Flom Test Lab
EMI, EMC, RF Testing Experts Since 1963

toll-free: (866) 311-3268
fax: (480) 926-3598
www.flomlabs.com
info@flomlabs.com

Date: March 9, 2009

Applicant: Thales Communications, Inc.
22605 Gateway Center Drive
Clarksburg, MD 20871

Attention of: Eric R. Hooker, Principal Engineer
(240) 864-7377
email: eric.hooker@thalescomminc.com

Equipment: Liberty
FCC ID: OKC-4102023501
FCC Rules: 22, 74, 80, 90

Gentlemen:

Enclosed please find your copy of the Engineering Test Report for which you are subject to the restrictions as listed on the attached summary.

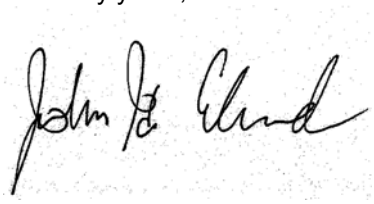
Once a Telecommunication Certification Body (TCB) issues a Grant the Federal Communication Commission (FCC) has 30 days to review the application and request added information. It is your decision whether or not to market the equipment subject to a possible recall before the end of the 30 days.

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.

Thank you.

Sincerely yours,



John Erhard

Summary of Restrictions

1. All submissions to the FCC are subject to **their** Examiner's interpretation.

2. Please allow from 60 to 90 days before hearing from the FCC with regard to any submission.

3. The FCC can set aside any action; modify or set aside any action, within 30 days. (FCC Rule 1.108, 1.113).

4. Under Rule 2.803, if device is not type accepted/certificated then it must **not** be sold, leased, offered for sale, imported, shipped or distributed or advertised for sale.

5. FCC can revoke its certificates at any time if the equipment does not meet or **continue** to meet their Rules. (Rule Parts 2.927, 2.939).

6. FCC can request a sample at any time (2.936).

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Date: March 9, 2009

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

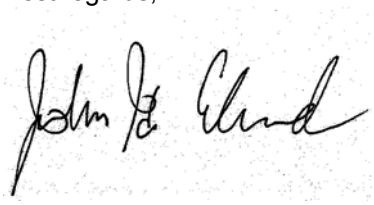
Applicant: Thales Communications, Inc.
Equipment: Liberty
FCC ID: OKC-4102023501
FCC Rules: 22, 74, 80, 90

Dear Gentleman:

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.

Best regards,



John Erhard

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

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Test Report

for

FCC ID: OKC-4102023501

Model: Liberty

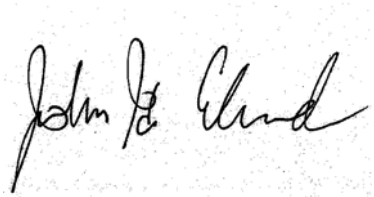
to

Federal Communications Commission

Rule Part(s) 22, 74, 80, 90

Date of report: March 9, 2009

On the Behalf of the Applicant:	Thales Communications, Inc.
At the Request of:	Thales Communications, Inc. 22605 Gateway Center Drive Clarksburg, MD 20871
Attention of:	Eric R. Hooker, Principal Engineer (240) 864-7377 email: eric.hooker@thalescomminc.com



Reviewed by: John Erhard

Test Report Revision History

Revision	Date	Revised By	Reason for revision
1.0	March 9, 2009	J Erhard	Original Document
2.0	March 17, 2009	J Erhard	Edit test report adding test frequency of 406.2.2 MHz
3.0	March 24, 2009	J Erhard	Add industry Canada Masks for 25 KHz channels

List of Exhibits

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

Applicant: Thales Communications, Inc.

FCC ID: OKC-4102023501

By Applicant:

1. Letter of Authorization

2. Confidentiality Request: 0.457 And 0.459

3. Identification Drawings, 2.1033(c)(11)
   - Label
   - Location of Label
   - Compliance Statement
   - Location of Compliance Statement

4. Photographs, 2.1033(c)(12)

5. Documentation: 2.1033(c)
   - (3) User Manual
   - (9) Tune Up Info
   - (10) Schematic Diagram
   - (10) Circuit Description
   - Block Diagram
   - Parts List
   - Active Devices

6. MPE/SAR Report

By F.T.L.:

A. Testimonial & Statement of Certification

The Applicant has been cautioned as to the following:

15.21 **Information to the 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.

Flom Test Lab

Testimonial and Statement of Certification

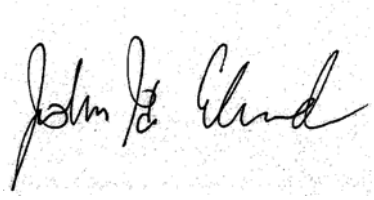
This is to Certify:

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.

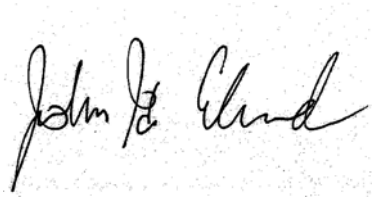


Certifying Engineer: John Erhard

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

Table of Contents

Required information per ISO 17025-2005, paragraph 5.10.2:

a)	**Test Report**
b) Laboratory: (FCC: 31040/SIT) (Canada: IC 2044-A)	Flom Test Lab 3356 N. San Marcos Place, Suite 107 Chandler, AZ 85225
c) Report Number:	d0930008
d) Client:	Thales Communications, Inc. 22605 Gateway Center Drive Clarksburg, MD 20871
e) Identification: EUT Description:	Liberty FCC ID: OKC-4102023501 Multi Band Land Mobile Radio
f) EUT Condition:	Not required unless specified in individual tests.
g) Report Date:	March 9, 2009
h, j, k):	As indicated in individual tests.
i) Sampling method:	No sampling procedure used.
l) Measurement Uncertainty:	In accordance with FTL internal quality manual.
m) Reviewed by:	 John Erhard
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.

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: 22, 74, 80, 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/TIA-603-C-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.

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

A2LA

"A2LA has accredited Flom Test Labs, 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 for current scope of accreditation.

Certificate number: 2152.01

ACCREDITED
CERT NO: 2152-01

FCC OATS Reg. #933597

IC Reg. # 2044A-1

List of General Information Required for Certification

In Accordance with FCC Rules and Regulations,
Volume II, Part 2 and to 22, 74, 80, 90Sub-part 2.1033

(c)(1):

Name and Address of Applicant: Thales Communications, Inc.
22605 Gateway Center Drive
Clarksburg, MD 20871

Manufacturer: Thales Communications, Inc.
22605 Gateway Center Drive
Clarksburg, MD 20871

(c)(2):**FCC ID**: OKC-4102023501

Model Number: Liberty

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

Please see attached exhibits

(c)(4): **Type of Emission**: FM, C4FM (digital)

(c)(5): **Frequency Range, MHz**: 136-174, 380-520, 763-775, 793-805- 806-824, 851-869

(c)(6): **Power Rating, Watts**: 5.3 W

____ Switchable x Variable ____ N/A

Antenna Gain: 136 – 174 MHz = -8 dBi
380 – 520 = -2 dBi
763 – 869; -3 dBi

FCC Grant Note: EF

(c)(7): **Maximum Allowable Power, Watts**: Manufacturer declaration +20% tolerance 90.205(r)

DUT Results: Passes x Fails _____

Subpart 2.1033 (continued)

(c)(8): Voltages & currents in all elements in final RF stage, including final transistor or solid-state device:

Collector Current, A	=	1.4
Collector Voltage, Vdc	=	10.8
Supply Voltage, Vdc	=	10.8

(c)(9): **Tune-Up Procedure**:

Please see attached exhibits

(c)(10): **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)(11): **Label Information**:

Please see attached exhibits

(c)(12): **Photographs**:

Please see attached exhibits

(c)(13): **Digital Modulation Description**:

___ Attached Exhibits
_x_ N/A

(c)(14): **Test and Measurement Data**:

Follows

Test Results Summary

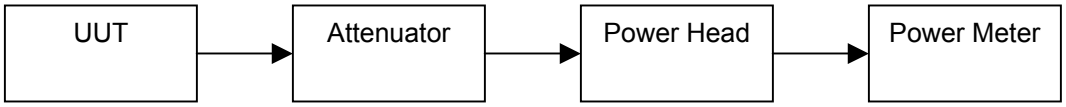
Specification	Test Name	Pass, Fail, N/A	Comments
2.1046	Carrier Output Power (Conducted)	Pass	
2.1051	Unwanted Emissions (Transmitter Conducted)	Pass	
2.1053	Field Strength of Spurious Radiation	Pass	
90.210	Emission Masks (Occupied Bandwidth)	Pass	
2.1047	Audio Low Pass Filter (Voice Input)	Pass	
2.1047	Audio Frequency Response	Pass	
2.1047	Modulation Limiting	Pass	
90.543(a)	Adjacent Channel Power Rejection Ratio	Pass	
90.543(e)	Adjacent Channel Power Rejection Ratio	Pass	
90.543(f)	Adjacent Channel Power Rejection Ratio	Pass	
90.213	Frequency Stability (Temperature Variation)	Pass	
90.213	Frequency Stability (Voltage Variation)	Pass	

Name of Test: Carrier Output Power (Conducted)
Specification: 2.1046 **Engineer: J Erhard**
Test Equipment Utilized: i00228, i00344 **Test Date: 3/6/2009**

Measurement Procedure

The Unit Under Test (UUT) was connected to a power meter input. The peak readings were taken and the result was then compared to the limit.

Test Setup



High Power Transmitter Peak Output Power

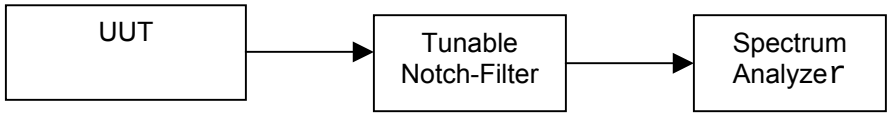
Tuned Frequency MHz	Measured Power dBm	Measured Power Watts	Limit Watts
138	37.2	5.2	6.0
150	37.2	5.2	6.0
157.5 (part 74, 80)	37.2	5.2	6.0
162 (part22)	37.2	5.2	6.0
174	37.2	5.2	6.0
380	37.3	5.4	6.0
406.2	37.3	5.4	6.0
430	37.3	5.4	6.0
470 (part 22, 74)	37.3	5.4	6.0
520	37.3	5.4	6.0
763	33.7	2.4	3.0
770	33.7	2.4	3.0
775	33.7	2.4	3.0
793	34.1	2.6	3.0
800	34.1	2.6	3.0
806	34.7	3.0	3.6
821	34.7	3.0	3.6
824	34.7	3.0	3.6
851	35.0	3.1	3.6
866	34.8	3.0	3.6
869	34.8	3.0	3.6

Name of Test: Conducted Spurious Emissions
Specification: 2.1051 **Engineer: J Erhard**
Test Equipment Utilized: i00331 **Test Date: 3/6/2009**

Test Procedure

The UUT 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 resolution bandwidth set for 100 kHz for measurements below 1 GHZ and 1 MHZ for measurements above 1 GHz. The reference level was adjusted to ensure the system had sufficient dynamic range to measure spurious emissions. The frequency range from 30 MHz to beyond the 10th harmonic of the fundamental transmitter was observed and plotted. The limit line was set for –25 dBm for comparison to RSS-119 which is the more stringent limit. In all plots the suppressed fundamental can be seen. The highest emission for each tuned frequency is indicated in the summary table with the limit of –25 for IC frequencies and –13 for FCC only frequencies.

Test Setup

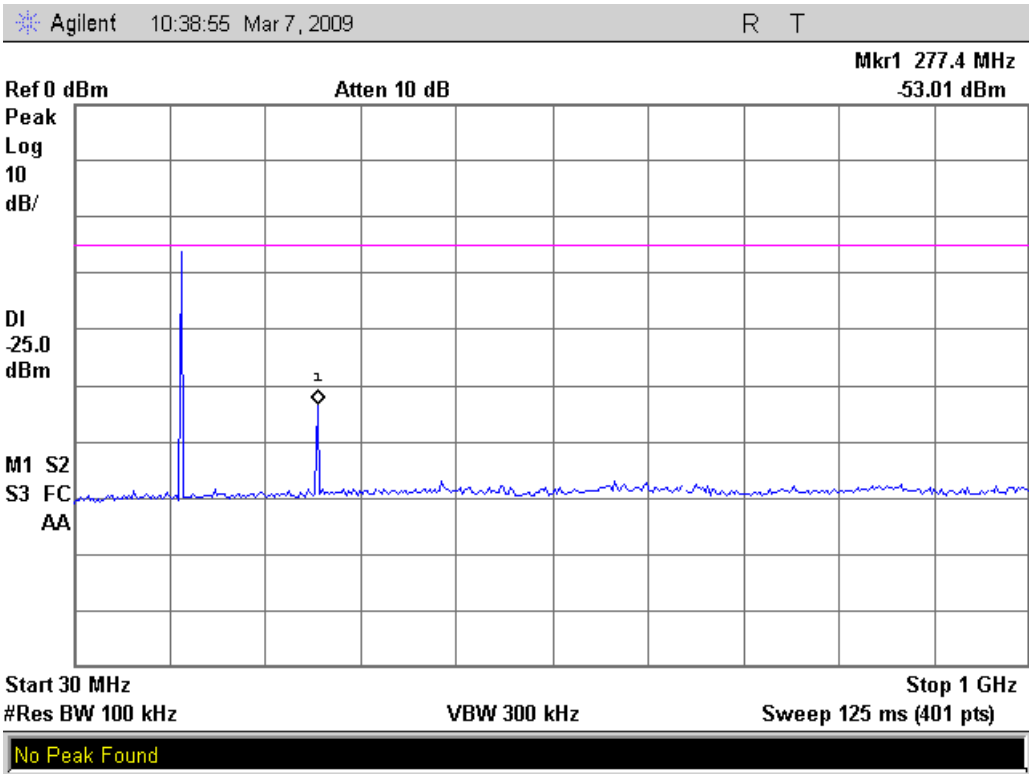


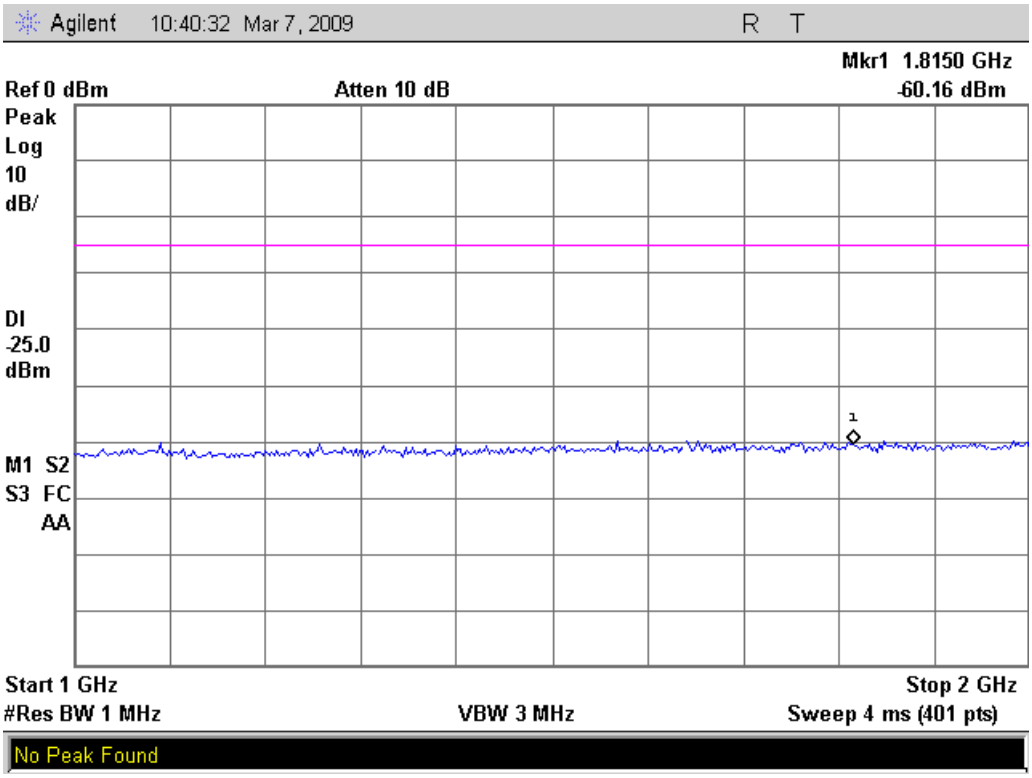
High Power Conducted Spurious Emissions Summary Test Table

Tuned Frequency MHz	Spurious Frequency MHz	Measured Spurious Level (dBm)	Specification Limit (dBm)	Result
138	277.4	-53.01	-25	Pass
150	1862.5	-60.50	-25	Pass
157.5 (part 74, 80)	317.7	-58.83	-25	Pass
162 (part22)	325.9	-58.33	-25	Pass
174	347.7	-57.31	-25	Pass
380	759.9	-50.47	-13	Pass
406.2	813.3	-55.24	-25	Pass
430	2960.0	-58.06	-25	Pass
470 (part 22, 74)	2950.0	-58.33	-25	Pass
520	2991.0	-57.48	-13	Pass
763	1525.0	-57.94	-25	Pass
770	2992.5	-57.32	-25	Pass
775	1542.5	-56.43	-25	Pass
793	1595.0	-55.90	-25	Pass
800	1600.0	-55.36	-25	Pass
806	8500.0	-58.93	-25	Pass
821	1638.0	-56.75	-25	Pass
824	1656.0	-56.7	-25	Pass
851	2980.0	-57.77	-25	Pass
866	2820.0	-57.84	-25	Pass
869	3100.0	-57.47	-25	Pass

