bandwidth and the function for Channel power = 99% is activated. Max hold on this plot is presented.



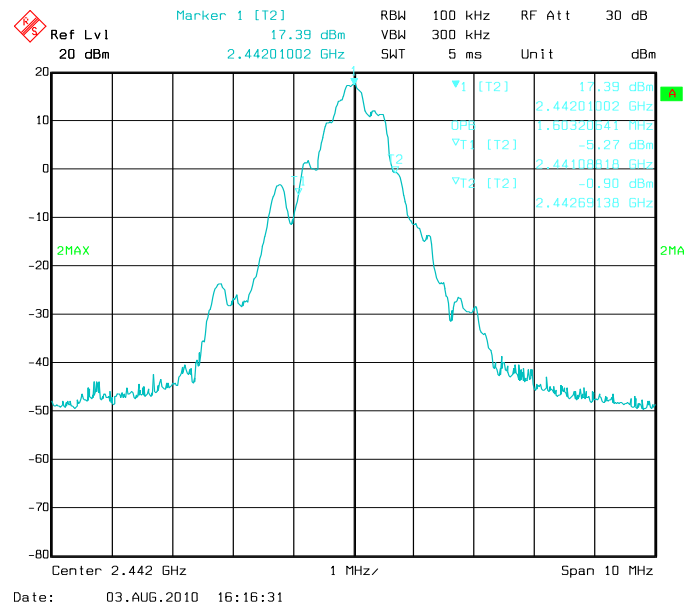
LOW Channel 20dB bandwidth = 2.40 MHz



LOW Channel 99% bandwidth = 2.40 MHz

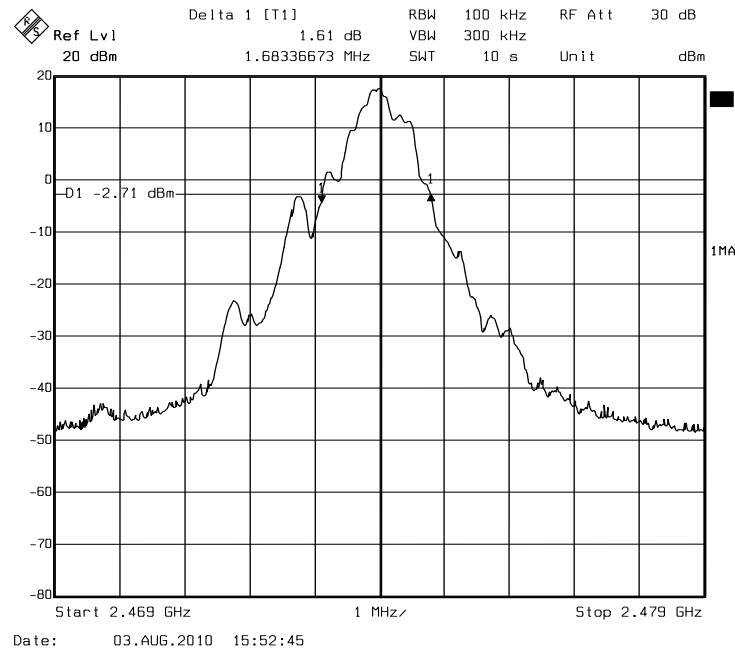


MID Channel 20dB bandwidth = 1.70 MHz

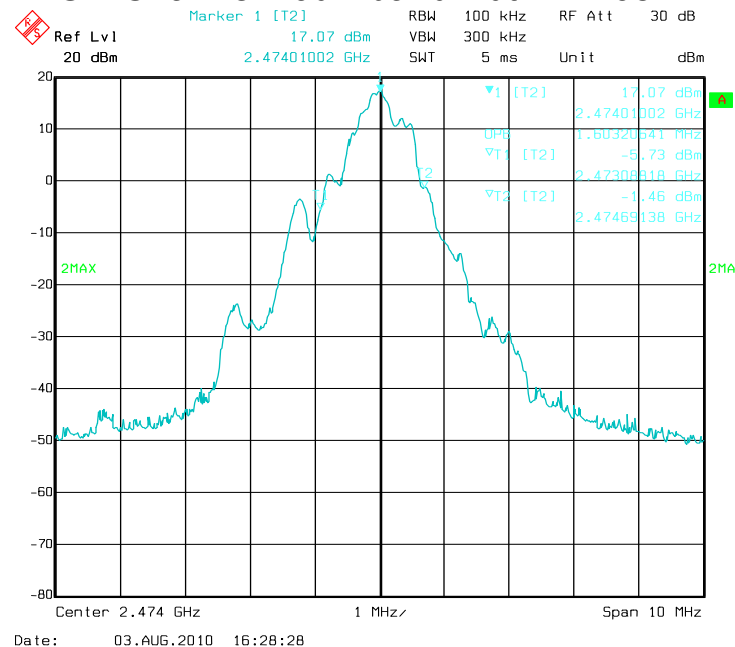


MID Channel 99% bandwidth = 2.44 MHz

FCC ID: WD9-G2CAM  
IC: 7764A-G2CAM



**HIGH Channel 20dB bandwidth = 1.68 MHz**



**HIGH Channel 99% bandwidth = 2.47 MHz**

## Spurious RF Conducted Emissions

### 15.247 (d) I

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 Sec. 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Sec. 15.205(a), must also comply with the radiated emission limits specified in Sec. 15.209(a) (see Sec. 15.205(c)).

### A8.5 Out-of-band Emissions

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated device is operating, the radio frequency power that is produced 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 Section A8.4(4), the attenuation required shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Tables 2 and 3 is not required.

### Test Conditions:

|                     |                      |              |               |
|---------------------|----------------------|--------------|---------------|
| Sample Number:      | VUE Camera Gen II    | Temperature: | 25 °C         |
| Date:               | August 4, 2010       | Humidity:    | 44%           |
| Modification State: | Lo/Mid/High Channels | Tester:      | A. Laudani    |
|                     |                      | Laboratory:  | Shield Room 2 |

### Test Results:

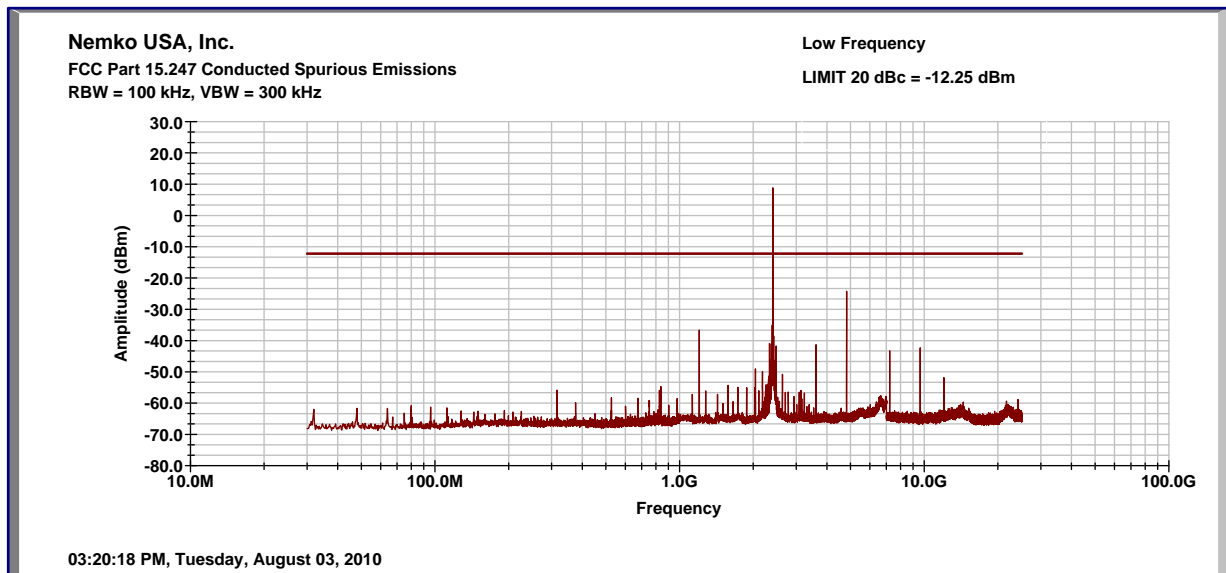
See attached plots.

