



**Compliance Testing, LLC**  
Previously Flom Test Lab  
EMI, EMC, RF Testing Experts Since 1963

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[info@ComplianceTesting.com](mailto:info@ComplianceTesting.com)

Date: August 27, 2010

Applicant: Amp'ed RF Technology  
1879 Lundy Ave, Suite 138  
San Jose, CA 95131

Attention of: Annie Cai, Operations Manager  
Ph: (408) 213-9530  
Fax: (408) 213-9533  
Email: [acai@ampedrftech.com](mailto:acai@ampedrftech.com)

Equipment: BT23  
FCC ID: X32ZBTMOD2  
FCC Rules:

**Part 15.247**

Enclosed please find your copy of the Engineering Test Report for which you are subject to the restrictions as listed on the attached summary. This report may not be reproduced, except in full, without written permission from Compliance Testing, LLC. Please retain a copy of this report for your archival purposes.

Once a Telecommunication Certification Body (TCB) issues a Grant the Federal Communication Commission (FCC) has 30 days to review the application and request added information. It is your decision whether or not to market the equipment subject to a possible recall before the end of the 30 days.

If your equipment is still retained by us, it will be returned to you 30 days after approval is achieved. Our invoice for services has been directed to your Accounts Payable Department.

For any additional information please contact us.

Sincerely,

Compliance Testing



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## **Test Report**

for

**FCC ID:** X3ZBTMOD2

**Model:** BT23

**Description:** Bluetooth Module

to

**Federal Communications Commission**

**Rule Part(s) 15.247 FHSS**

**Date of Report:** August 27, 2010

**On the Behalf of the Applicant:** Amp'ed RF Technology  
1879 Lundy Ave, Suite 138  
San Jose, CA 95131

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by  
**Compliance Testing, LLC**  
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## Revision History

Revision	Date	Revised By	Reason for revision
1.0	September 14, 2010	G. Corbin	Original Document
2.0	September 27, 2010	K. Springer	Corrected Applicant Information
3.0	November 11, 2010	G. Corbin	Added Receiver Spurious



## 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**, the facts set forth in the application and accompanying technical data are true and correct to the best of my knowledge and belief.

Certifying Engineer:

Greg Corbin



**The applicant has been cautioned as to the following:**

**15.21 Information to User**

The user's 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.



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### List of General Information Required For Certification

Tested 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:** Amp'ed RF Technology

(c)(2): **FCC ID:** X3ZBTMOD2

**Model Number:** BT23

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

Please See Attached Exhibits

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

(c)(5): **FREQUENCY RANGE, MHz:** 2402 - 2480

(c)(6): **Power Rating, W:** .000007

☐ Switchable

☐ Variable

☒ N/A

(c)(7): **Maximum Power Rating, W:** 1

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 an integrated PCB antenna with a gain of -2.395 dBi.**

#### EUT Description

The EUT is a transmitter module containing a 2.4 GHz Bluetooth Transmitter, a Class 1 GPS receiver, and a 1.6 GHz Simplex Transmitter.

The EUT is powered by 2 "AA" Lithium batteries during normal operation.

The EUT connects to a PC USB port for firmware updates only.

The transmitters are disabled when the EUT is connected to a USB port.

The EUT had test code installed to allow the EUT to be tuned to the low, mid, and high frequency.



**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 902-928, 2400-2483.5, 5725-5850 MHz

### **Standard Test Conditions and Engineering Practices**

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

In accordance with ANSI C63.4-2009, ANSI C63.10-2009, FCC DA 00-705, 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.

<b>Environmental Conditions</b>	
<b>Temperature</b>	<b>Humidity</b>
<b>25.6 deg C</b>	32.7%

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



**Compliance Testing, LLC**  
Previously Flom Test Lab

## **A2LA**

"A2LA has accredited Compliance Testing, LLC in 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



**TESTING CERT# 2152.01**

**FCC OATS Reg. #933597**

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



### Test Results Summary

Specification	Test Name	Pass, Fail, N/A	Comments
15.247(b)(2)	Radiated 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	
RSS-GEN	Radiated Spurious Emissions	Pass	



**Name of Test:** Radiated Output Power  
**Specification:** 15.247(b)  
**Test Equipment Utilized:** i00028, i00103, i00331

**Engineer:** G. Corbin  
**Test Date:** 9/14/2010

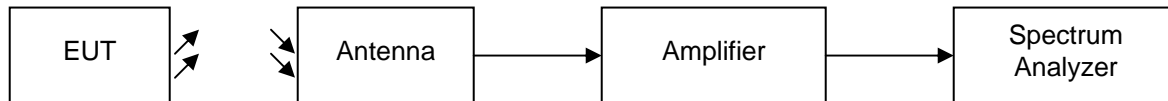
### Test Procedure

The EUT was connected directly to a power meter input. The peak readings were taken and the result was then compared to the limit.

