

**MFA**

# Report Tracker

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Applicant:	SNIF Labs
Model:	Base station
FCC ID:	VLFS5B001

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# Flom Test Labs

EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268  
fax: (480) 926-3598  
<http://www.flomlabs.com>  
[info@flomlabs.com](mailto:info@flomlabs.com)

Date: September 19, 2007

Federal Communications Commission  
Via: Electronic Filing

Attention: Authorization & Evaluation Division

Applicant: SNIF Labs  
Equipment: Base station  
FCC ID: VLFS5B001  
FCC Rules: 15.247

Gentlemen:

On behalf of the Applicant, enclosed please find Application Form 731, Engineering Test Report and all pertinent documentation, the whole for approval of the referenced equipment as shown.

We trust the same is in order. Should you need any further information, kindly contact the writer who is authorized to act as agent.

Sincerely yours,

Hoosamuddin S. Bandukwala, Lab Director

enclosure(s)  
cc: Applicant  
HSB/je

**List Of Exhibits**  
**(FCC Certification (Transmitters) - Revised 9/28/98)**

Applicant: SNIF Labs

FCC ID: VLFS5B001

**By Applicant:**

1. Letter Of Authorization
2. Identification Drawings
  - Id Label
  - Location Info
  - Attestation Statement (s)
  - Location of Compliance Statement
3. Documentation: 2.1033(B)
  - (3) User Manual (s)
  - (4) Operational Description
  - (5) Block Diagram
  - (5) Schematic Diagram
  - (7) External Photographs  
Internal Photographs  
Parts List  
Active Devices

**By F.T.L. Inc.**

- A. Testimonial & Statement of Certification
- B. Statement of Qualifications



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## Transmitter Certification

of

FCC ID: VLFS5B001  
Model: Base station

to

**Federal Communications Commission**

Rule Part(s) 15.247

**Date Of Report:** September 19, 2007  
**Date of Revised Report:** October 22, 2007

**On the Behalf of the Applicant:** SNIF Labs  
108 Lincoln Street  
Boston, MA 02111

**Attention of:** Jon Gips  
Ph: 617-338-7643  
Fax: 617-933-9363  
email: [jon@sniflabs.com](mailto:jon@sniflabs.com)

Supervised By:

Hoosamuddin S. Bandukwala, Lab Director

**The applicant has been cautioned as to the following:****15.21      Information to User.**

The users manual or instruction manual for an intentional radiator shall caution the user that changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**15.27(a)      Special Accessories.**

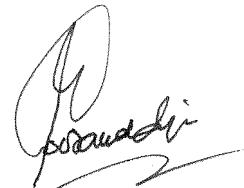
Equipment marketed to a consumer must be capable of complying with the necessary regulations in the configuration in which the equipment is marketed. Where special accessories, such as shielded cables and/or special connectors are required to enable an unintentional or intentional radiator to comply with the emission limits in this part, the equipment must be marketed with, i.e. shipped and sold with, those special accessories. However, in lieu of shipping or packaging the special accessories with the unintentional or intentional radiator, the responsible party may employ other methods of ensuring that the special accessories are provided to the consumer, without additional charge.

Information detailing any alternative method used to supply the special accessories for a grant of equipment authorization or retained in the verification records, as appropriate. The party responsible for the equipment, as detailed in § 2.909 of this chapter, shall ensure that these special accessories are provided with the equipment. The instruction manual for such devices shall include appropriate instructions on the first page of text concerned with the installation of the device that these special accessories must be used with the device. It is the responsibility of the user to use the needed special accessories supplied with the equipment.

## Testimonial And Statement Of Certification

**This is to certify that:**

1. **That** the application was prepared either by, or under the direct supervision of, the undersigned.
2. **That** the technical data supplied with the application was taken under my direction and supervision.
3. **That** the data was obtained on representative units, randomly selected.
4. **That**, to the best of my knowledge and belief, the facts set forth in the application and accompanying technical data are true and correct.



Certifying Engineer:

Hoosamuddin S. Bandukwala, Lab Director

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*Required information per ISO 17025-2005, paragraph 5.10.2:*  
a) **Test Report**

b) Laboratory: Flom Test Lab, Inc.  
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107  
(Canada: IC 2044) Chandler, AZ 85225

c) Report Number: d0790017

d) Client: SNIF Labs

e) Identification: Base station  
FCC ID: VLFS5B001  
Description: Basestation Transceiver

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: September 19, 2007  
EUT Received:

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with FTL internal quality manual.

m) Supervised by: Hoosamuddin S. Bandukwala

n) Results: The results presented in this report relate only to the item tested.

o) Reproduction: This report must not be reproduced, except in full, without written permission from this laboratory.

**List Of General Information Required For Certification**

In Accordance with FCC Rules and Regulations,  
Volume II, Part 2 and to

15.247

**Sub-Part 2.1033**

(c)(1):

**Name and Address of Applicant:** SNIF Labs

(c)(2): **FCC ID:** VLFS5B001

**Model Number:** Base station

(c)(3): **Instruction Manual(s):**

Please See Attached Exhibits

(c)(4): **Type of Emission:** DTS

(c)(5): **FREQUENCY RANGE, MHz:** 2401 –2482 MHz

(c)(6): **Power Rating, W:** 19 uW  
 Switchable       Variable       N/A

(c)(7): **Maximum Power Rating, W:** 1.0

**15.203: Antenna Requirement:**

The antenna is permanently attached to the EUT  
 The antenna uses a unique coupling  
 The EUT must be professionally installed  
 The antenna requirement does not apply

**The unit was tested with a folded dipole antenna with a gain of 3.0 dBi.**

**Subpart 2.1033 (continued)****(c)(8): Circuit Diagram/Circuit Description:**

Including description of circuitry & devices provided for determining and stabilizing frequency, for suppression of spurious radiation, for limiting modulation and limiting power.

Please See Attached Exhibits

**(c)(9): Label Information:**

Please See Attached Exhibits

**(c)(10): Photographs:**

Please See Attached Exhibits

**(c)(11): Digital Modulation Description:**

       Attached Exhibits  
x N/A

**(c)(12): Test And Measurement Data:**

Follows

Sub-part  
2.1033(b):

### Test And Measurement Data

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2 and the following individual Parts:

15.247 Operation within bands 2400-2483.5 MHz (spread spectrum)

### Standard Test Conditions and Engineering Practices

Except as noted herein, the following conditions and procedures were observed during the testing:

In accordance with ANSI C63.4-2004, and unless otherwise indicated in the specific measurement results, the ambient temperature of the actual EUT was maintained within the range of 10° to 40°C (50° to 104 °F) unless the particular equipment requirements specify testing over a different temperature range. Also, unless otherwise indicated, the humidity levels were in the range of 10% to 90% relative humidity.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

Measurement results, unless otherwise noted, are worst-case measurements.

### A2LA

"A2LA has accredited Flom Test Labs, Inc. Chandler, AZ for technical competence in the field of Electrical testing. The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO 17025:2005 'General Requirements for the Competence of Testing and Calibration Laboratories' and any additional program requirements in the identified field of testing."

Please refer to [www.a2la.org](http://www.a2la.org) for current scope of accreditation.

Certificate number: 2152.01



**IC O.A.T.S. Number:** 2044A-1

### Test Results Summary

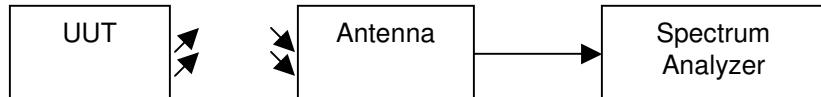
Specification	Test Name	Pass, Fail, N/A	Comments
	Radiated Peak Output Power	Pass	
15.247(d), 15.209(a), 15.205	Radiated Spurious Emissions	Pass	
15.247(d), 15.209(a), 15.205	Emissions At Band Edges	Pass	
15.247(a)(2)	Occupied Bandwidth	Pass	
15.247(e)	Transmitter Power Spectral Density	Pass	
15.207	A/C Powerline Conducted Emissions	Pass	

**Name of Test:** Peak Output Power Radiated  
**Specification:** 15.247(b)  
**Test Equipment Utilized** i00228, i00317

### Test Procedure

The UUT was tested in an anechoic chamber as a radiated measurement. **NOTE:** Conducted measurements could not be made on the UUT, as the integrated RF device doesn't allow for disconnection of the antenna. Therefore radiated measurements were recorded in its place. The peak readings were taken and the result was then compared to the limit.