### Additional Observations:

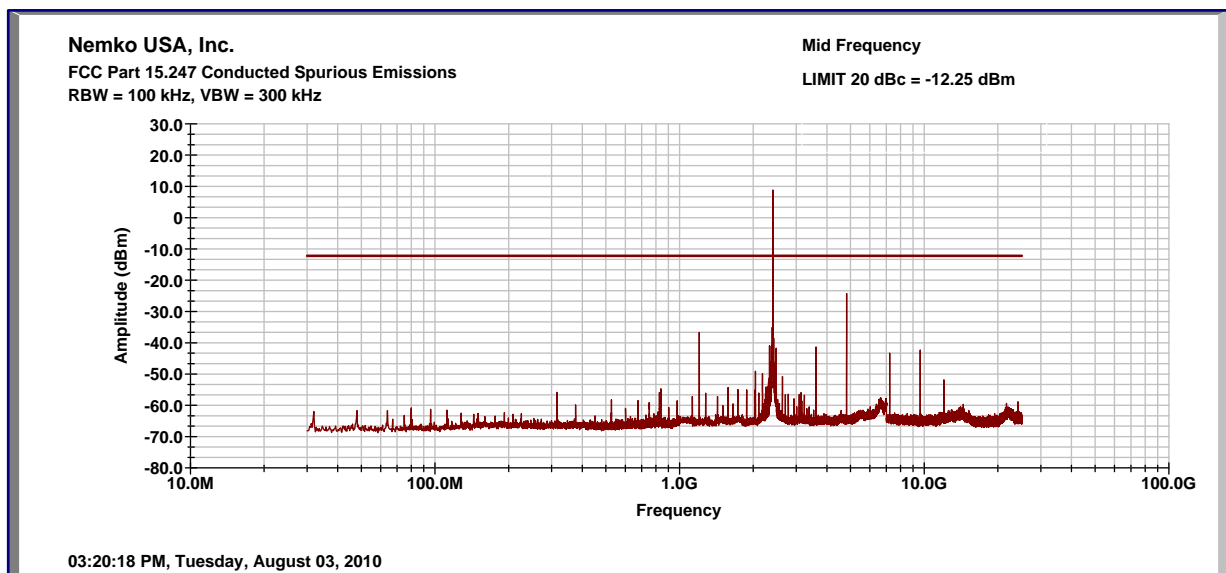
- RBW =100kHz
- Sweep = Auto
- Detector function = peak.
- Trace = Max hold
- No offset used, EUT connected directly to the spectrum analyzer.
- Conductive measurement with minimum offset of hardline "pigtail" soldered onto circuit board --cutting out integral antenna.
- Testing occurred with a freshly charged battery.



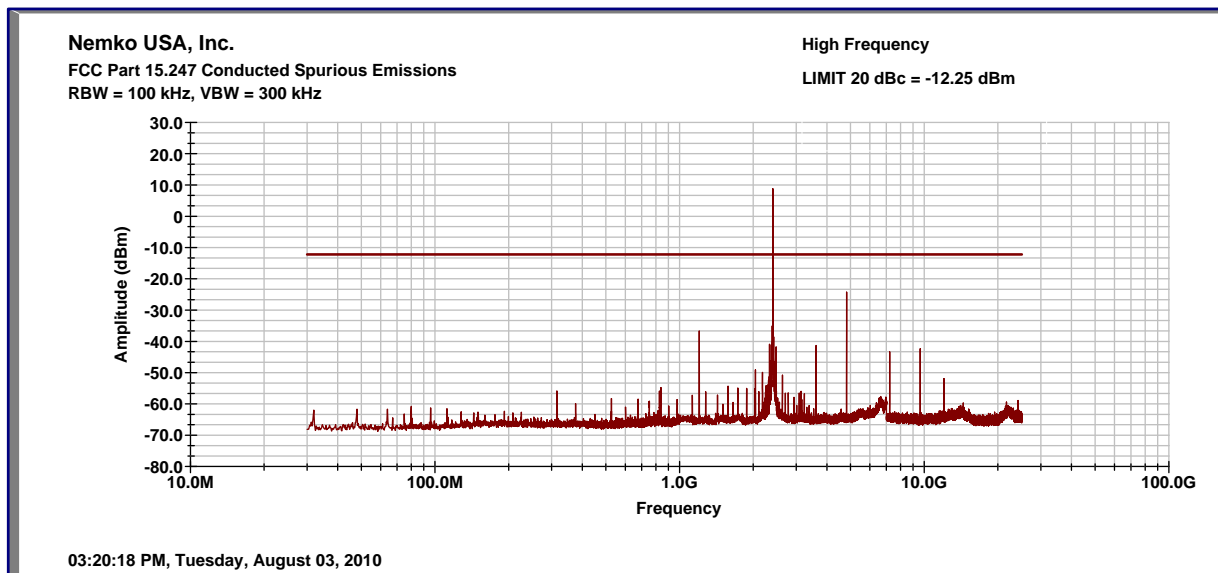
Low Channel:



Mid Channel:



High Channel:



## Radiated Emissions within Restricted Bands

**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)).*

**RSS 210 2.2(b)**

Unwanted emissions falling into restricted bands of Table 1 shall meet Tables 2 and 3 limits. It should also be noted that unwanted emissions falling in non-restricted bands do not need to be suppressed to a level lower than the Table 2 and 3 limits.

**Test Conditions:**

|                     |                      |              |            |
|---------------------|----------------------|--------------|------------|
| Sample Number:      | VUE Camera Gen II    | Temperature: | 24         |
| Date:               | August 4, 2010       | Humidity:    | 50%        |
| Modification State: | Lo/Mid/High Channels | Tester:      | A. Laudani |
|                     |                      | Laboratory:  | SOATS      |

**Test Results:**

See attached plots.

**Additional Observations:**

- RBW/VBW = 1MHz above 1GHz while RBW 120kHz/VBW 300kHz below 1GHz using Quasi-Peak detector.
- Sweep = Auto
- Detector function = peak.
- Trace = Max hold
- The Spectrum was searched from 30MHz to the 10<sup>th</sup> Harmonic, 25000 MHz. There are no emissions found that do not comply to the restricted bands defined in FCC Part 15 Subpart C, 15.205 or Part 15.247(d).
- Testing occurred with a freshly charged battery



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**Radiated Emissions Data**

Job #: 54533-1 Date: 8-3-2010 Page 1 of 1  
 NEX #: 154507 Time: 1500  
 Staff: aal

Client Name: AVAAK  
 EUT Name: Gateway  
 EUT Model #: VUE System Gen II  
 EUT Serial #: FCC1  
 EUT Config.: Transmitting normal use  
 Dual Camera

EUT Voltage: battery  
 EUT Frequency: -  
 Phase: -  
 NOATS  
 SOATS X  
 Distance < 1000 MHz: 3 m  
 Distance > 1000 MHz: 3 m