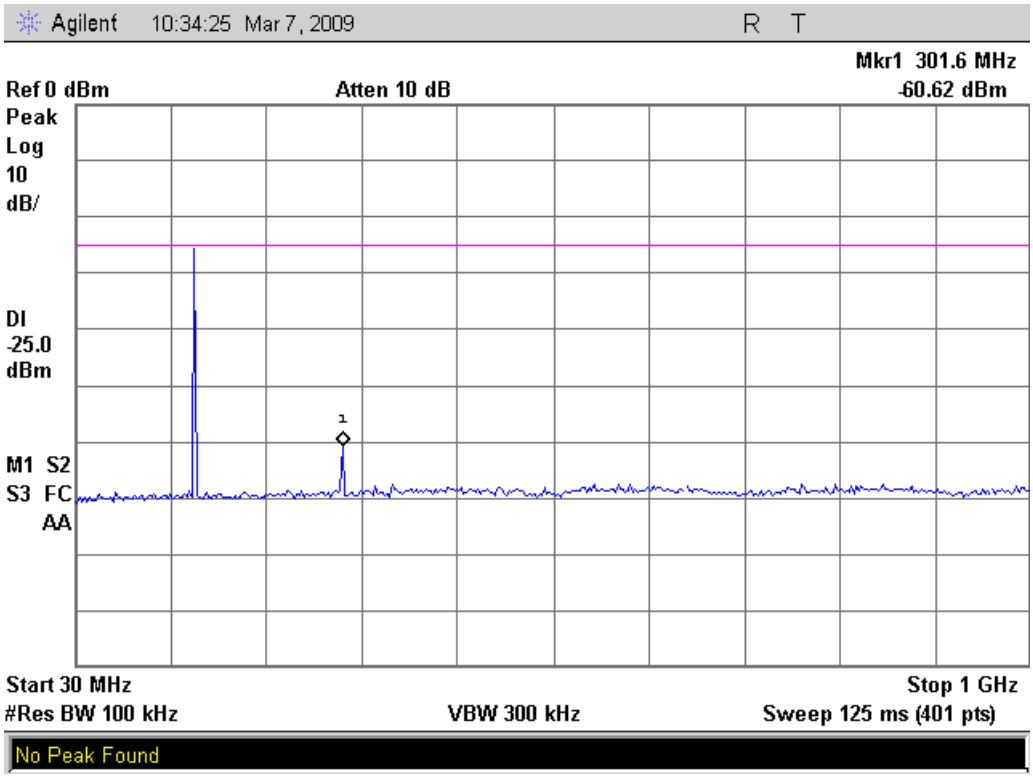
Test Plots

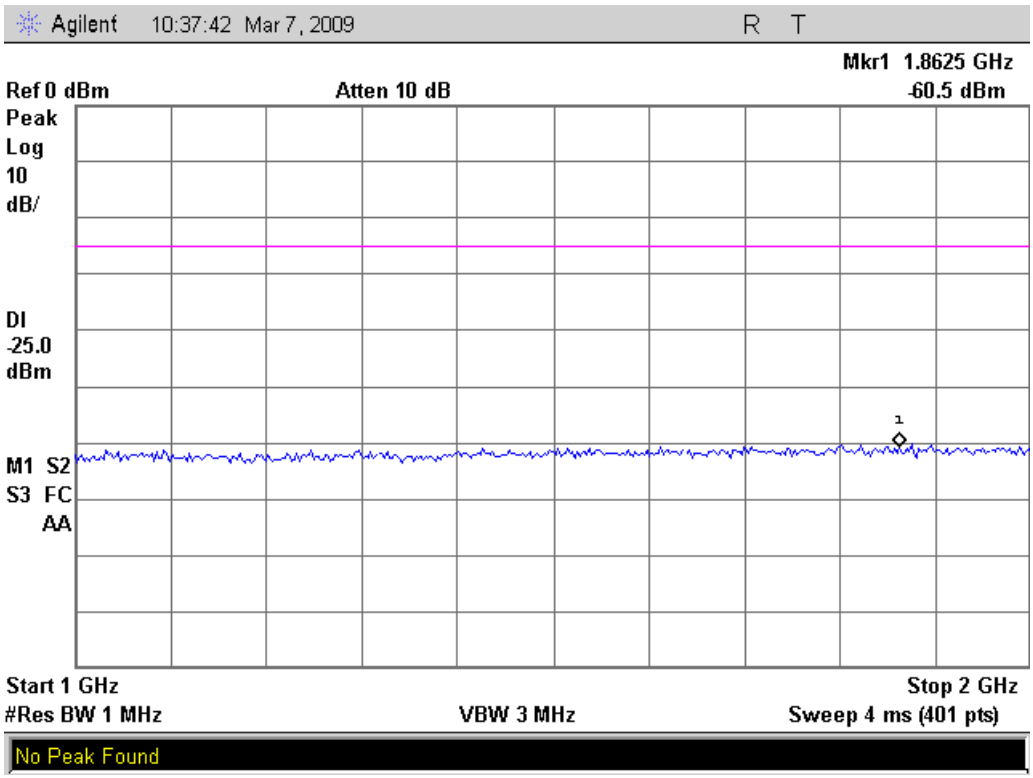
138MHz



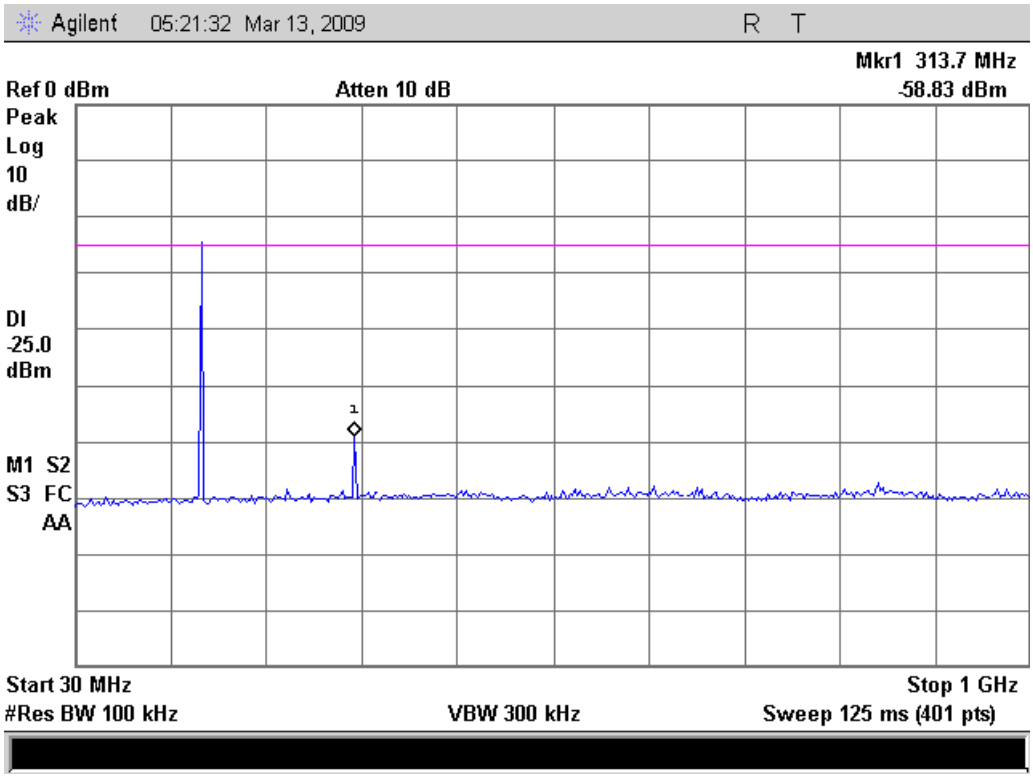


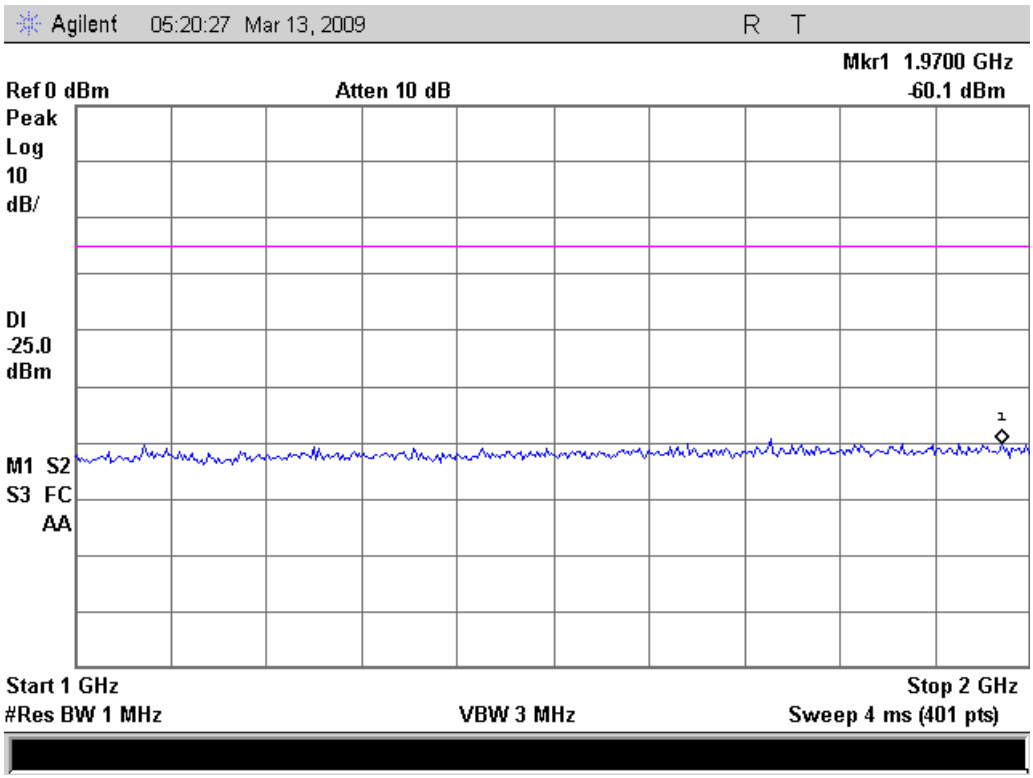
150 MHz (part 90)



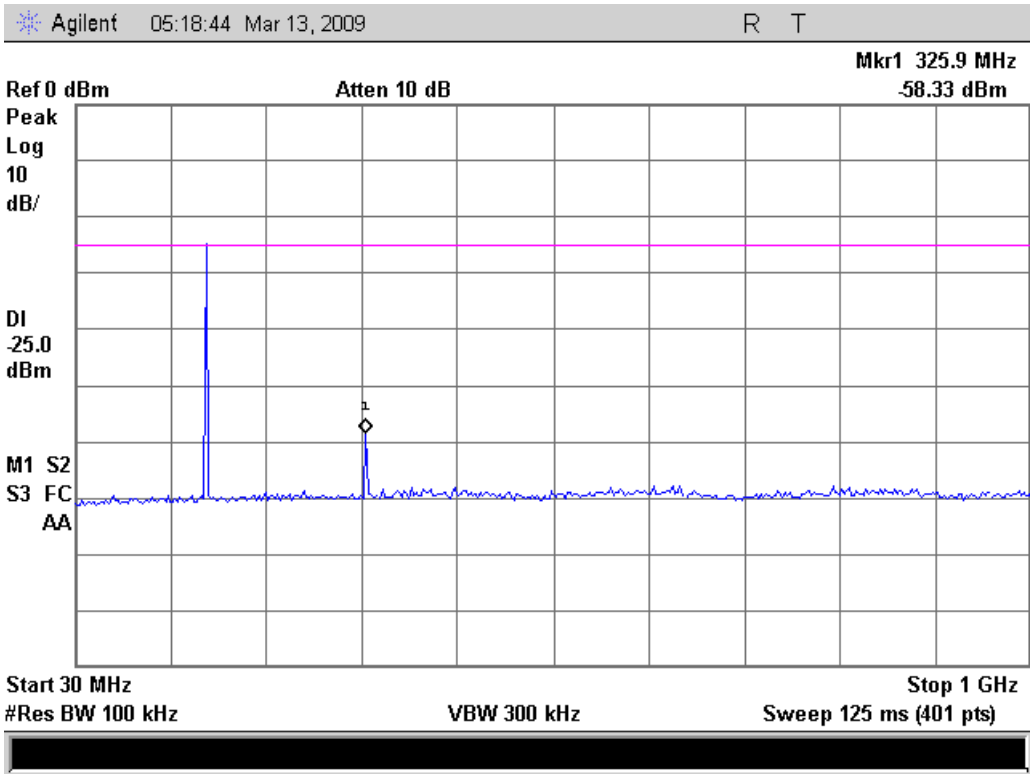


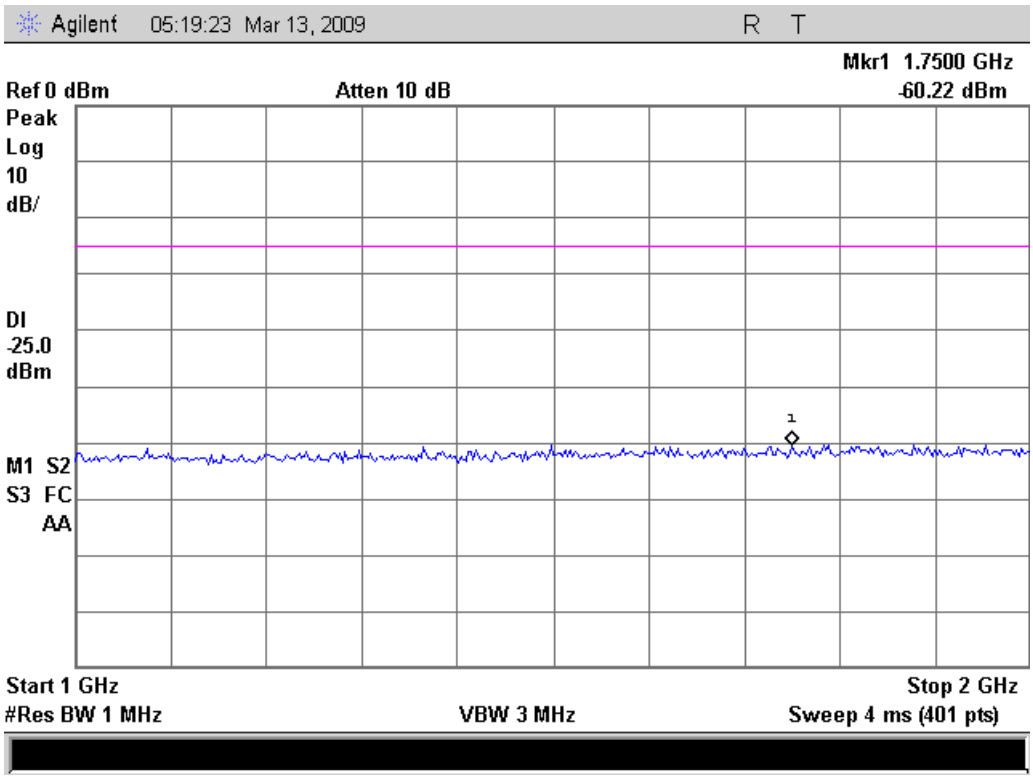
157.5 MHz (part 74, 80)



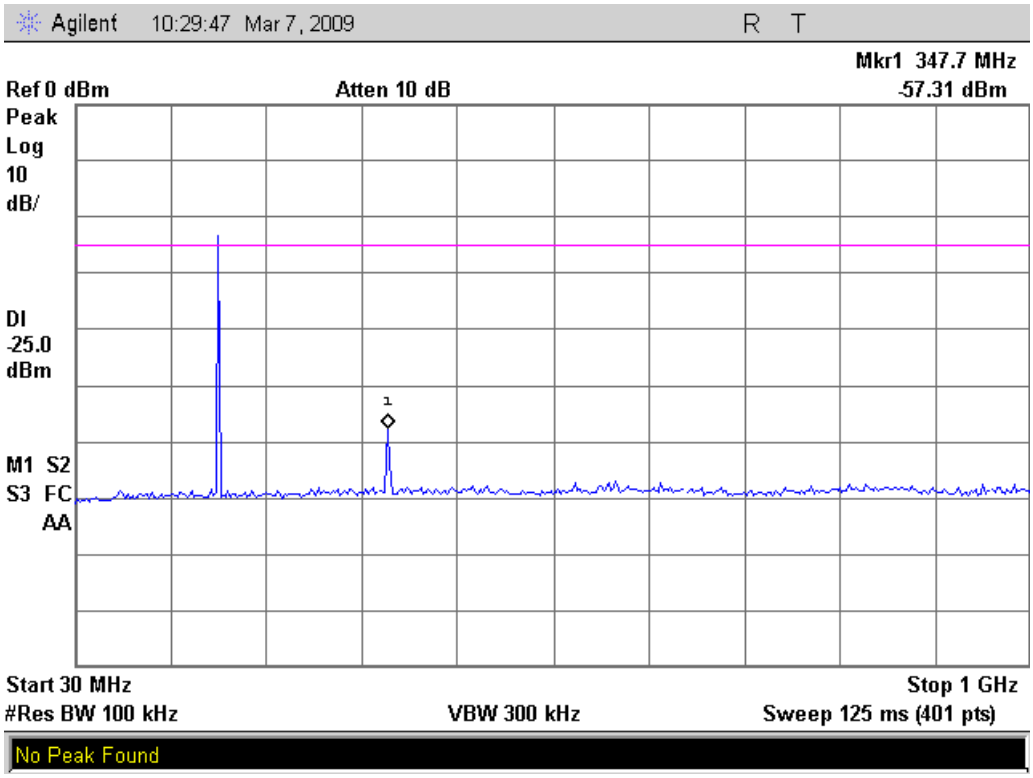


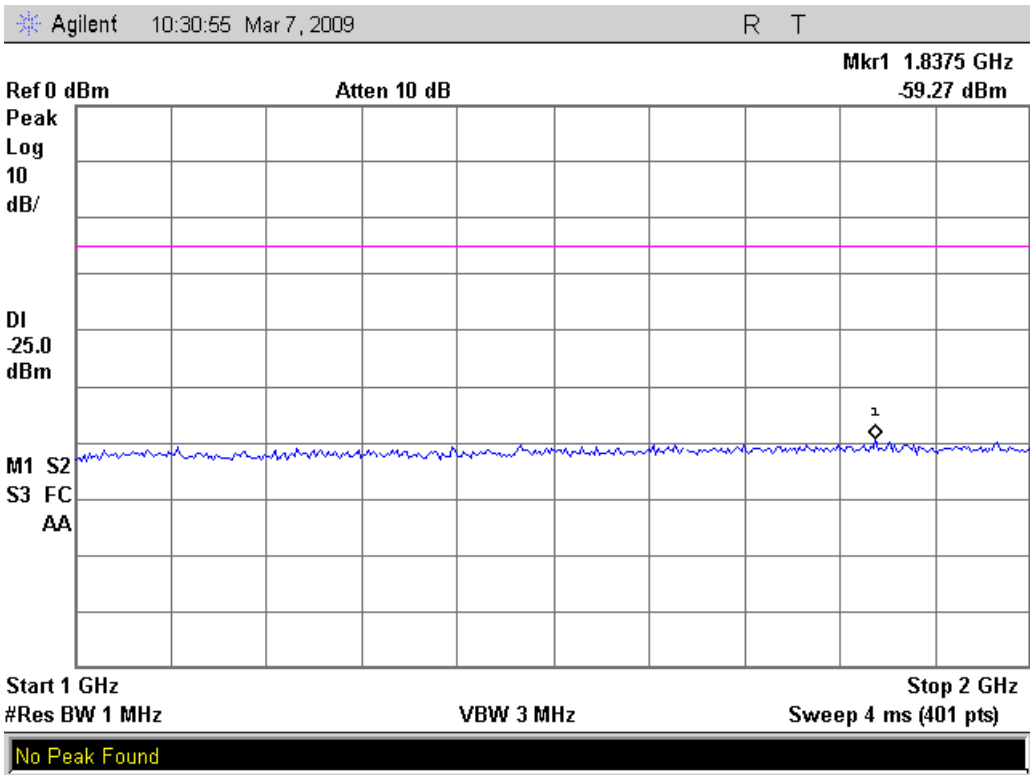
162 MHz (part22)



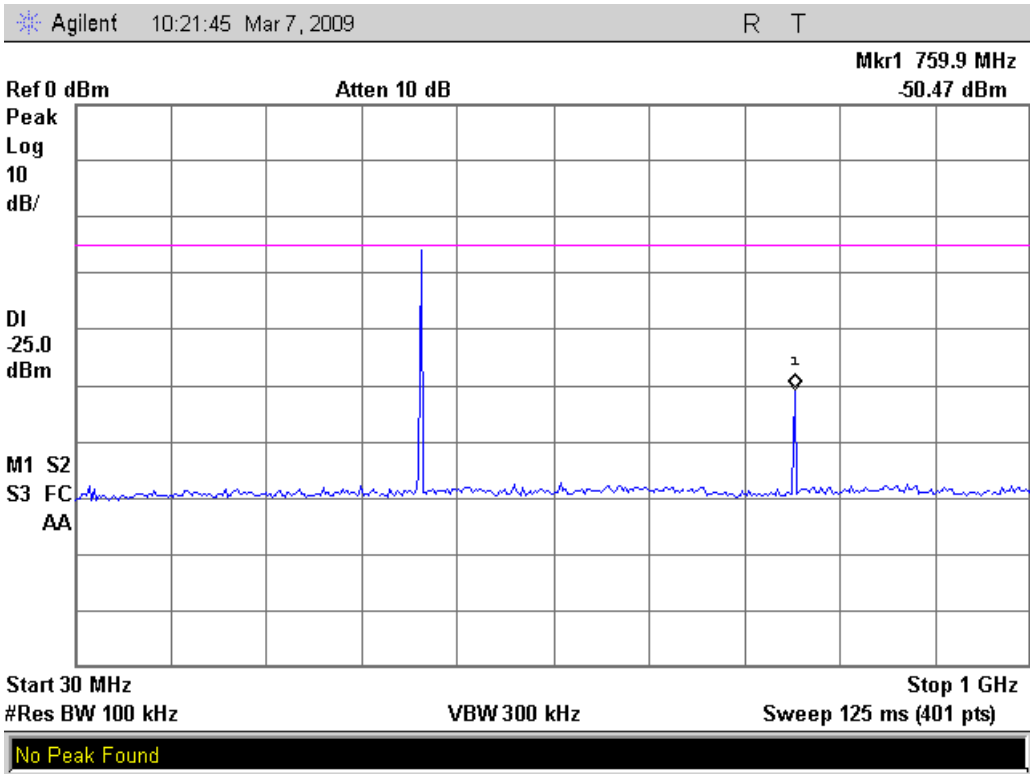


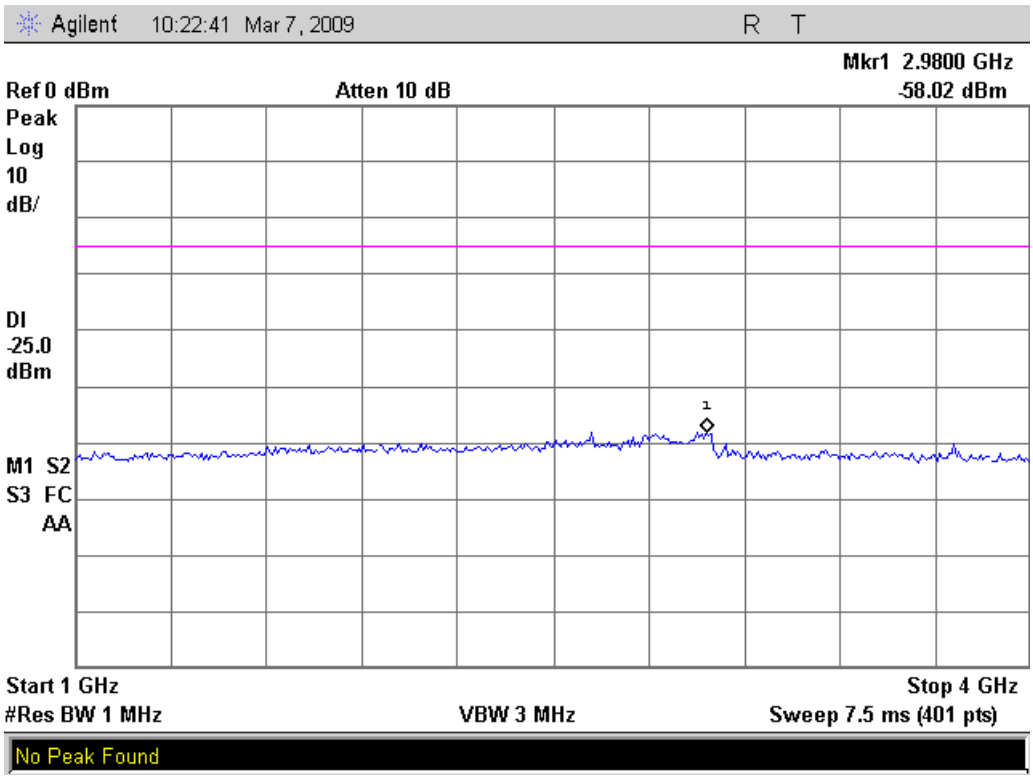
174 MHz


Agilent 10:29:47 Mar 7, 2009
R T
Mkr1 347.7 MHz
Ref 0 dBm
Atten 10 dB
-57.31 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

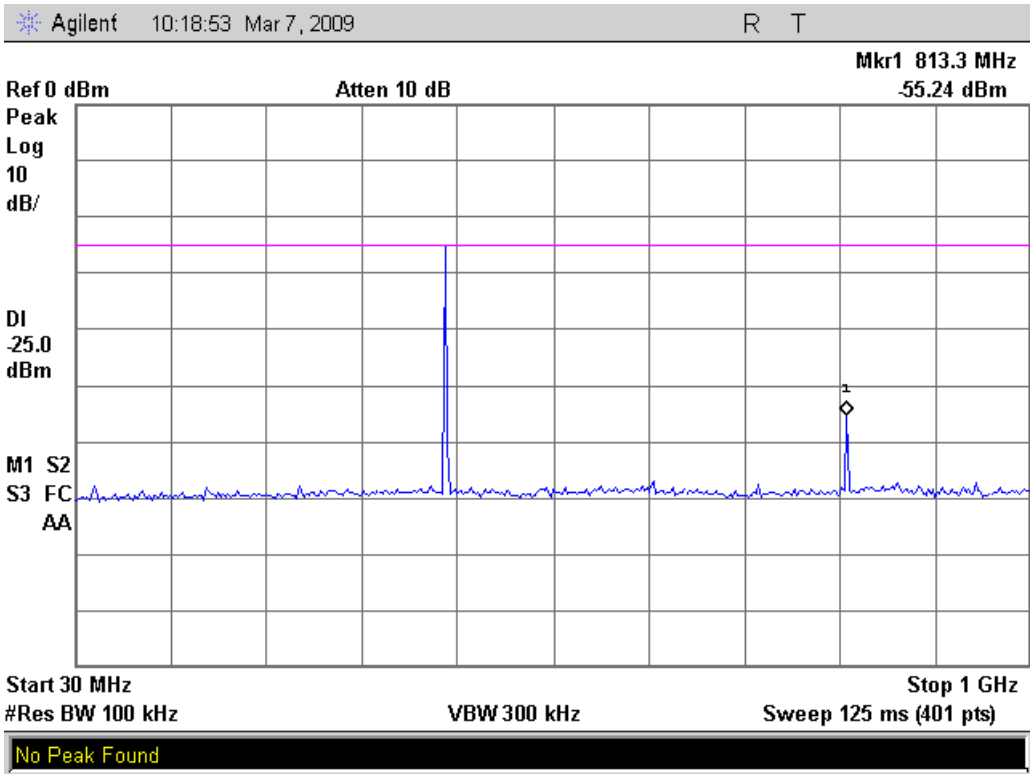

Agilent 10:30:55 Mar 7, 2009
R T
Mkr1 1.8375 GHz
Ref 0 dBm
Atten 10 dB
-59.27 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 2 GHz
Sweep 4 ms (401 pts)
No Peak Found