The EUT was tested in a semi-anechoic chamber set 3m from the receiving antenna. A spectrum analyzer was used to measure the Radiated Output Power. The antenna and cable correction factors along with the amplifier gain and input into the spectrum analyzer as an offset to ensure accurate readings

RBW = 1 MHz  
VBW = 3 MHz

### Test Setup



### Transmitter Peak Output Power

Tuned Frequency MHz	Recorded Measurement	Specification Limit	Result
2402	7 uW	1 W	Pass
2441	6 uW	1 W	Pass
2480	7 uW	1 W	Pass



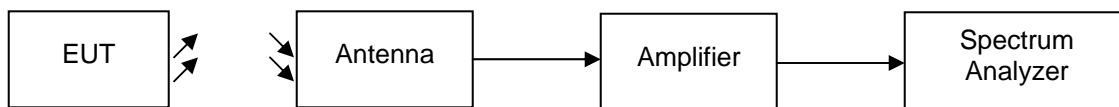
**Name of Test:** Radiated Spurious Emissions  
**Specification:** 15.247(d), 15.209(a), 15.205  
**Test Equipment Utilized:** i00028, i00103, i00331

**Engineer:** G. Corbin  
**Test Date:** 9/14/2010

### Test Procedure

The EUT was tested in a semi-anechoic chamber set 3m from the receiving antenna. A spectrum analyzer was used to verify that the EUT met the requirements for Radiated Spurious Emissions. The antenna and cable correction factors along with the amplifier gain were input into the spectrum analyzer as an offset to ensure accurate readings. The spectrum for each tuned frequency was examined to the 10<sup>th</sup> harmonic.

### Test Setup



Detector Settings	RBW	VBW	Span
Peak	1 MHz	3 MHz	As Necessary
Average	1 MHz	3 MHz	As Necessary

### Radiated Spurious Emissions

Tuned Freq (MHz)	Emission Freq (MHz)	Peak Monitored Level (dBuV/m)	Peak Limit (dBuV/m)	Average Monitored Level (dBuV/m)	Average Limit (dBuV/m)	Result
2402	4804	52.4	74.0	46.4	54.0	Pass
2402	7206	53.4	74.0	45.7	54.0	Pass
2402	9608	60.5	74.0	52.8	54.0	Pass
2441	4882	50.9	74.0	45.7	54.0	Pass
2441	7323	61.9	74.0	45.5	54.0	Pass
2441	9764	63.5	74.0	53.9	54.0	Pass
2480	4960	50.5	74.0	45.8	54.0	Pass
2480	7440	54.0	74.0	45.2	54.0	Pass
2480	9920	61.2	74.0	53.1	54.0	Pass

No other emissions were detectable. All emissions were greater than -20 dBc.



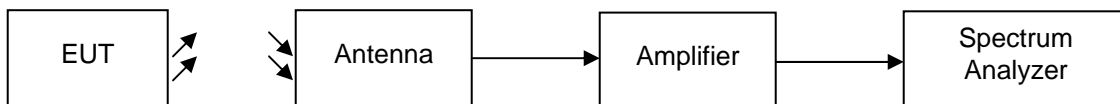
**Name of Test:** Emissions At Band Edges  
**Specification:** 15.247(d), 15.209(a), 15.205  
**Test Equipment Utilized:** i00028, i00103, i00331