Specification: CFR47 Part 15, Subpart B, Class B

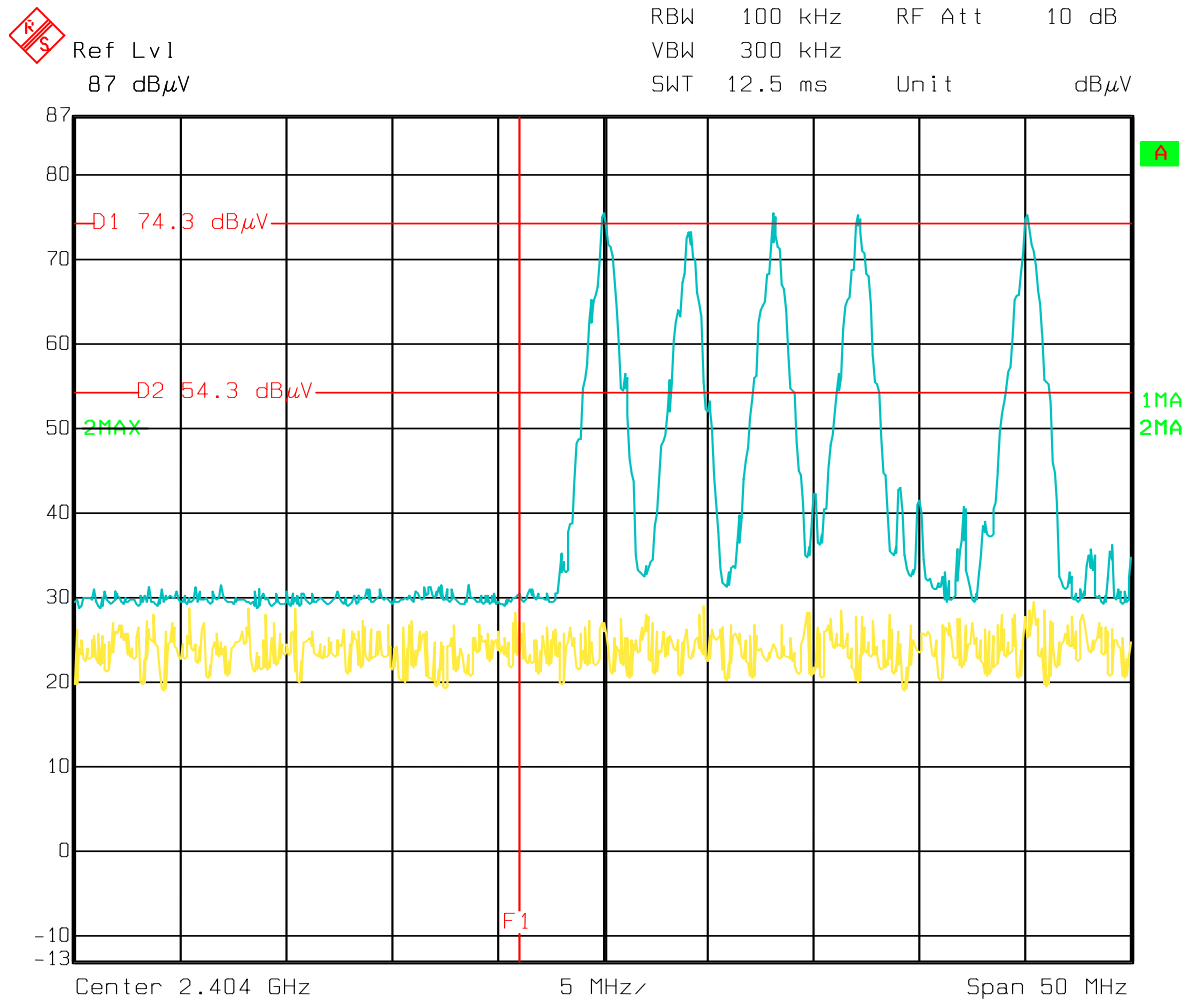
Loop Ant. #: NA  
 Bicon Ant. #: 114\_3m Temp. (°C): 21  
 Log Ant. #: 110\_3m Humidity (%): 50  
 DRG Ant. #: 752 Spec Analyzer #: 898 835  
 Cable LF#: SOATS Analyzer Display #: 898 835  
 Cable HF#: 40ft\_blue Quasi-Peak Detector #: 898  
 Preamp LF#: NA Preselector #: 899  
 Preamp HF#: 317

Quasi-Peak RBW: 120 kHz  
 Video Bandwidth 300 kHz  
 Peak RBW: 1 MHz  
 Video Bandwidth 3 MHz  
 Average RBW: 1 MHz  
 Video Bandwidth 10 Hz

Measurements below 1 GHz are Quasi-Peak values, unless otherwise stated.  
 Measurements above 1 GHz are Average values, unless otherwise stated.

| Meas. Freq. (MHz) | Meter Reading Vertical | Meter Reading Horizontal | Det. | EUT Side F/L/R/B | Ant. Height m | Max. Reading (dBµV) | Corrected Reading (dBµV/m) | Spec. limit (dBµV/m) | CR/SL Diff. (dB) | Pass Fail | Comment        |
|-------------------|------------------------|--------------------------|------|------------------|---------------|---------------------|----------------------------|----------------------|------------------|-----------|----------------|
| 2483.5            | 28.0                   | 26.9                     | P    | -                | 1.0           | 28.0                | 63.0                       | 74.0                 | -11.0            | Pass      | single channel |
| 2483.5            | 14.2                   | 14.1                     | A    | -                | 1.0           | 14.2                | 49.2                       | 54.0                 | -4.8             | Pass      |                |
| 2474.0            | 28.3                   | 27.2                     | P    | -                | 1.0           | 28.3                | 63.3                       | 74.0                 | -10.7            | Pass      | hopping        |
| 2483.5            | 14.2                   | 14.0                     | A    | -                | 1.0           | 14.2                | 49.2                       | 54.0                 | -4.8             | Pass      |                |
| 2404.0            | 73.3                   | 67.0                     | P    | -                | 1.0           | 73.3                | 108.3                      |                      |                  |           | standing       |
| 2404.0            | 65.6                   | 71.4                     | P    | -                | 1.0           | 71.4                | 106.4                      |                      |                  |           | side           |
| 2404.0            | 68.6                   | 72.4                     | P    | -                | 1.0           | 72.4                | 107.4                      |                      |                  |           | back           |
| 4808.0            | 55.0                   | 52.5                     | P    | -                | 1.0           | 55.0                | 66.1                       | 74.0                 | -7.8             | Pass      | standing       |
| 4808.0            | 35.0                   | 32.5                     | A    | -                | 1.0           | 35.0                | 46.1                       | 54.0                 | -7.8             | Pass      | standing       |
| 7212.0            | 48.9                   | 45.0                     | P    | -                | 1.0           | 48.9                | 66.3                       | 74.0                 | -7.7             | Pass      | standing       |
| 7212.0            | 28.9                   | 25.0                     | A    | -                | 1.0           | 28.9                | 46.3                       | 54.0                 | -7.7             | Pass      | standing       |
| 2442.0            | 73.3                   | 68.4                     | P    | -                | 1.0           | 73.3                | 108.3                      |                      |                  |           | standing       |
| 2442.0            | 70.6                   | 72.0                     | P    | -                | 1.0           | 72.0                | 107.0                      |                      |                  |           | side           |
| 2442.0            | 68.1                   | 72.1                     | P    | -                | 1.0           | 72.1                | 107.1                      |                      |                  |           | back           |
| 4884.0            | 58.4                   | 54.9                     | P    | -                | 1.0           | 58.4                | 69.5                       | 74.0                 | -4.4             | Pass      | standing       |
| 4884.0            | 38.4                   | 34.9                     | A    | -                | 1.0           | 38.4                | 49.5                       | 54.0                 | -4.4             | Pass      | standing       |
| 7326.0            | 50.0                   | 48.9                     | P    | -                | 1.0           | 50.0                | 67.7                       | 74.0                 | -6.2             | Pass      | standing       |
| 7326.0            | 30.0                   | 28.9                     | A    | -                | 1.0           | 30.0                | 47.7                       | 54.0                 | -6.2             | Pass      | standing       |
| 2474.0            | 74.6                   | 69.0                     | P    | -                | 1.0           | 74.6                | 109.6                      |                      |                  |           | standing       |
| 2474.0            | 72.5                   | 71.8                     | P    | -                | 1.0           | 72.5                | 107.5                      |                      |                  |           | side           |
| 2474.0            | 69.8                   | 74.6                     | P    | -                | 1.0           | 74.6                | 109.6                      |                      |                  |           | back           |
| 4948.0            | 55.7                   | 53.0                     | P    | -                | 1.0           | 55.7                | 66.9                       | 74.0                 | -7.1             | Pass      | standing       |
| 4948.0            | 35.7                   | 33.0                     | A    | -                | 1.0           | 35.7                | 46.9                       | 54.0                 | -7.1             | Pass      | standing       |
| 7422.0            | 45.3                   | 44.0                     | P    | -                | 1.0           | 45.3                | 63.0                       | 74.0                 | -11.0            | Pass      | standing       |
| 7422.0            | 25.3                   | 24.0                     | A    | -                | 1.0           | 25.3                | 43.0                       | 54.0                 | -11.0            | Pass      | standing       |