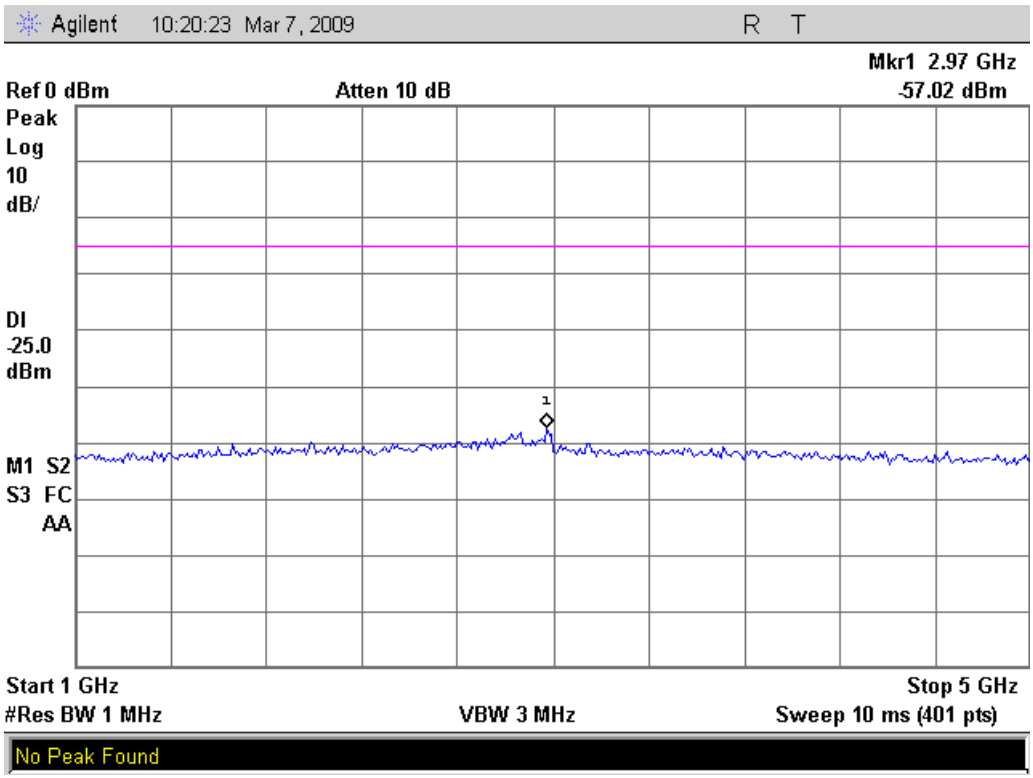
380 MHz


Agilent 10:21:45 Mar 7, 2009
R T
Mkr1 759.9 MHz
Ref 0 dBm
Atten 10 dB
-50.47 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

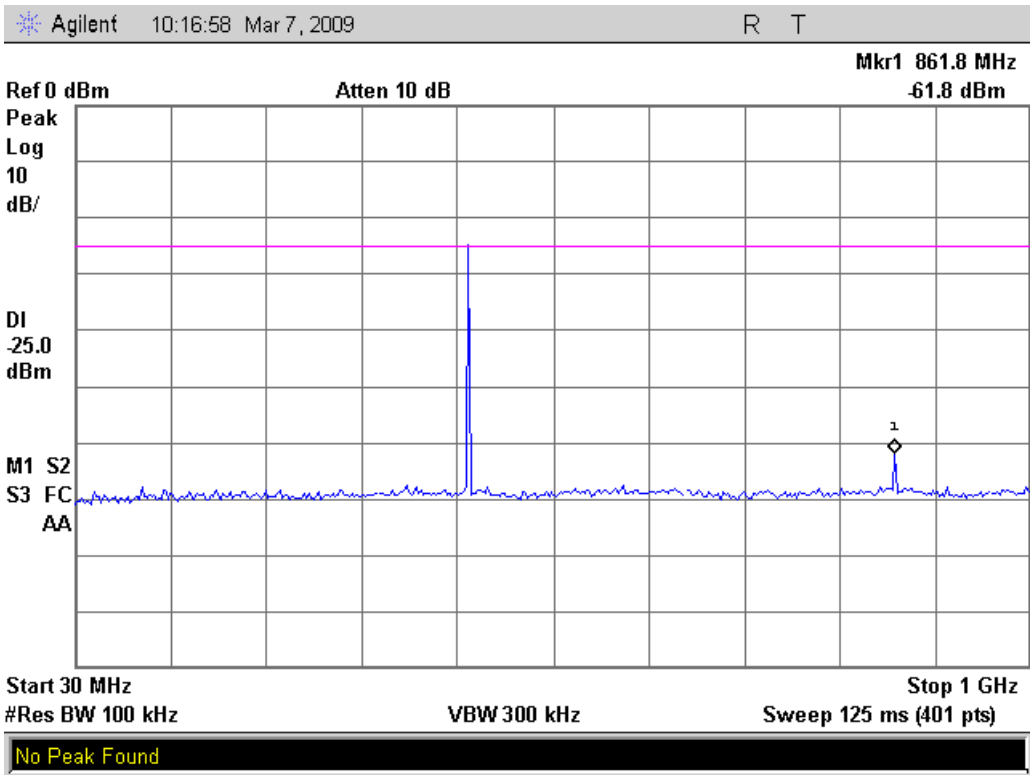

Agilent 10:22:41 Mar 7, 2009
R T
Mkr1 2.9800 GHz
Ref 0 dBm
Atten 10 dB
-58.02 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 4 GHz
Sweep 7.5 ms (401 pts)
No Peak Found

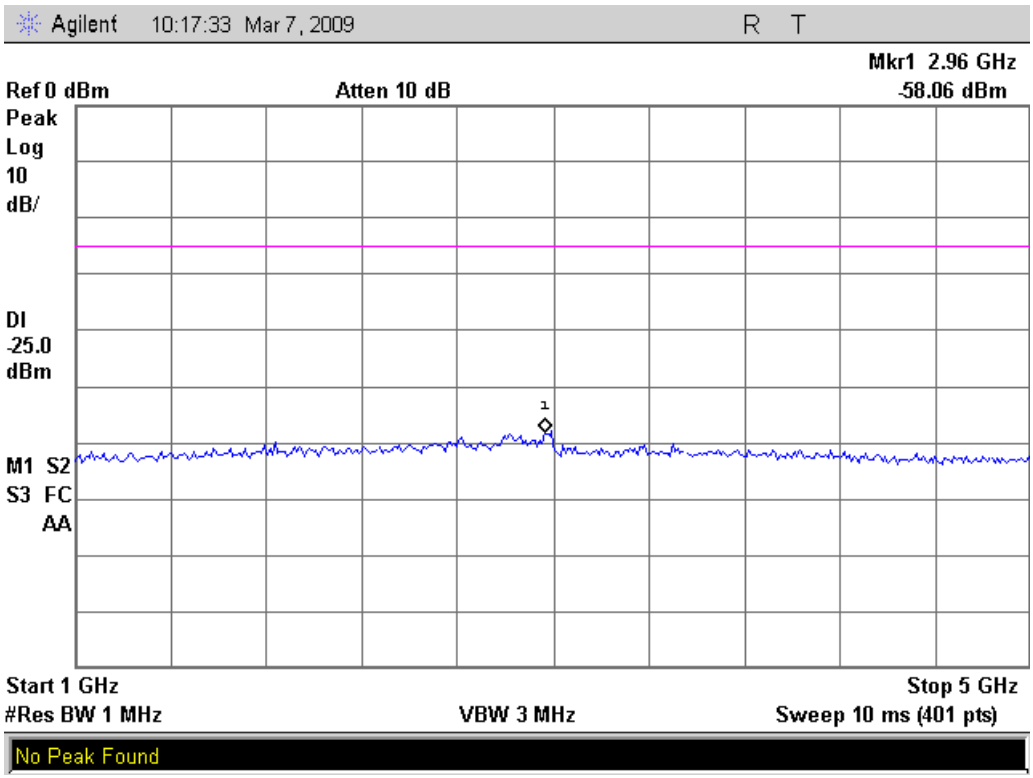
406.2 MHz


Agilent 10:18:53 Mar 7, 2009
R T
Mkr1 813.3 MHz
Ref 0 dBm
Atten 10 dB
-55.24 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

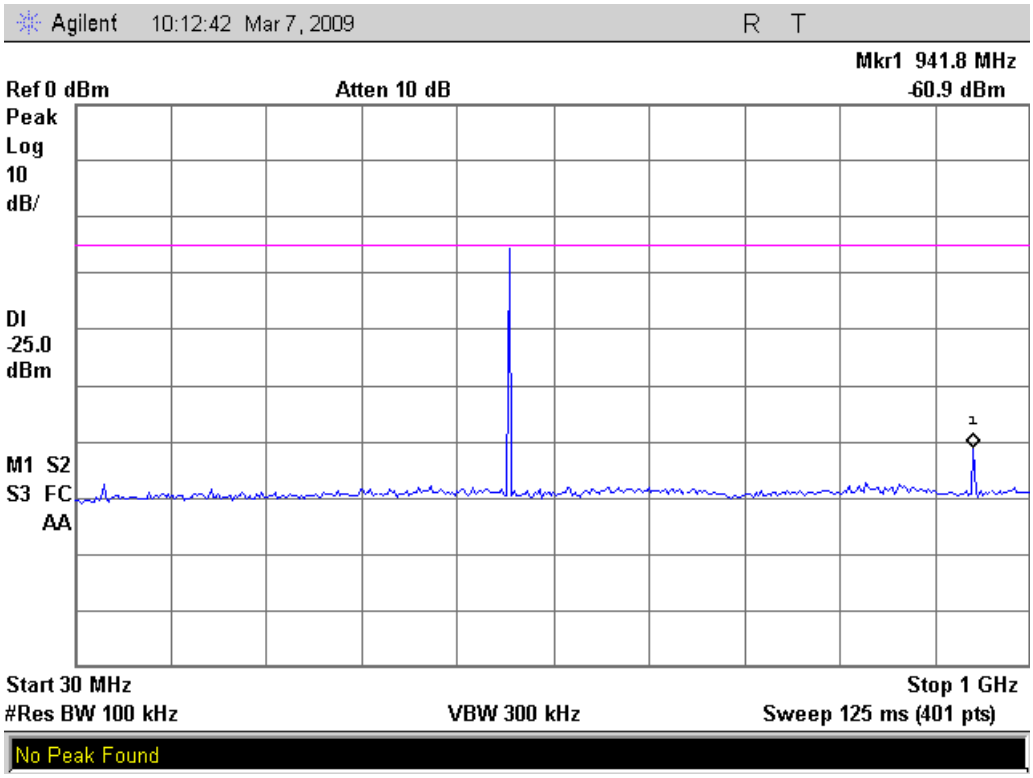

Agilent 10:20:23 Mar 7, 2009
R T
Mkr1 2.97 GHz
Ref 0 dBm
Atten 10 dB
-57.02 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 5 GHz
Sweep 10 ms (401 pts)
No Peak Found

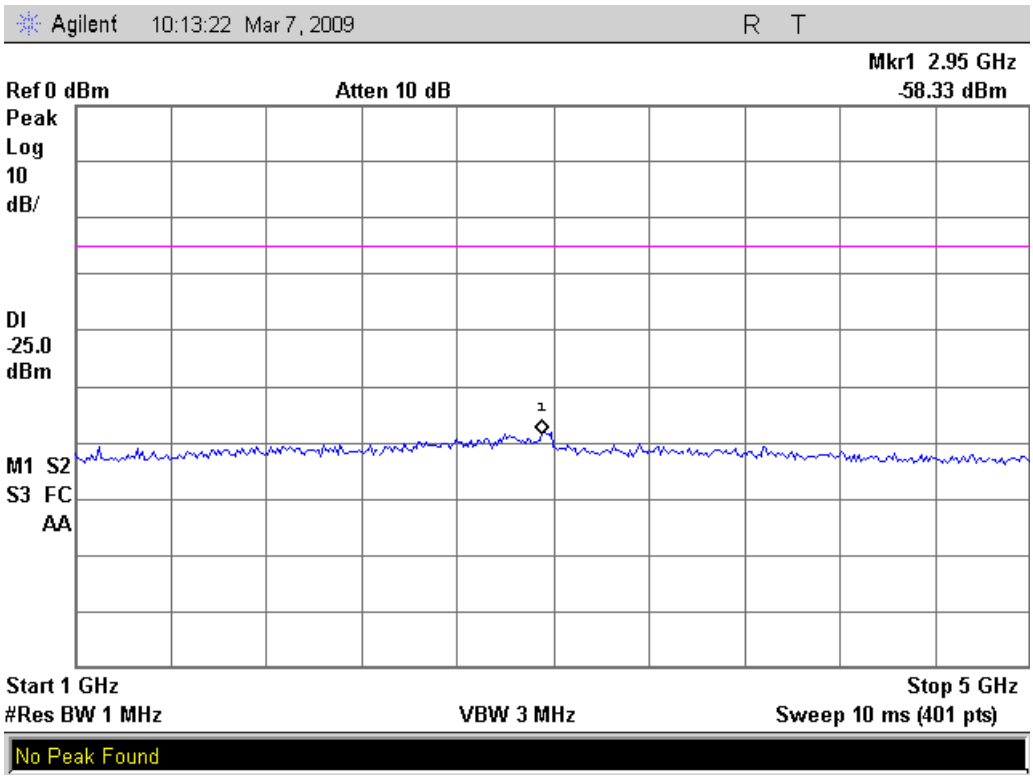
430 MHz


Agilent 10:16:58 Mar 7, 2009
R T
Mkr1 861.8 MHz
Ref 0 dBm
Atten 10 dB
-61.8 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
1
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

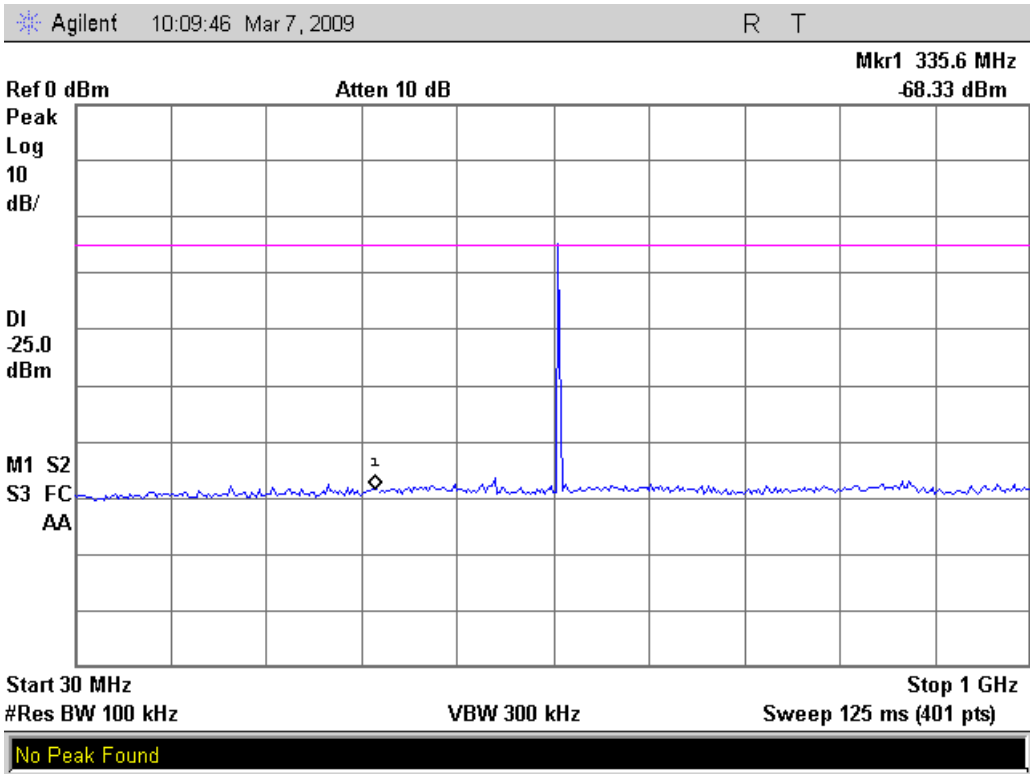

Agilent 10:17:33 Mar 7, 2009
R T
Mkr1 2.96 GHz
Ref 0 dBm
Atten 10 dB
-58.06 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
1
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 5 GHz
Sweep 10 ms (401 pts)
No Peak Found

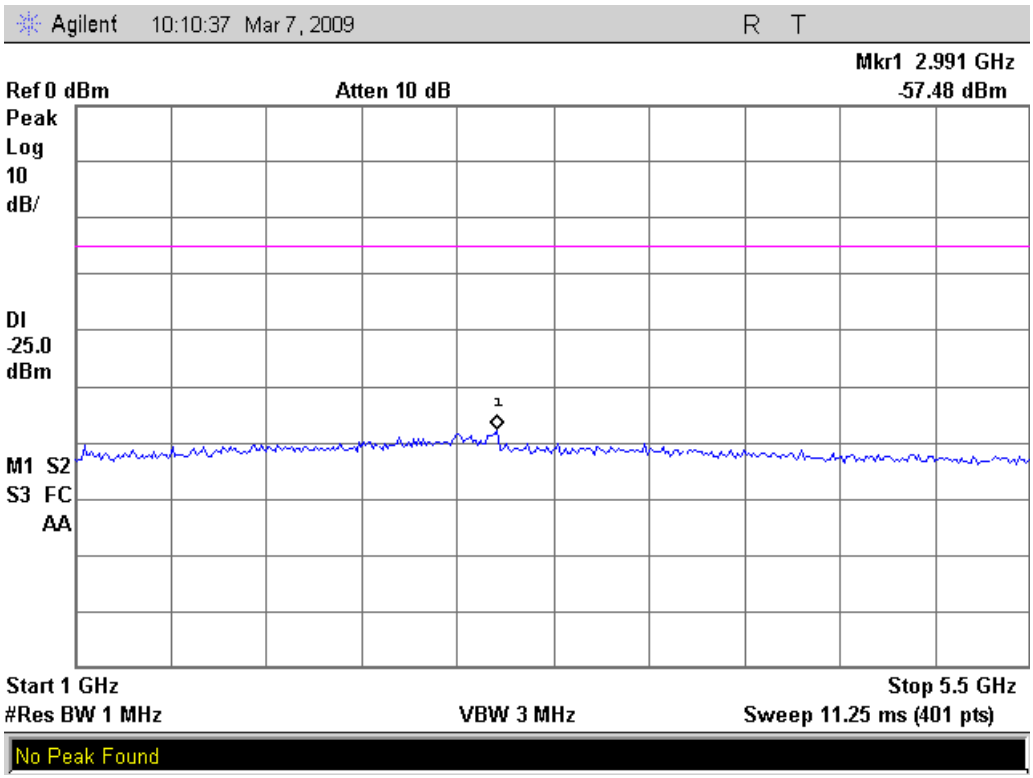
470 MHz (part 22, 74)



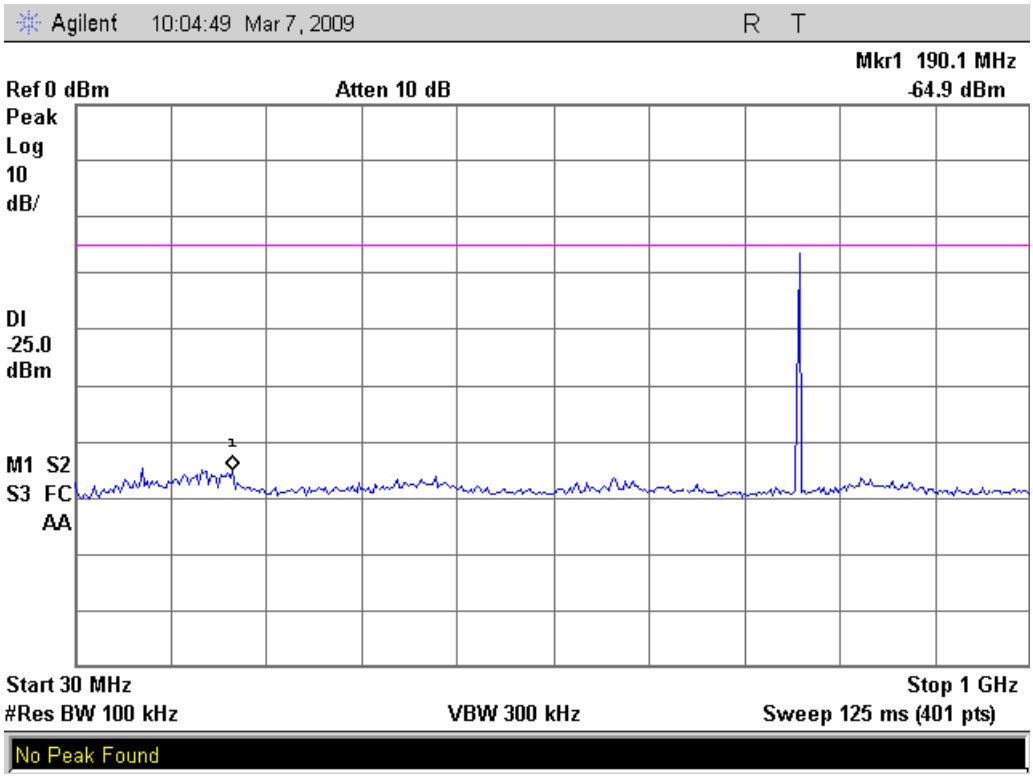


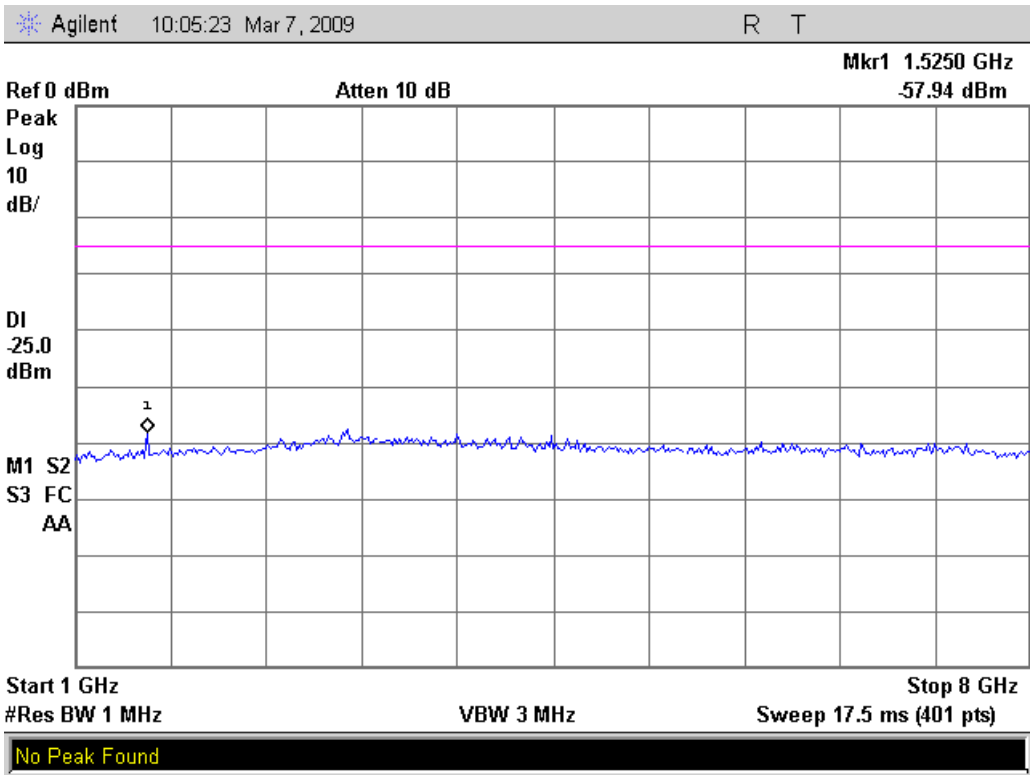
520 MHz


Agilent 10:09:46 Mar 7, 2009
R T
Mkr1 335.6 MHz
Ref 0 dBm
Atten 10 dB
-68.33 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