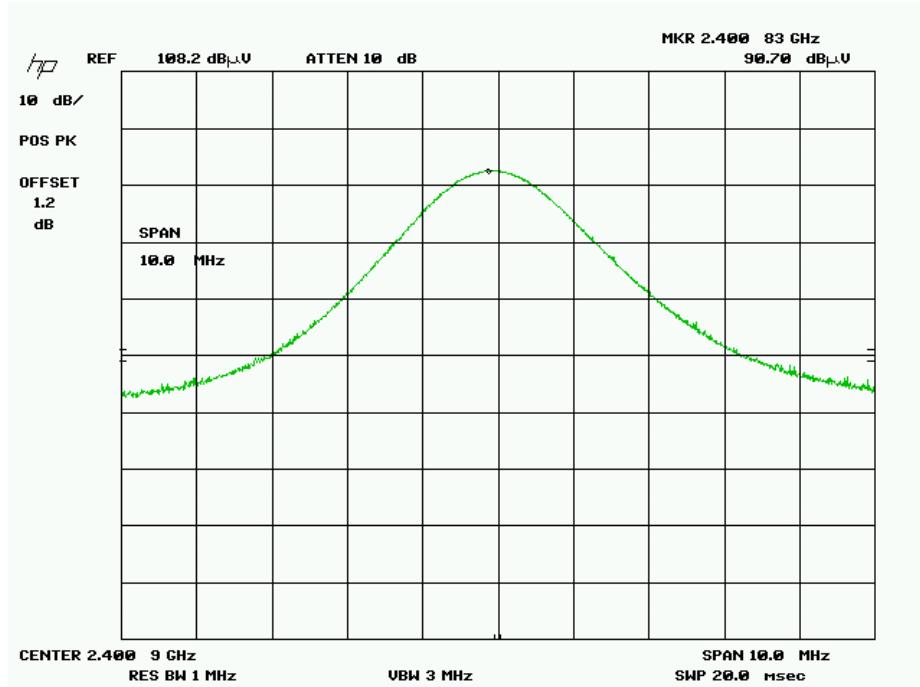
### Test Setup



### Transmitter Peak Output Power Radiated

Tuned Freq (MHz)	Monitored Level (dB <sub>uV</sub> /mtr)	Correction Factor (dB)	Corrected Value (dB <sub>uV</sub> /mtr)	Limit (dB <sub>uV</sub> /mtr)	Result
2401	89.5	1.2	90.7	137.0	Pass
2442	86.4	1.2	87.6	137.0	Pass
2482	84.7	1.2	85.9	137.0	Pass

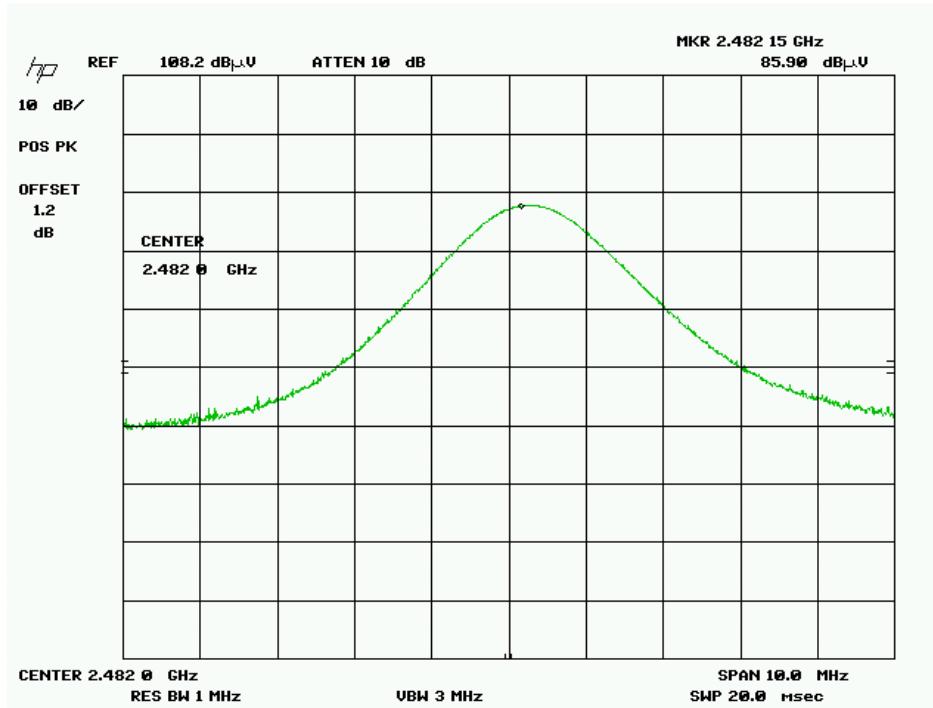
### Radiated Power Output 2402MHz



## Radiated Power Output 2441MHz



## Radiated Power Output 2482MHz

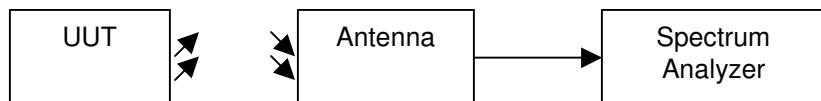


**Name of Test:** Radiated Spurious Emissions  
**Specification:** 15.209(a), 15.205  
**Spec. Limit:** See Table  
**Test Equipment Utilized** i00029, i00033, i00088, i00089, i00103

### Test Procedure

The UUT was tested in an Open Area Test Site (OATS) set 3m from the receiving transducer. A spectrum analyzer was used to verify that the UUT met the requirements for Radiated Spurious Emissions. The UUT was tested by rotating it 360° with the antennas in both the vertical and horizontal orientation and raised from 1 to 4 meters to ensure the TX signal levels were maximized.

### Test Setup



Settings  
 RBW = 100 KHz  
 VBW = 100KHz  
 Detector – Quasi Peak

### Sample Calculations

$$\text{Corrected Level} = \text{Recorded Level} + \text{Correction factor}$$

$$\text{Correction factor} = \text{ACF} + \text{Cable loss} + \text{Distance Correction factor}$$

$$\text{Distance Correction factor} = 10 \log D1/D2$$

### Radiated Spurious Emissions

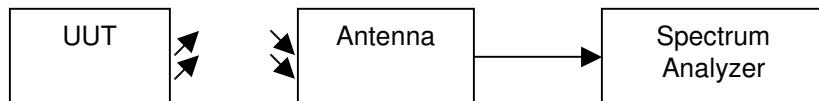
Tuned Freq (MHz)	Emission Freq (MHz)	Monitored Level (dBuV/m)	Correction Factor (dB)	Corrected Value (dBuV/m)	Limit (dBuV/m)	Result
	200.00600	12.6	16.3	28.9	40.0	Pass
	250.00000	11.9	18.0	29.9	47.0	Pass
	300.01800	14.4	16.7	31.1	47.0	Pass
	325.01800	10.6	18.1	28.7	47.0	Pass
	349.99200	16.9	17.8	34.7	47.0	Pass
	374.99200	27.5	18.5	46.0	47.0	Pass
	400.00600	16.3	20.6	38.9	47.0	Pass

**Name of Test:** Radiated Emissions  
**Specification:** 15.247(d)  
**Spec. Limit:** See Table  
**Test Equipment Utilized** i00029, i00033, i00088, i00089, i00103

### Test Procedure

The UUT was tested in an Open Area Test Site (OATS) set 3m from the receiving transducer. A spectrum analyzer was used to verify that the UUT met the requirements for Radiated Spurious Emissions. The UUT was tested by rotating it 360° with the antennas in both the vertical and horizontal orientation and raised from 1 to 4 meters to ensure the TX signal levels were maximized.

### Test Setup



Settings  
 RBW = 1 MHz  
 VBW = 100KHz  
 Detector – Peak

RBW = 1 MHz  
 VBW = 10Hz  
 Detector – Avg

Sample Calculations:

Corrected Level = Recorded Level + Correction factor

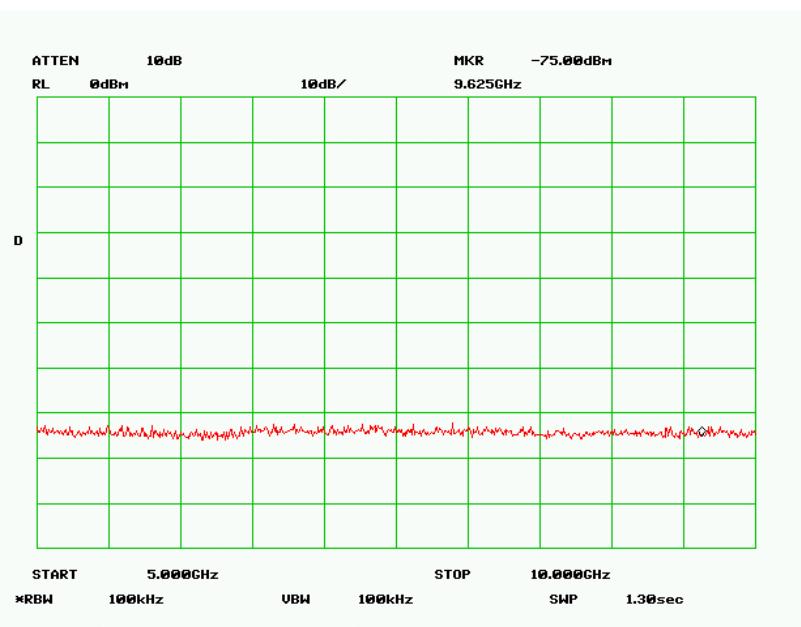
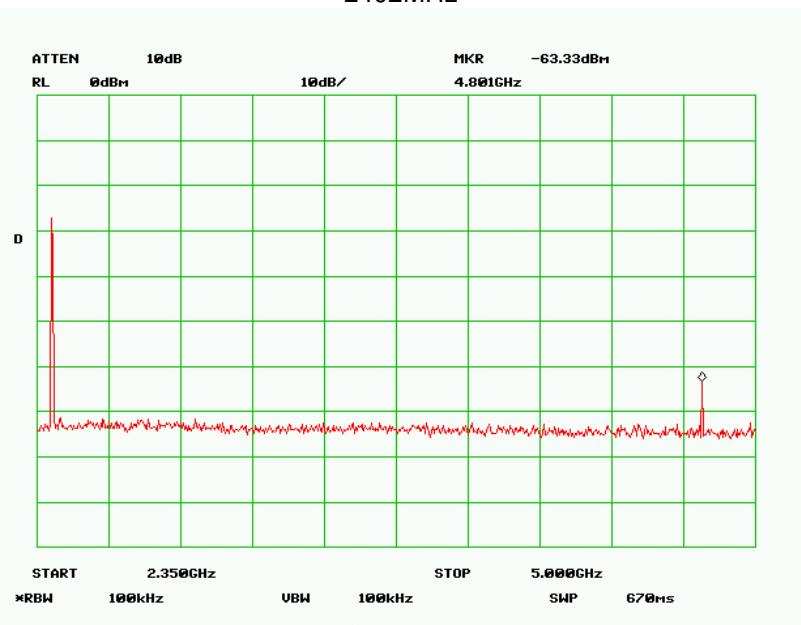
Correction factor = ACF + Cable loss + Amplifier

Tuned Freq (MHz)	Emission Freq (MHz)	Recorded Level (dBuV/m)	Correction Factor (dB)	Corrected Level (dBuV/m)	Limit (dBuV/m)	Result
2402	4804	48.7	1.2	49.9	74 PEAK	Pass
2402	4804	41.0	1.2	42.2	54 AVG	Pass
2442	4884	45.9	1.2	47.1	74 PEAK	Pass
2442	4884	38.7	1.2	39.9	54 AVG	Pass
2482	4964	46.3	1.2	47.5	74 PEAK	Pass
2482	4964	41.7	1.2	42.9	54 AVG	Pass

No observable emissions were detected above the 2<sup>nd</sup> harmonic. Emissions were checked up to the 10<sup>th</sup> harmonic.