## Bandedge Measurement (Low Channel Hopping)

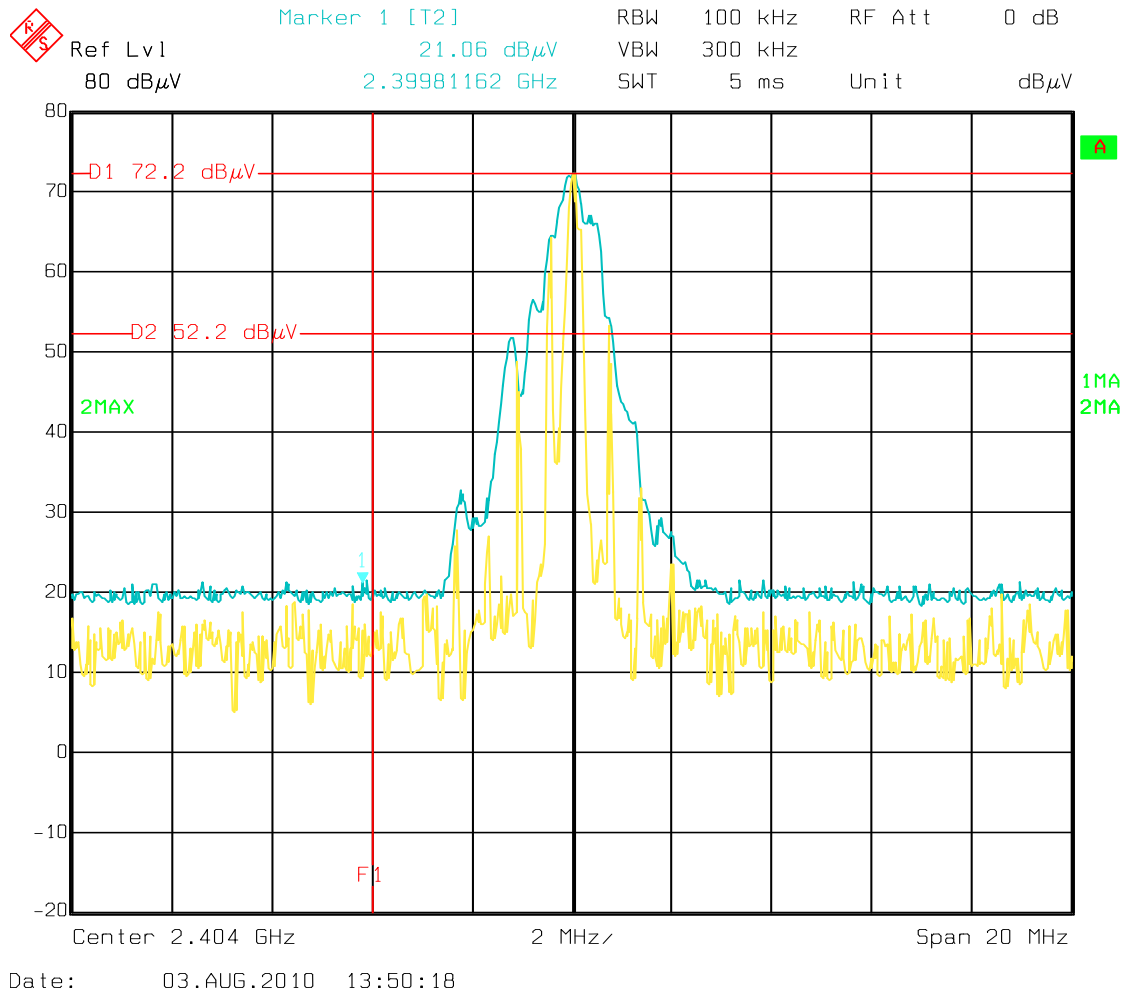


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Low Channel 2404 MHz (Peak Measurement)

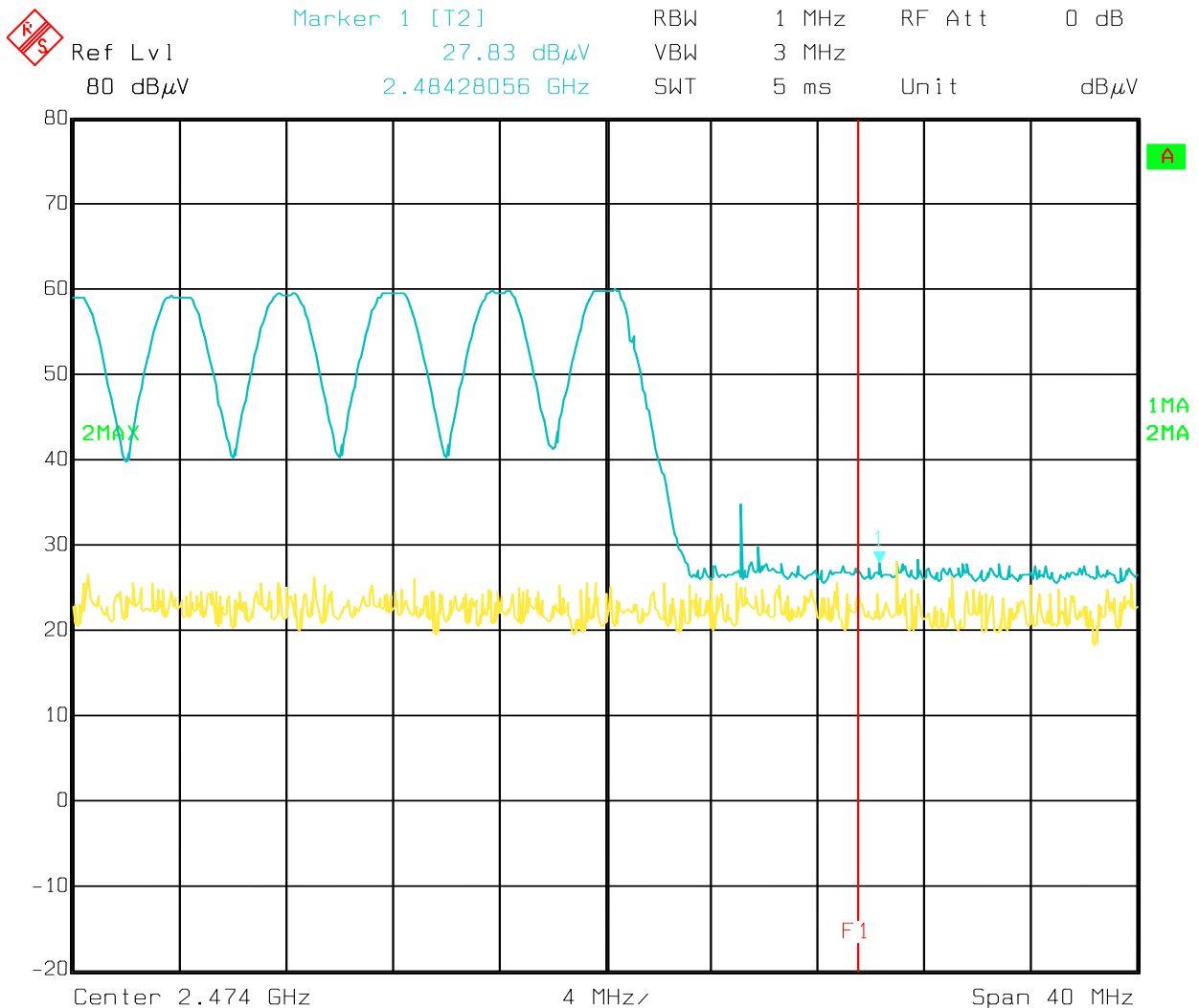
*Emissions below 20 dBc at bandedge.*

## Bandedge Measurement (Low Channel Non-Hopping)



*Emissions below 20 dBc at bandedge*

## Bandedge Measurement (High Channel Hopping)



Date: 03.AUG.2010 14:35:20

High Channel (2474MHz using 1MHz RBW/ 3MHz VBW)

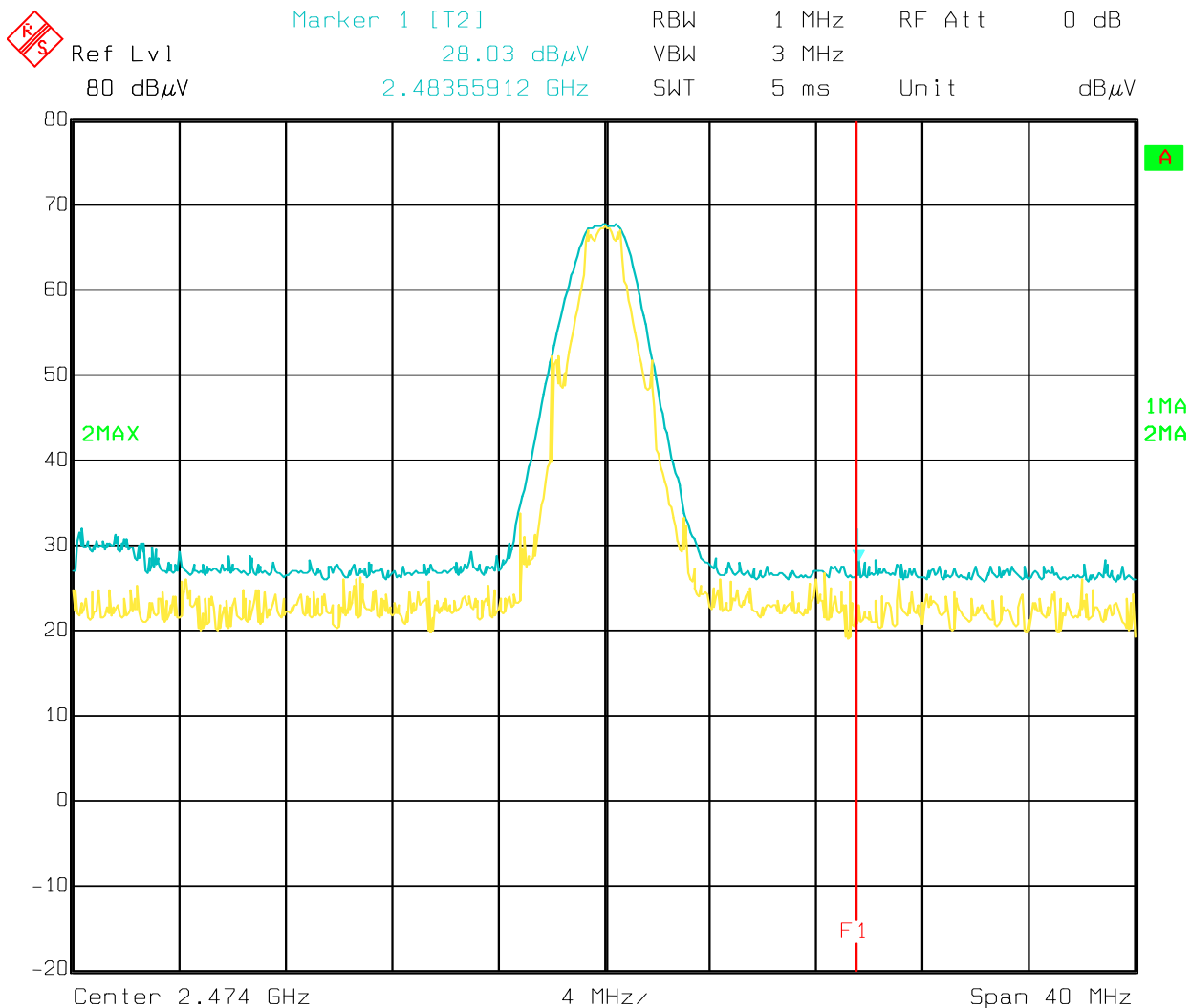
$27.8 \text{ dBuV} \text{ plus antenna factor } 27.3 \text{ dB/m and cable loss } 7.7\text{dB} = 62.8 \text{ dB}\mu\text{V/m}$