**Engineer:** G. Corbin  
**Test Date:** 9/14/2010

### Test Procedure

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

### Test Setup



### Band Edge Emissions Summary

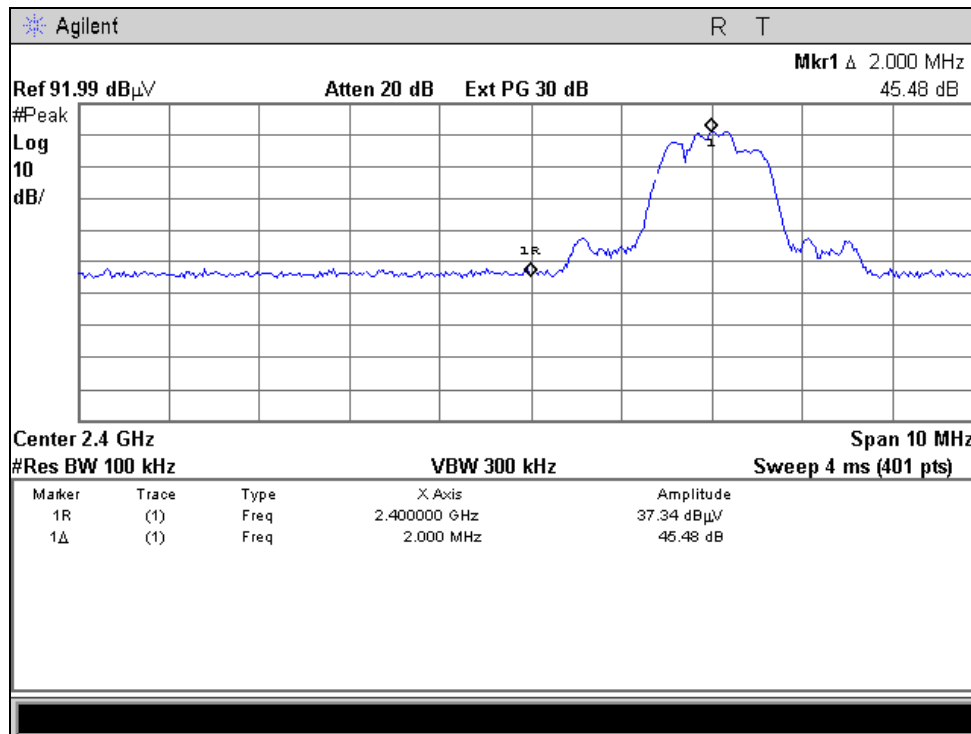
Tuned Freq (MHz)	Emission Freq (MHz)	Monitored Level (dBc)	Detector	Limit (dBc)	Result
2402	2400	-45.5	Peak	-20 dBc	Pass
2480	2483.5	-44.8	Peak	-20 dBc	Pass

### Restricted Band Emissions Summary

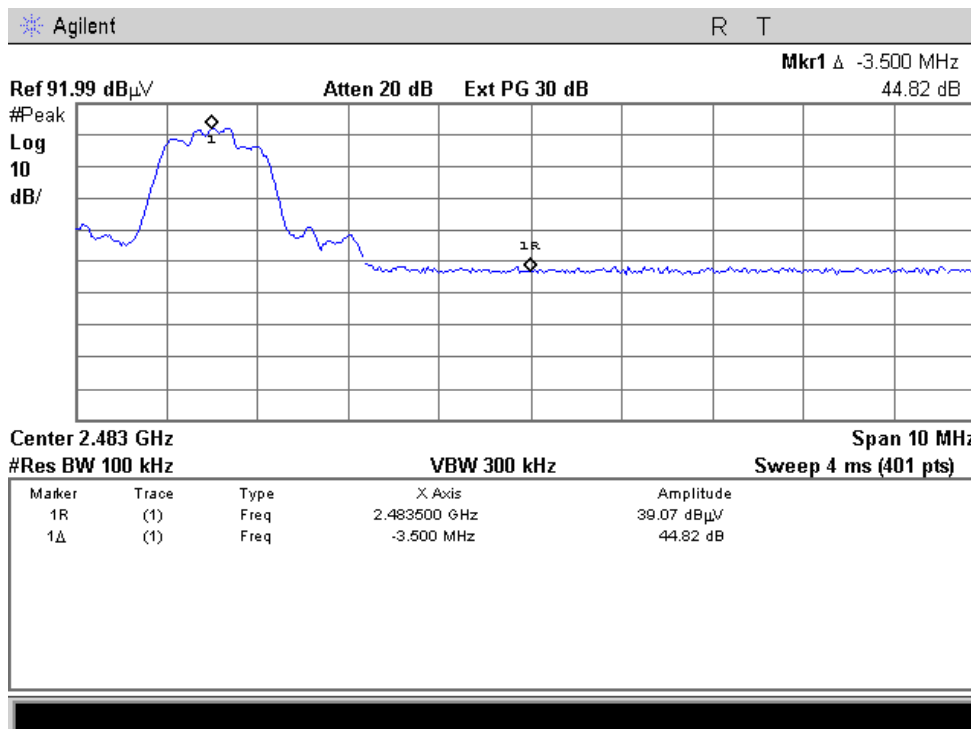
Restricted Band (MHz)	Tuned Freq (MHz)	Emission Freq (MHz)	Monitored Level (dBuV/m)	Detector	Limit (dBuV/m)	Result
2300 - 2390	2402	2338	49.6	Peak	74	Pass
2300 - 2390	2402	2387	41.9	Average	54	Pass
2843.5 - 2500	2480	2483.5	52.6	Peak	74	Pass
2843.5 - 2500	2480	2483.5	49.3	Average	54	Pass