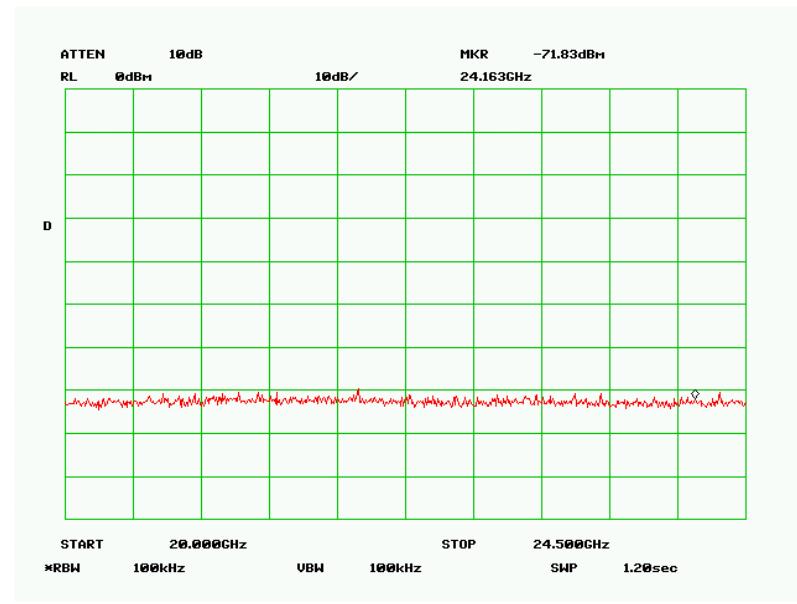
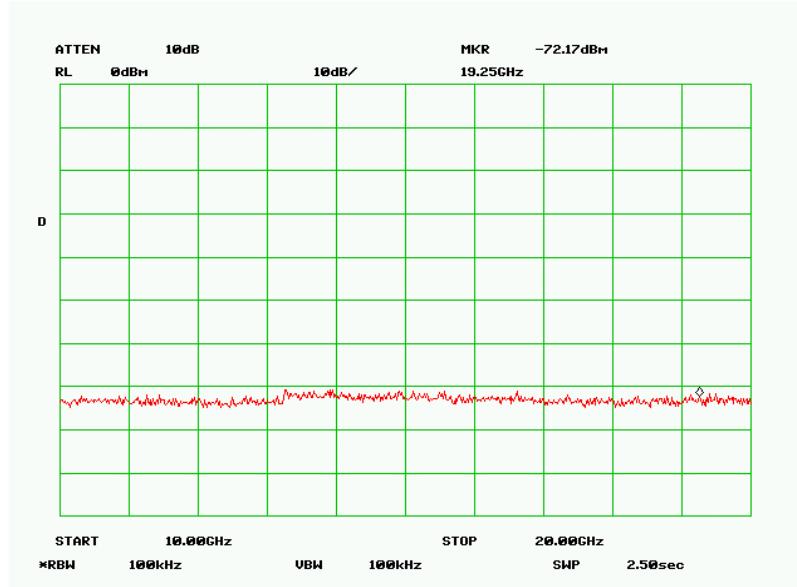
**Name of Test:** Radiated Emissions  
**Specification:** 15.247(d)  
**Spec. Limit:** See Table  
**Test Equipment Utilized** i00029, i00033, i00088, i00089, i00103

2402MHz



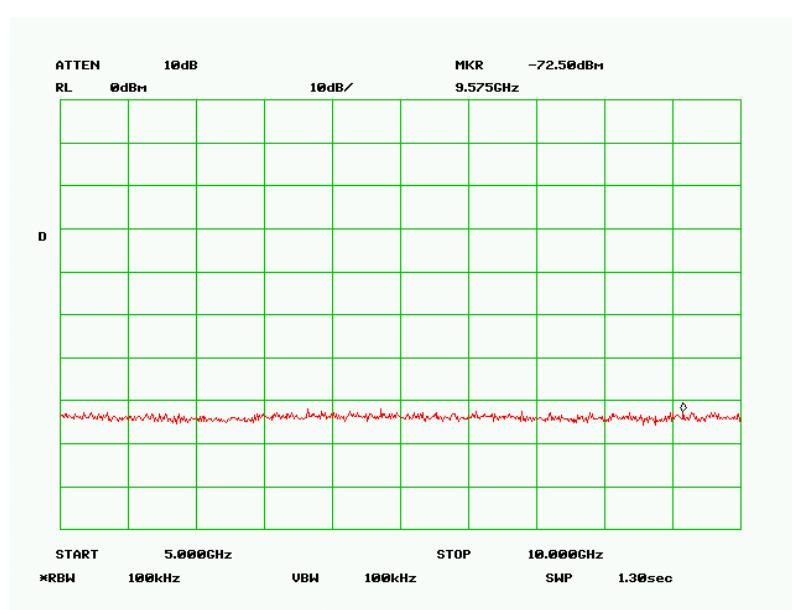
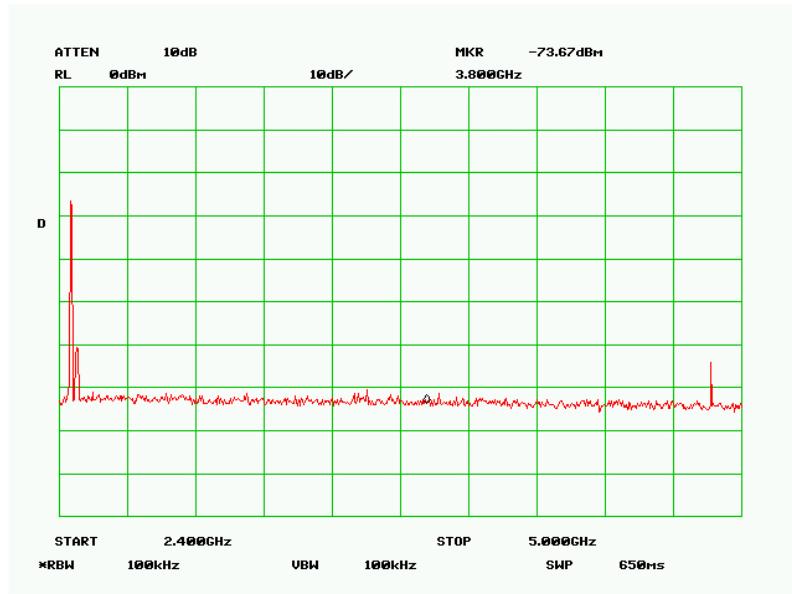
**Name of Test:** Radiated Emissions  
**Specification:** 15.247(d)  
**Spec. Limit:** See Table  
**Test Equipment Utilized** i00029, i00033, i00088, i00089, i00103

2402MHz



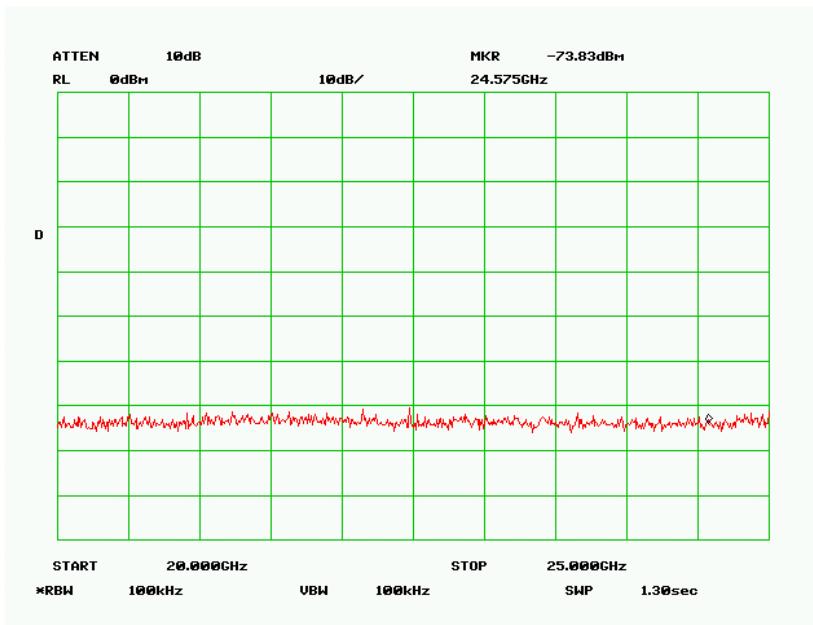
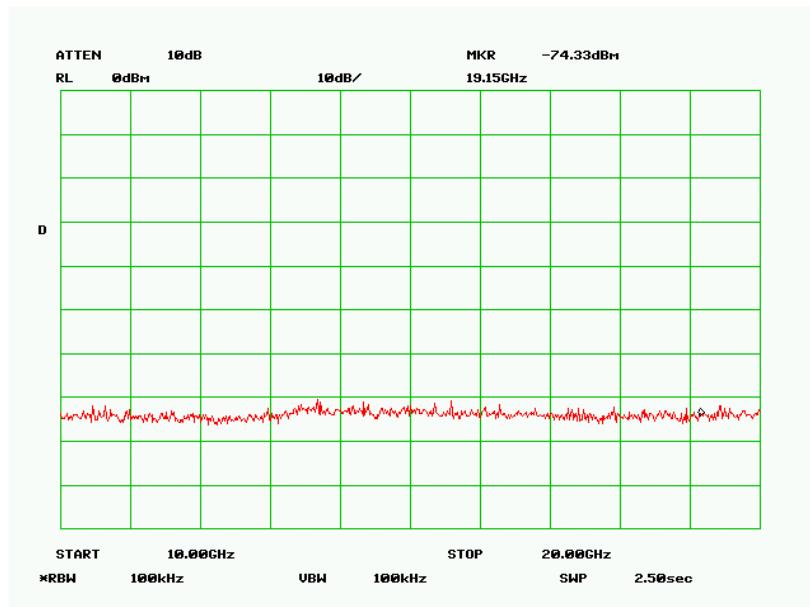
**Name of Test:** Radiated Emissions  
**Specification:** 15.247(c), 15.209(a), 15.205  
**Spec. Limit:** See Table  
**Test Equipment Utilized** i00029, i00033, i00088, i00089, i00103