$62.8 \text{ dB}\mu\text{V/m} < 74.0 \text{ dB}\mu\text{V/m}$ , EUT complies for Peak.

DC fact = -20 dB, EUT complies for Average.

$62.8 \text{ dB}\mu\text{V/m} - 20\text{dB} = 42.8 \text{ dB}\mu\text{V/m} < 54.0 \text{ dB}\mu\text{V/m}$

## Bandedge Measurement (High Channel Non-Hopping)



Date: 03.AUG.2010 13:42:44

High Channel (2474MHz using 1MHz RBW/ 3MHz VBW)

$28.0 \text{ dB}\mu\text{V} \text{ plus antenna factor } 27.3 \text{ dB/m and cable loss } 7.7\text{dB} = 63.0 \text{ dB}\mu\text{V/m}$

$63.0 \text{ dB}\mu\text{V/m} < 74.0 \text{ dB}\mu\text{V/m}$ , EUT complies for Peak.

DC fact = -20 dB, EUT complies for Average.

$63.0 \text{ dB}\mu\text{V/m} - 20\text{dB} = 43.0 \text{ dB}\mu\text{V/m} < 54.0 \text{ dB}\mu\text{V/m}$



## Maximum Peak Output Power

**15.257 (b)(1)**

For frequency hopping systems operating in the 2400–2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725–5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400–2483.5 MHz band: 0.125 watts.

**A8.4(2)**

For frequency hopping systems operating in the band 2400-2483.5 MHz employing at least 75 hopping channels, the maximum peak conducted output power shall not exceed 1 W; for all other frequency hopping systems in the band, the maximum peak conducted output power shall not exceed 0.125 W. Except as provided in Section A8.4(5), the e.i.r.p. shall not exceed 4W.

**Test Conditions:**

|                     |                      |              |                |
|---------------------|----------------------|--------------|----------------|
| Sample Number:      | VUE Camera Gen II    | Temperature: | 24 °C          |
| Date:               | August 4, 2010       | Humidity:    | 50 %           |
| Modification State: | Lo/Mid/High Channels | Tester:      | A. Laudani     |
|                     |                      | Laboratory:  | Ground plane 2 |

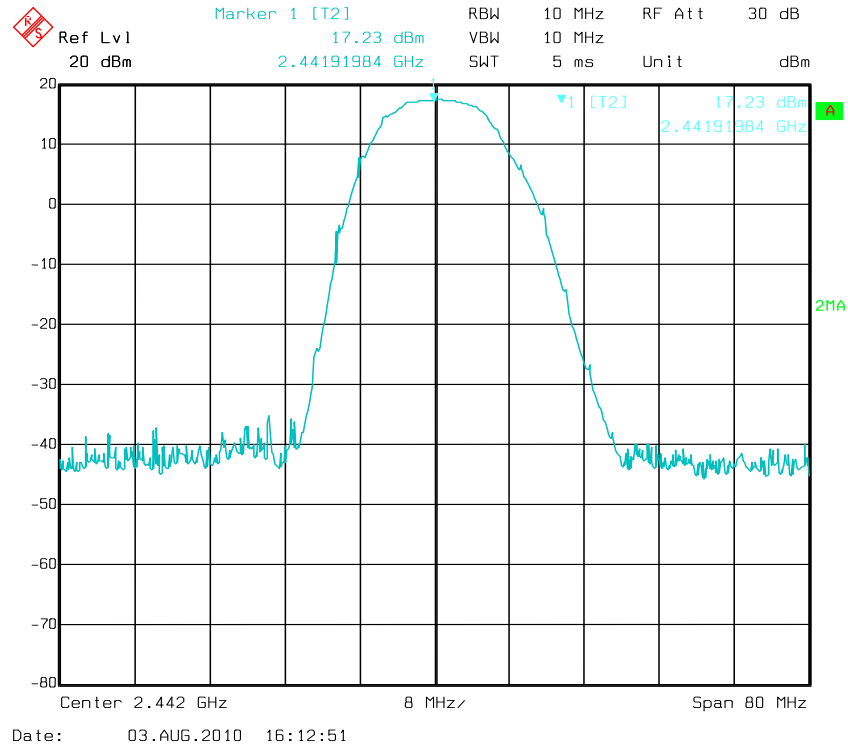
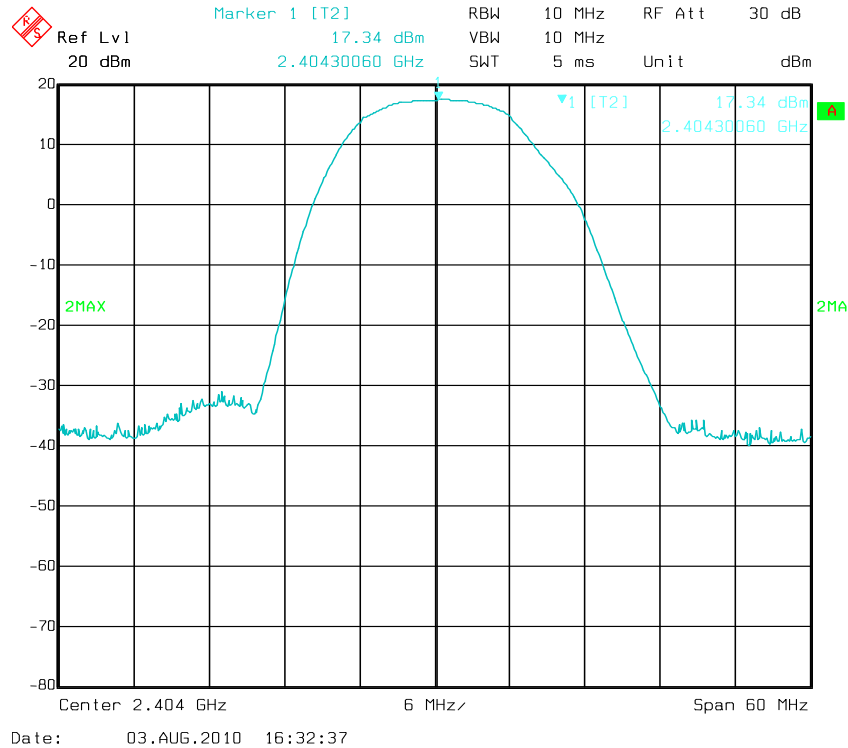
**Additional Observations:**