### Band Edge 2400 MHz

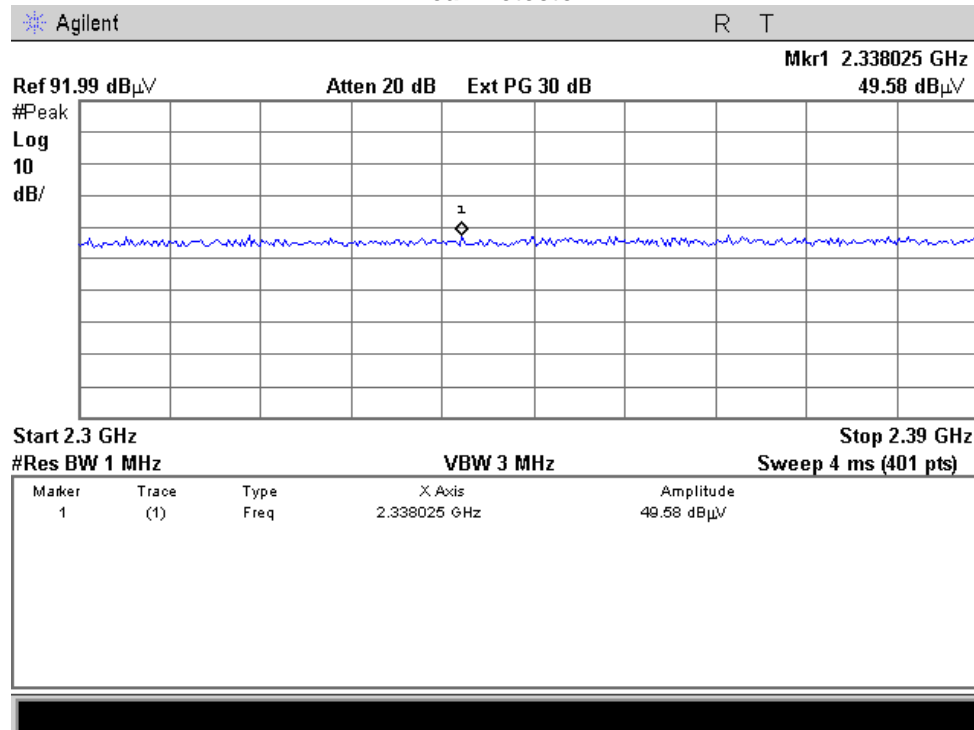


### Band Edge 2483.5 MHz

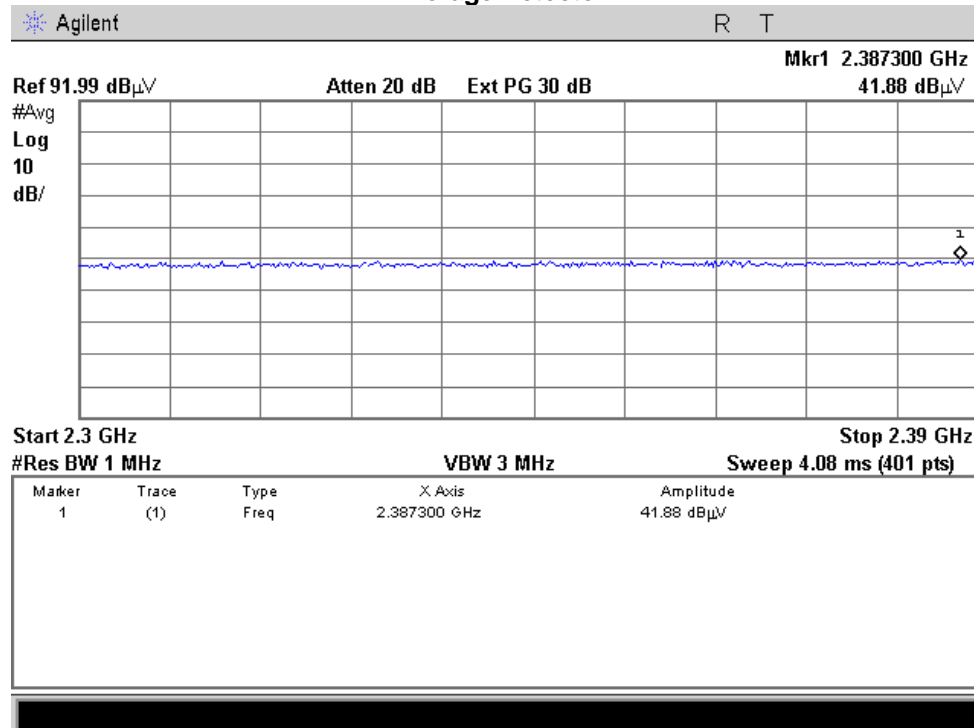




**Restricted Band Plots  
2300 – 2390 MHz  
Peak Detector**



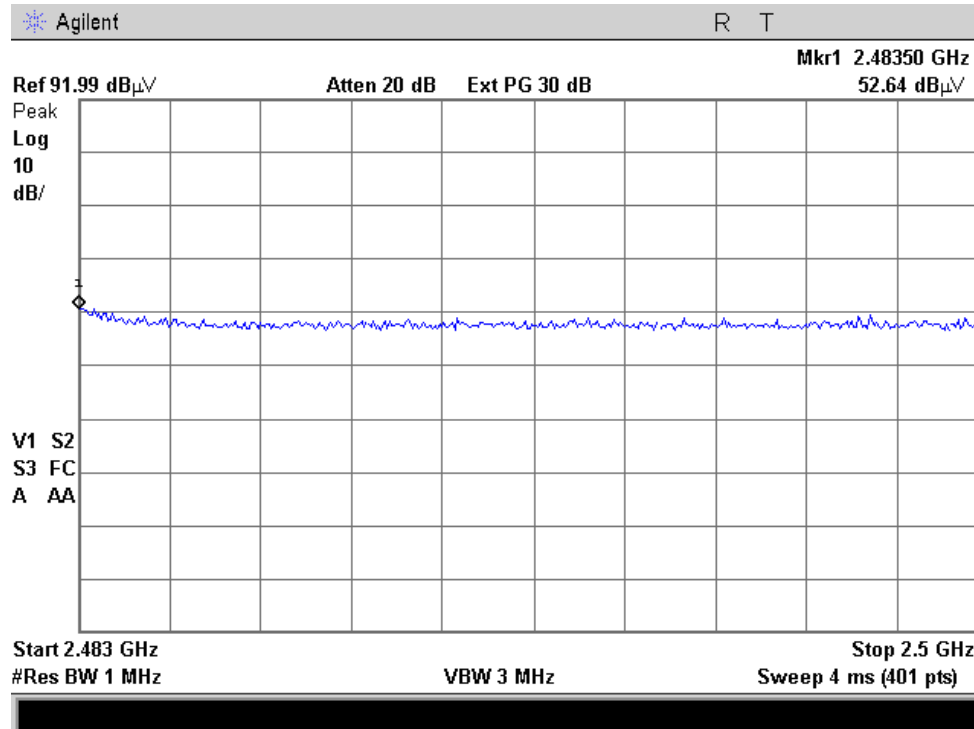
**Average Detector**



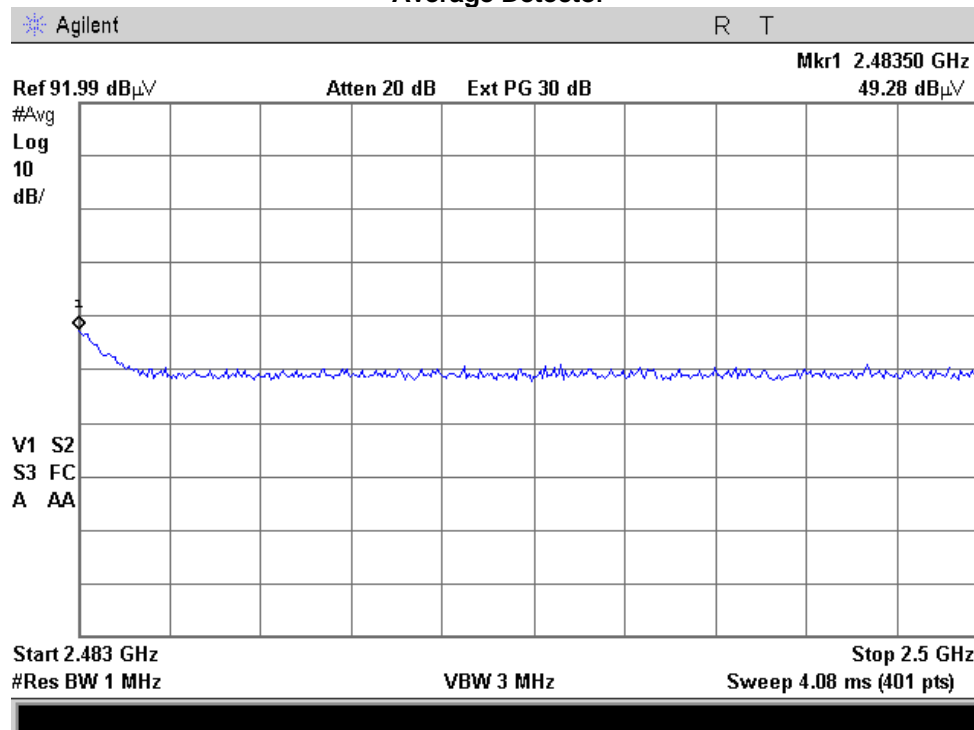




**Restricted Band  
2483.5 - 2500 MHz  
Peak Detector**



**Average Detector**

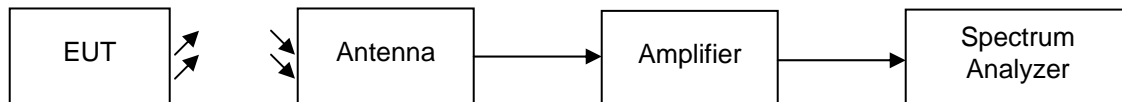




**Name of Test:** Receiver Spurious Emissions  
**Specification:** RSS GEN  
**Test Equipment