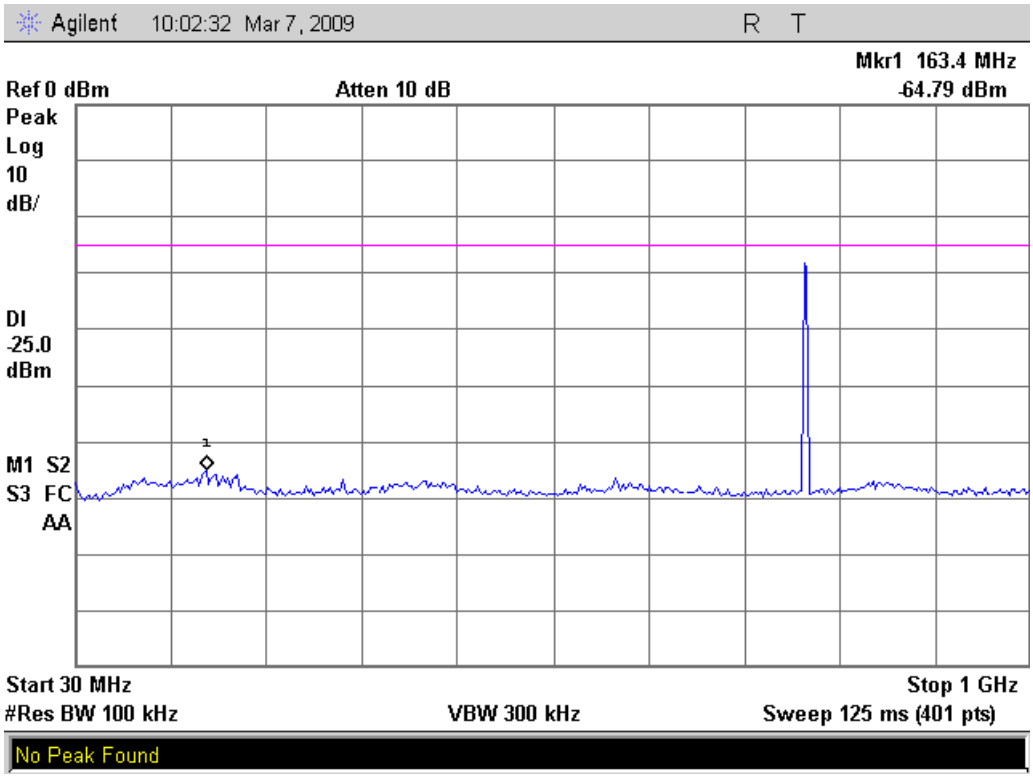

Agilent 10:10:37 Mar 7, 2009
R T
Mkr1 2.991 GHz
Ref 0 dBm
Atten 10 dB
-57.48 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 5.5 GHz
Sweep 11.25 ms (401 pts)
No Peak Found

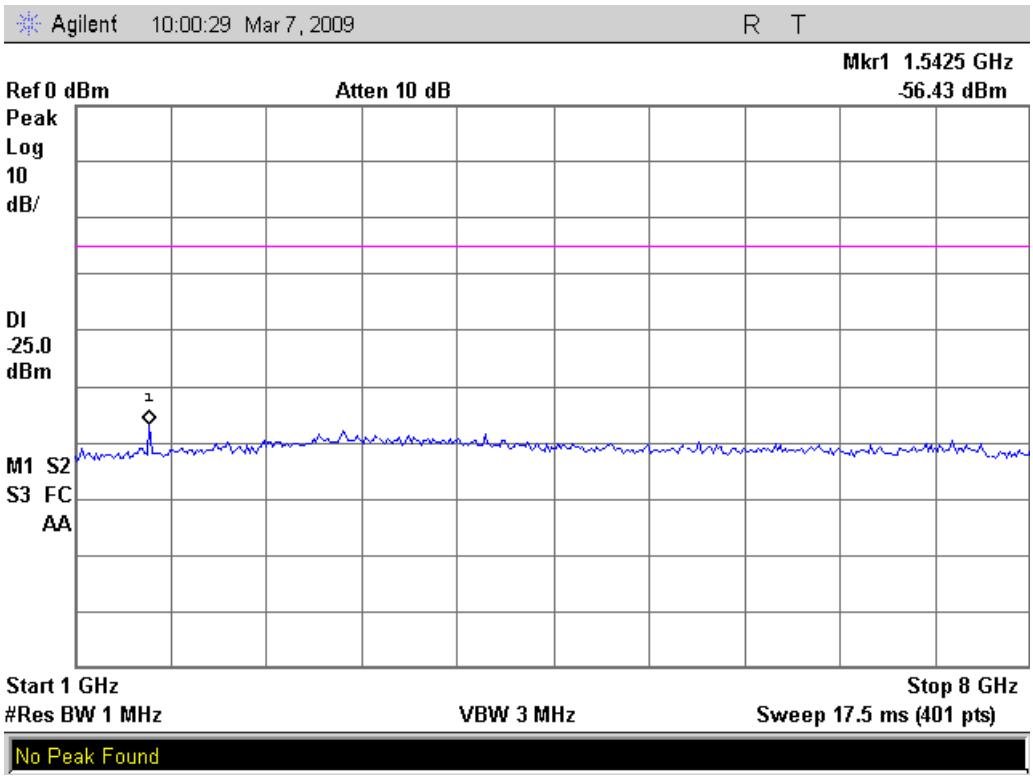
763 MHz


Agilent 10:04:49 Mar 7, 2009
R T
Mkr1 190.1 MHz
Ref 0 dBm
Atten 10 dB
-64.9 dBm
Peak
Log
10
dB/
Dl
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

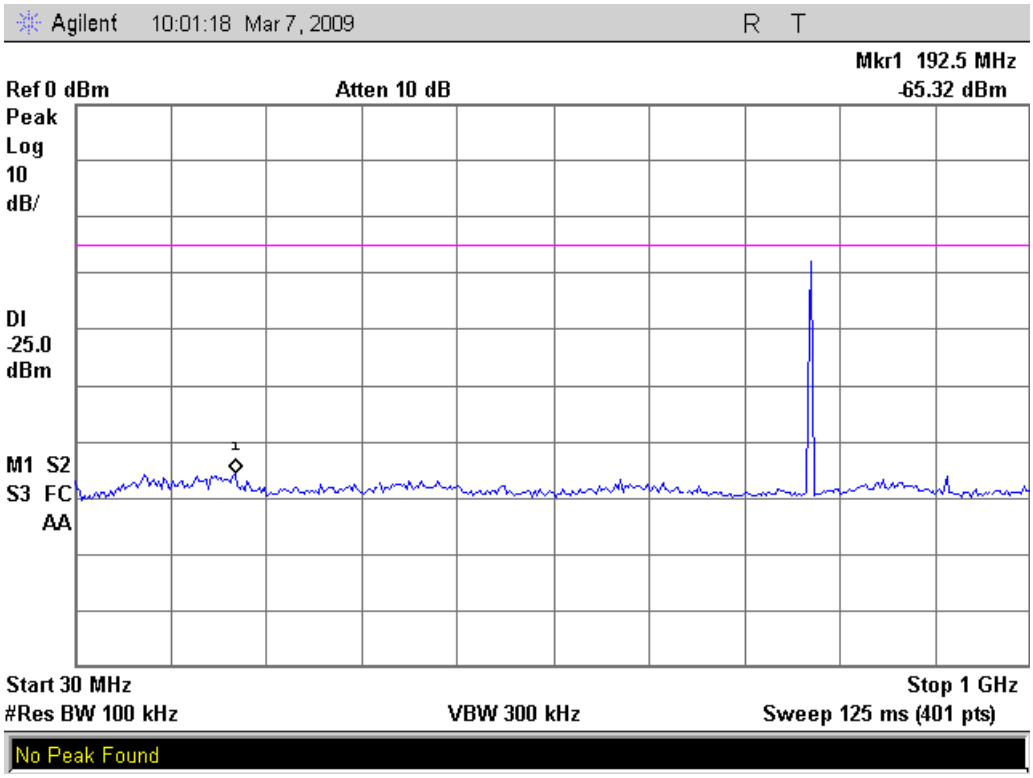

Agilent 10:05:23 Mar 7, 2009
R T
Mkr1 1.5250 GHz
Ref 0 dBm
Atten 10 dB
-57.94 dBm
Peak
Log
10
dB/
Dl
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 8 GHz
Sweep 17.5 ms (401 pts)
No Peak Found

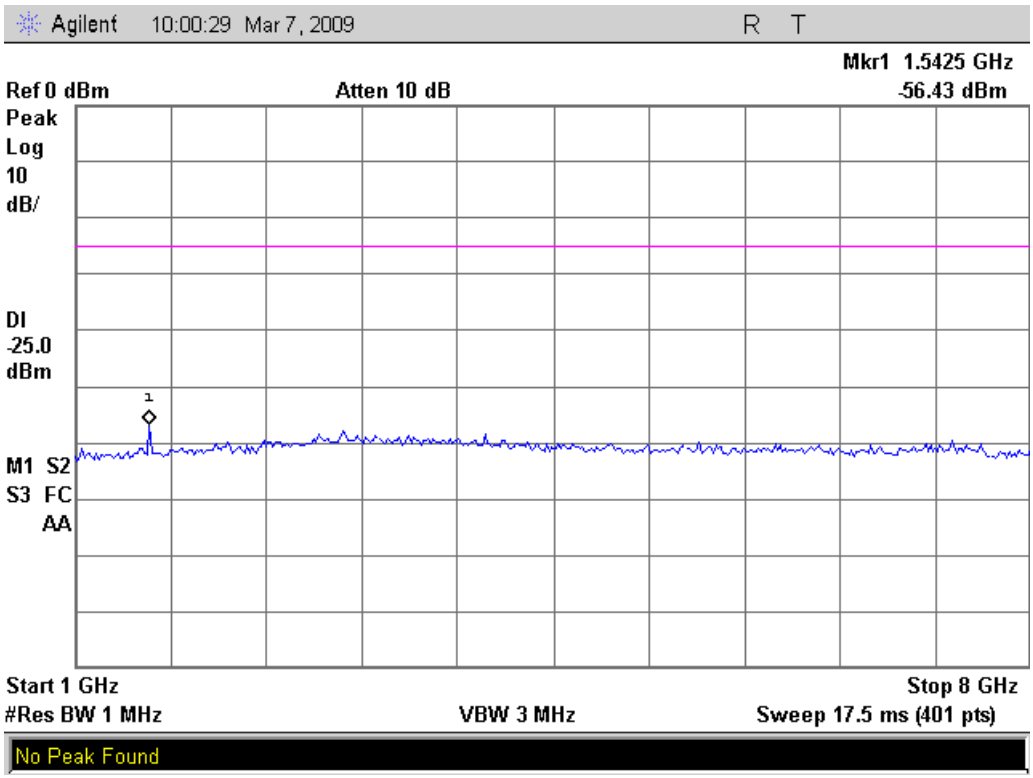
770 MHz


Agilent 10:02:32 Mar 7, 2009
R T
Mkr1 163.4 MHz
Ref 0 dBm
Atten 10 dB
-64.79 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

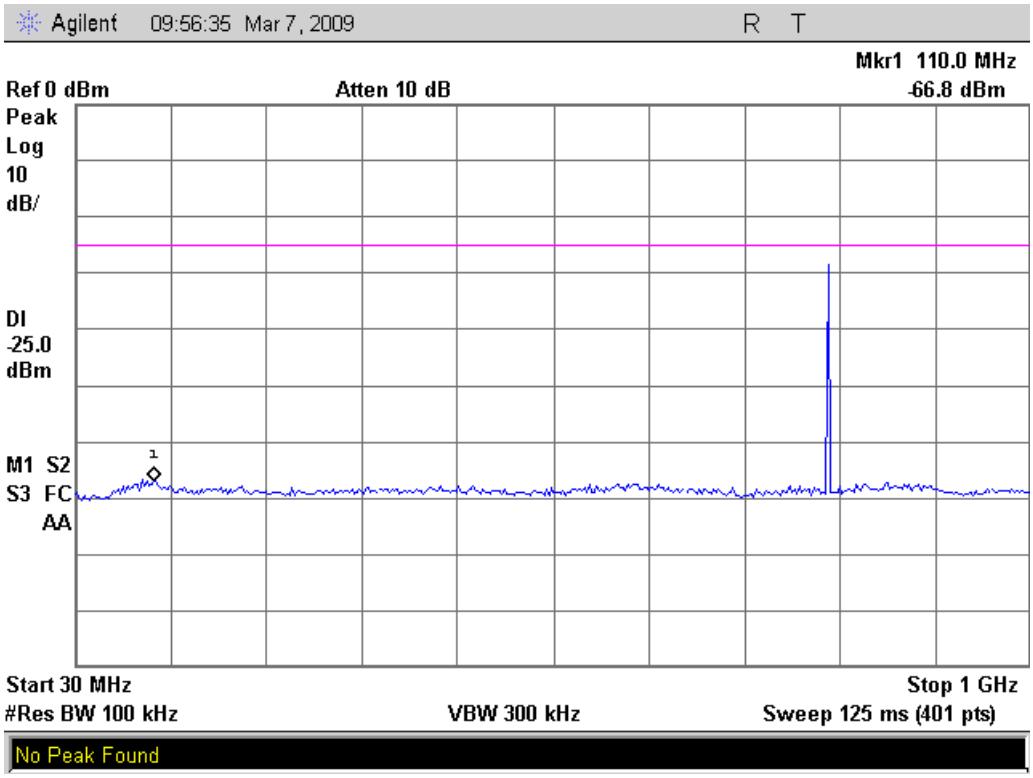

Agilent 10:00:29 Mar 7, 2009
R T
Mkr1 1.5425 GHz
Ref 0 dBm
Atten 10 dB
-56.43 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 8 GHz
Sweep 17.5 ms (401 pts)
No Peak Found

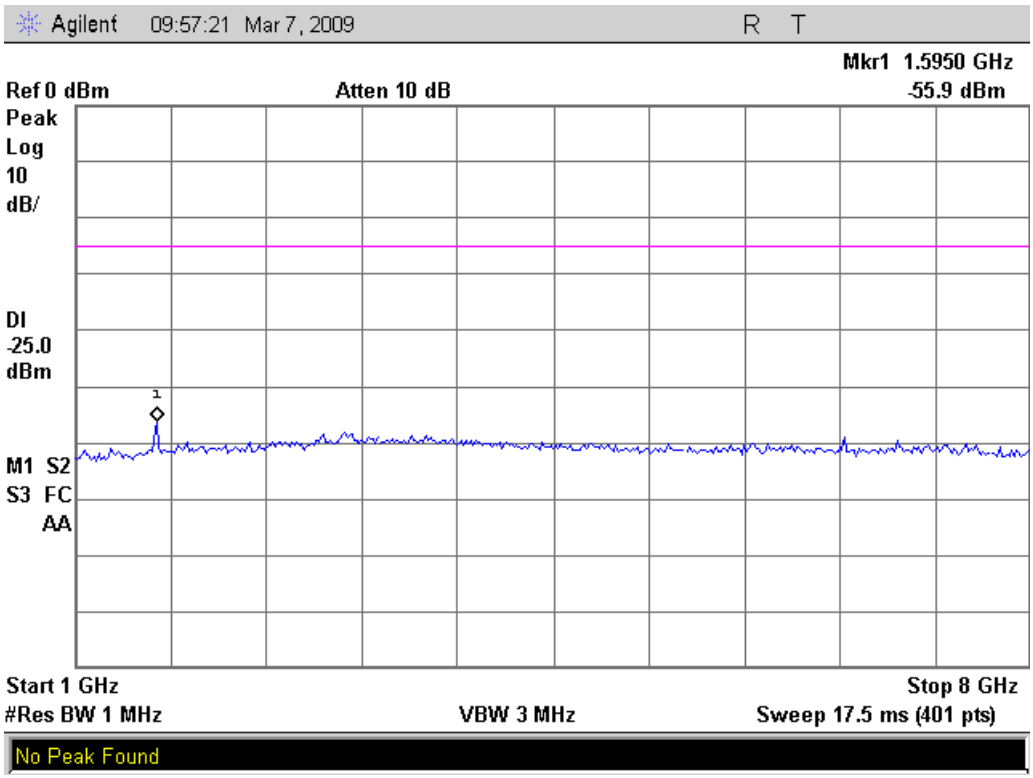
775 MHz


Agilent 10:01:18 Mar 7, 2009
R T
Mkr1 192.5 MHz
Ref 0 dBm
Atten 10 dB
-65.32 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

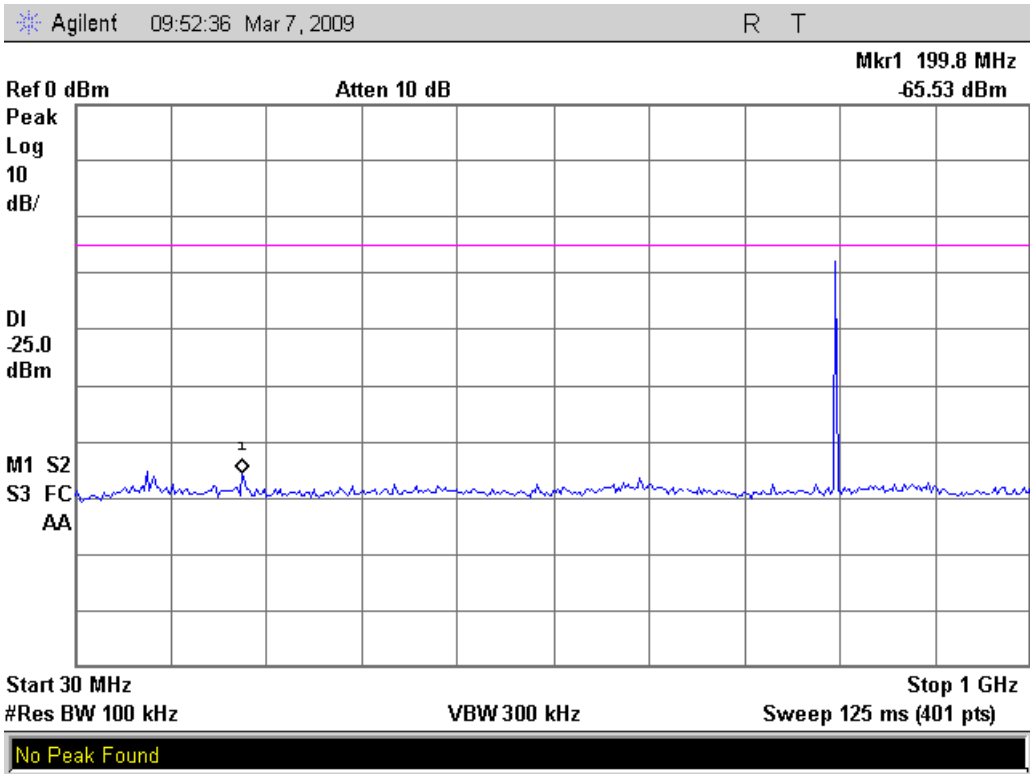

Agilent 10:00:29 Mar 7, 2009
R T
Mkr1 1.5425 GHz
Ref 0 dBm
Atten 10 dB
-56.43 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 8 GHz
Sweep 17.5 ms (401 pts)
No Peak Found

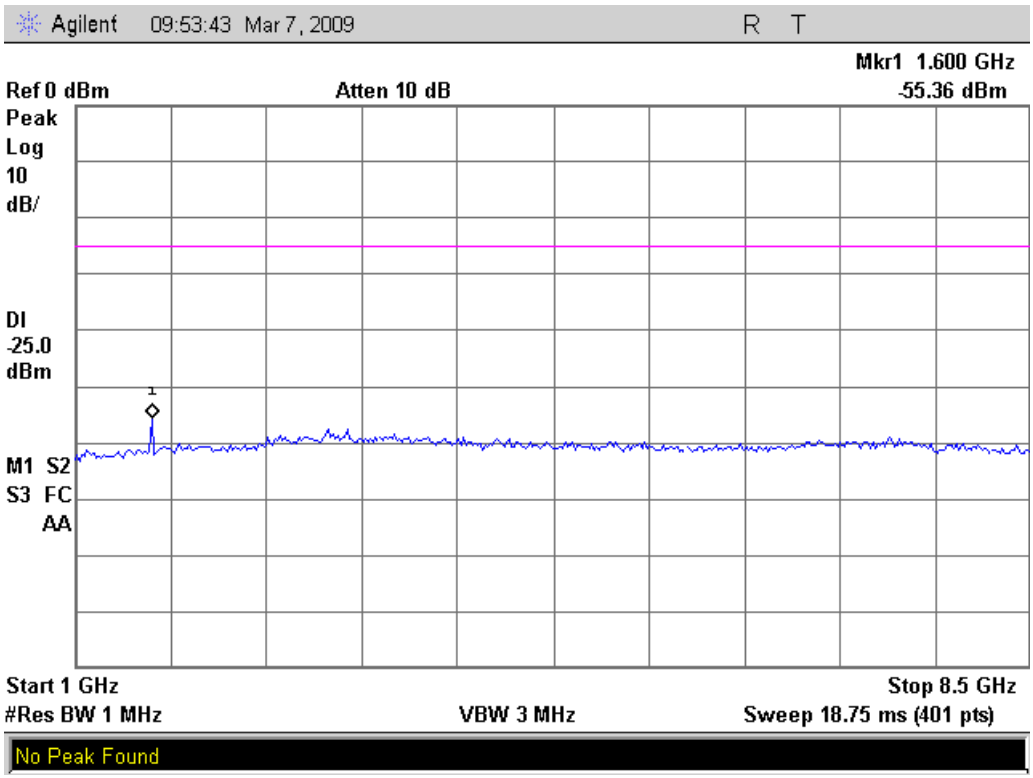
793 MHz


Agilent 09:56:35 Mar 7, 2009
R T
Mkr1 110.0 MHz
Ref 0 dBm
Atten 10 dB
-66.8 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

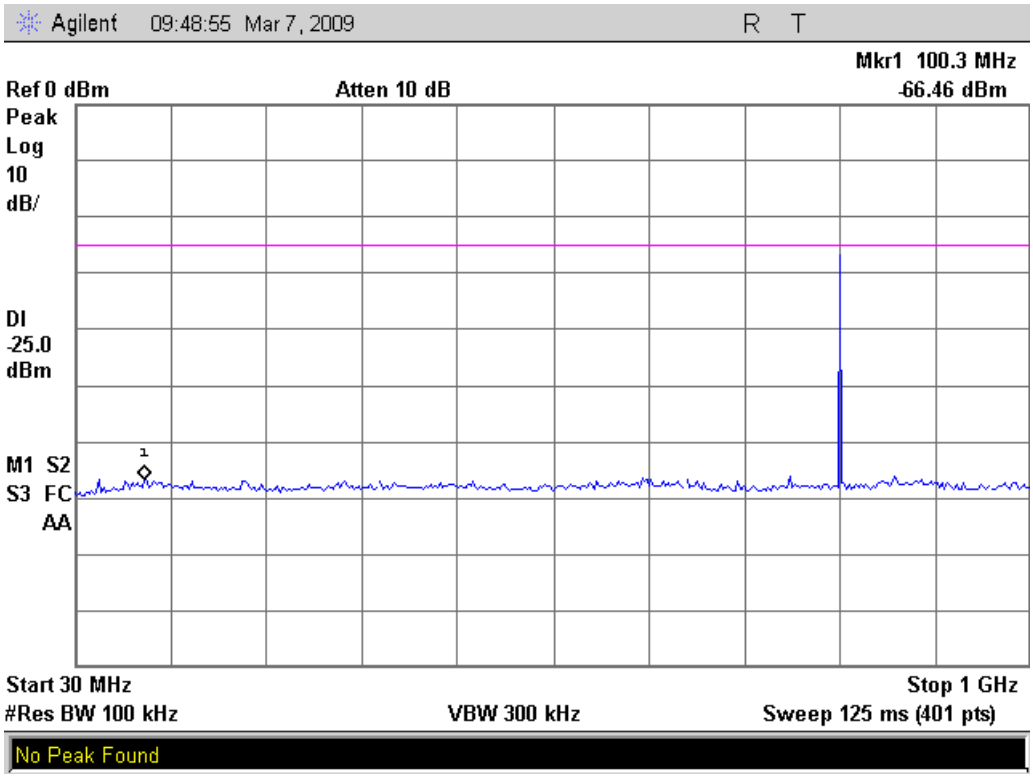

Agilent 09:57:21 Mar 7, 2009
R T
Mkr1 1.5950 GHz
Ref 0 dBm
Atten 10 dB
-55.9 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 8 GHz
Sweep 17.5 ms (401 pts)
No Peak Found

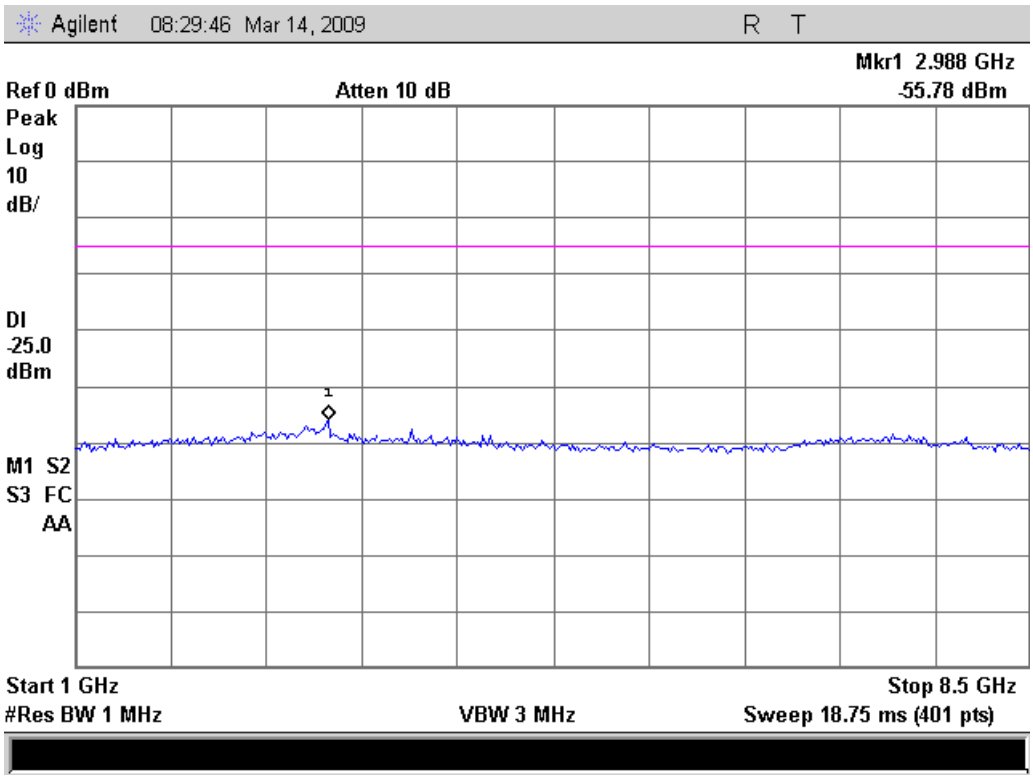
800 MHz


Agilent 09:52:36 Mar 7, 2009
R T
Mkr1 199.8 MHz
Ref 0 dBm
Atten 10 dB
-65.53 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

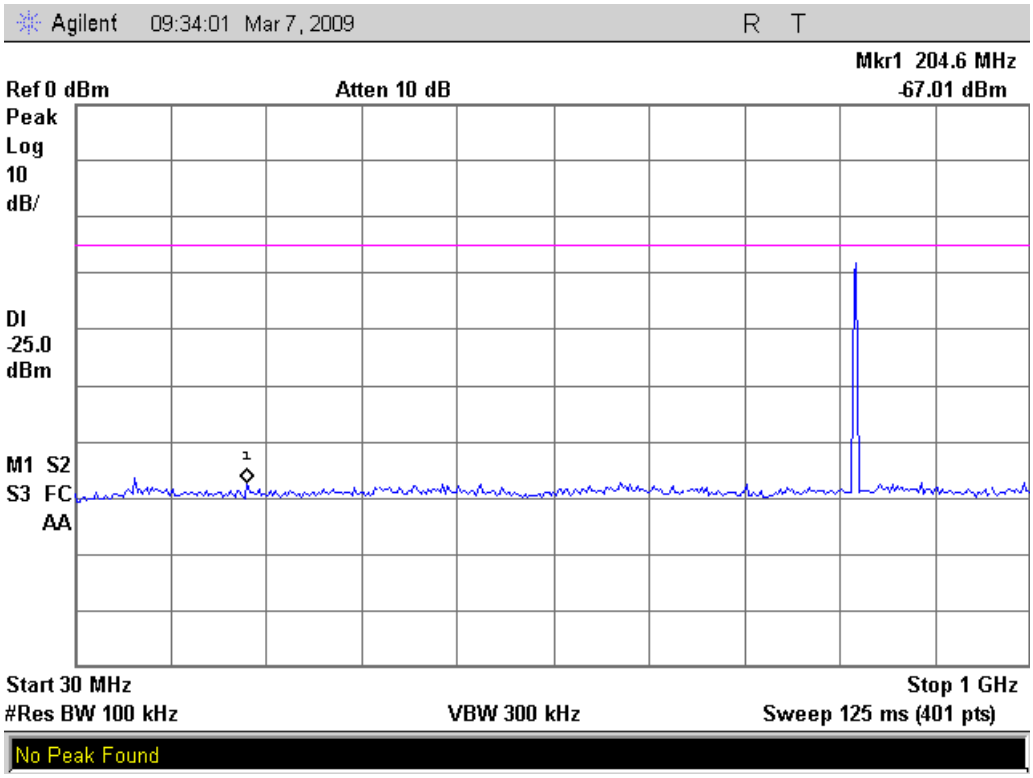

Agilent 09:53:43 Mar 7, 2009
R T
Mkr1 1.600 GHz
Ref 0 dBm
Atten 10 dB
-55.36 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 8.5 GHz
Sweep 18.75 ms (401 pts)
No Peak Found

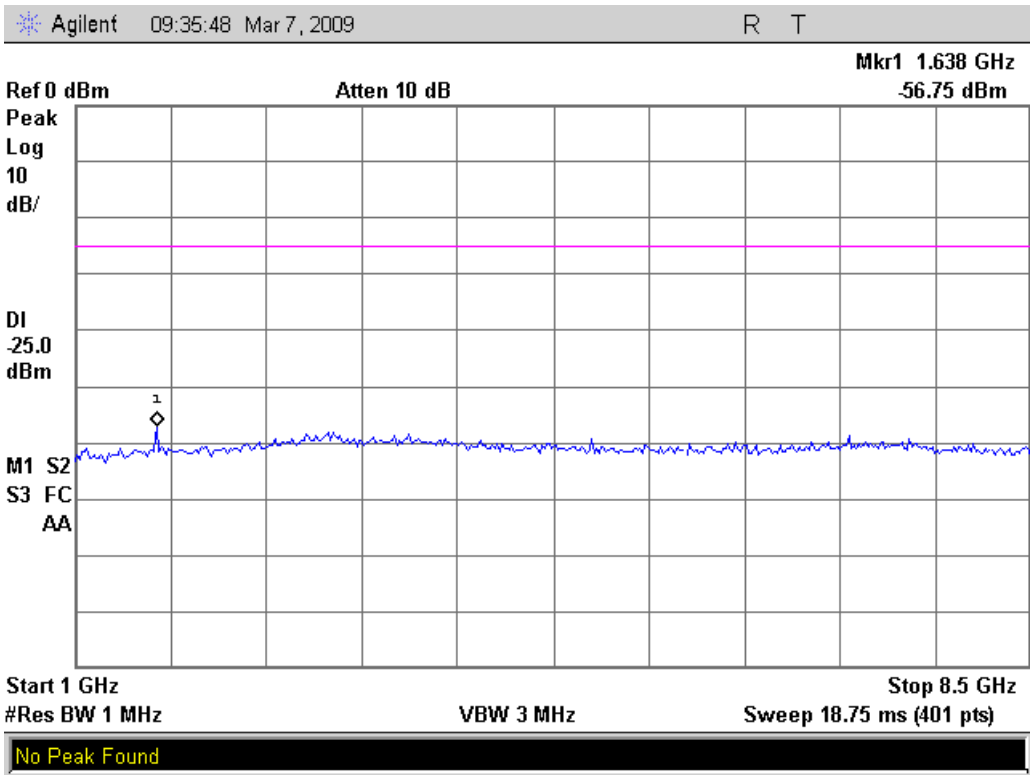
806 MHz


Agilent 09:48:55 Mar 7, 2009
R T
Mkr1 100.3 MHz
Ref 0 dBm
Atten 10 dB
-66.46 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

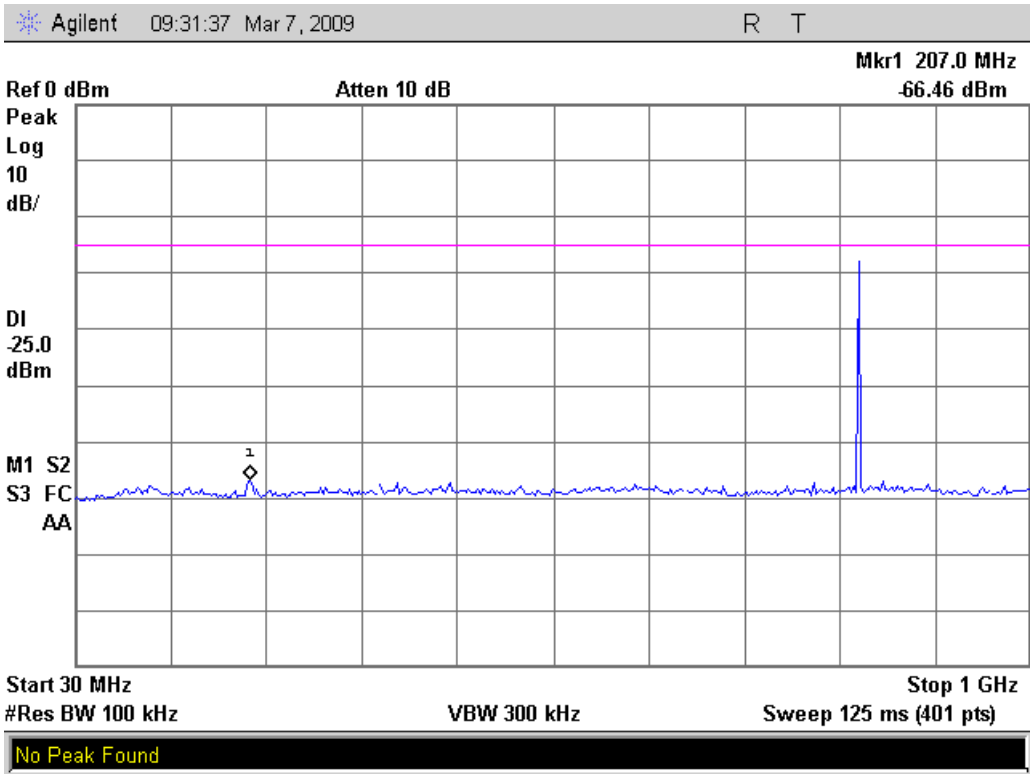

Agilent 08:29:46 Mar 14, 2009
R T
Mkr1 2.988 GHz
Ref 0 dBm
Atten 10 dB
-55.78 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 8.5 GHz
Sweep 18.75 ms (401 pts)

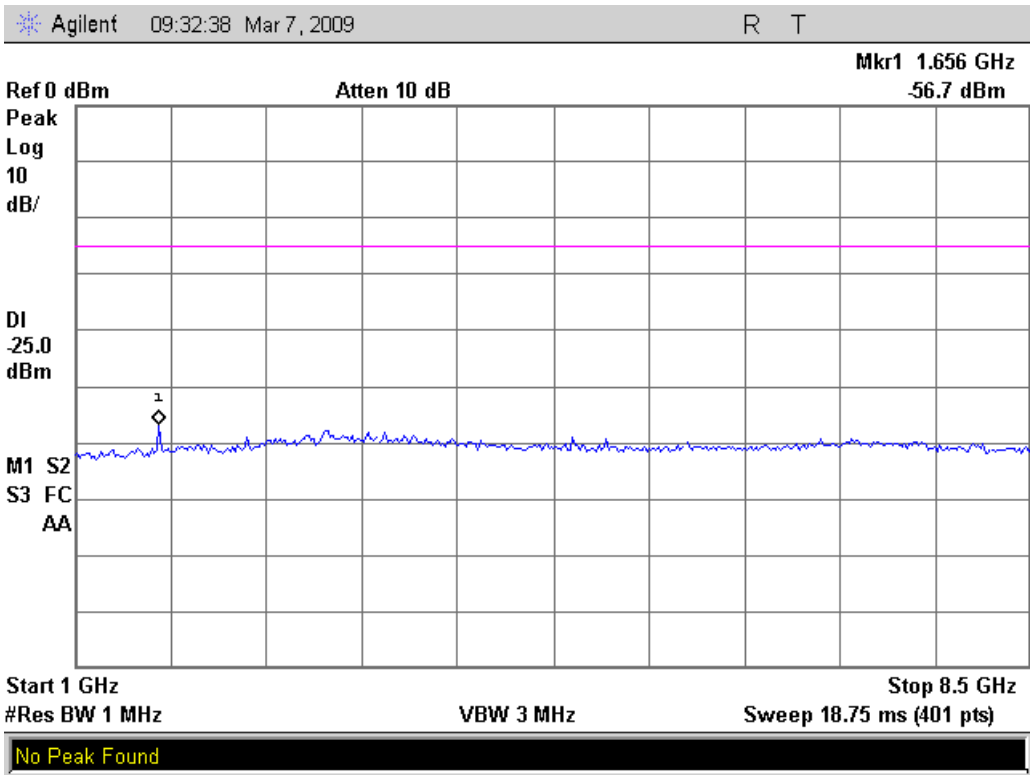
821 MHz


Agilent 09:34:01 Mar 7, 2009
R T
Mkr1 204.6 MHz
Ref 0 dBm
Atten 10 dB
-67.01 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

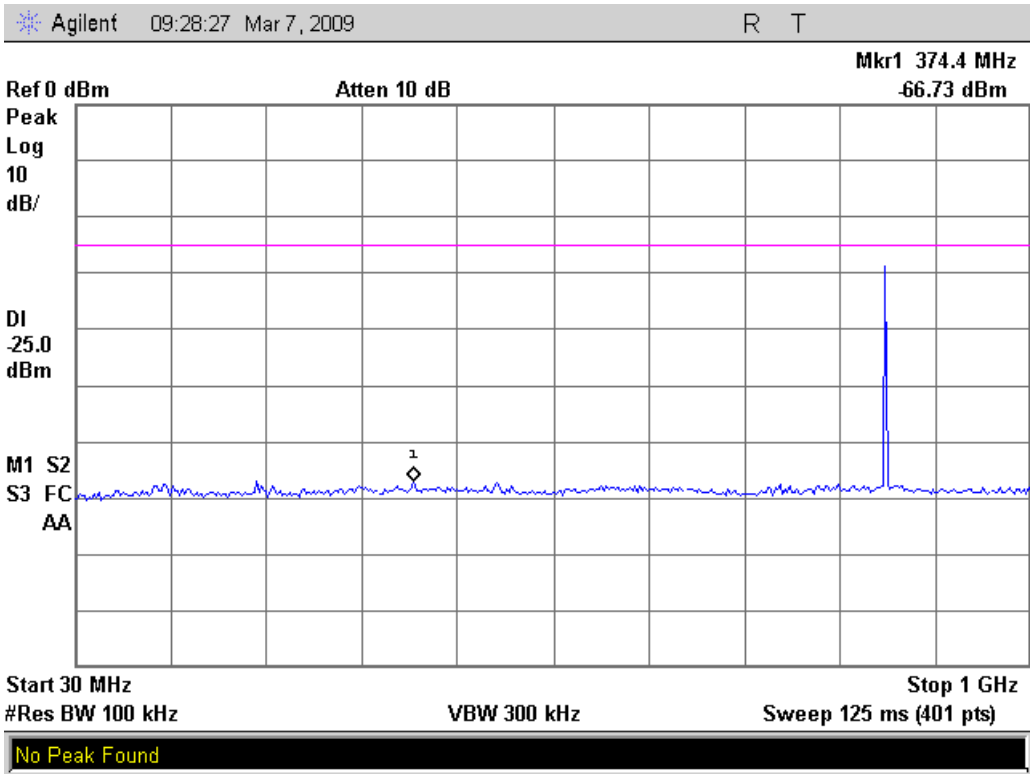

Agilent 09:35:48 Mar 7, 2009
R T
Mkr1 1.638 GHz
Ref 0 dBm
Atten 10 dB
-56.75 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 8.5 GHz
Sweep 18.75 ms (401 pts)
No Peak Found

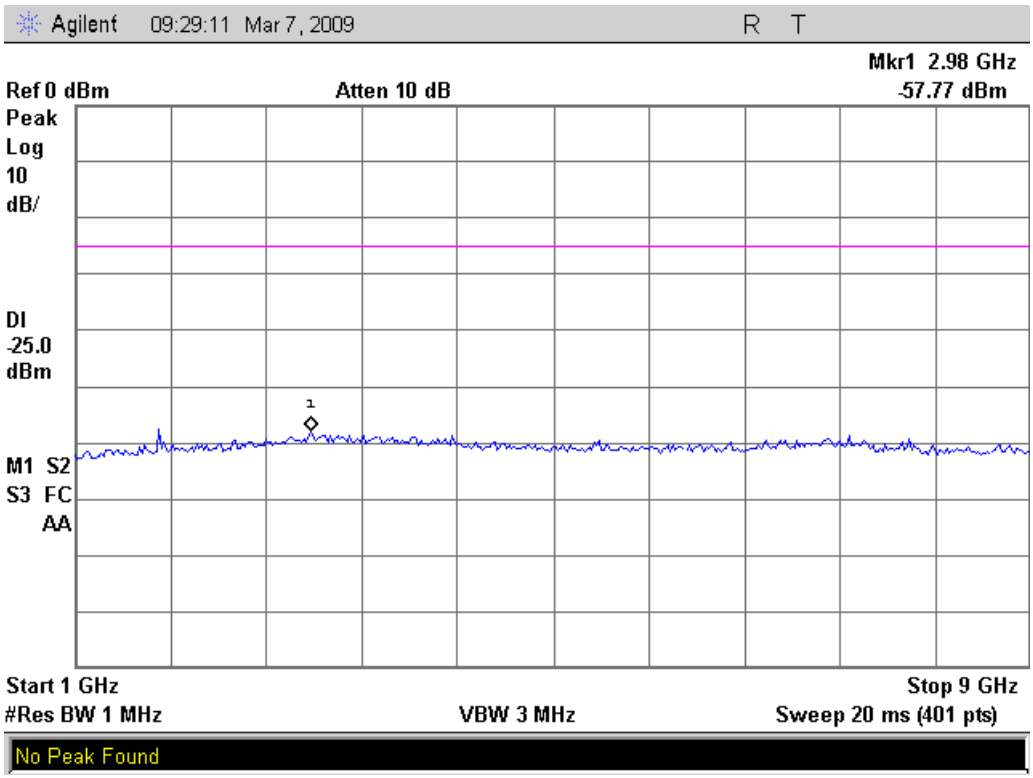
824 MHz


Agilent 09:31:37 Mar 7, 2009
R T
Mkr1 207.0 MHz
Ref 0 dBm
Atten 10 dB
-66.46 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

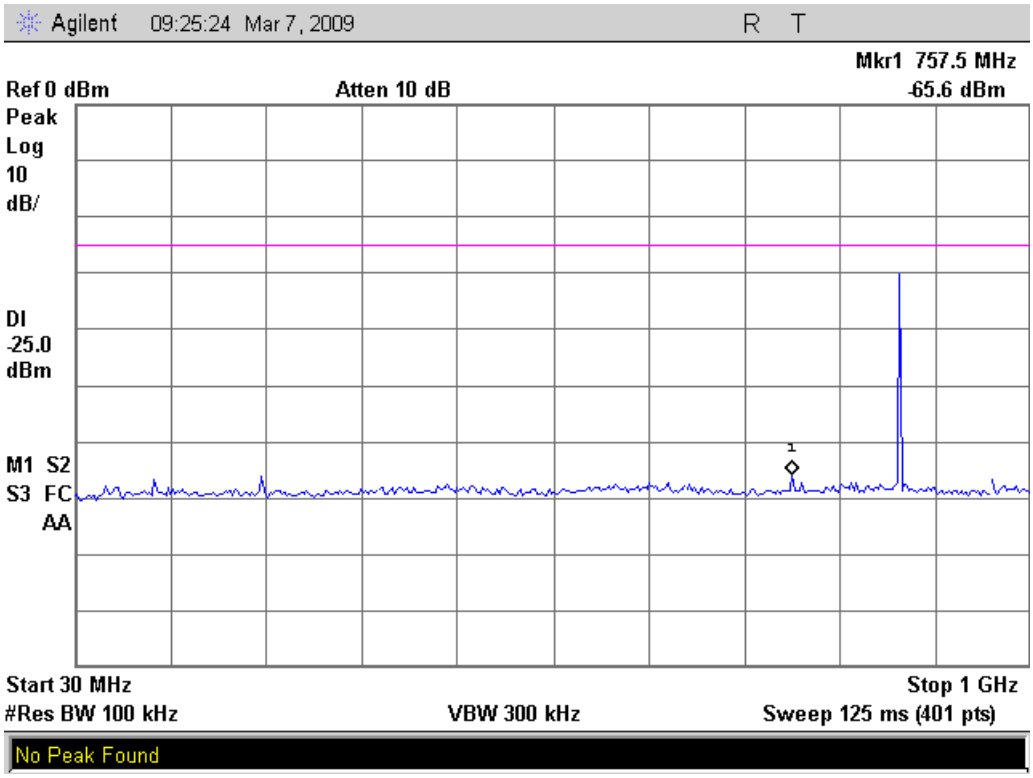

Agilent 09:32:38 Mar 7, 2009
R T
Mkr1 1.656 GHz
Ref 0 dBm
Atten 10 dB
-56.7 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 8.5 GHz
Sweep 18.75 ms (401 pts)
No Peak Found