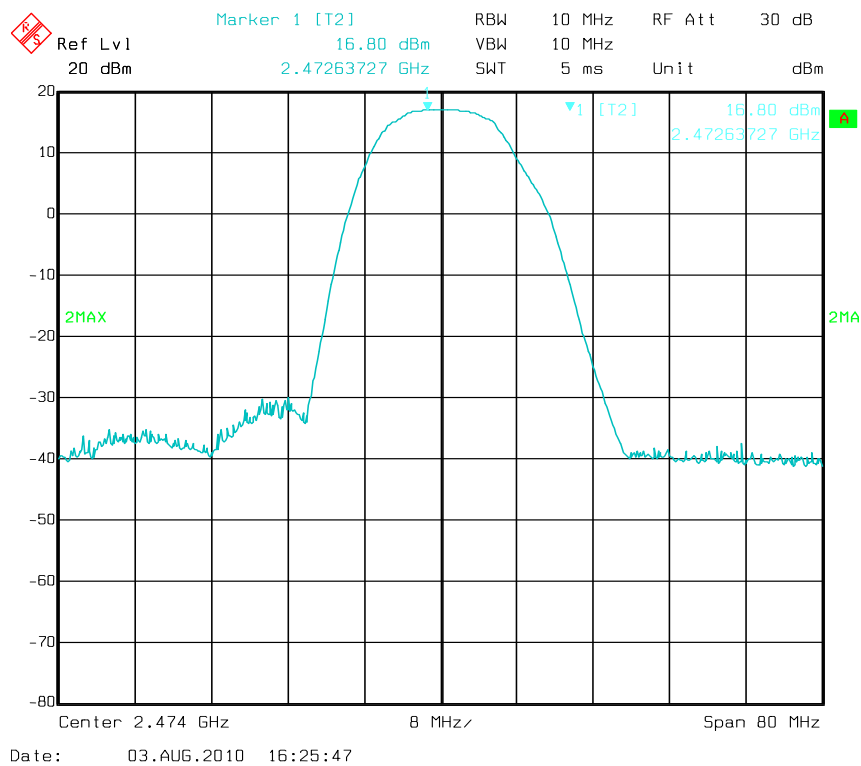
- Conductive measurement with minimum offset of hardline “pigtail” soldered onto circuit board --cutting out integral antenna.
- Autotransformer was used to vary power input 120 VAC +/- 15% and this resulted in no significant output power differences.
- RBW was greater than 20 dB bandwidth.
- Detector peak, max hold.

**Test Results:**

| Channel | Frequency (MHz) | Measured Output Power Conducted dBm | Measured Output Power Conducted mW | Gain | EIRP dBm |
|---------|-----------------|-------------------------------------|------------------------------------|------|----------|
| Low     | 2404            | 17.34                               | 54                                 | 0    | 17.34    |
| Mid     | 2442            | 17.23                               | 53                                 | 0    | 17.23    |
| High    | 2474            | 16.80                               | 48                                 | 0    | 16.80    |

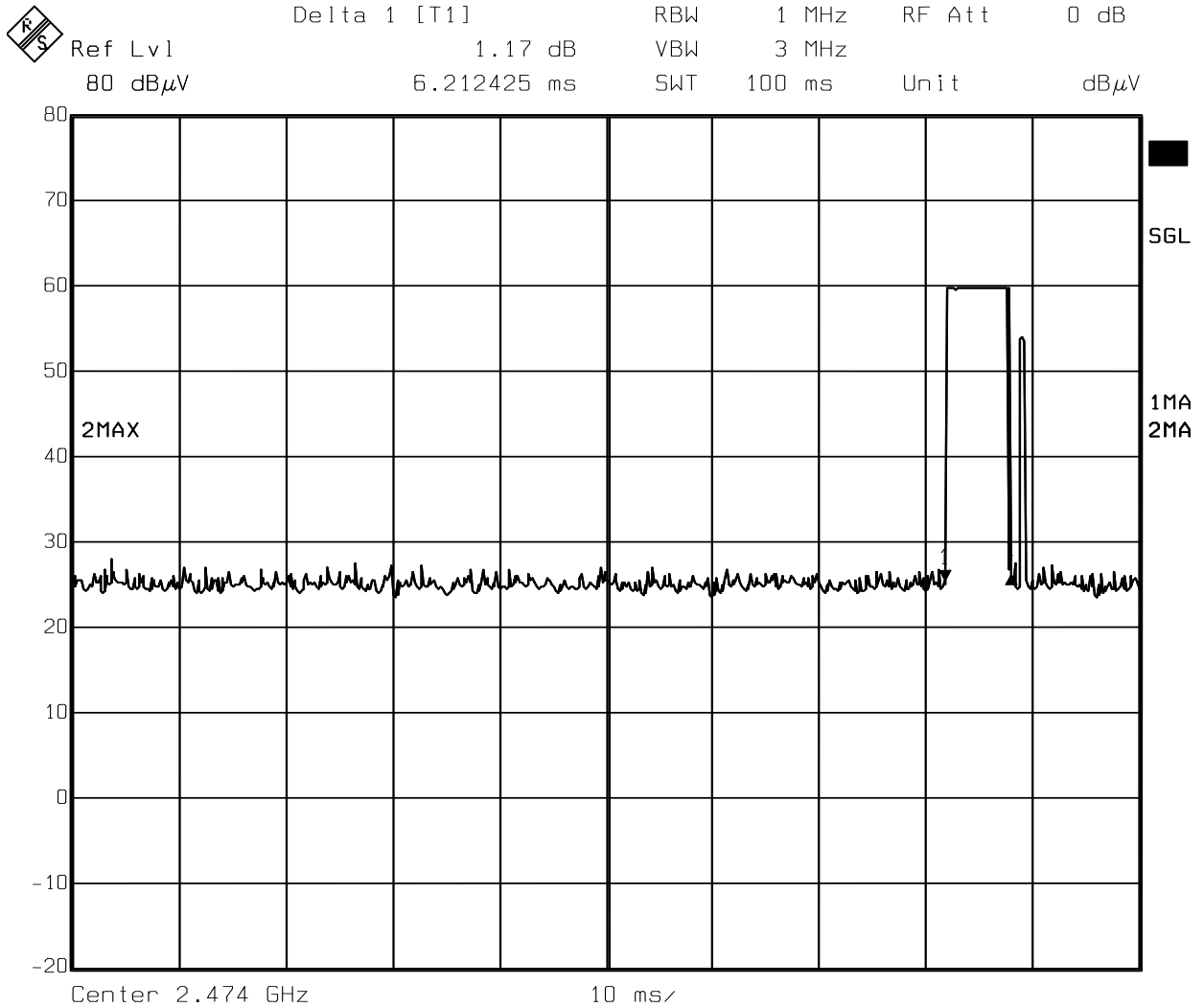
Plots:





**Duty Cycle Computation**  
**Duty Cycle Computation**

One emission in 100 ms



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**Duty Cycle** = 6.21 ms/100ms = 6%  
**Duty Cycle Factor** = -20 dB since duty cycle is <10%

## Carrier Frequency Separation

**15.247(a)(1)**

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400–2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW. The system shall hop to channel frequencies that are selected at the system hopping rate from a pseudo randomly ordered list of hopping frequencies. Each frequency must be used equally on the average by each transmitter. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

**A8.1(b)**

Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the band 2400-2483.5 MHz may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 0.125 W. The system receivers shall have input bandwidths that match the hopping channel bandwidths of their corresponding transmitters and shall shift frequencies in synchronization with the transmitted signals.

**Test Conditions:**

|                     |                   |              |                |
|---------------------|-------------------|--------------|----------------|
| Sample Number:      | VUE Camera Gen II | Temperature: | 24             |
| Date:               | August 4, 2010    | Humidity:    | 44%            |
| Modification State: | Hopping           | Tester:      | A. Laudani     |
|                     |                   | Laboratory:  | Ground Plane 2 |

