



Compliance Testing, LLC

Previously Flom Test Lab

EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268

fax: (480) 926-3598

<http://www.ComplianceTesting.com>

info@ComplianceTesting.com

Test Report

Prepared for: ISC Technologies

Model: ISC-T8311 (C2PC)

Description: Paging Transmitter

To

FCC Part 90

and

FCC Part 22

Date of Issue: May 18, 2012

On the behalf of the applicant:

**ISC Technologies
301 Oak Street
Quincy, IL 62301**

Attention of:

**Tim Anderson, Vice President
Ph: (217) 221-0985
E-Mail: anderson@illinoisignal.com**

**Prepared By
Compliance Testing, LLC
3356 N San Marcos Pl, Suite 107
Chandler, AZ 85225-7176
(866) 311-3268 phone / (480) 926-3598 fax
www.compliancetesting.com
Project No: p1240012**

**Greg Corbin
Project Test Engineer**

This report may not be reproduced, except in full, without written permission from Compliance Testing
All results contained herein relate only to the sample tested



Test Report Revision History

Revision	Date	Revised By	Reason for Revision
1.0	May 18, 2012	Greg Corbin	Original Document



Table of Contents

<u>Description</u>	<u>Page</u>
Standard Test Conditions and Engineering Practices	6
Test Result Summary	8
Carrier Output Power (Conducted)	9
Conducted Spurious Emissions	10
Emission Masks (Occupied Bandwidth)	14
Necessary Bandwidth Calculations	18
Test Equipment Utilized	19



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 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



The Applicant has been cautioned as to the following:

15.21: Information to the 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 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.



Test and Measurement Data

Sub-part

2.1033(c)(14):

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.

Environmental Conditions		
Temp (°C)	Humidity (%)	Pressure (mbar)
22.3 – 25.5	32.8 – 38.6	959.3 – 965.7

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

EUT Description

Model: ISC-T8311

Description: Paging Transmitter

DSP Firmware: ver 2.12

Control Software: ver 2.26

Additional Information:

The EUT is a 125 watt one way paging transmitter system, consisting of an exciter and power amplifier.

The EUT is powered by an AC to DC power supply.

EUT Operation during Tests

The EUT was installed in a 19 inch rack and was tested under normal operation.

A pc with a hyper-terminal program connected to the VT 100 serial port was used to communicate to the EUT as required.

The analog audio settings in the control software were set as follows:

- Analog Deviation = 1900 Hz
- Analog Limiter = 3000 Hz
- Analog offset = 0 Hz
- Audio Response = Flat

The analog input signal, 3000 Hz @ 1.2 Vp-p was connected to Pins 3 and 4 (the analog audio input) of the J4 I/O connector.



Accessories: None

Cables: None

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



Test Result Summary

Specification	Test Name	Pass, Fail, N/A	Comments
2.1046 22.565(b) 90.205(s)	Carrier Output Power (Conducted)	Pass	
2.1051 22.359 90.210(d)	Unwanted Emissions (Transmitter Conducted)	Pass	
2.1049 22.357 90.210(d)	Emission Masks (Occupied Bandwidth)	Pass	
2.202	Necessary Bandwidth Calculation	Pass	



Carrier Output Power (Conducted)

Name of Test: Carrier Output Power (Conducted)

Engineer: Greg Corbin

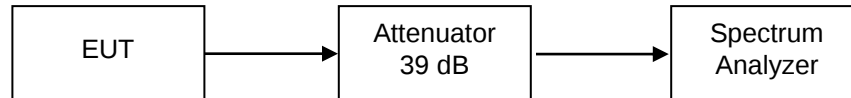
Test Equipment Utilized: i00172, i00379

Test Dates: 5/17/2012, 5/25/2012

Measurement Procedure

The Equipment under Test (EUT) was connected as shown in the test setup.
The peak readings were taken and the result was then compared to the limit.

Test Setup



Transmitter Peak Output Power

Tuned Frequency (MHz)	Recorded Measurements (dBm) (Watts)		Limit (Watts)	Result
152.25	50.87	122.180	500	Pass
162	50.62	115.345	500	Pass
174	50.93	123.879	500	Pass

Note:

1. Measured Output Power is within 20% of the manufacturers rated output power per 90.205(s).
2. Mfr rated output power is 125 watts.



Conducted Spurious Emissions

Name of Test: Conducted Spurious Emissions

Engineer: Greg Corbin

Test Equipment Utilized: i00118, i00124, i00172, i00379

Test Date: 5/17/2012, 5/25/2012

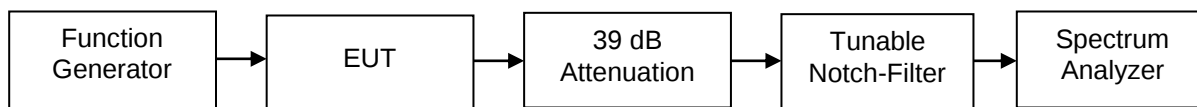
Test Procedure

The EUT was connected to a spectrum analyzer as shown in test set-up to verify that the EUT 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 10th harmonic of the fundamental transmitter was observed and plotted.

A modulation frequency of 3000 Hz sine wave at a level of 1.2 v p-p was input to pins 3 and 4 of the J4 I/O connector, this is the audio input. The deviation in the control software was set to 1900 Hz.

Test Setup



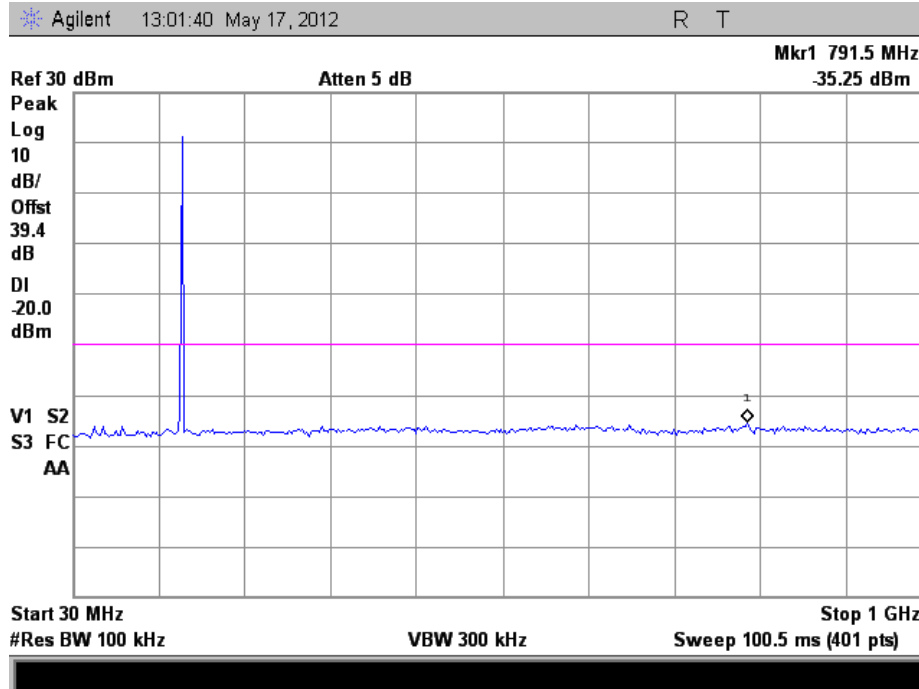
High Power Conducted Spurious Emissions Summary Test Table

Tuned Frequency (MHz)	Spurious Frequency (MHz)	Measured Spurious Level (dBm)	Specification Limit (dBm)	Result
152.25	1995	-26.6	-20	Pass
162	1925	-35.7	-20	Pass
174	1677.5	-34.9	-20	Pass