2442MHz



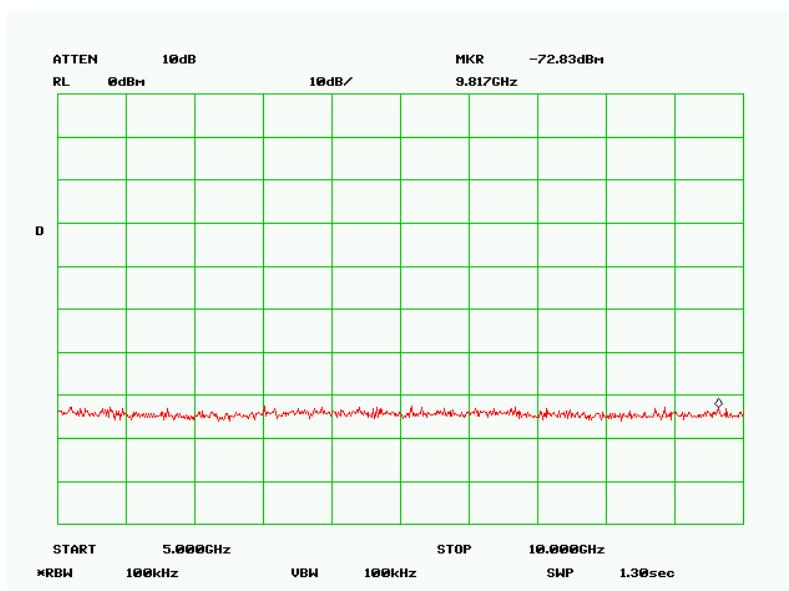
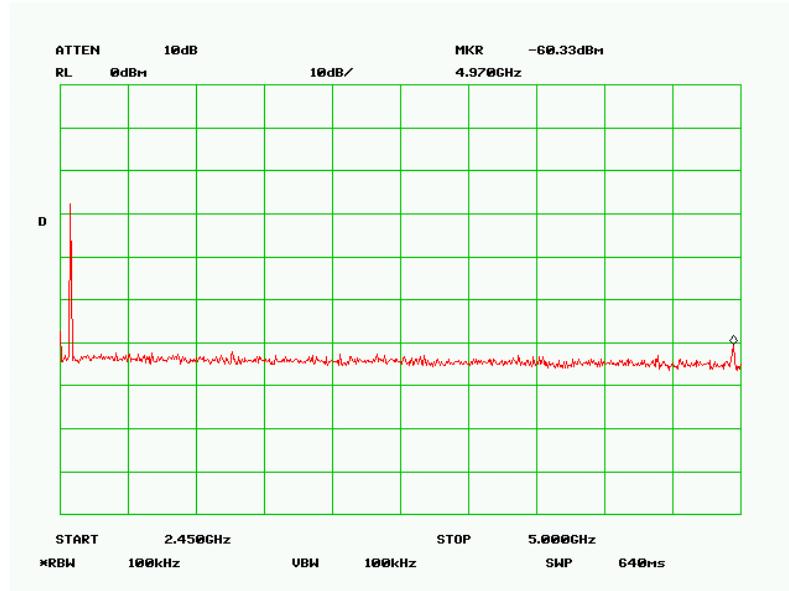
**Name of Test:** Radiated Emissions  
**Specification:** 15.247(d), 15.209(a), 15.205  
**Spec. Limit:** See Table  
**Test Equipment Utilized** i00029, i00033, i00088, i00089, i00103

2442MHz



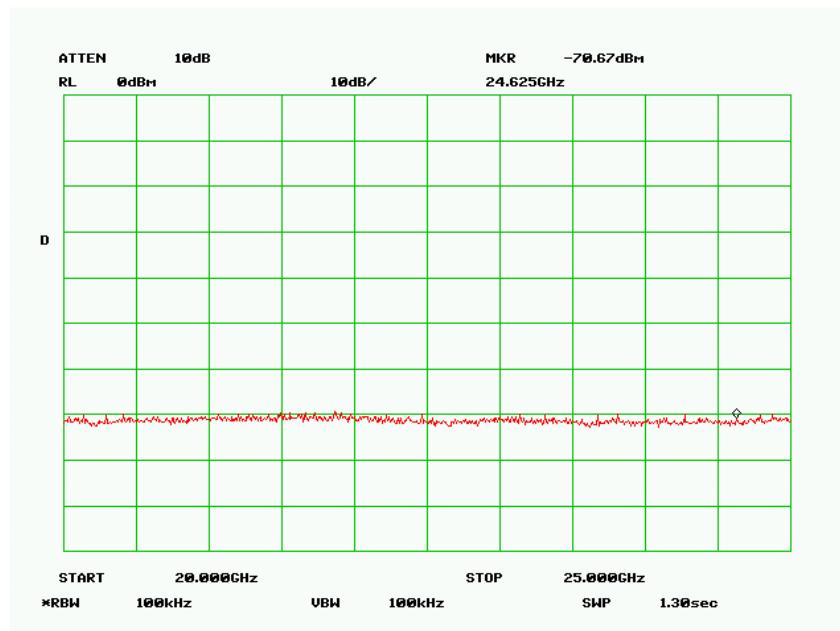
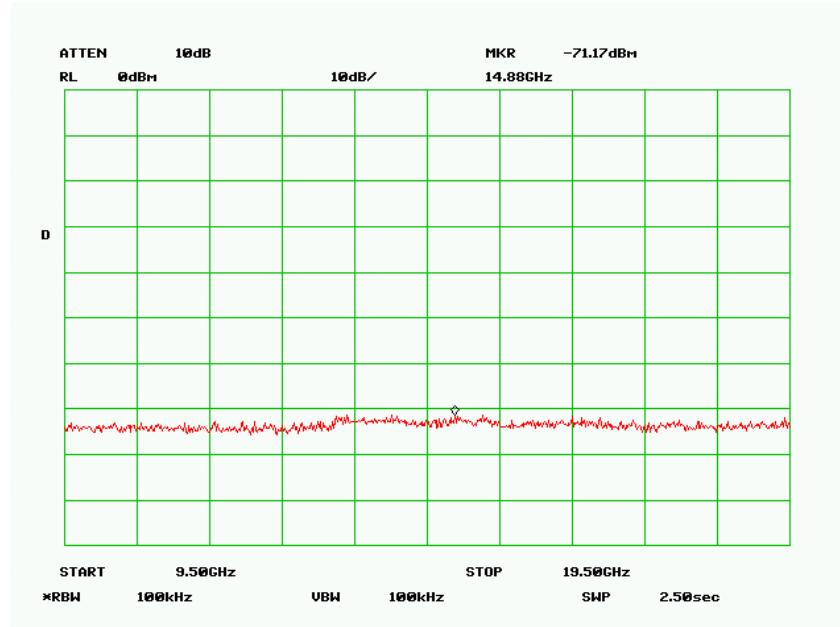
**Name of Test:** Radiated Emissions  
**Specification:** 15.247(d), 15.209(a), 15.205  
**Spec. Limit:** See Table  
**Test Equipment Utilized** i00029, i00033, i00088, i00089, i00103

2482MHz



**Name of Test:** Radiated Emissions  
**Specification:** 15.247(d), 15.209(a), 15.205  
**Spec. Limit:** See Table  
**Test Equipment Utilized** i00029, i00033, i00088, i00089, i00103