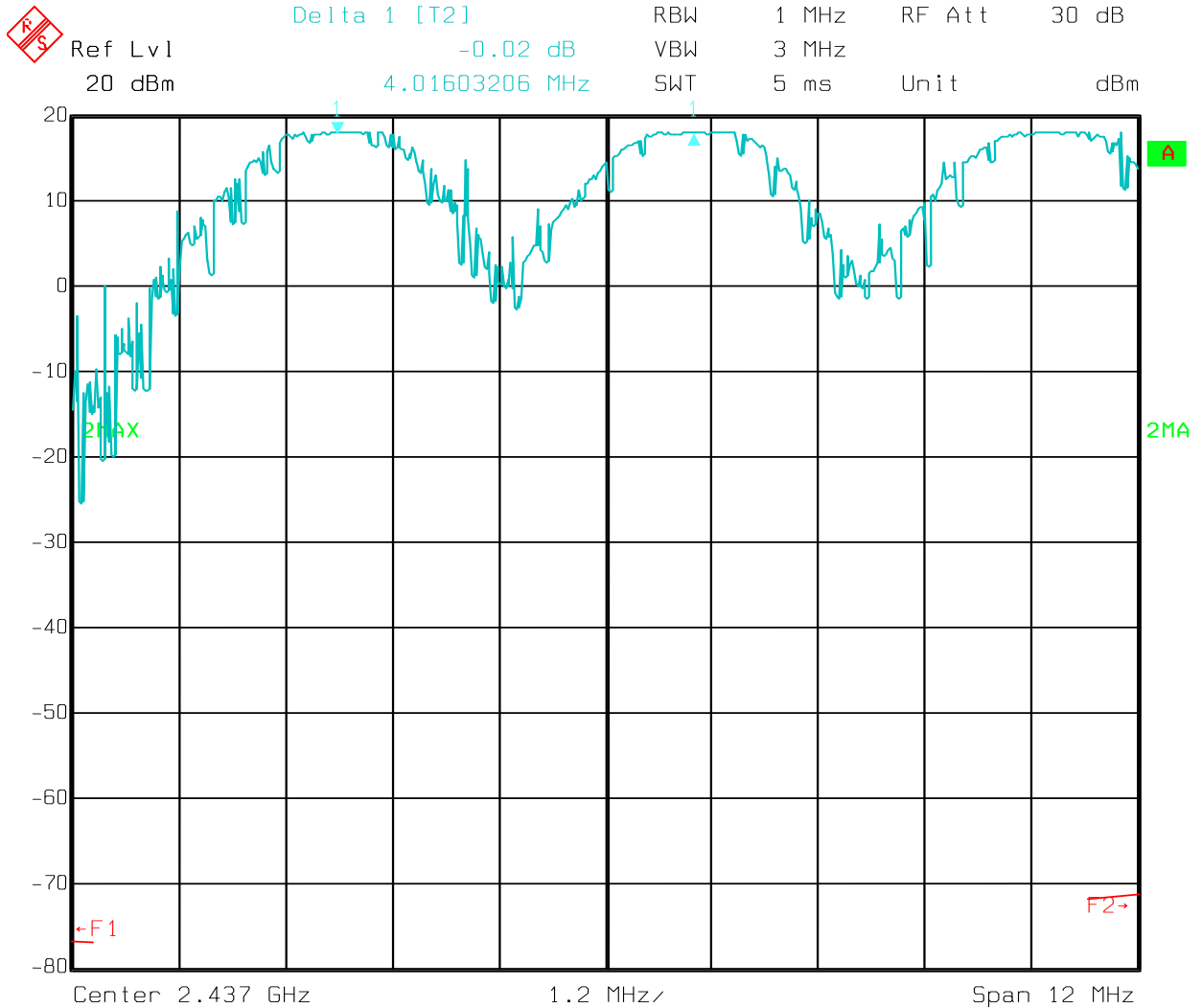
**Test Results:**

Passed - See attached plots.

**Additional Observations:**

- Span is set wide enough to capture the peaks of two adjacent channels.
- RBW is 1% of the span.
- Sweep = Auto
- Detector function = peak.
- Trace = Max hold
- Measured Carrier Frequency Separation should be greater than 1.5MHz (⅔ of 20dB Bandwidth)

**Carrier Frequency Separation: 4.0 MHz**



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## Number of Hopping Frequencies

**15.247(a)(1)(iii)**

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

**A8.1(d)**

Frequency hopping systems operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

## Test Conditions:

|                     |                   |              |                |
|---------------------|-------------------|--------------|----------------|
| Sample Number:      | VUE Camera Gen II | Temperature: | 24             |
| Date:               | August 4, 2010    | Humidity:    | 44%            |
| Modification State: | Hopping           | Tester:      | A. Laudani     |
|                     |                   | Laboratory:  | Ground plane 2 |

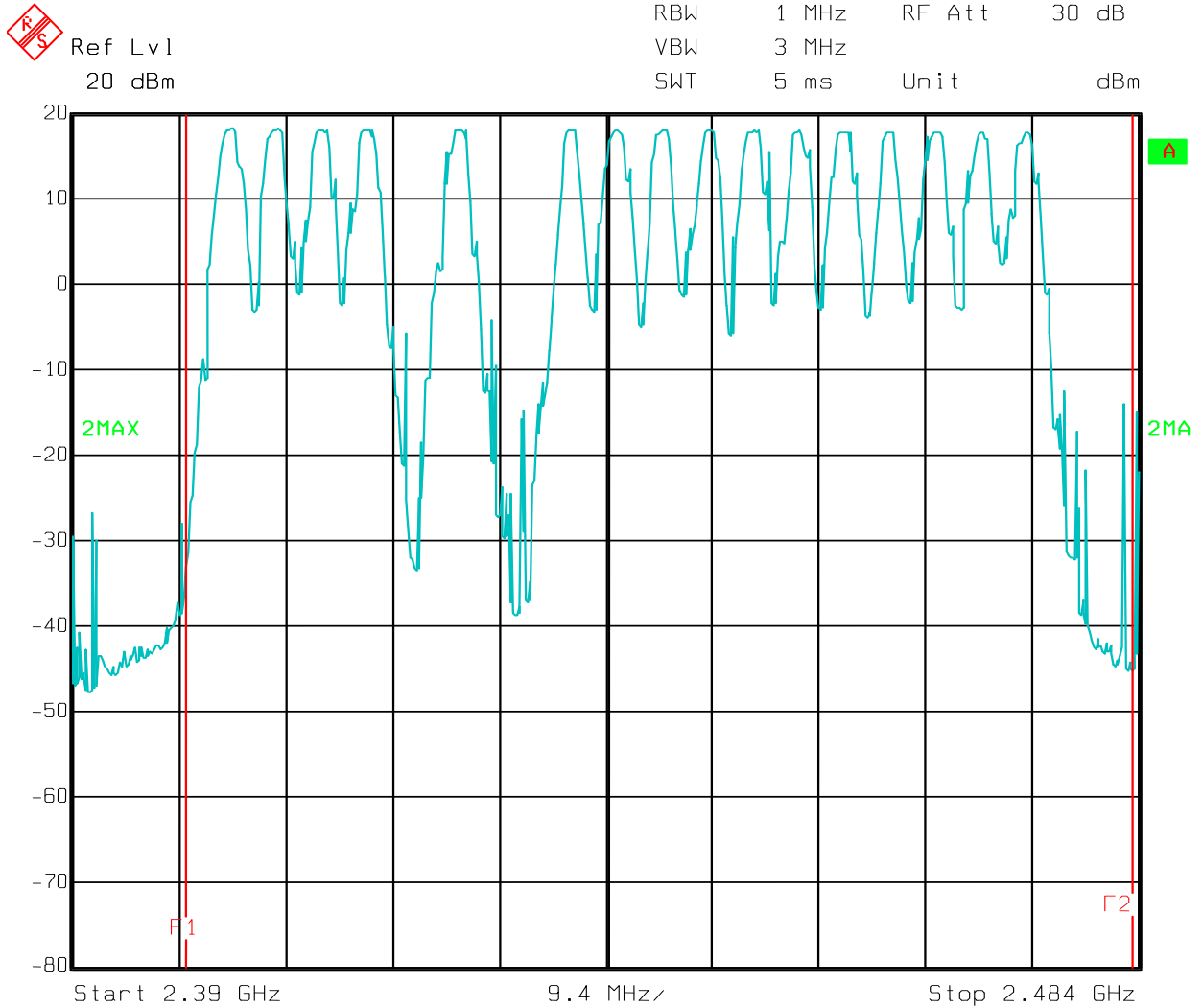
## Test Results:

Passed - See attached plots.

## Additional Observations:

- Span is set to the frequency band of operation.
- RBW is 1% of the span.
- Sweep = Auto
- Detector function = peak.
- Trace = Max hold

Number of Hopping Frequencies: 16



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## Time of Occupancy (Dwell Time)

**15.247(a)(1)(iii)**

Frequency hopping systems in the 2400–2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.

**A8.1(d)**

Frequency hopping systems operating in the band 2400-2483.5 MHz shall use at least 15 hopping channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Transmissions on particular hopping frequencies may be avoided or suppressed provided that a minimum of 15 hopping channels are used.