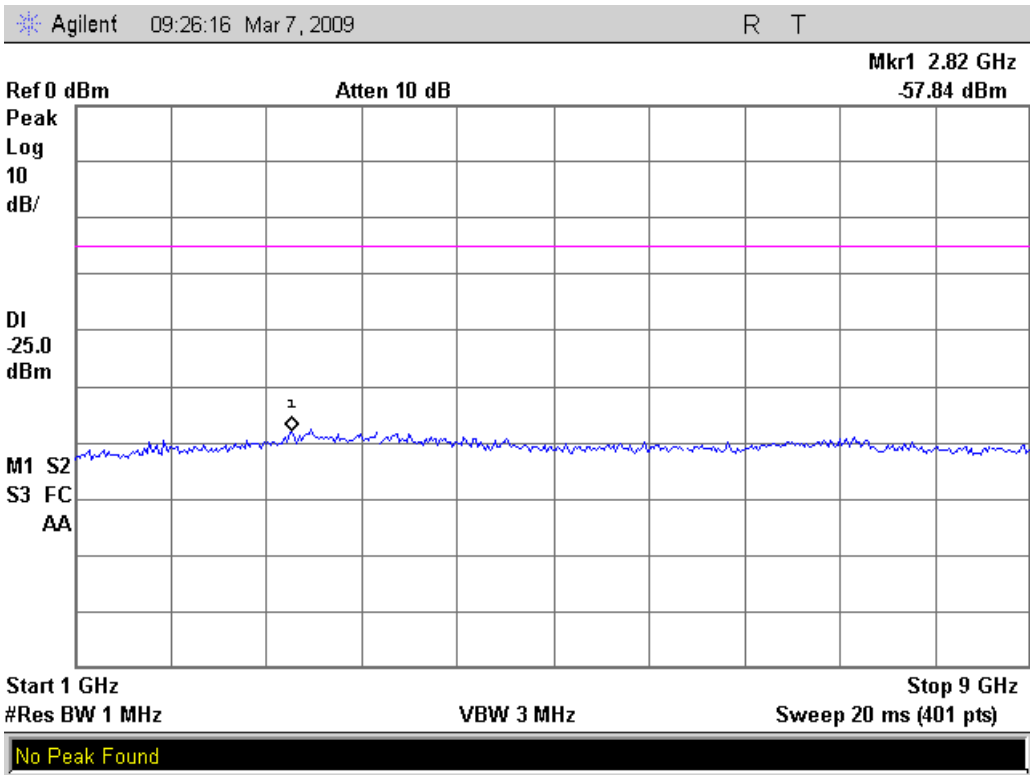
851 MHz


Agilent 09:28:27 Mar 7, 2009
R T
Mkr1 374.4 MHz
Ref 0 dBm
Atten 10 dB
-66.73 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found

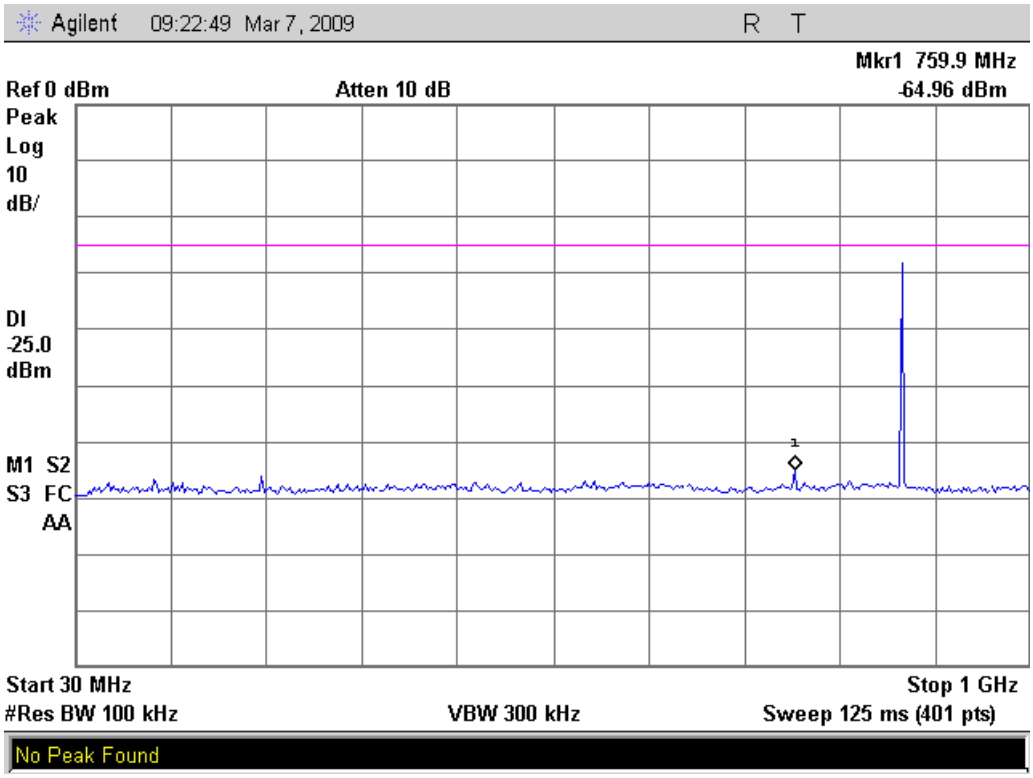

Agilent 09:29:11 Mar 7, 2009
R T
Mkr1 2.98 GHz
Ref 0 dBm
Atten 10 dB
-57.77 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 9 GHz
Sweep 20 ms (401 pts)
No Peak Found

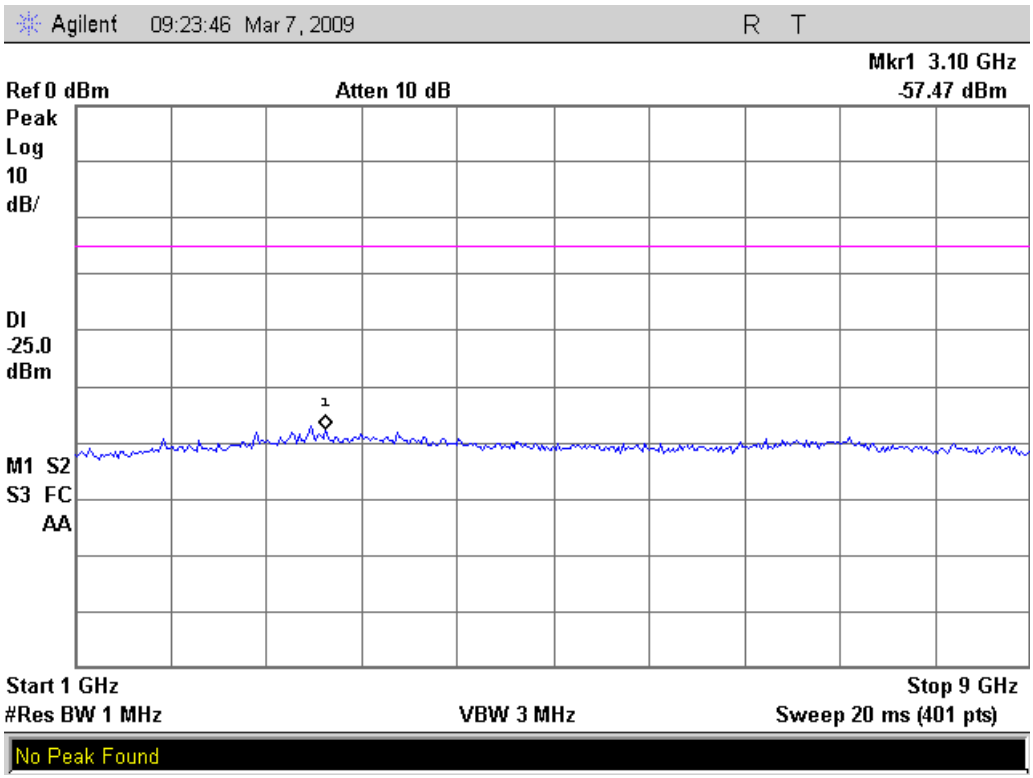
866 MHz


Agilent 09:25:24 Mar 7, 2009
R T
Mkr1 757.5 MHz
Ref 0 dBm
Atten 10 dB
-65.6 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found


Agilent 09:26:16 Mar 7, 2009
R T
Mkr1 2.82 GHz
Ref 0 dBm
Atten 10 dB
-57.84 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 9 GHz
Sweep 20 ms (401 pts)
No Peak Found

869 MHz


Agilent 09:22:49 Mar 7, 2009
R T
Mkr1 759.9 MHz
Ref 0 dBm
Atten 10 dB
-64.96 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 30 MHz
#Res BW 100 kHz
VBW 300 kHz
Stop 1 GHz
Sweep 125 ms (401 pts)
No Peak Found


Agilent 09:23:46 Mar 7, 2009
R T
Mkr1 3.10 GHz
Ref 0 dBm
Atten 10 dB
-57.47 dBm
Peak
Log
10
dB/
DI
-25.0
dBm
M1 S2
S3 FC
AA
Start 1 GHz
#Res BW 1 MHz
VBW 3 MHz
Stop 9 GHz
Sweep 20 ms (401 pts)
No Peak Found

Name of Test: Field Strength of Radiated Output Power & Spurious Radiation
Specification: 2.1053 **Engineer: M Sechrist**
Test Equipment Utilized: i00033, i00037, i00039, i00042, i00048, i00088, i00089, i00103 i00266 **Test Date: 3/12/2009**

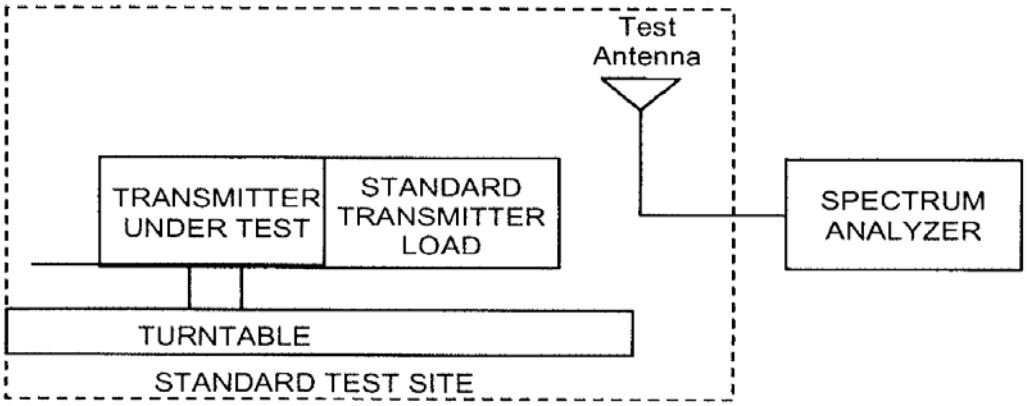
Test Procedure

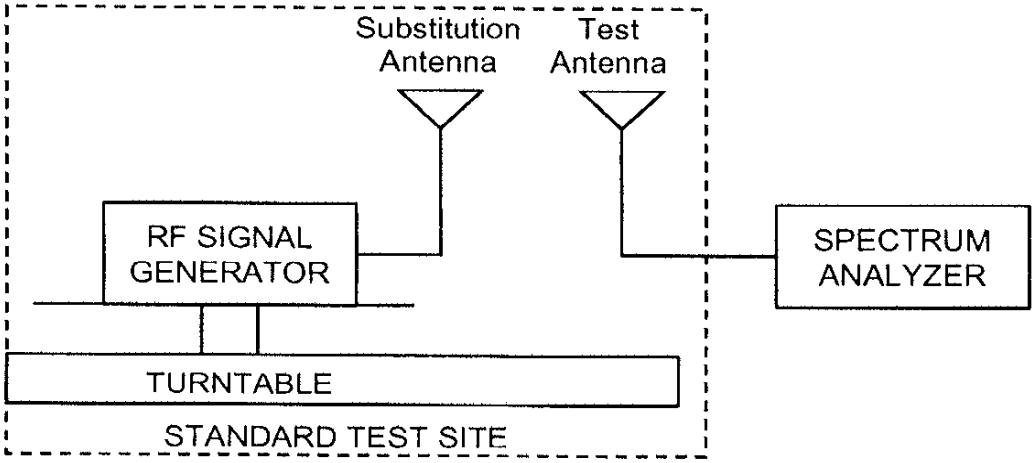
A) Connect the equipment as illustrated
B) Adjust the spectrum analyzer for the following settings:
1) Resolution Bandwidth 100 kHz (<1 GHZ), 1 MHZ (> 1GHz).
2) Video Bandwidth ≥ 3 times Resolution Bandwidth, or 30 kHz
3) Sweep Speed ≤2000 Hz/second
4) Detector Mode = Mean or Average Power
C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load that is placed on the turntable. The RF cable to this load should be of minimum length.
D) For each spurious measurement the test antenna should be adjusted to the correct length for the frequency involved. This length may be determined from a calibration ruler supplied with the equipment. Measurements shall be made from the lowest radio frequency generated in the equipment to the tenth harmonic of the carrier, except for the region close to the carrier equal to ± the test bandwidth (see section 1.3.4.4).
E) For each spurious frequency, raise and lower the test antenna from 1 m to 4 m to obtain a maximum reading on the spectrum analyzer with the test antenna at horizontal polarity. Repeat this procedure to obtain the highest possible reading. Record this maximum reading.
F) Repeat step E) for each spurious frequency with the test antenna polarized vertically.
G) Reconnect the equipment as illustrated.
H) Keep the spectrum analyzer adjusted as in step B).
I) Remove the transmitter and replace it with a substitution antenna (the antenna should be half-wavelength for each frequency involved). The center of the substitution antenna should be approximately at the same location as the center of the transmitter. At lower frequencies, where the substitution antenna is very long, this will be impossible to achieve when the antenna is polarized vertically. In such case the lower end of the antenna should be 0.3 m above the ground.
J) Feed the substitution antenna at the transmitter end with a signal generator connected to the antenna by means of a non-radiating cable. With the antennas at both ends horizontally polarized and with the signal generator tuned to a particular spurious frequency, raise and lower the test antenna to obtain a maximum reading at the spectrum analyzer. Adjust the level of the signal generator output until the previously recorded maximum reading for this set of conditions is obtained. This should be done carefully repeating the adjustment of the test antenna and generator output.
K) Repeat step J) with both antennas vertically polarized for each spurious frequency.
L) Calculate power in dBm into a reference ideal half-wave dipole antenna by reducing the readings obtained in steps J) and K) by the power loss in the cable between the generator and the antenna and further corrected for the gain of the substitution antenna used relative to an ideal half-wave dipole antenna.
M) The levels recorded in step L) are absolute levels of radiated spurious emissions in dBm. The radiated spurious emissions in dB can be calculated by the following:

Radiated spurious emissions dB = **$10\log_{10}$(TX power in watts/0.001) – the levels in step l)**

NOTE: It is permissible that other antennas provided can be referenced to a dipole.

Test Setup


Test
Antenna
TRANSMITTER
UNDER TEST
STANDARD
TRANSMITTER
LOAD
SPECTRUM
ANALYZER
TURNTABLE
STANDARD TEST SITE


Substitution
Antenna
Test
Antenna
RF SIGNAL
GENERATOR
SPECTRUM
ANALYZER
TURNTABLE
STANDARD TEST SITE

Radiated Output Power (ERP)

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)
138	6.7	14.8	21.5
150	0.4	14.9	15.3
157.5 (part 74, 80)	-1.4	15.0	13.6
162 (part22)	3.3	15.1	18.4
174	5.0	15.2	20.2
380	8.6	18.0	26.6
406.2	8.0	19.8	27.8
430	9.9	18.8	28.7
450	10.4	19.0	29.4
470 (part 22, 74)	9.0	19.6	28.6
520	9.0	20.5	29.5
763	0.9	24.8	25.7
770	1.3	24.9	26.2
775	1.3	24.9	26.2
793	0.1	25.2	25.3
800	-0.4	25.2	24.8
806	-0.1	25.4	25.3
821	-0.9	25.6	24.7
824	-1.4	25.6	24.2
851	-5.4	26.2	20.8
866	-7.0	26.5	19.5
869	-8.1	26.6	18.5

138 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
690.0	-81.7	23.3	-58.4	-25	Pass
828.0	-83.1	25.6	-57.5	-25	Pass
966.0	-81.8	29.0	-52.8	-25	Pass

150 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
600.0	-83.2	23.1	-60.1	-25	Pass
750.0	-80.6	25.6	-55.0	-25	Pass
900.0	-82.6	27.6	-55.0	-25	Pass

157.5 MHz Radiated Spurious Emissions (part 74, 80)

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
470.0	-79.9	20.1	-59.8	-25	Pass
785.0	-80.2	25.6	-54.6	-25	Pass
942.0	-83.5	29.3	-54.2	-25	Pass

162 MHz Radiated Spurious Emissions (part22)

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
648.0	-86.2	24.2	-62.0	-25	Pass
810.0	-85.1	26.0	-59.1	-25	Pass
972.0	-85.0	29.8	-55.2	-25	Pass

174 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
522.0	-81.4	21.0	-60.4	-25	Pass
696.0	-69.3	24.2	-45.1	-25	Pass
870.0	-83.7	27.2	-56.5	-25	Pass

380 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
3040.0	-70.8	35.2	-35.6	-13	Pass
3420.0	-69.3	36.5	-32.8	-13	Pass
3800.0	-70.3	37.8	-32.5	-13	Pass

406.2 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
2842.0	-69.0	34.5	-34.5	-25	Pass
3654.0	-71.5	37.3	-34.2	-25	Pass
406.20.0	-70.8	38.6	-32.2	-25	Pass

430 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
3440.0	-68.9	36.5	-32.4	-25	Pass
3870.0	-68.0	38.1	-29.9	-25	Pass
4300.0	-68.7	38.8	-29.9	-25	Pass

450 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
3599.9995	-69.0	37.1	-31.9	-25	Pass
4049.9995	-69.3	38.6	-30.7	-25	Pass
4499.9995	-68.5	38.9	-29.6	-25	Pass

470 MHz Radiated Spurious Emissions (part 22, 74)

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
3760.0	-68.8	37.7	-31.1	-25	Pass
4230.0	-69.1	38.7	-30.4	-25	Pass
4700.0	-68.1	39.7	-28.4	-25	Pass

520 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
4160.0	-68.5	38.6	-29.9	-13	Pass
4680.0	-70.8	39.6	-31.2	-13	Pass
5200.0	-68.4	41.2	-27.2	-13	Pass

763 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
6104.0	-70.9	42.3	-28.6	-25	Pass
6867.0	-71.0	43.8	-27.2	-25	Pass
7630.0	-70.1	45.7	-26.4	-25	Pass

770 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
6160.0	-71.9	42.4	-29.5	-25	Pass
6930.0	-72.7	43.9	-28.8	-25	Pass
7700.0	-70.6	45.8	-26.8	-25	Pass

775 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
6200.0	-71.5	42.5	-29.0	-25	Pass
6975.0	-70.4	44.0	-26.4	-25	Pass
7750.0	-75.0	45.8	-29.2	-25	Pass

793 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
3965.0	-67.3	38.4	-28.9	-25	Pass
5551.0	-70.8	41.9	-28.9	-25	Pass
6344.0	-68.8	42.8	-26.0	-25	Pass

800 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
2400.0	-61.4	32.9	-28.5	-25	Pass
5600.0	-70.0	41.9	-28.1	-25	Pass
6400.0	-71.8	42.8	-29.0	-25	Pass

806 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP(dBm)	Limit (dBm)	Result
2418.0	-59.9	33.0	-26.9	-25	Pass
5642.0	-71.3	41.9	-29.4	-25	Pass
6448.0	-70.2	42.9	-27.3	-25	Pass

821 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value ERP (dBm)	Limit (dBm)	Result
4926.0	-71.3	40.5	-30.8	-25	Pass
5747.0	-69.1	42.0	-27.1	-25	Pass
6508.0	-71.7	43.0	-28.7	-25	Pass

824 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value EIRP (dBm)	Limit (dBm)	Result
4120.0	-70.0	38.6	-31.4	-25	Pass
4944.0	-68.3	40.5	-27.8	-25	Pass
5768.0	-70.5	42.0	-28.5	-25	Pass

851 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm)	Result
4255.0	-70.2	38.7	-31.5	-25	Pass
5106.0	-71.3	41.0	-30.3	-25	Pass
5957.0	-71.3	42.1	-29.2	-25	Pass

866 MHz Radiated Spurious Emissions

Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value (dBm)	Limit (dBm)	Result
4330.0	-69.9	38.8	-31.1	-25	Pass
5196.0	-71.7	41.2	-30.5	-25	Pass
6062.0	-72.0	42.2	-29.8	-25	Pass

869 MHz Radiated Spurious Emissions

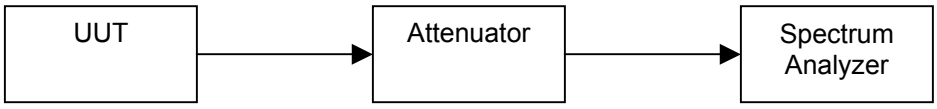
Emission Frequency (MHz)	Measured Level (dBm)	Correction Factor (dB)	Corrected Value EIRP (dBm)	Limit (dBm)	Result
4345.0	-71.3	38.8	-32.5	-25	Pass
5214.0	-69.4	41.2	-28.2	-25	Pass
6083.0	-71.2	42.3	-28.9	-25	Pass

No other emissions were detected. All emissions were less than –25 dBm.

Name of Test: Emission Masks (Occupied Bandwidth)
Specification: 90.210 **Engineer: J Erhard**
Test Equipment Utilized: i00324, i00331 **Test Date: 3/5/2009**

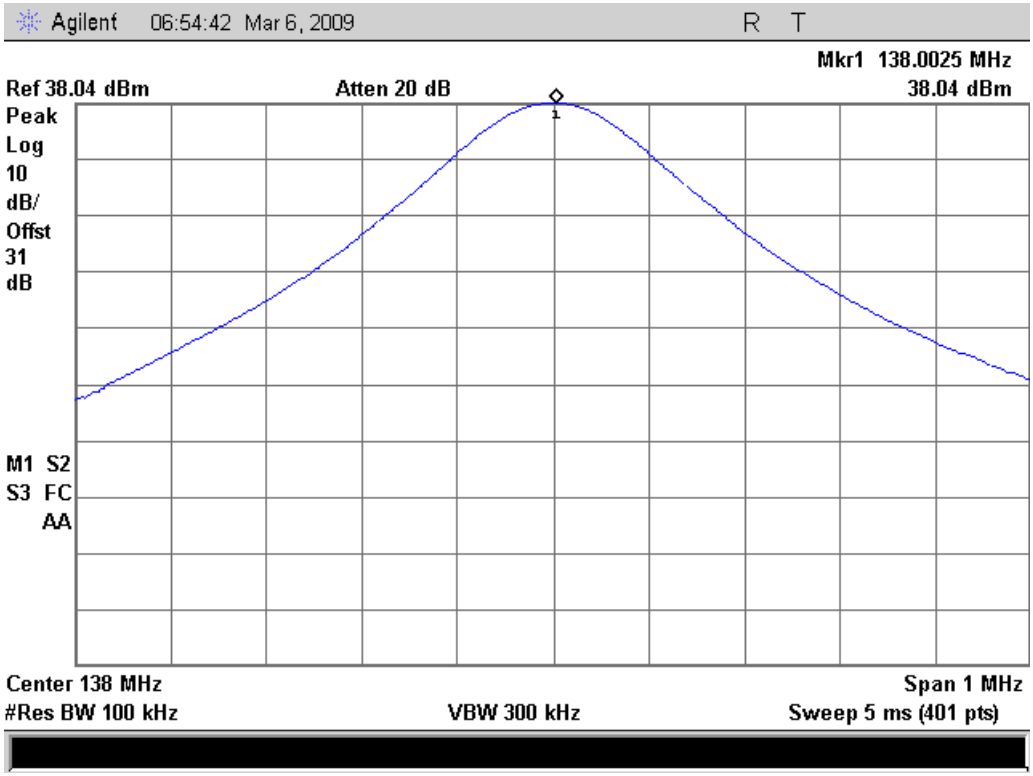
The EUT was connected directly to a spectrum analyzer to verify that the EUT meets the required emissions mask. A reference level plot is provided to verify that the peak power was established prior to testing the mask. A modulation frequency of 2.5 kHz at a level of 35 mVPP was input into the UUT for the analog tests and an internal test pattern was utilized for the digital modulation.