2482MHz

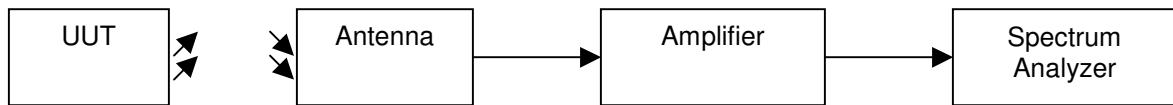


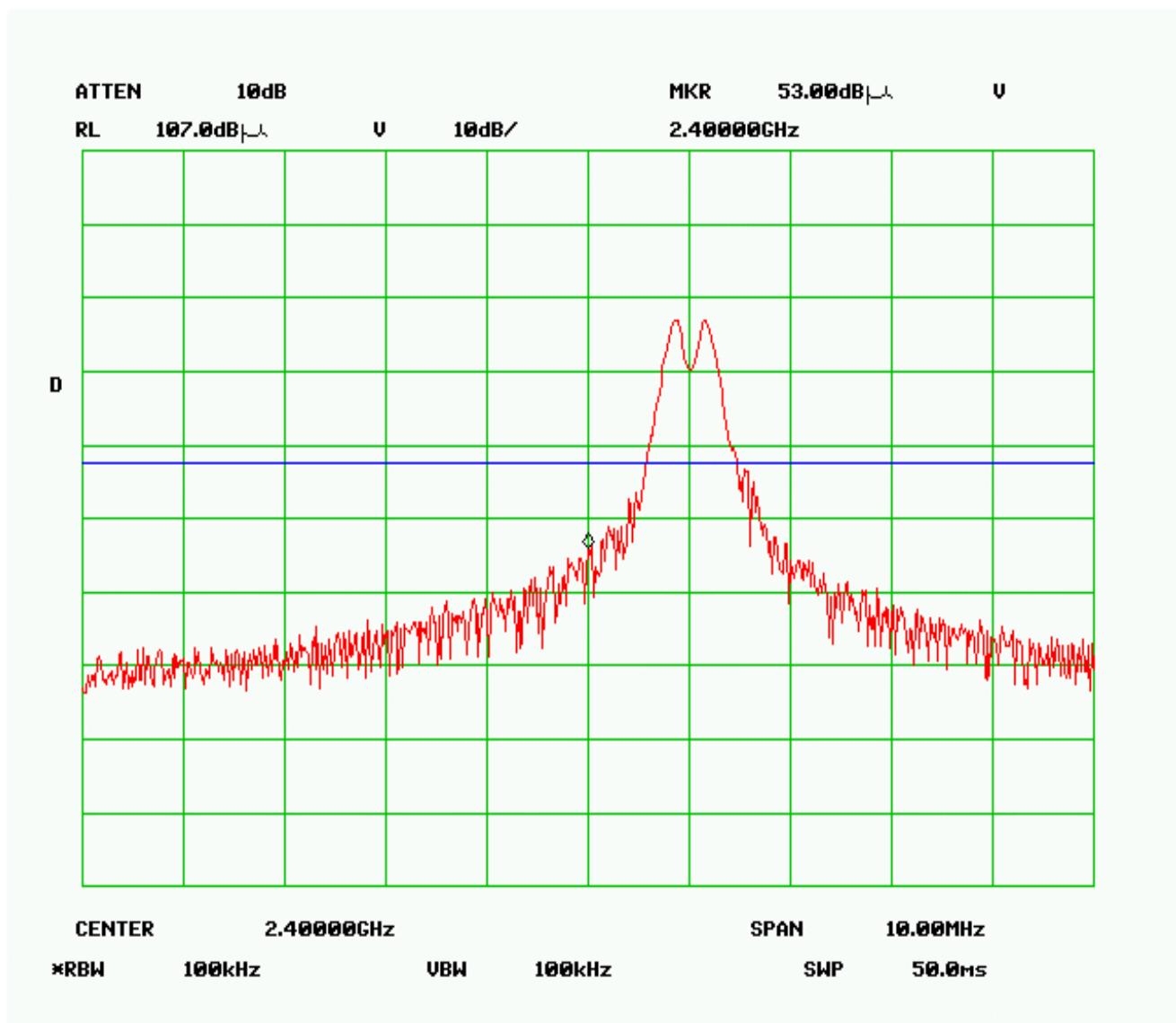
**Name of Test:** Emissions At Band Edges  
**Specification:** 15.247(c), 15.209(a), 15.205  
**Limit:** -20 dBC and for restricted band 54 dBuV average and 74 dBuV peak  
**Test Equipment Utilized** i00028, i00271, i00290

### Test Procedure

The UUT was tested in a semi-anechoic chamber set 3m from the receiving transducer. A spectrum analyzer was used to verify that the UUT met the requirements for band edge with both peak and average measurements. The cable and transducer correction factors were input into the analyzer as a reference level offset to ensure accurate readings were obtained.