### Test Conditions:

|                     |                       |              |               |
|---------------------|-----------------------|--------------|---------------|
| Sample Number:      | VUE Camera Gen II     | Temperature: | 21            |
| Date:               | August 4, 2010        | Humidity:    | 50            |
| Modification State: | Two adjacent channels | Tester:      | A. Laudani    |
|                     |                       | Laboratory:  | Shield Room 2 |

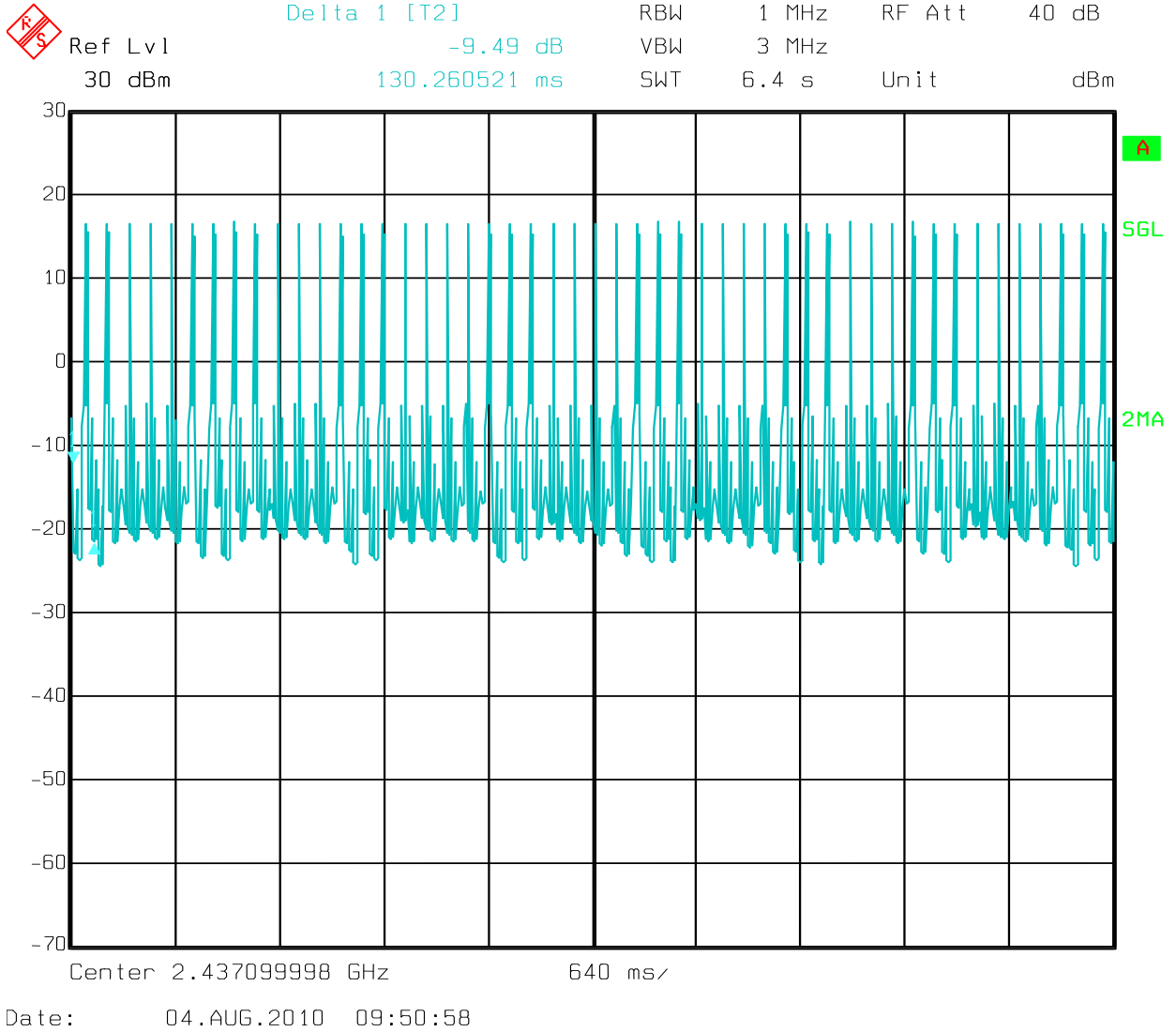
Test Results: 6.21 ms x 49 = 0.304s

Passed - See attached plots.

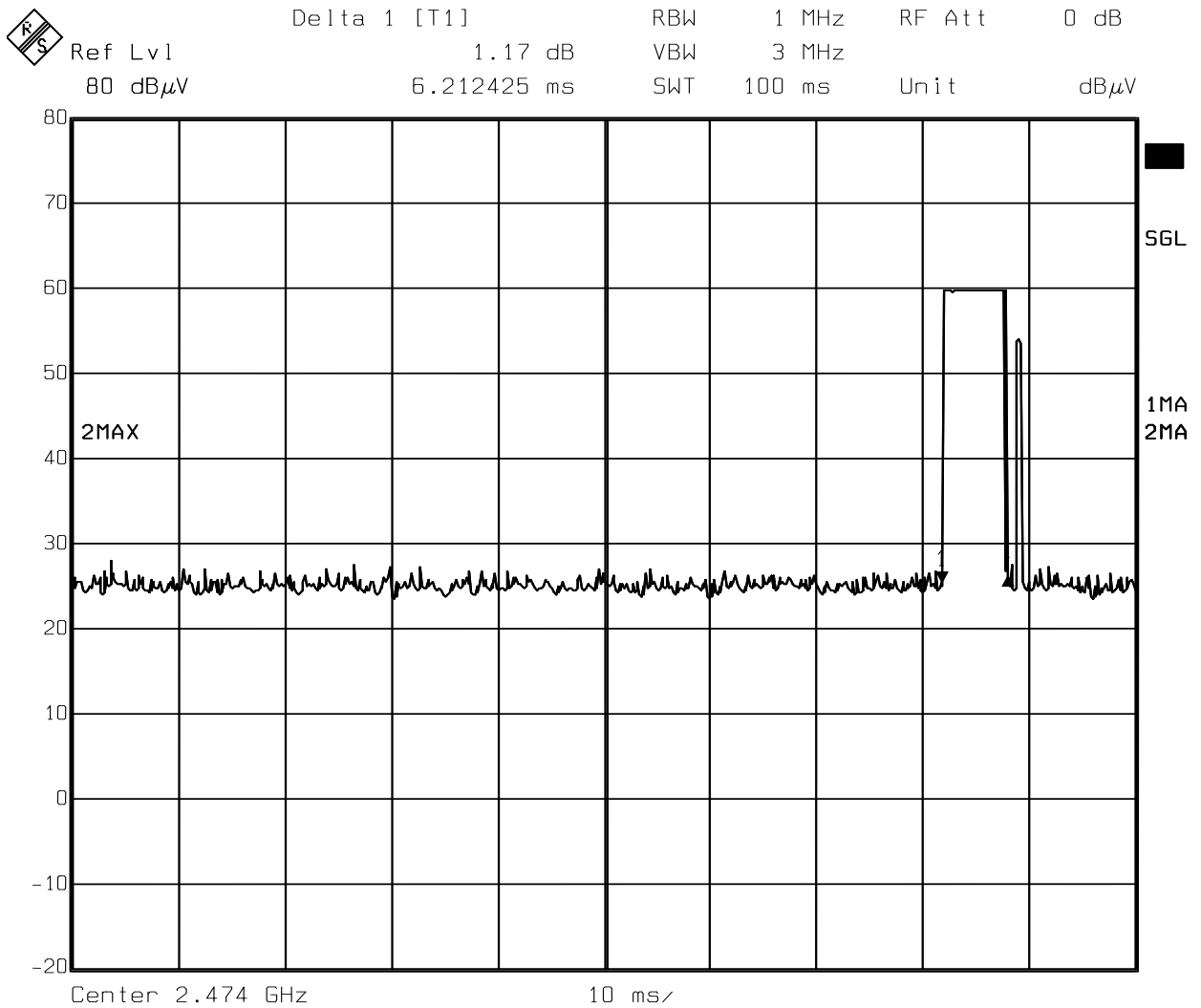
### Additional Observations:

- Span is set to zero centered on a hopping channel.
- RBW is 1MHz.
- Sweep = 6.4 seconds (0.4 second x 16 hopping channels)
- Detector function = peak.
- Trace = Max hold

**Count 49**



Pulse = 6.21 ms



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## Radiated Emissions –Receive mode

RSS-GEN 4.8

### Test Conditions:

|                     |                   |              |            |
|---------------------|-------------------|--------------|------------|
| Sample Number:      | VUE Camera Gen II | Temperature: | 21         |
| Date:               | August 3, 2010    | Humidity:    | 50         |
| Modification State: | Receive           | Tester:      | A. Laudani |
|                     |                   | Laboratory:  | NEMKO OATS |

### Test Results:

Passed – No detectable emissions.

Limits meet Table 1 of RSS-Gen

Emissions were searched over a range of 30 MHz to 10000 MHz

### Additional Observations:

Transmits only to answer Camera's transmitter:

