



## **Compliance Testing, LLC**

Previously Flom Test Lab

EMI, EMC, RF Testing Experts Since 1963

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# **FCC CFR47 Part 90 Test Report**

Prepared for: ISC Technologies, Inc

FCC ID: SS6ISC-T5340

Model: ISC-T5340

Description: Licensed Non-Broadcast Station Transmitter

To

Federal Communications Commission

Rule Part(s) 22, 90

Date of Issue: June 7, 2011

On the behalf of the applicant: ISC Technologies, Inc  
301 Oak Street  
Quincy, IL 62301

Attention of: Tim Anderson, Vice President  
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Project ID: p10b0027

Greg Corbin

Project Test Engineer

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All results of this test report relate only to the item(s) that were tested.



### Test Report Revision History

| Revision | Date         | Revised By  | Reason for revision |
|----------|--------------|-------------|---------------------|
| 1.0      | June 7, 2011 | Greg Corbin | Original Document   |
|          |              |             |                     |
|          |              |             |                     |



**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 the 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 an 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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Sub-part  
2.1033(c) (14):

### **Test and Measurement Data**

All tests and measurement data shown were performed in accordance with FCC Rules and Regulations, Volume II; Part 2, Sub-part J, Sections 2.947, 2.1033(c), 2.1041, 2.1046, 2.1047, 2.1079, 2.1051, 2.1053, 2.1055, 2.1057 and the following individual Parts: 90.

### **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, 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>Pressure</b> |
| 25.0 deg C                      | 23.8 %          | 971.5 mbar      |

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



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

## ILAC / A2LA

Compliance Testing, LLC, has been accredited in accordance with the recognized International Standard ISO/IEC 17025:2005. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer joint ISO-ILAC-IAF Communiqué dated January 2009)

The tests results contained within this test report all fall within our scope of accreditation, unless noted in the table below.

Please refer to <http://www.compliancetesting.com/labscope.html> for current scope of accreditation.

Testing Certificate Number: **2152.01**



**FCC OATS Reg, #933597**

**IC Reg. #2044A-1**

**Non-accredited tests contained in this report:**

**N/A**



### List of General Information Required for Certification

In Accordance with FCC Rules and Regulations,  
Volume II, Part 2 and to Part 90

Sub-part 2.1033

(c)(1):

**Name and Address of Applicant:** ISC Technologies, Inc  
301 Oak Street  
Quincy, IL 62301

**Manufacturer:** ISC Technologies, Inc  
301 Oak Street  
Quincy, IL 62301

(c)(2): **FCC ID:** SS6ISC-T5340

**Model Number:** ISC-T5340

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

Please see attached exhibits

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

(c)(5): **Frequency Range, MHz:** 406.1 - 470

(c)(6): **Power Rating, Watts:** 125.829  
\_\_\_\_\_ Switchable        X   Variable      \_\_\_\_\_ N/A

**FCC Grant Note:** The output power is continuously variable from the value listed in this entry to 10%-15% of the value listed.

(c)(7): **Maximum Allowable Power, Watts:** 500

DUT Results: Passes   X   Fails \_\_\_\_\_



### Test Results Summary

| Specification                     | Test Name                                  | Pass, Fail, N/A | Comments |
|-----------------------------------|--|-----------------|----------|
| 2.1046,<br>22.535(b)<br>90.205(s) | Carrier Output Power (Conducted)           | Pass            |          |
| 2.1051,<br>22.359                 | Unwanted Emissions (Transmitter Conducted) | Pass            |          |
| 2.1049,<br>22.357,<br>90.210      | Emission Masks (Occupied Bandwidth)        | Pass            |          |

### Accessories:

| Qty | Type               | Make, Model | S/N |
|-----|--------------------|-------------|-----|
| 1   | Attenuator – 30 dB | Bird, 8329  | N/A |
| 1   | Attenuator – 10 dB | Narda, 779  | N/A |





### Carrier Output Power (Conducted)

**Name of Test:** Carrier Output Power (Conducted)

**Specification:** 2.1046, 22.535(b), 90.205(s)

**Test Equipment Utilized:** i00124, i00172, i00331

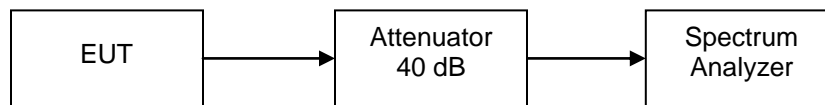
**Engineer:** Greg Corbin

**Test Date:** 6/6/2011

### Measurement Procedure

The Equipment under Test (EUT) was connected directly to a spectrum analyzer input.  
The peak readings were taken and the result was then compared to the limit.

### Test Setup



### Transmitter Peak Output Power

| Tuned Frequency | Recorded Measurement |         | Result |
|-----------------|----------------------|---------|--------|
|                 | MHz                  | dBm     |        |
| 407             | 51.0                 | 125.829 | Pass   |
| 450             | 50.97                | 125.025 | Pass   |
| 470             | 50.94                | 124.165 | Pass   |

Note: Measured Output Power is within 20% of the manufacturers rated output power per 90.205(s)



### Conducted Spurious Emissions

**Name of Test:** Conducted Spurious Emissions

**Specification:** 2.1051, 22.359

**Test Equipment Utilized:** i00118, i00124, i00172, i00331

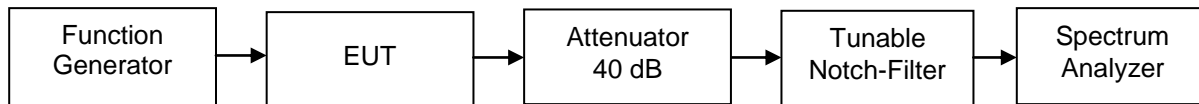
**Engineer:** Greg Corbin

**Test Date:** 3/15/2011

### Test Procedure

The EUT was connected directly to a spectrum analyzer to verify that the UUT met the requirements for spurious emissions. A tunable notch filter was utilized to ensure the fundamental did not put the spectrum analyzer into compression. The frequency range from 30 MHz to the 10<sup>th</sup> harmonic of the fundamental transmitter was observed and plotted. A modulation frequency of 1200 Hz square wave at a level of 4 v p-p was input to the 2 level input of the EUT. The deviation in the control software was set to 3000 Hz.

### Test Setup



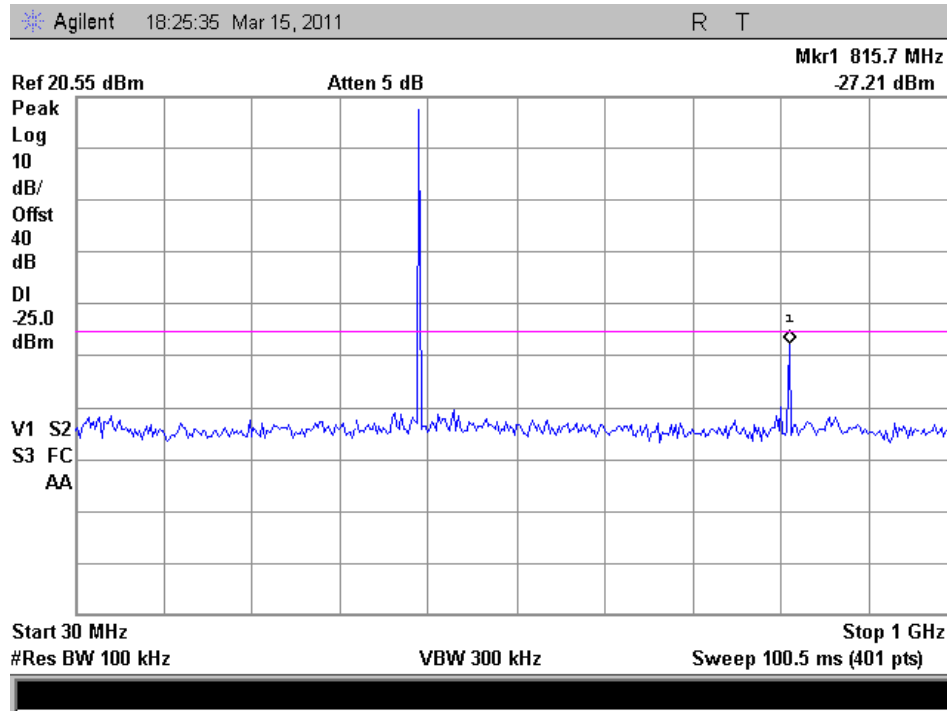
**Conducted Spurious Emissions Summary Test Table**

| Tuned Frequency (MHz) | Spurious Frequency (MHz) | Measured Spurious Level (dBm) | Specification Limit (dBm) | Result |
|-----------------------|--------------------------|-------------------------------|---------------------------|--------|
| 152.24                | 815.7                    | -27.2                         | -20                       | Pass   |
| 162                   | 2830                     | -29.2                         | -20                       | Pass   |
| 174                   | 2960                     | -28.7                         | -20                       | Pass   |

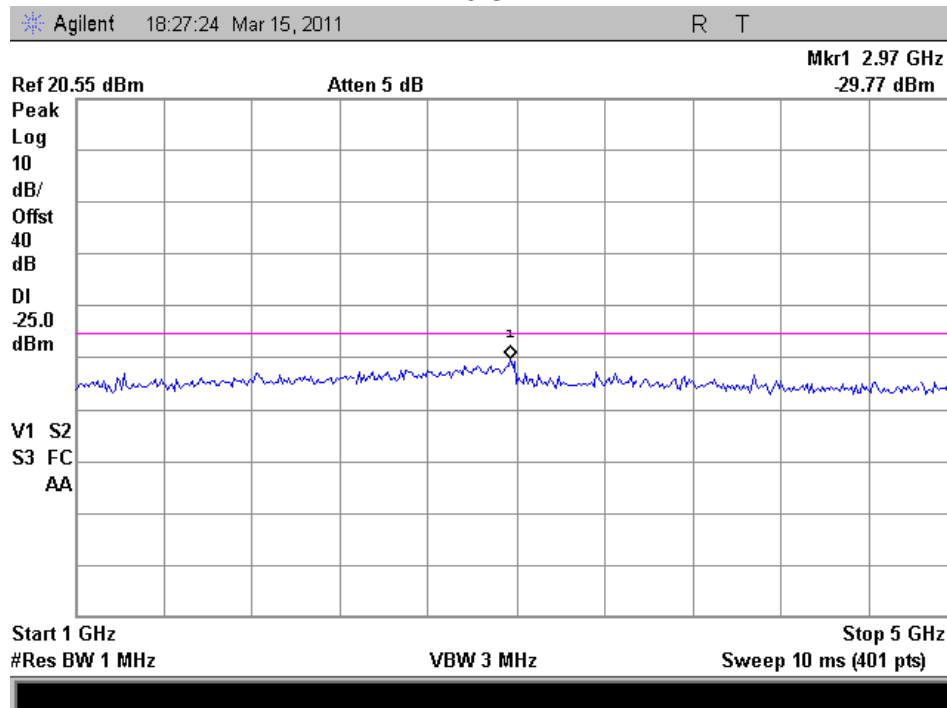


## Conducted Spurious Emission Test Plots

Tuned Frequency = 407 MHz  
30 MHz – 1 GHz

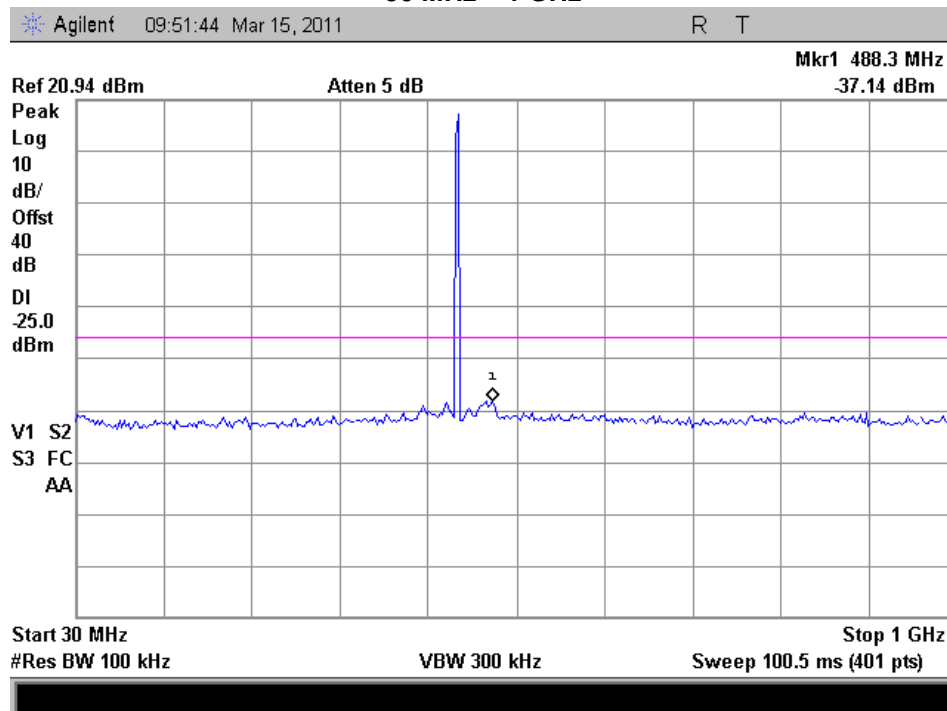


Tuned Frequency = 407 MHz  
1 - 5 GHz

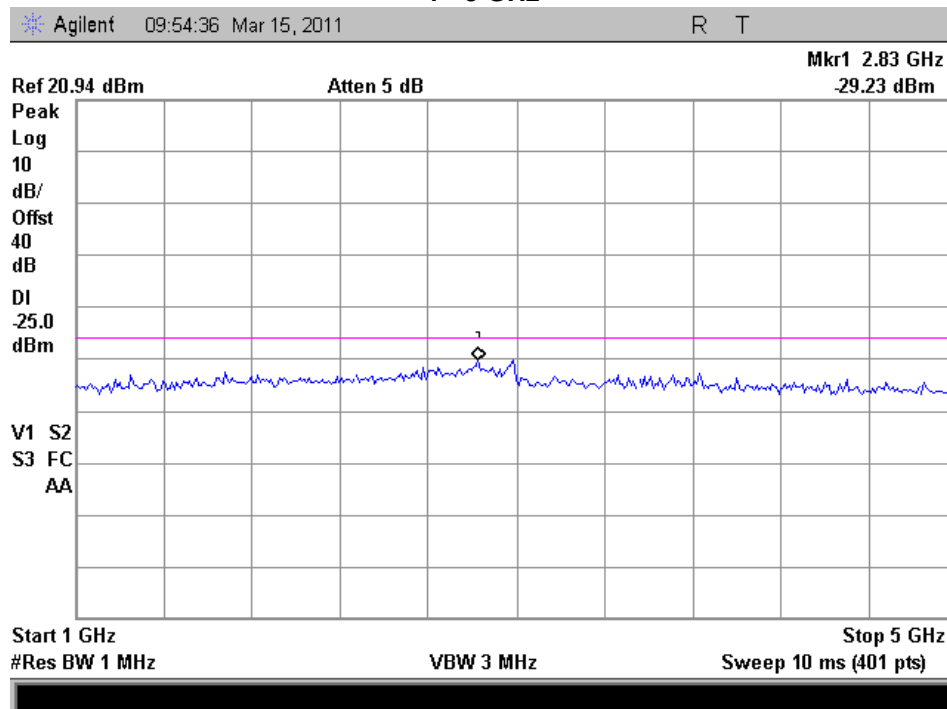




Tuned Frequency = 450 MHz  
30 MHz – 1 GHz

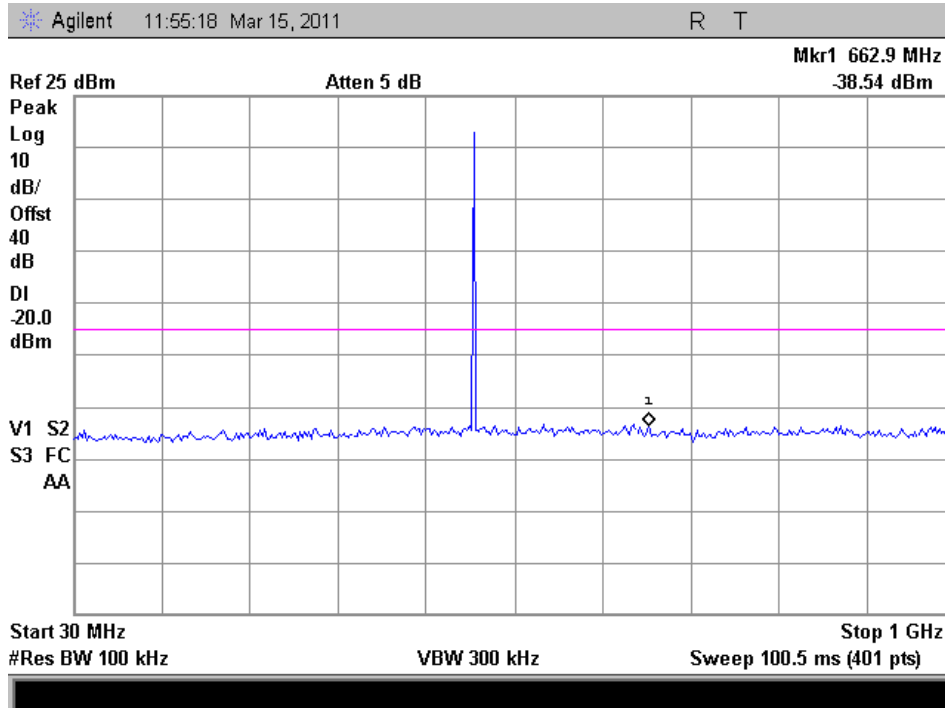


Tuned Frequency = 450 MHz  
1 - 5 GHz