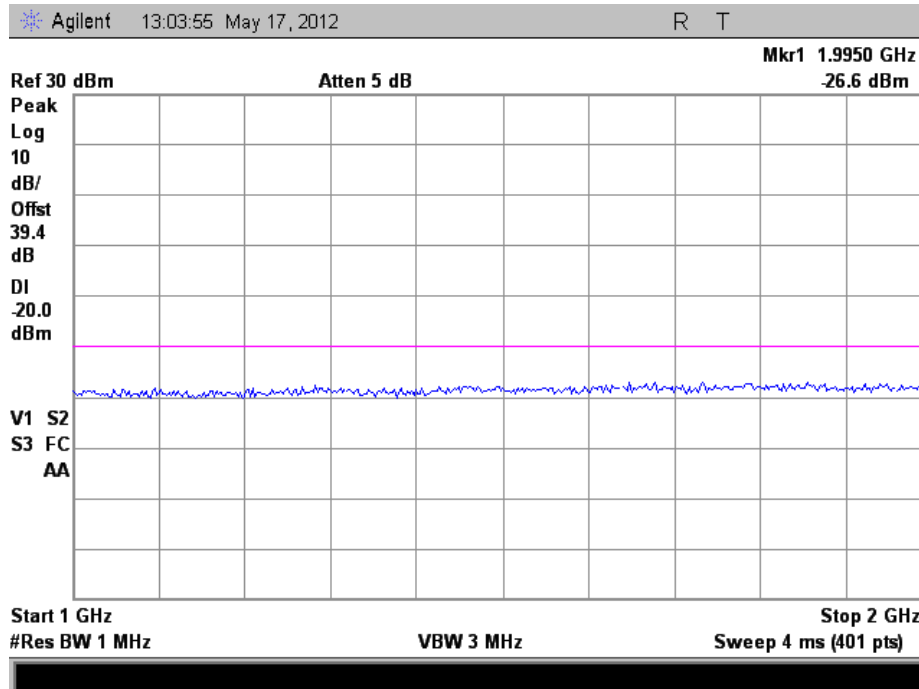


Conducted Spurious Emission Test Plots

Tuned Frequency = 152.24 MHz
30 MHz – 1 GHz

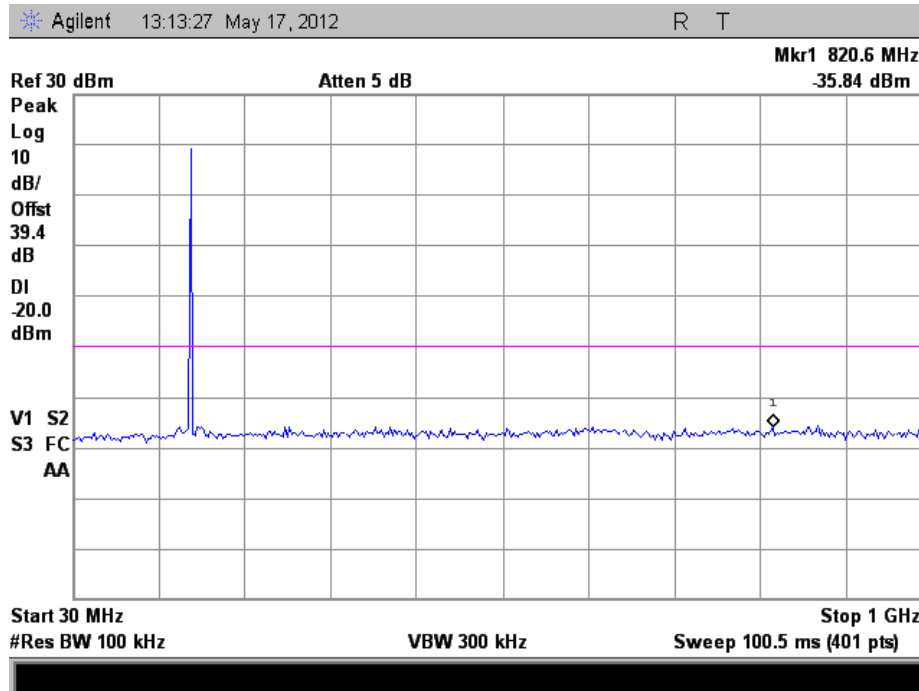


Tuned Frequency = 152.24 MHz
1 - 2 GHz

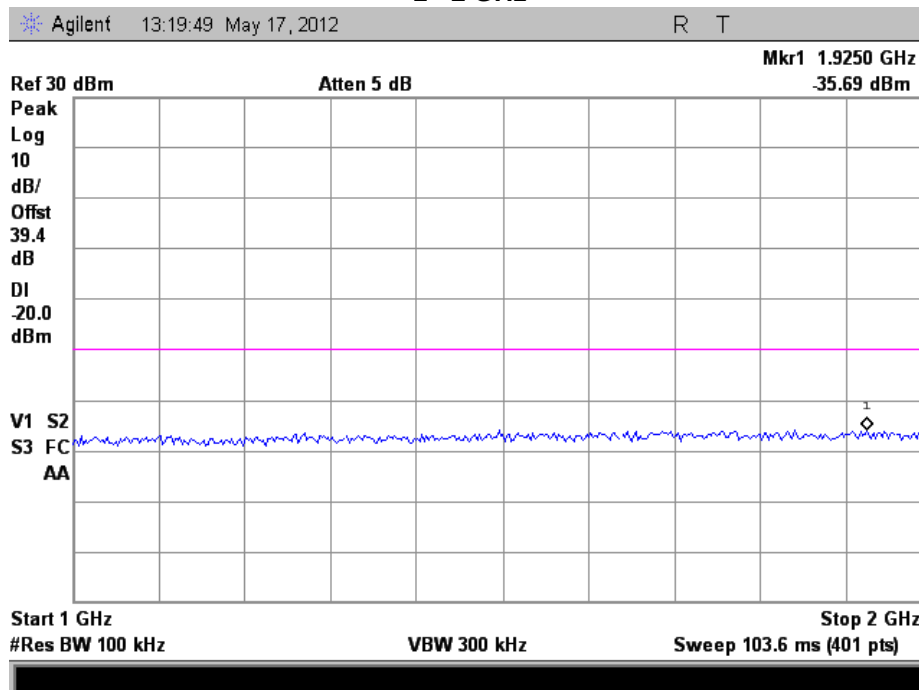




Tuned Frequency = 162 MHz
30 MHz – 1 GHz

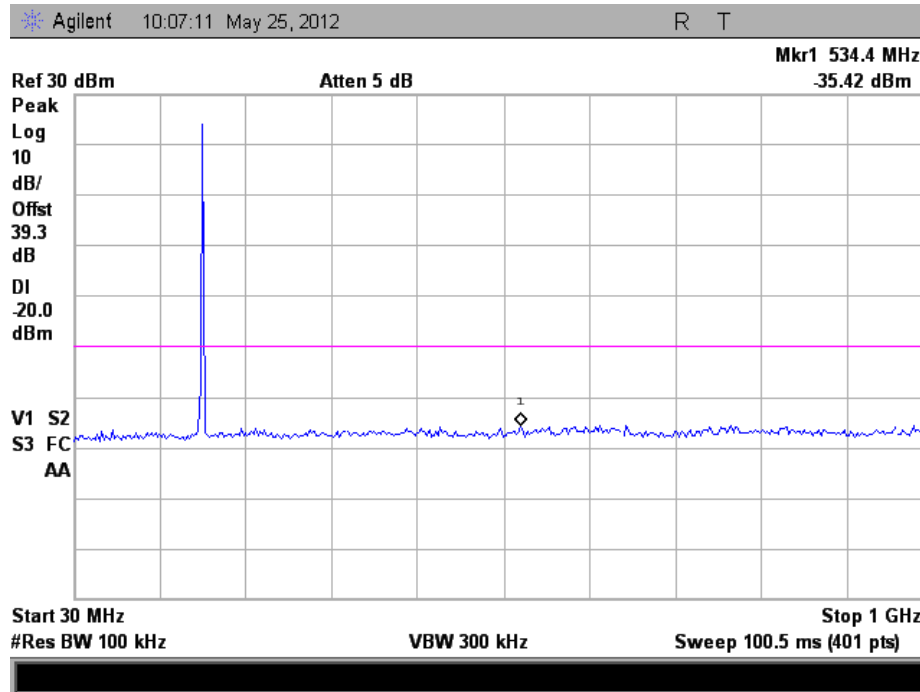