Utilized:** i00028, i00033, i00103, i00267

**Engineer:** G. Corbin  
**Test Date:** 9/14/2010

### Test Setup



### Receiver Spurious Emissions Test results

Frequency Range (MHz)	Emission Freq (GHz)	Measured Level (dBuV/m)	Resolution Bandwidth	Detector	Limit (dBuV/m)	Margin (dB)
30 - 88	50.15	14.0	120 KHz	QP	40	-26.0
88 - 216	215.14	16.8	120 KHz	QP	43.5	-26.7
216 - 960	821.45	29.3	120 KHz	QP	46.1	-16.8
1 – 7.5 GHz	2.840	39.2	1 MHz	Avg	56	-16.8

The Frequency range from 30 MHz – 7.5 GHz was examined.  
No receiver spurious signals were detected the highest noise floor measurement was recorded.



### Test Equipment Utilized

Description	MFG	Model Number	CT Asset Number	Last Cal Date	Cal Due Date
Preamplifier	HP	8449A	i00028	6/29/2009	6/29/2010 **
EMI Receiver	HP	8546A	i00033	11/04/2009	11/04/2010
Horn Antenna	EMCO	3115	i00103	11/25/2008	11/25/2010
Bi-Log Antenna	Schaffner	CBL611C	i00267	11/21/2009	11/21/2011
Spectrum Analyzer	Agilent	E4407B	i00331	11/03/2009	11/03/2010

\*\* Calibration extension allowed per CT QA manager

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