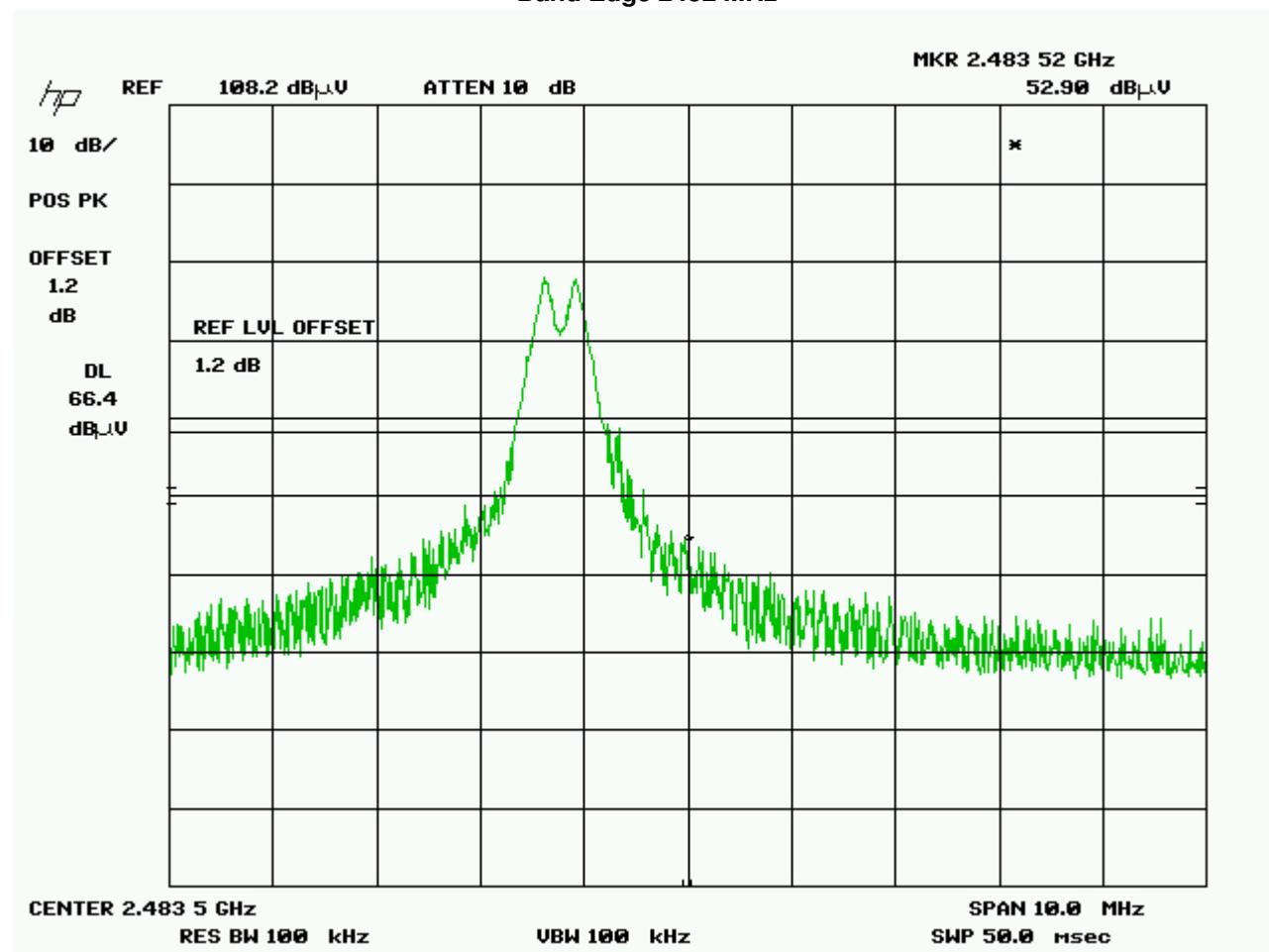
### Test Setup



**Band Edge 2402MHz**


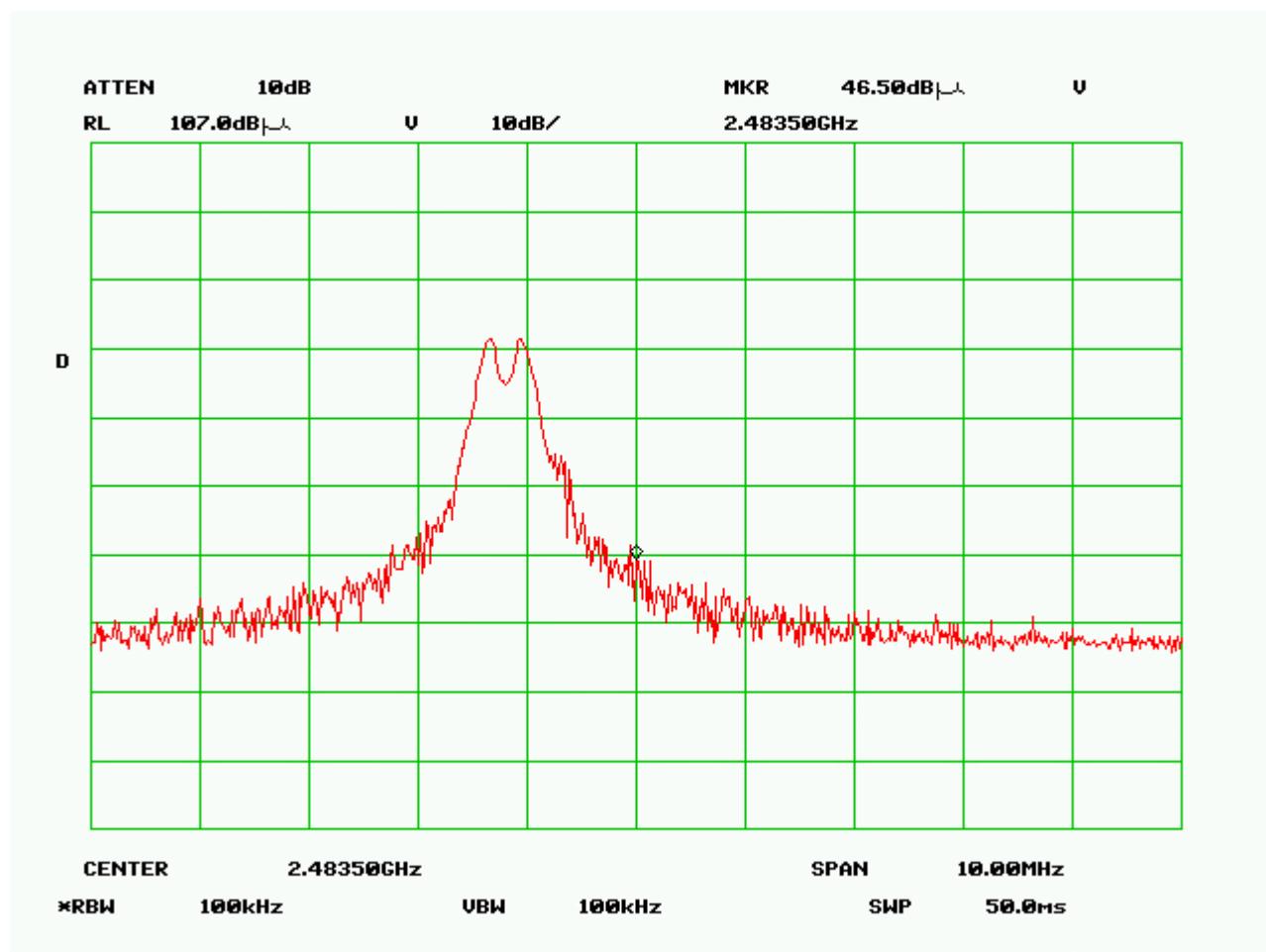
Signal amplitude at band edge 2400MHz (see marker on plot) is 53 dBuV. The display line indicates 20dBc.

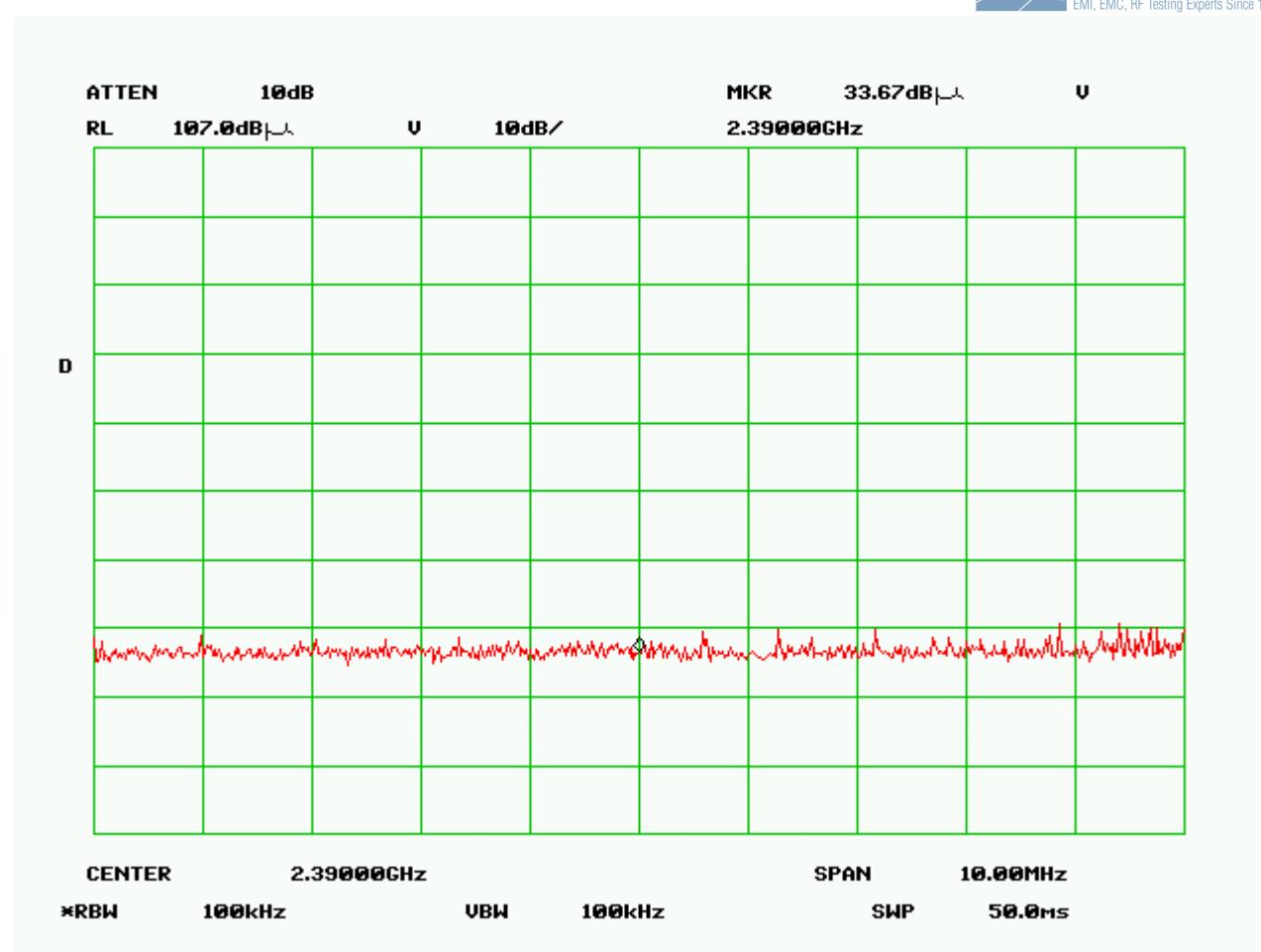
## Band Edge 2482 MHz



Signal amplitude at band edge 2483.5MHz (see marker on plot) is -52.9dB<sub>UV</sub> The display line indicates 20dBc.

Restricted Band



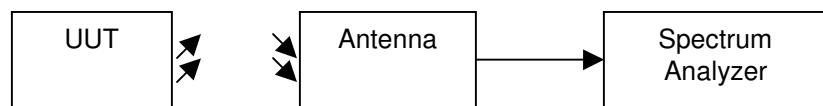


**Name of Test:** Occupied Bandwidth  
**Specification:** 15.247(a)(2)  
**Limit:** BW  $\geq$  500 KHz  
**Test Equipment Utilized** i00329

### Test Procedure

The UUT was connected directly to a spectrum analyzer. The Span was set wide enough to capture the entire transmit spectrum and the resolution bandwidth was set to at least 1% of the span. The analyzer was set to max hold and when the entire spectrum was captured the 6dB and 99% bandwidths were measured to verify the bandwidth met the specification.

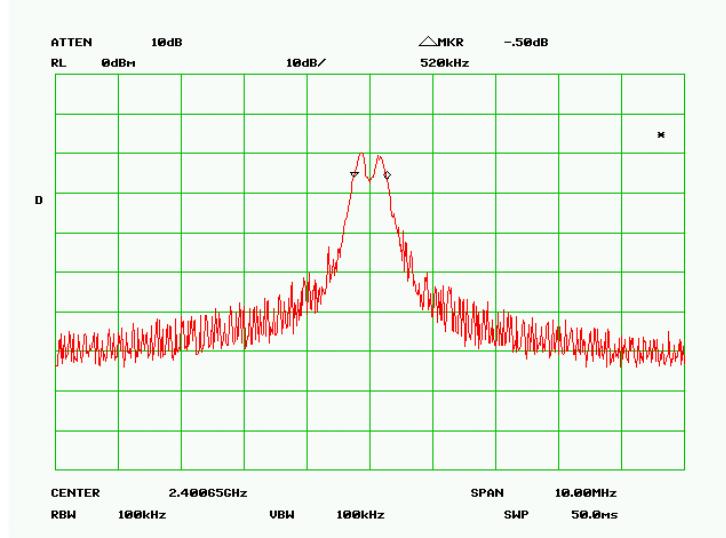
### Test Setup



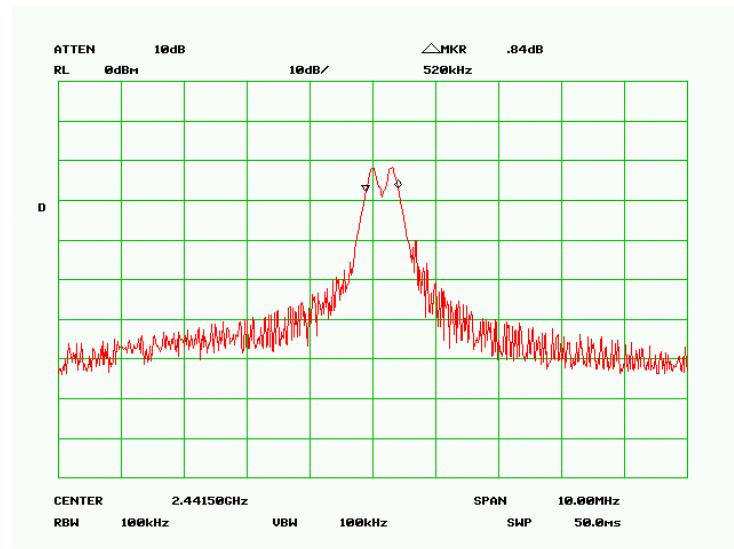
### Occupied Bandwidth Summary

Frequency MHz	Recorded Measurement	Specification Limit	Result
2401.50000	520KHz	$\geq$ 500 KHz	Pass
2441.50000	520KHz	$\geq$ 500 KHz	Pass
2482.10000	520KHz	$\geq$ 500 KHz	Pass