Tuned Frequency = 162 MHz
1 - 2 GHz

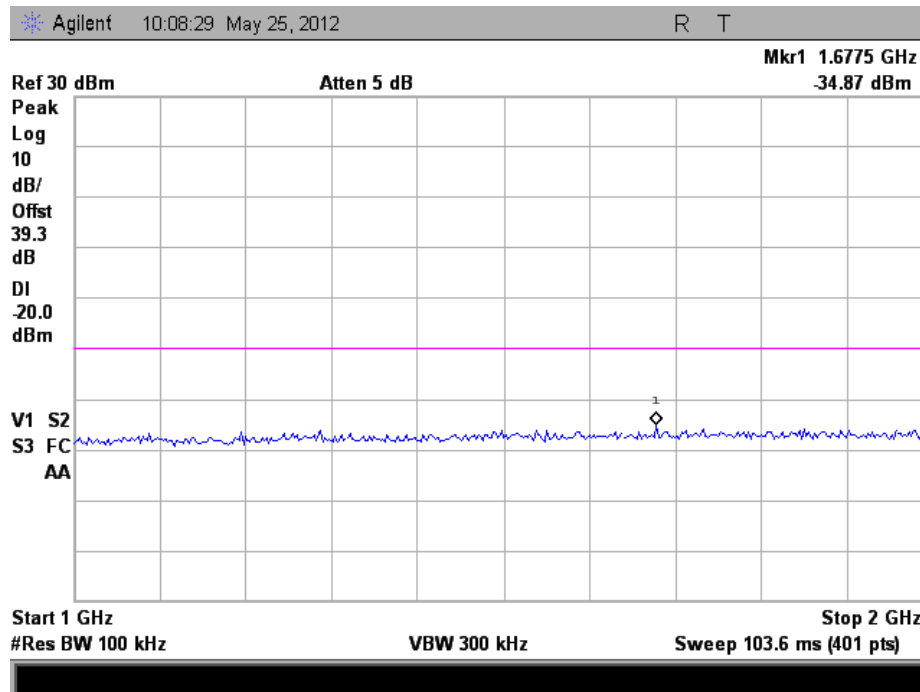




Tuned Frequency = 174 MHz
30 MHz – 1 GHz



Tuned Frequency = 174 MHz
1 - 2 GHz





Emission Masks (Occupied Bandwidth)

Name of Test: Emission Masks (Occupied Bandwidth)

Engineer: Greg Corbin

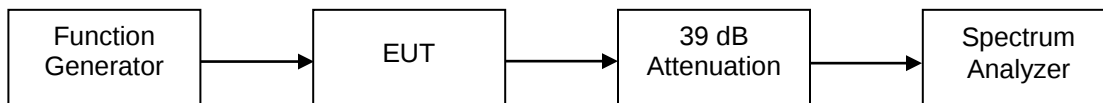
Test Equipment Utilized: i00118, i00172, i00379

Test Date: 5/17/2012, 5/25/2012

Measurement Procedure

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 3000 Hz sinewave at a level of 1.2 v p-p was input to pins 3 and 4 of the J4 I/O connector, this is the audio input. The deviation in the control software was set to 1900 Hz.