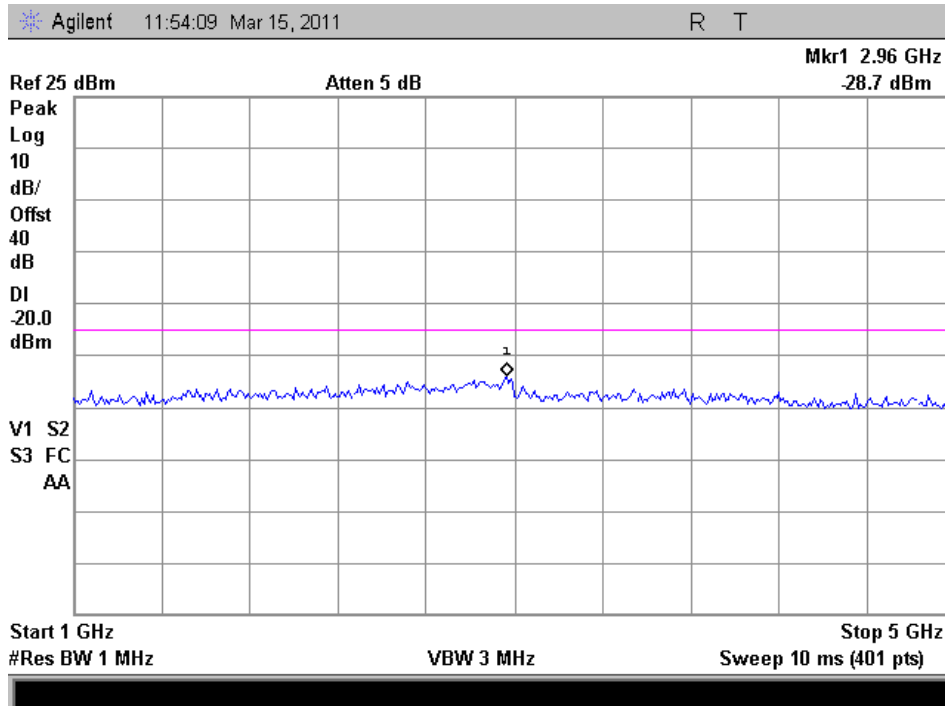




Tuned Frequency = 470 MHz  
30 MHz – 1 GHz



Tuned Frequency = 470 MHz  
1 - 5 GHz





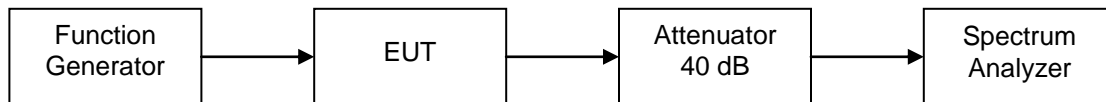
### Emission Masks (Occupied Bandwidth)

**Name of Test:** Emission Masks (Occupied Bandwidth)  
**Specification:** 2.1049, 22.357, 90.210(d)  
**Test Equipment Utilized:** i00118, i00172, i00331

**Engineer:** Greg Corbin  
**Test Date:** 6/6/2011

The EUT was connected directly to a spectrum analyzer to verify that the EUT meets the required emissions mask. A reference level plot is provided to verify that the peak power was established prior to testing the mask. A modulation frequency of 1200 Hz square wave at a level of 4 v p-p was input to the 2 level input of the EUT. The deviation in the control software was set to 3000 Hz.