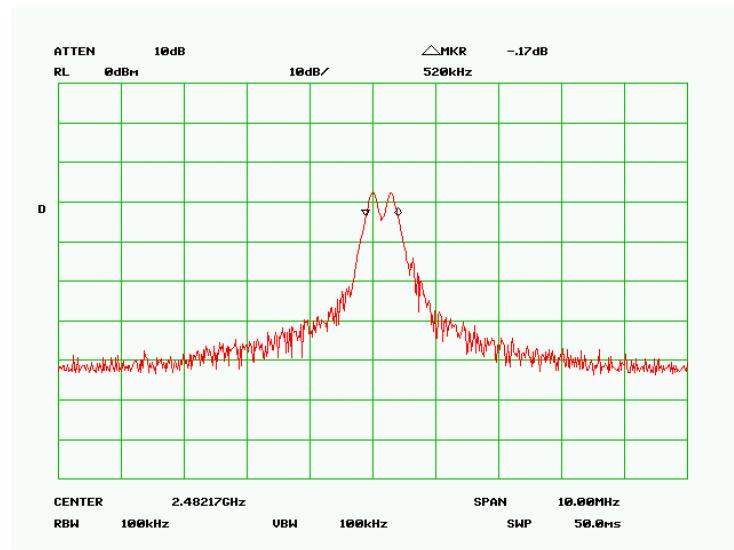
### 6dB Bandwidth 2401MHz

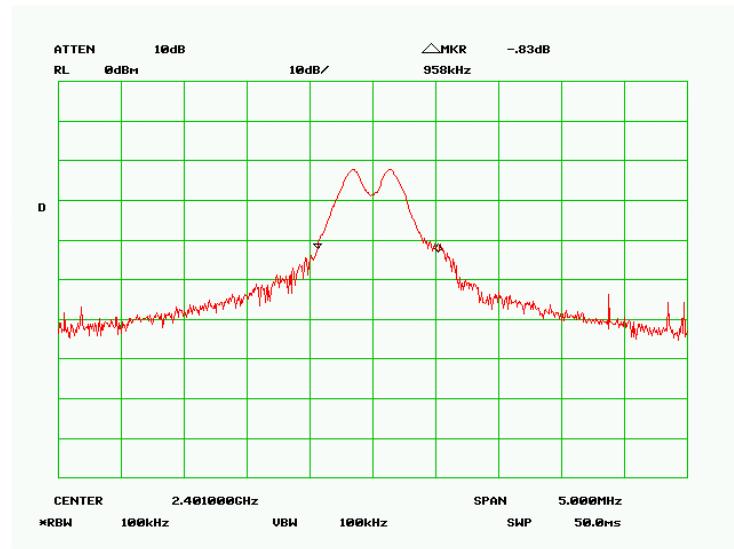
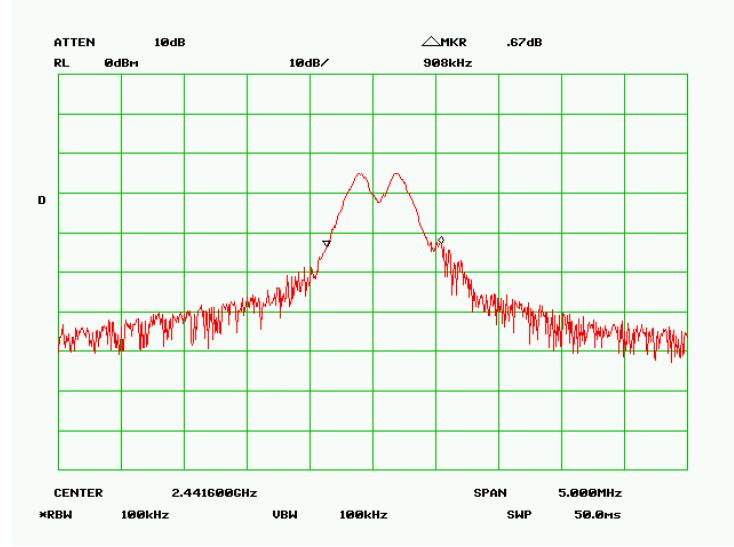


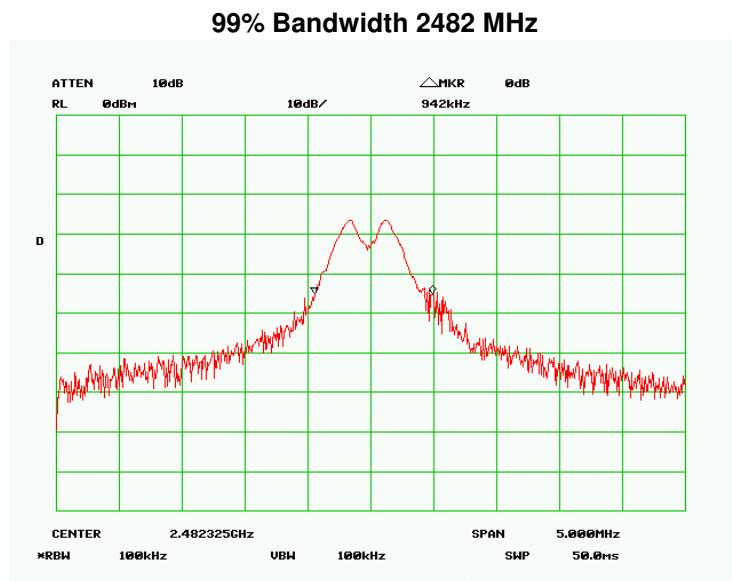
### 6dB Bandwidth 2441 MHz



### 6dB Bandwidth 2482 MHz



**99% Bandwidth 2401 MHz**

**99% Bandwidth 2441MHz**


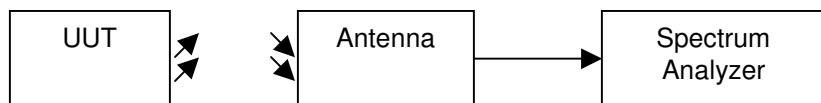


**Name of Test:** Transmitter Power Spectral Density (PSD)  
**Specification:** 15.247(d)  
**Limit:** 8 dBm in any 3 kHz Bandwidth  
**Test Equipment Utilized** i00329

### Test Procedure

The UUT tested in an anechoic chamber as a radiated device. The UUT can't be tested conducted, as the integrated radio chip doesn't support conducted connection. The Span was set to 1.5 MHz and the resolution bandwidth was set to 3 KHz. The analyzer was set for a sweep time of 500 seconds. When the entire spectrum was captured the marker peak function of the analyzer was utilized to verify the PSD met the specification.

### Test Setup



### PSD Summary

Frequency MHz	Recorded Measurement	Specification Limit	Result
2402.0000	87.87dBuV	8 dBm	Pass
2441.0000	89.03dBuV	8 dBm	Pass
2482.0000	84.37dBuV	8 dBm	Pass

### Sample Calculations:

- 1) Calculate the transmitter's peak power using the following equation:

$$P = (E \times d)^2 / (30 \times G) \quad \text{where,}$$

G = the numeric gain of the transmitting antenna over an isotropic radiator.

d = the distance in meters from which the field strength was measured.

P = the power in watts for which you are solving:

- 2) Measure the power spectral density as follows:

- A) Tune the analyzer to the highest point of the maximized fundamental emission. Reset the analyzer to a RBW = 3kHz, VBW>RBW, span = 300kHz, sweep = 100 sec.
- B) From the peak level obtained in (A) derive the field strength, E, by applying the appropriate antenna factor, cable loss, pre-amp gain, etc. Using the equation listed in (1), calculate a power level for comparison to the +8 dBm limit.

From dBuV/mtr to uV/mtr =  $(E/20)^{10}$

$V/mtr = 1 \times 10^6 \text{ uV/mtr}$

Numeric gain for 3 dBi antenna =  $(E/10)^{10} = 1.64$

The power in watts for +8 dBm is  $6.2 \times 10^{-3}$  Watts

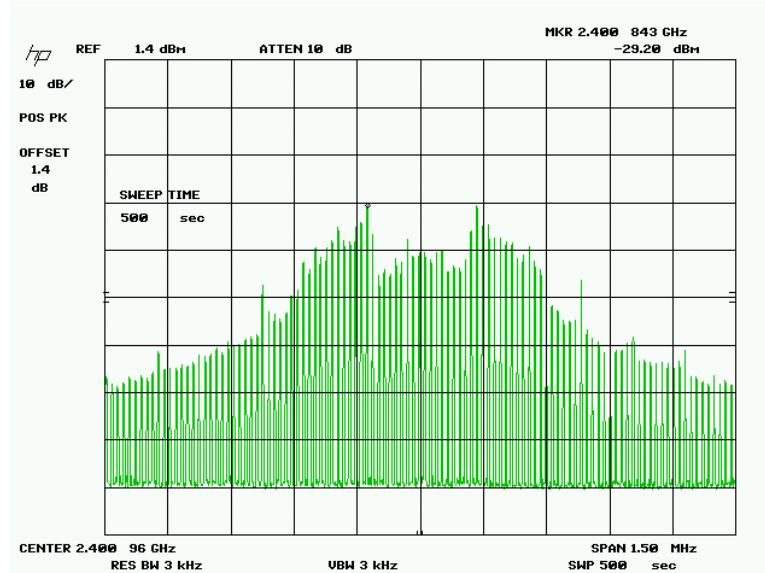
Flom Test Labs  
 3356 N. San Marcos Place, Suite 107  
 Chandler, Arizona 85225-7176  
 (866) 311-3268 phone, (480) 926-3598 fax

$$P = [(2.47 \times 10^{-2})(3)]^2 / (30)(1.64) \quad \text{for field strength of } 87.87 \text{ dBuV} = 1.119 \times 10^{-4} \text{ watts}$$