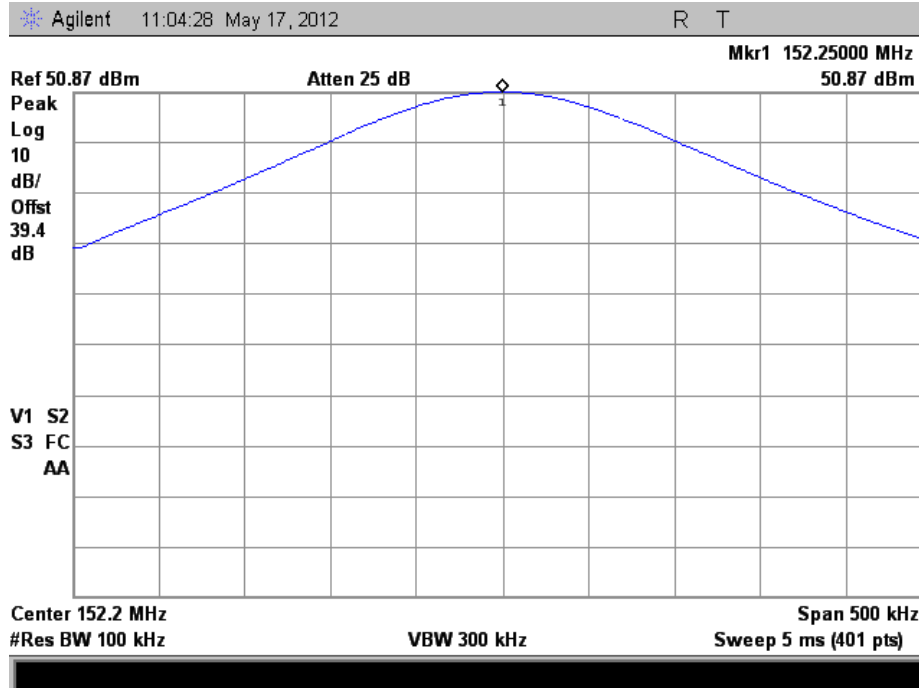
Test Setup



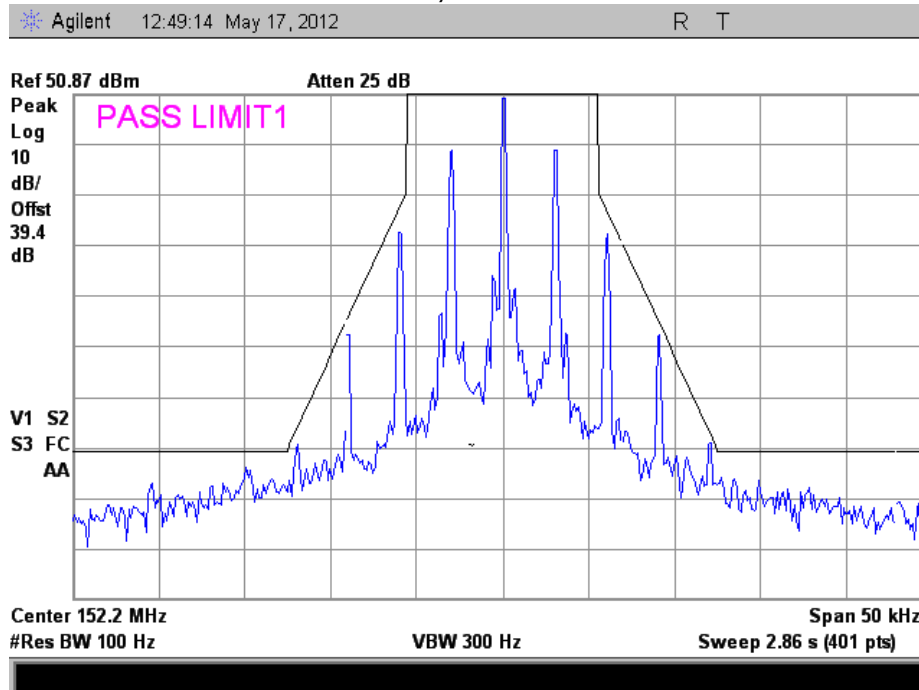


Occupied Bandwidth Plots

Reference 152.25 MHz

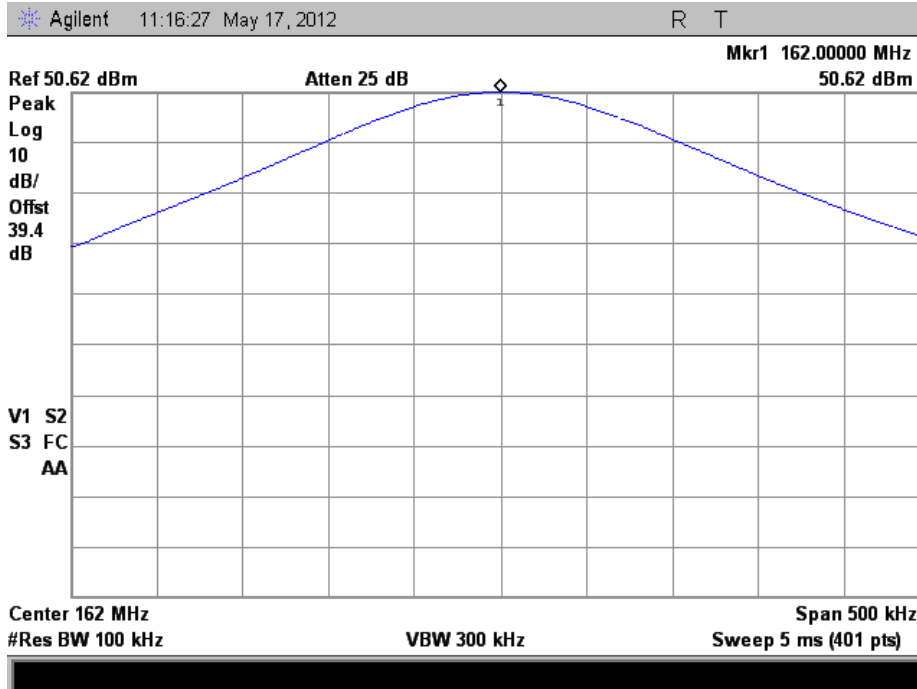


Mask D, 152.25 MHz

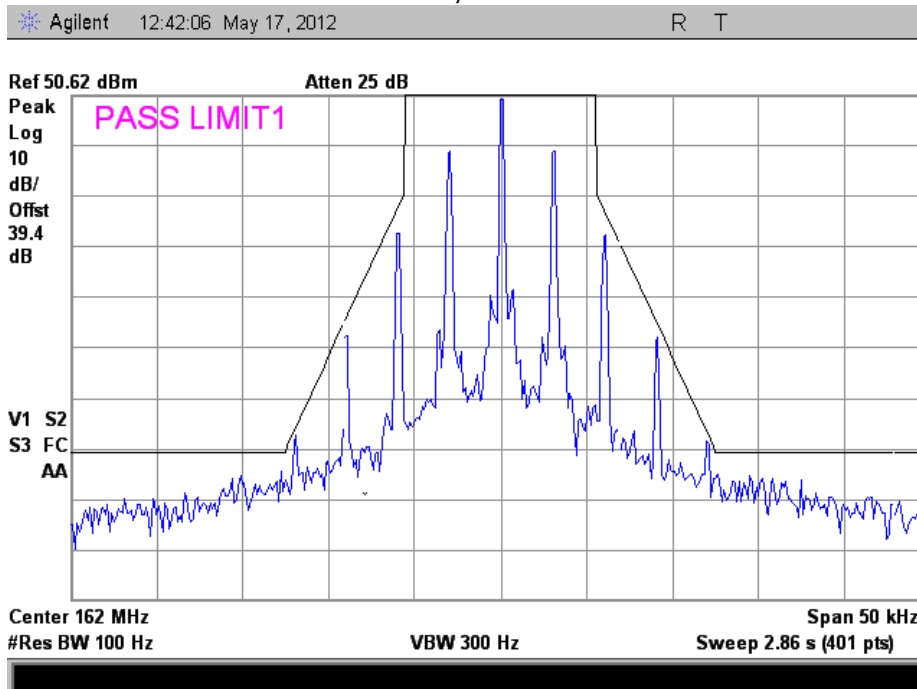




Reference 162 MHz

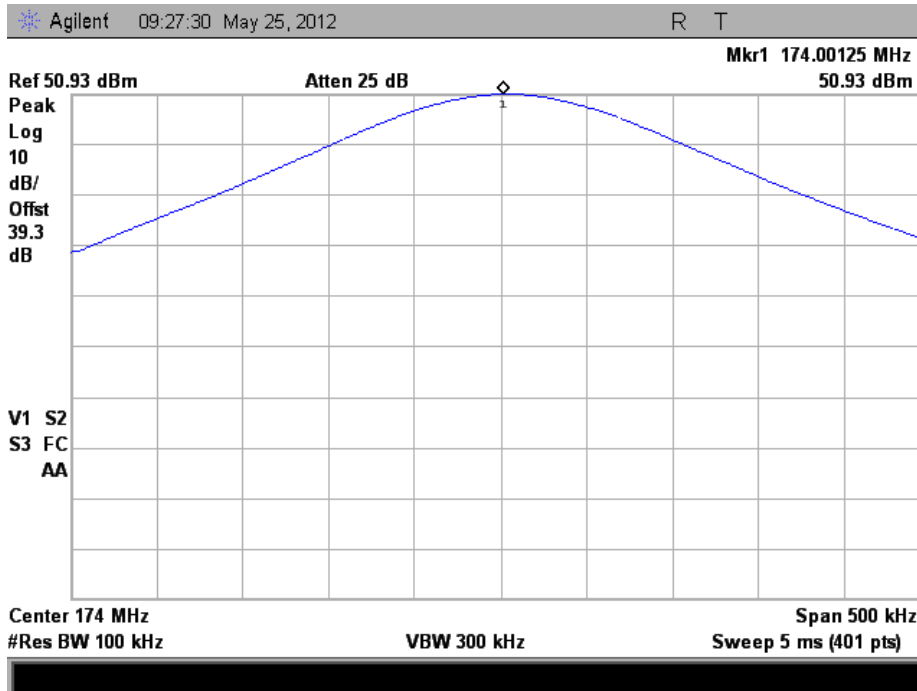


Mask D, 162 MHz

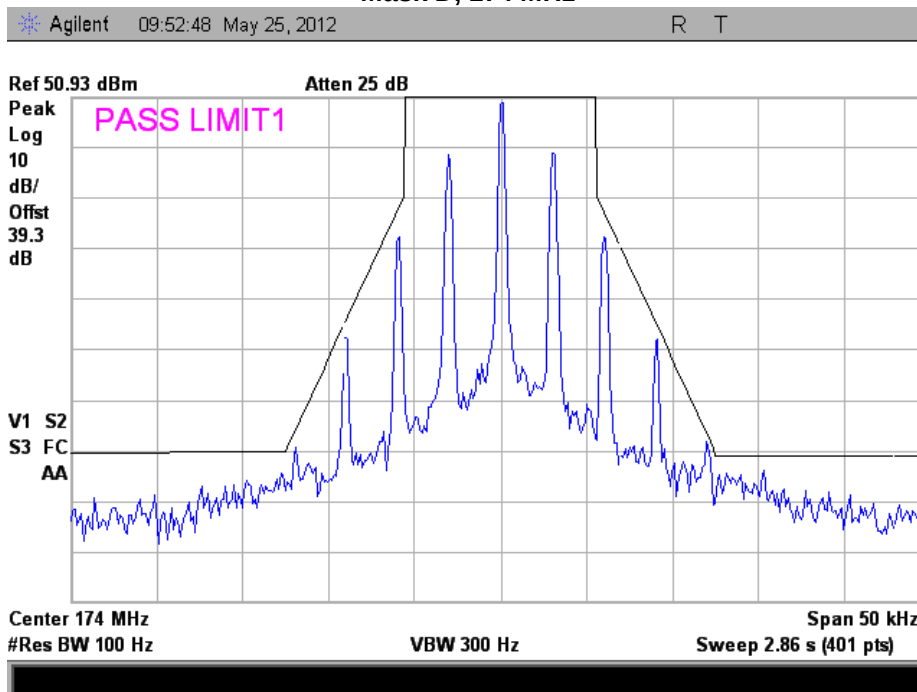




Reference 174 MHz



Mask D, 174 MHz





Necessary Bandwidth Calculations

Name of Test: Necessary Bandwidth Calculations
Specification 2.202

Engineer: Greg Corbin

Test Date: 5/17/2012

Modulation = 9K80F3E

Necessary Bandwidth Calculation:

Maximum Modulation (M), kHz	=	3
Maximum Deviation (D), kHz	=	1.9
Constant Factor (K)	=	1
Necessary Bandwidth (B_N), kHz	=	$(2 \times M) + (2 \times D \times K)$
	=	9.8



Test Equipment Utilized

Description	Manufacturer	Model Number	CT Asset #	Last Cal Date	Cal Due Date
Function Generator	HP	33120A	i00118	Verified on: 5/17/12	
Tunable Notch Filter	Eagle	TNF-1-(250-850MHz)	i00124	Verified on: 5/17/12	
Attenuator – 30 dB 2000 watt	Bird	8329	i00172	Verified on: 5/17/12	
Humidity / Temp Meter	Newport	IBTHX-W-5	i00282	11/5/11	11/5/12
EMI Analyzer	Agilent	E7405A	i00379	12/14/11	12/14/12
Attenuator – 9 dB, 2W	Narda	757C	None	Verified on: 5/17/12	

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