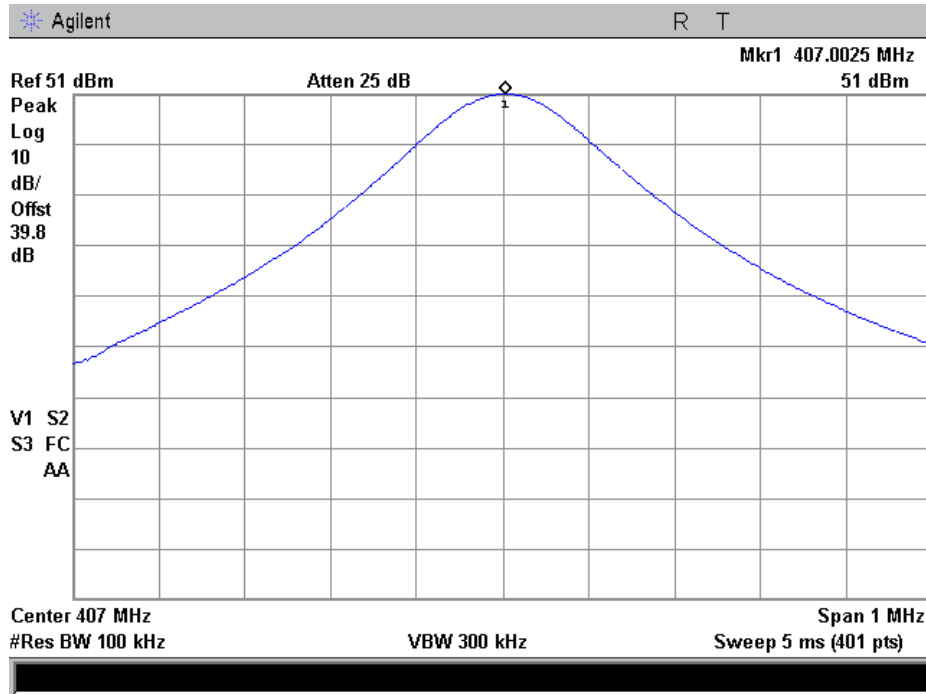
### Test Setup



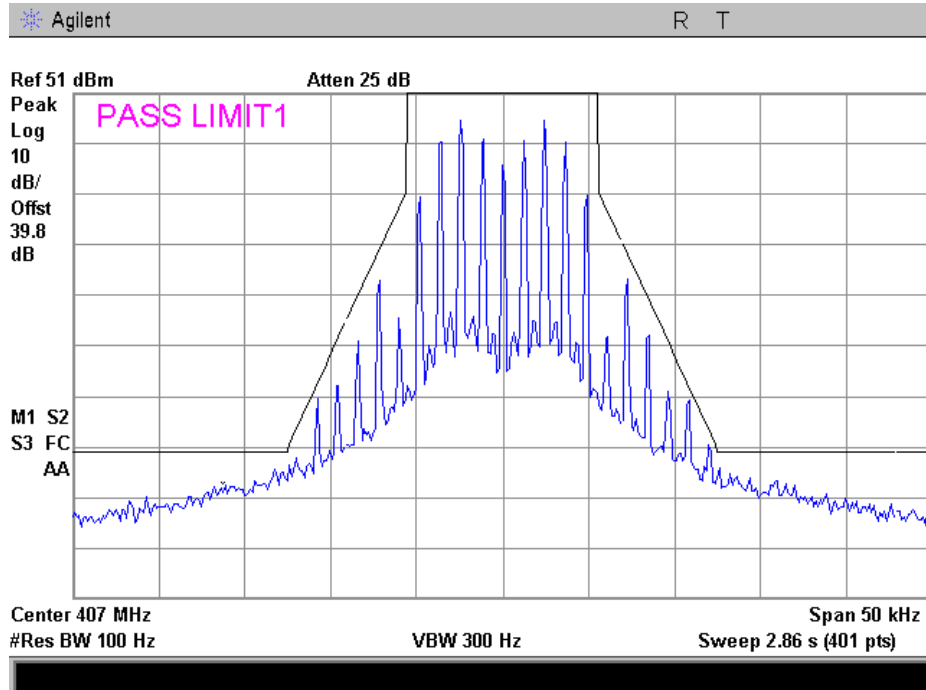


## Occupied Bandwidth Plots

### Reference 407 MHz

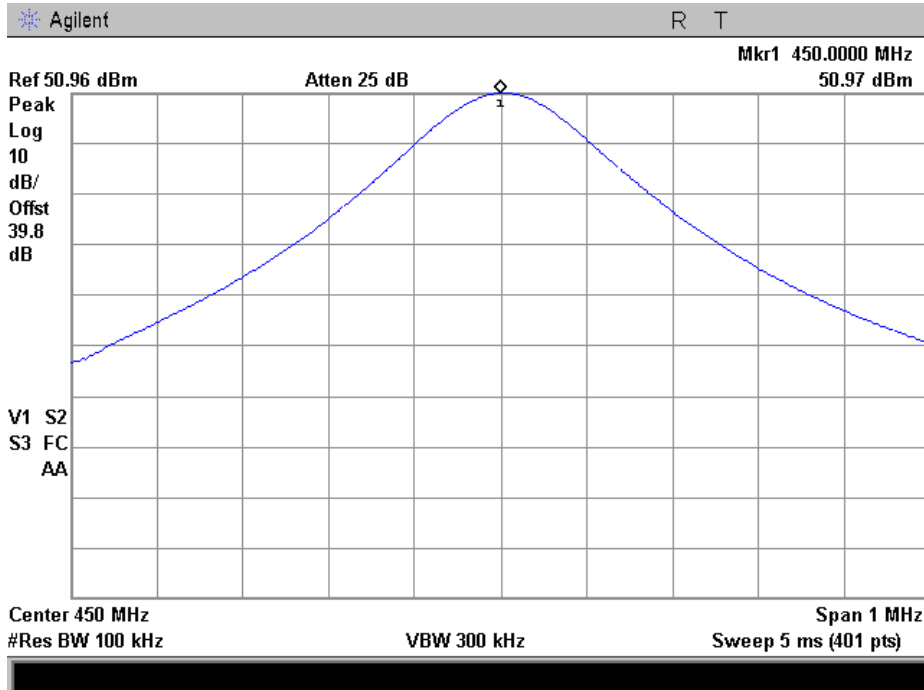


### Mask D - 407 MHz

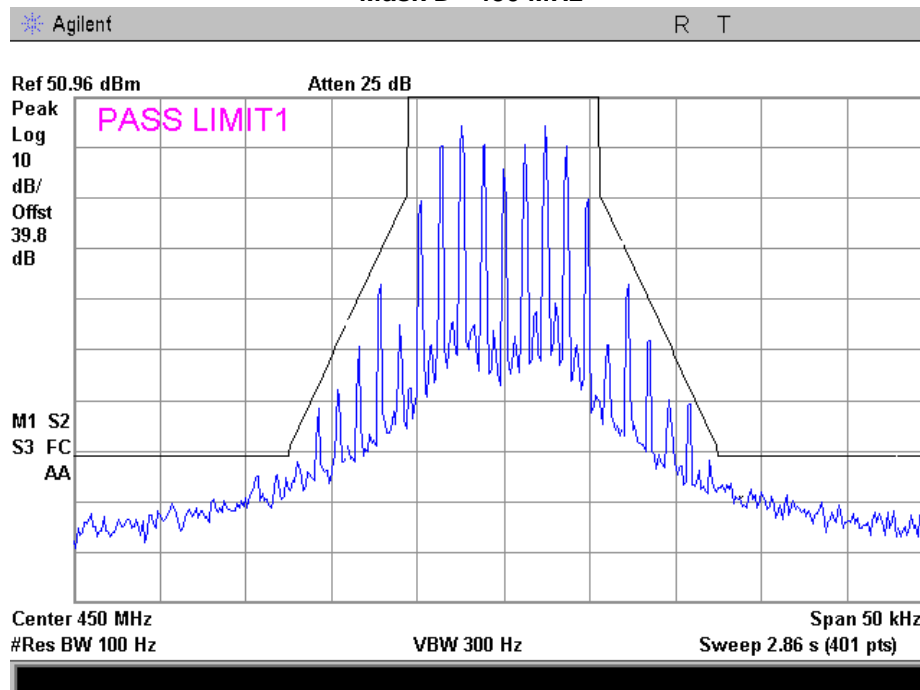




### Reference 450 MHz



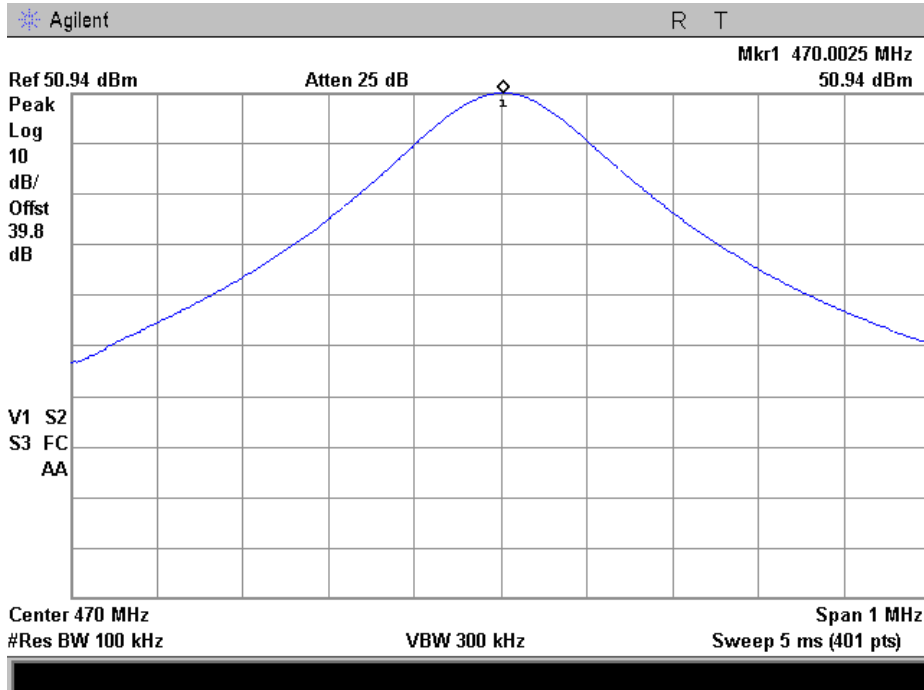
### Mask D - 450 MHz



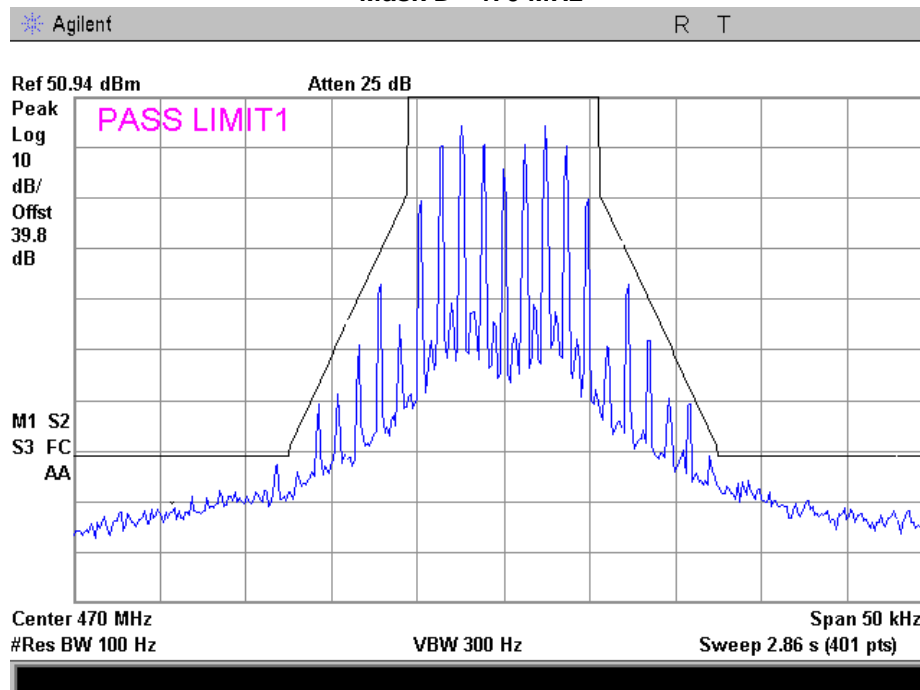




### Reference 470 MHz



### Mask D - 470 MHz





### **Necessary Bandwidth Calculations**

**Name of Test:** Necessary Bandwidth Calculations

**Specification:** 2.202, 90.209

**Test Equipment Utilized:** N/A

**Engineer:** Greg Corbin

**Test Date:** 6/6/2011

Modulation = 9K6F1D

### **Necessary Bandwidth Calculation:**

|                                    |   |               |
|------------------------------------|---|---------------|
| Data Rate (R) Kbps                 | = | 2.4           |
| Maximum Deviation (D), kHz         | = | 3             |
| Necessary Bandwidth ( $B_N$ ), kHz | = | $2.4D + 1.0R$ |
|                                    | = | 9.6           |



### Test Equipment Utilized

| Description                  | Manufacturer | Model Number       | CT Asset No. | Last Cal Date | Cal Due Date |
|------------------------------|--------------|--------------------|--------------|---------------|--------------|
| Function Generator           | HP           | 33120A             | i00118       | Verify When   | Use          |
| Tunable Notch Filter         | Eagle        | TNF-1-(250-850MHz) | i00124       | Verify When   | Use          |
| Attenuator – 30 dB 2000 watt | Bird         | 8329               | I00172       | Verify When   | Use          |
| Humidity / Temp Meter        | Newport      | IBTHX-W-5          | i00282       | 11/11/10      | 11/11/11     |
| Spectrum Analyzer            | Agilent      | E4407B             | i00331       | 12/20/10      | 12/20/11     |

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