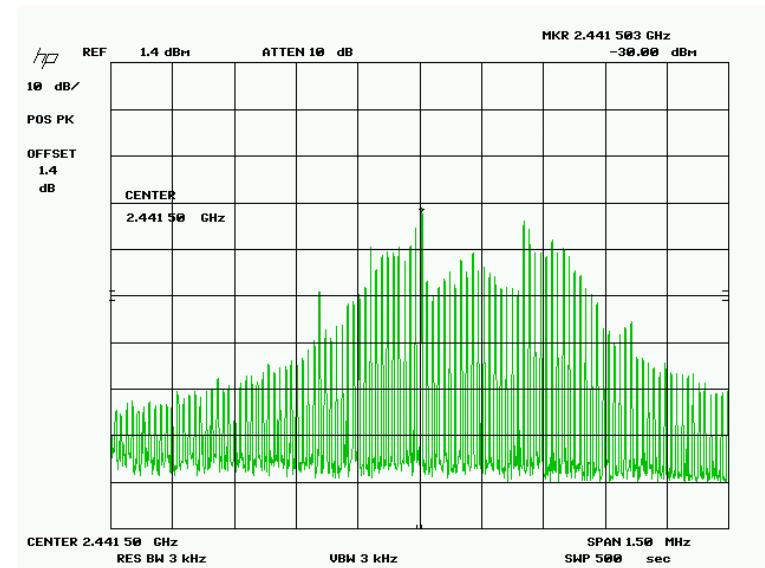
$$P = [(2.83 \times 10^{-2})(3)]^2 / (30)(1.64) \quad \text{for field strength of } 89.03 \text{ dBuV} = 1.463 \times 10^{-4} \text{ watts}$$

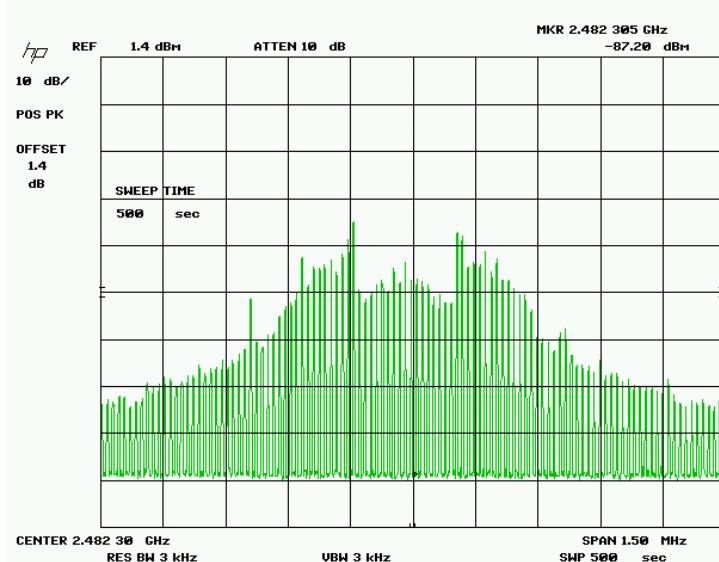
$$P = [(1.65 \times 10^{-2})(3)]^2 / (30)(1.64) \quad \text{for field strength of } 84.37 \text{ dBuV} = 5.084 \times 10^{-5} \text{ watts}$$

Since 8 dBm is  $6.2 \times 10^{-3}$  watts and the values calculated for the peak power are less than  $6.2 \times 10^{-3}$  then the results are passing.



PSD 2401 MHz



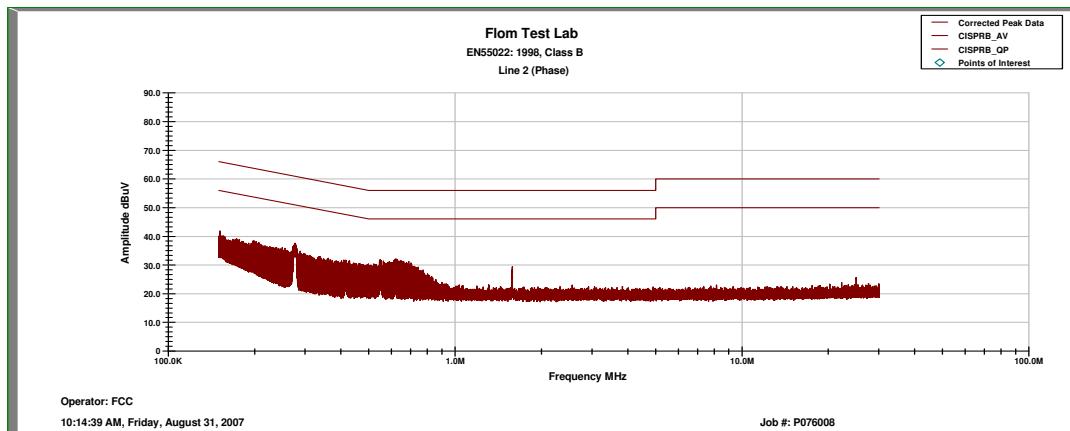
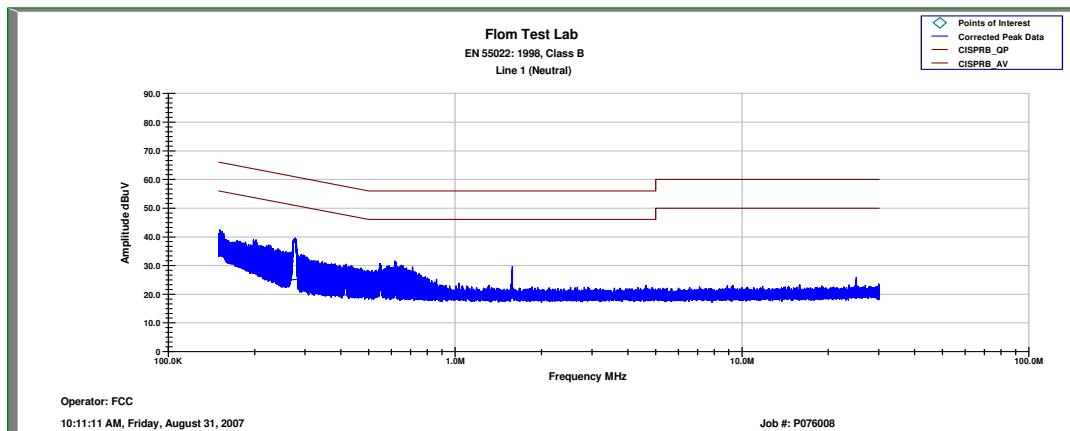
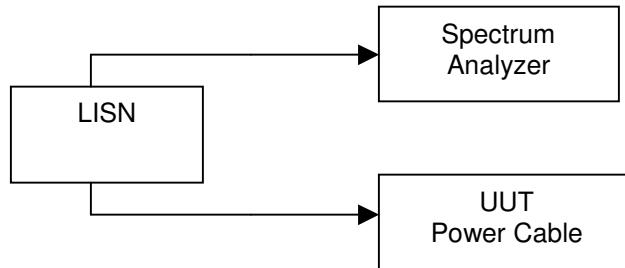
**PSD 2441 MHz**

**PSD 2482 MHz**

**Name of Test:** A/C Powerline Conducted Emissions  
**Specification:** 15.207  
**Test Equipment Utilized** i00033, i00270

### Test Procedure

The UUT power cable connected to a LISN and the monitored output of the LISN was connected directly to a spectrum analyzer. The conducted emissions from 150 kHz to 30 MHz were monitored and compared to the specification limits. The average measurements were the worst-case and are recorded in the tables below.

### Test Setup



### Test Equipment Utilized

Description	MFG	Model Number	FTL Asset Number	Last Cal Date	Cal Due Date
RF Pre-Amplifier	HP	8449	i00028	1/23/07	01/23/09
Spectrum Analyzer	HP	8563E	i00029	1/26/07	03/09/08
Spectrum Analyzer	HP	85462A	i00033	11/03/06	11/03/07
Bi-conical Antenna	EMCO	3109B	i00088	10/14/05	10/14/07
Log Periodic Antenna	Aprel	2001	i00089	10/20/05	10/20/07
Horn Antenna	EMCO	3115	i00103	9/5/06	09/05/07
Power Meter	HP	E4418B	i00228	8/1/07	09/06/08
Power Head	HP	8481A	i00317	8/1/07	09/06/08
LISN	FCC	FCC-LISN-50-32-2-01	i00270	10/25/05	10/25/07
Horn Antenna	ARA	DRG-1181A	i00271	2/1/04	02/01/07
Spectrum Analyzer	HP	8566B	i00290	6/07/07	06/07/08
Power Meter	HP	8481A	i00317	10/1/06	10/01/07
Spectrum Analyzer	HP	8566B	i00329	4/16/07	04/16/08

In addition to the above listed equipment standard RF connectors and cables were utilized in the testing of the described equipment. Prior to testing these components were tested to verify proper operation.

### END OF TEST REPORT