Test Setup

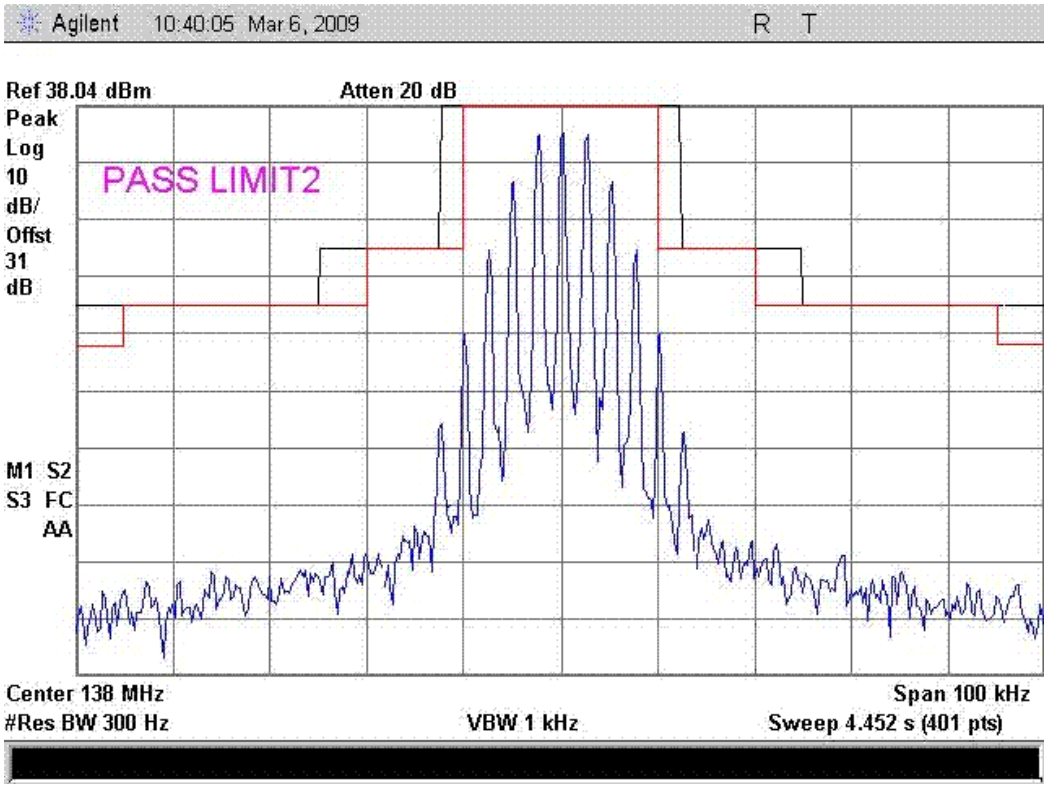


Occupied Bandwidth Plots

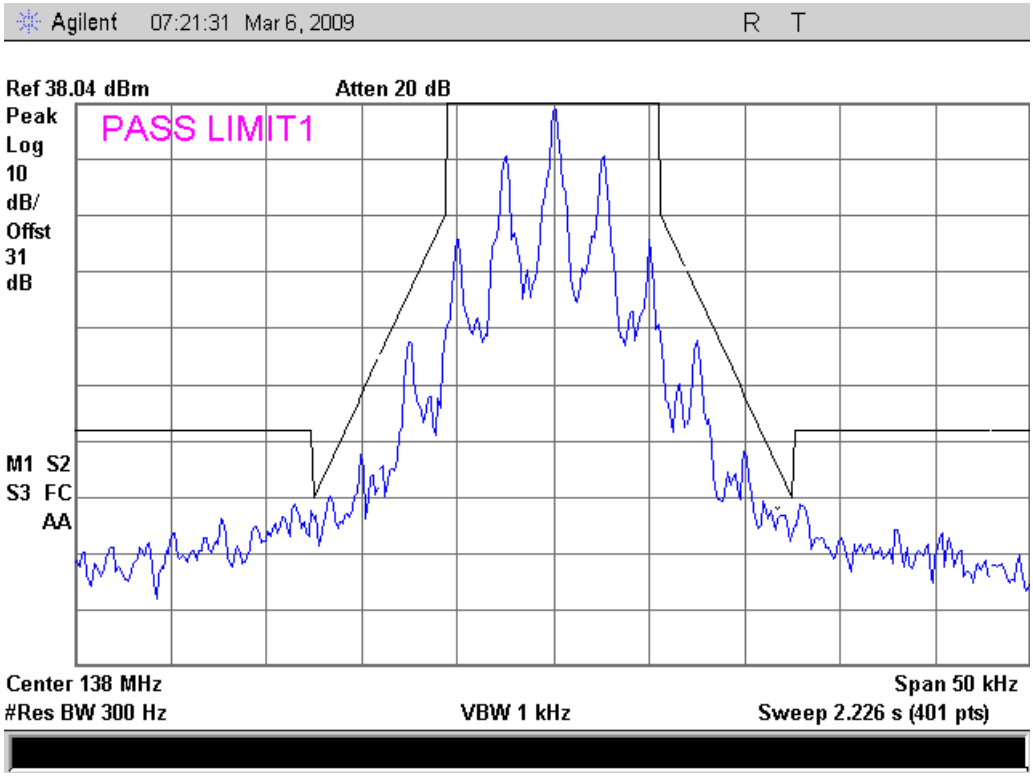
138 MHz Reference



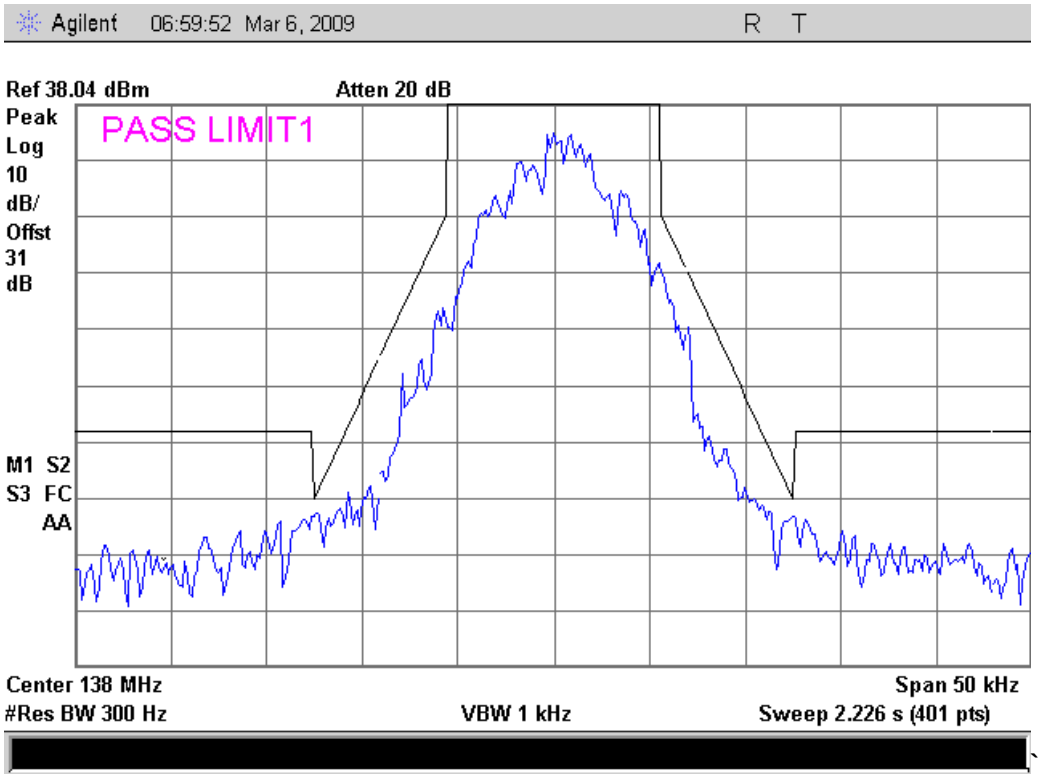
138 MHz 25KHz Mask B



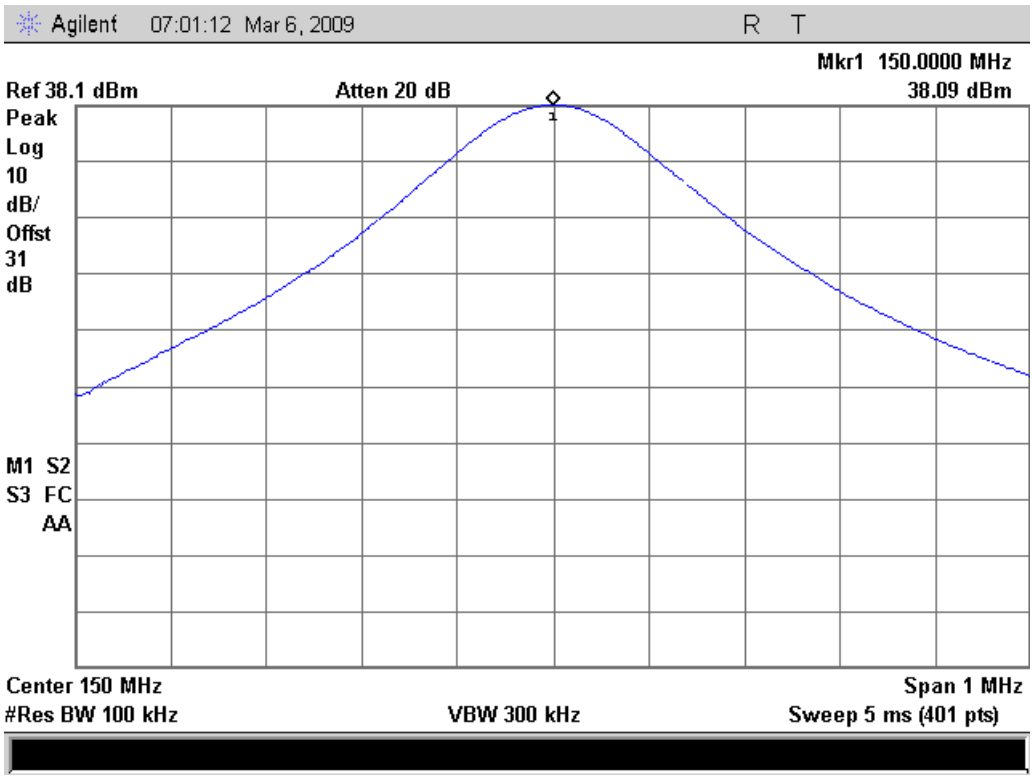
138 MHz 12.5kHz Mask D



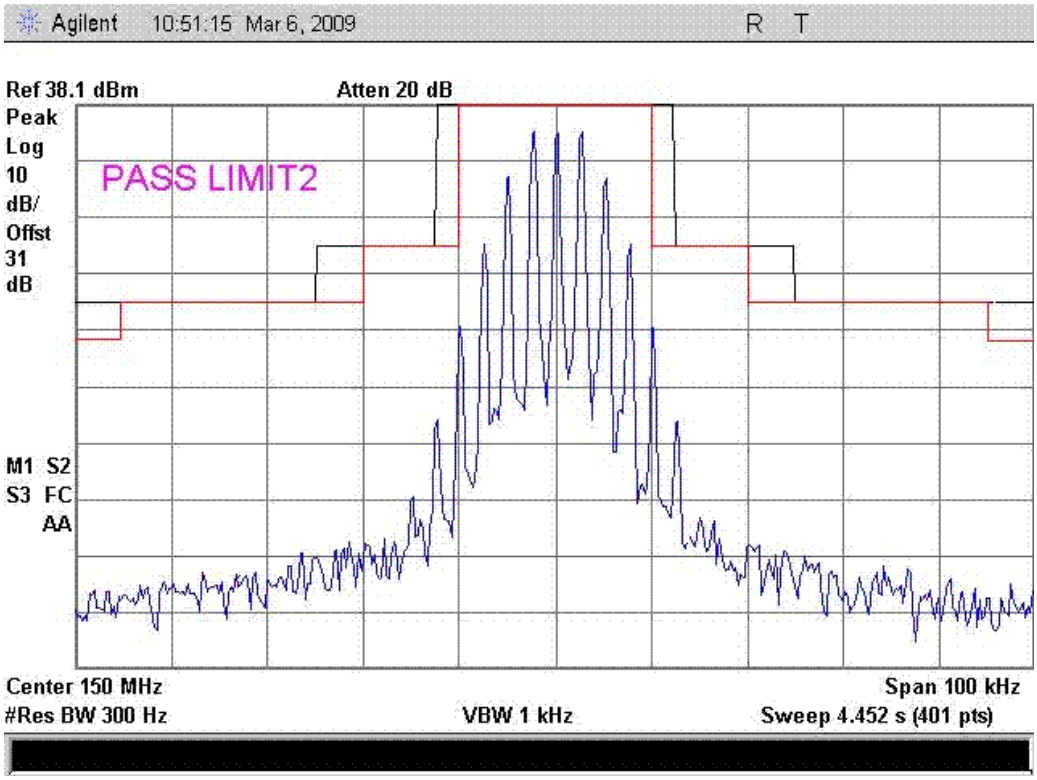
138 MHz Digital Mask D



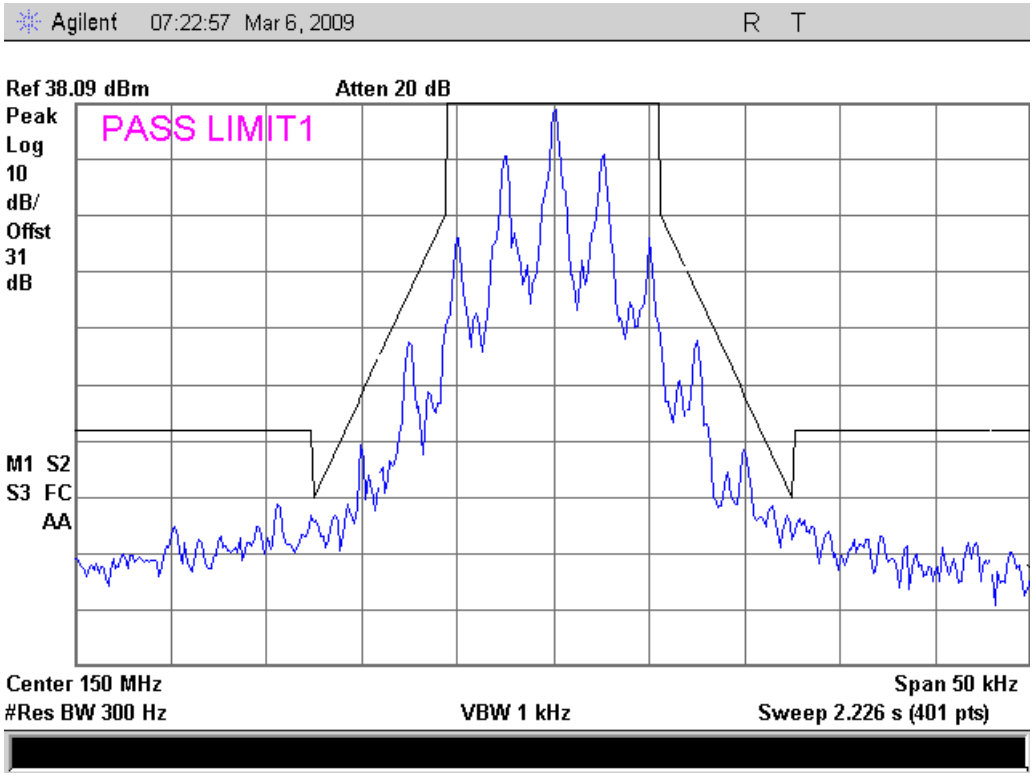
150 MHz Reference



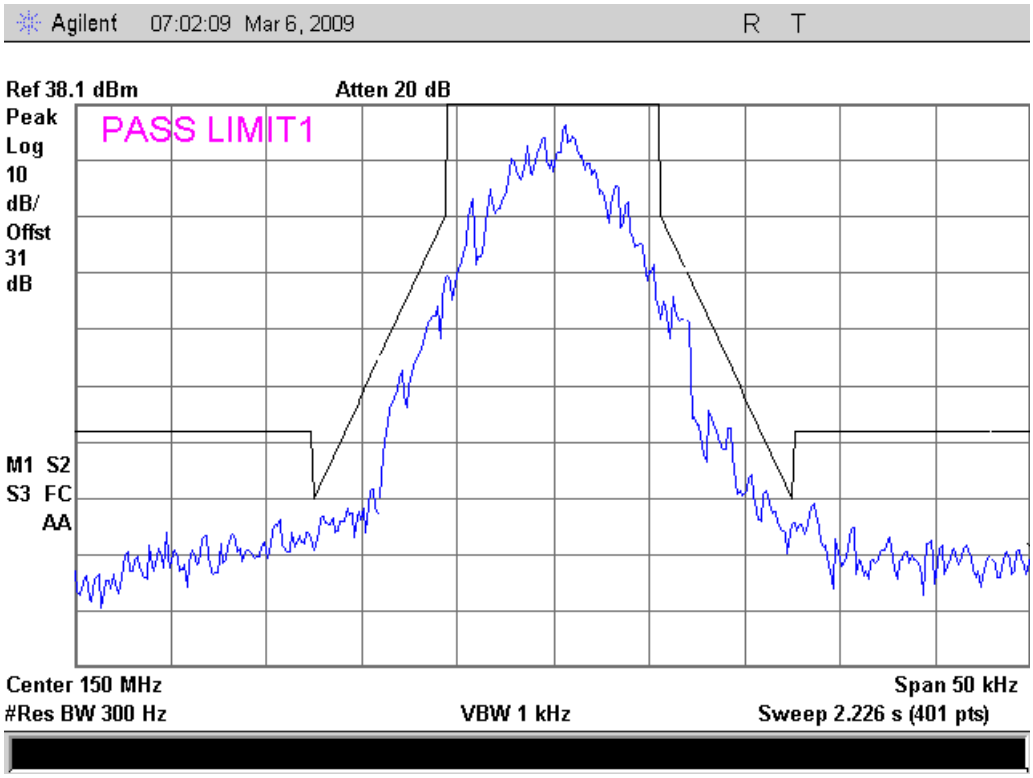
150 MHz 25KHz Mask B



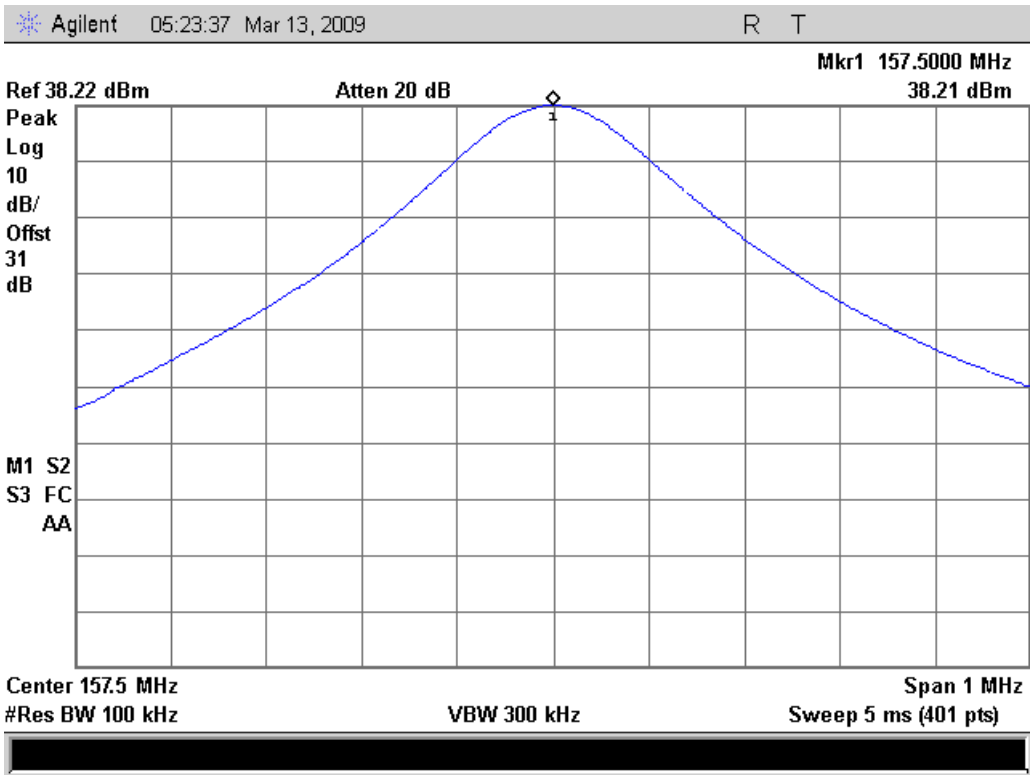
150 MHz 12.5kHz Mask D



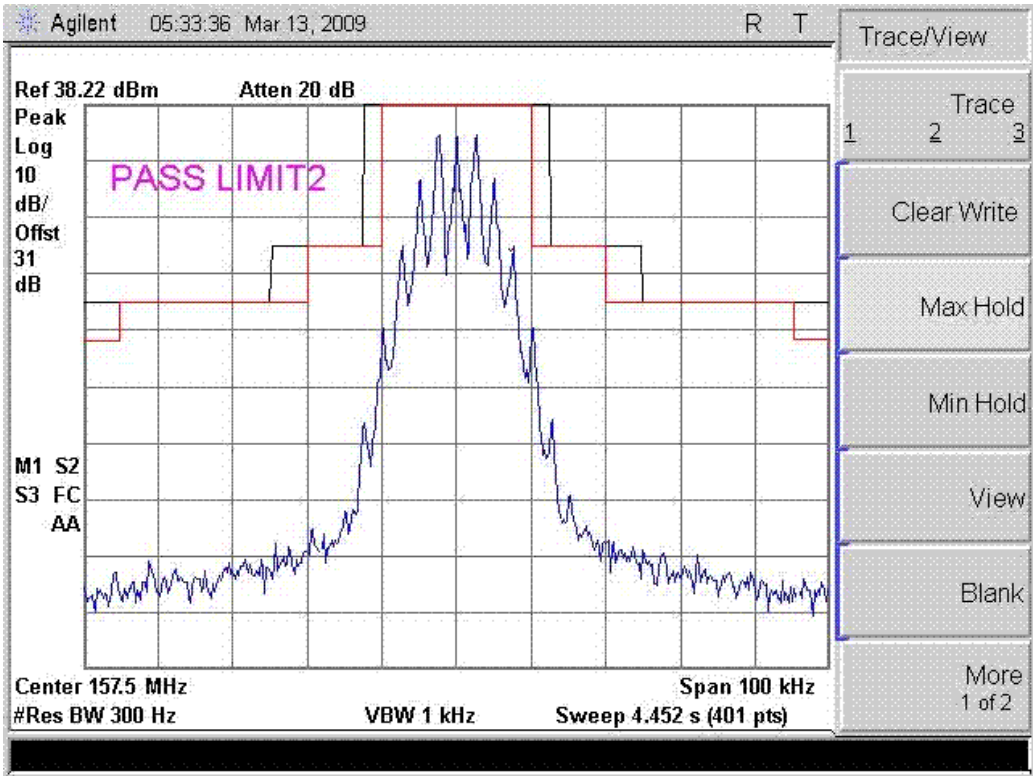
150 MHz Digital Mask D



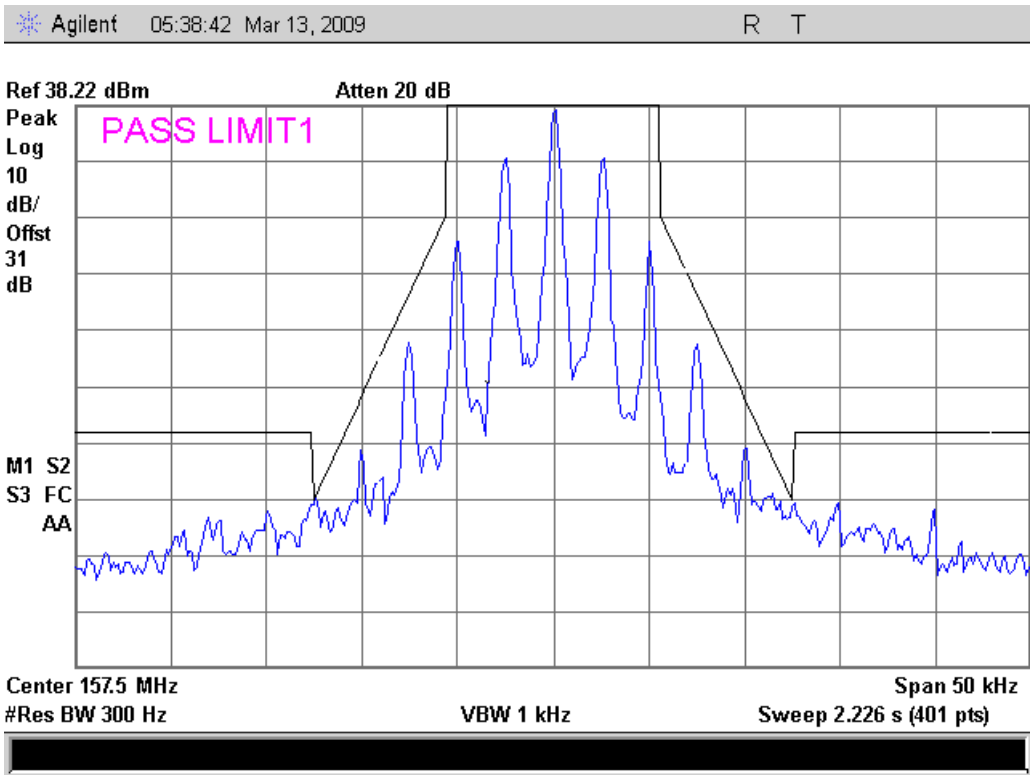
157.5 MHz Reference (part 74, 80)



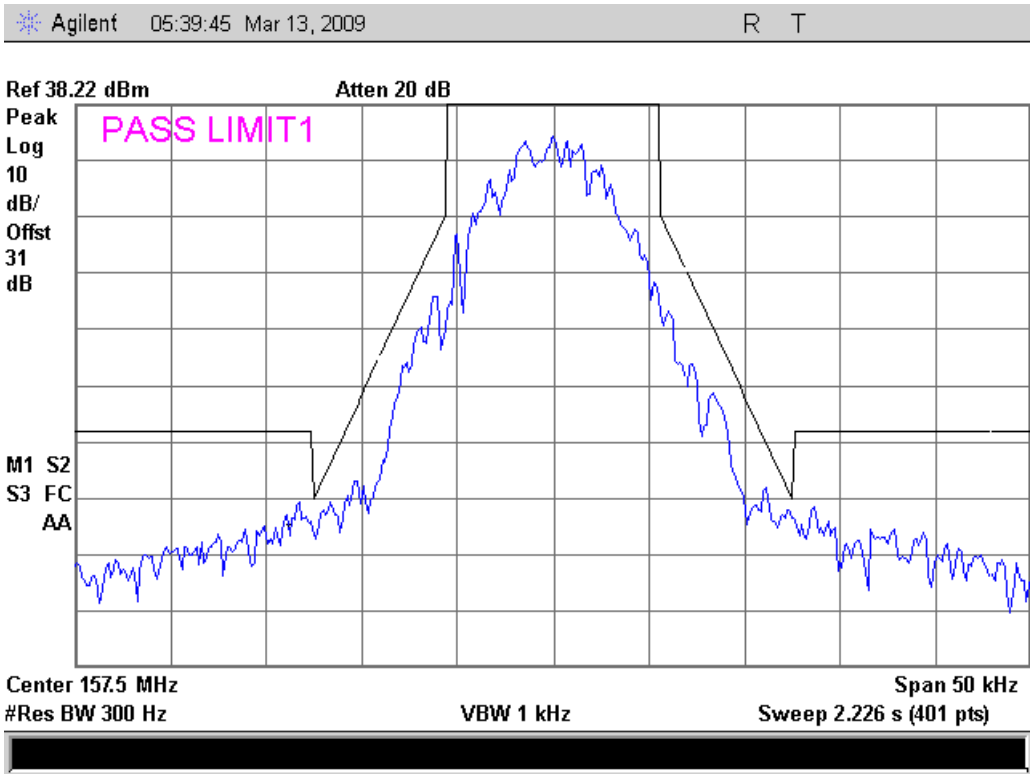
157.5 MHz 25KHz Mask B (part 74, 80)



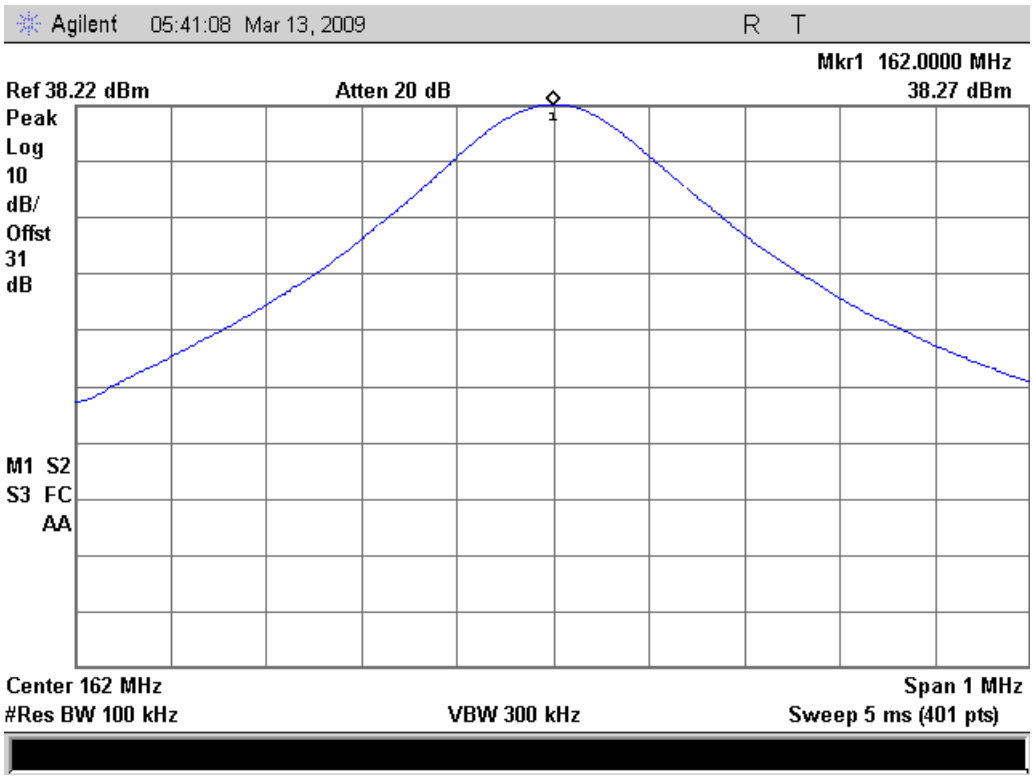
157.5 MHz 12.5kHz Mask D (part 74, 80)



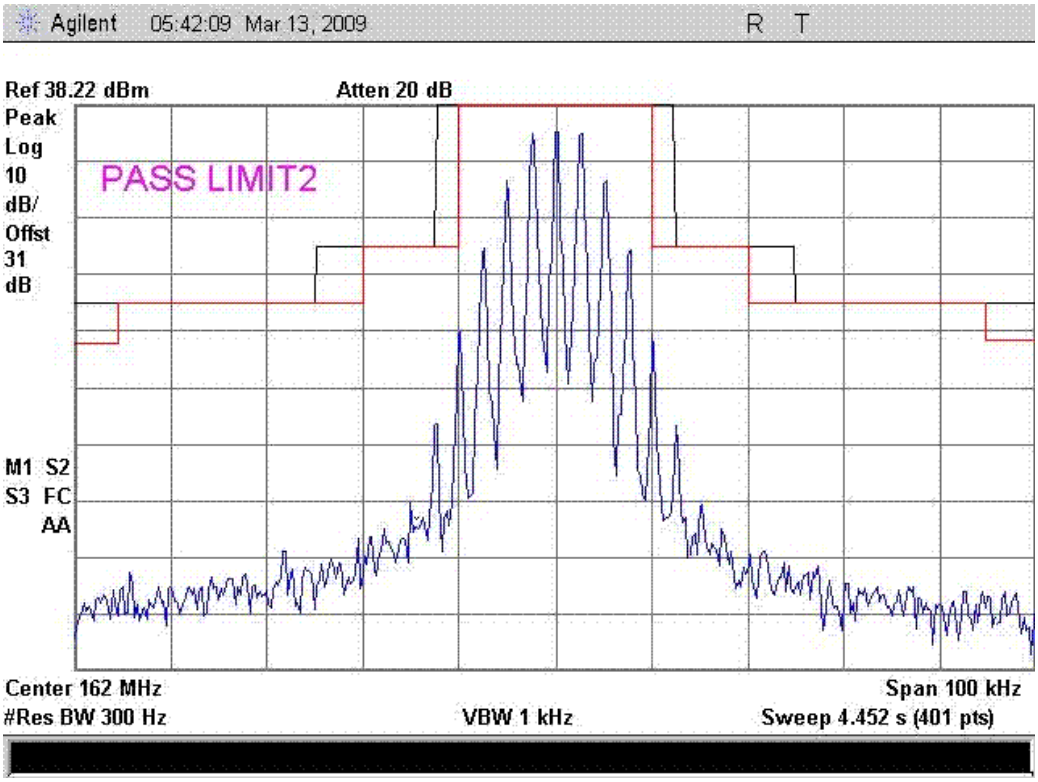
157.5 MHz Digital Mask D (part 74, 80)



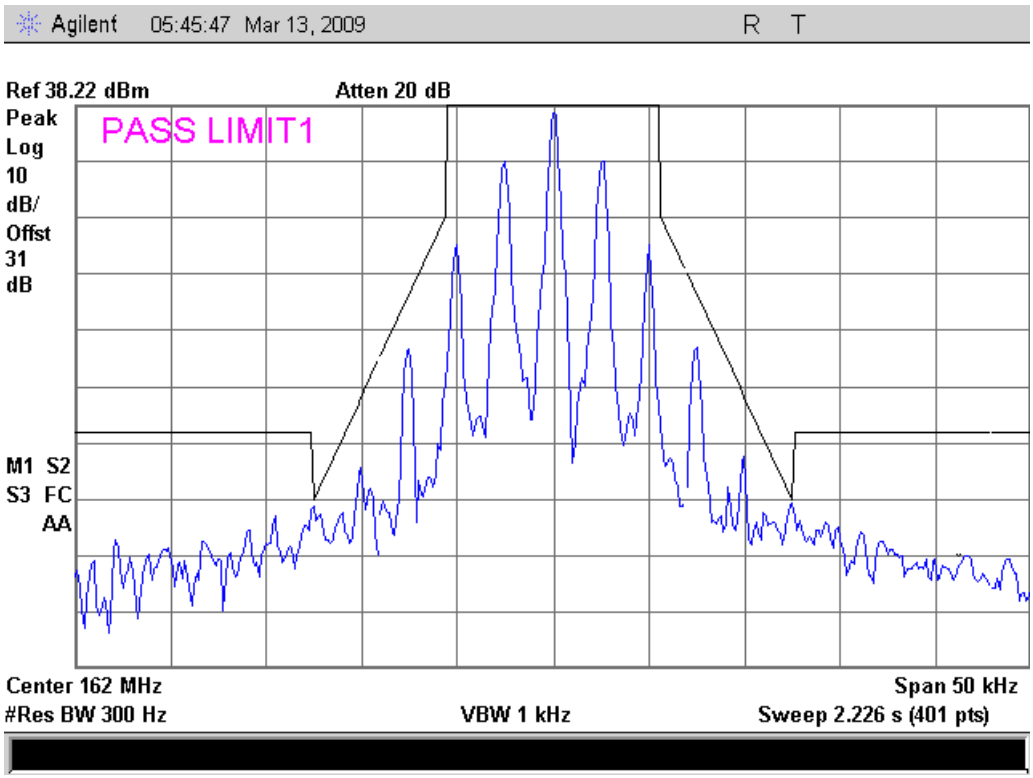
162 MHz Reference (part22)



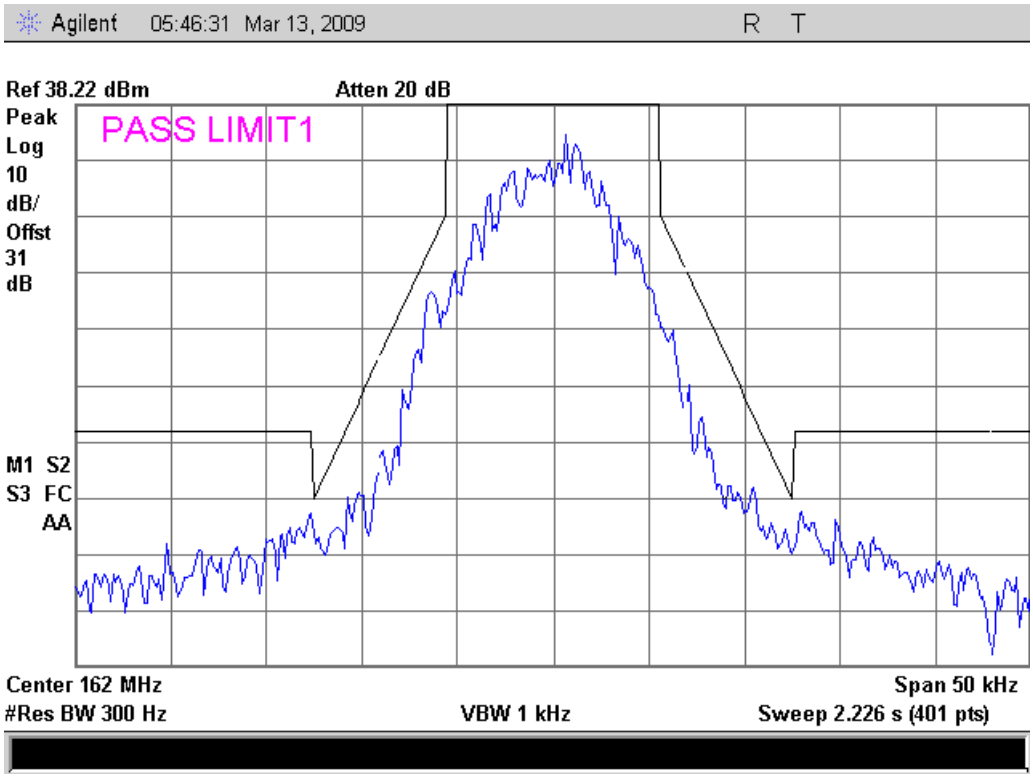
162 MHz 25KHz Mask B (part22)



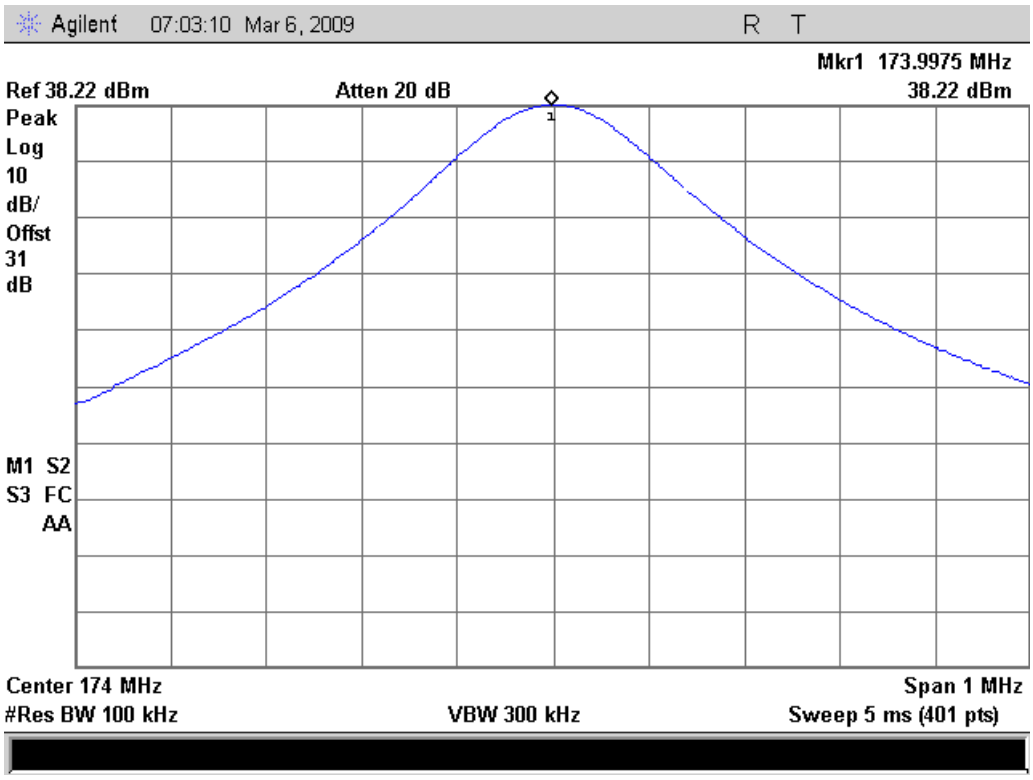
162 MHz 12.5kHz Mask D (part22)



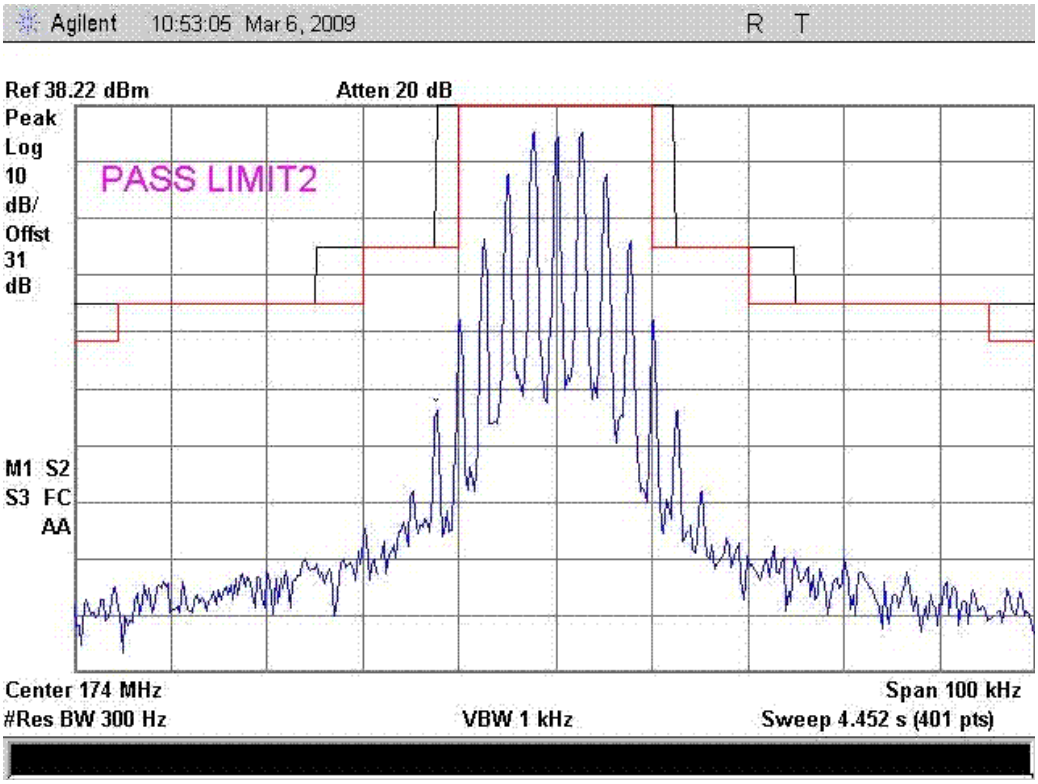
162 MHz Digital Mask D (part22)



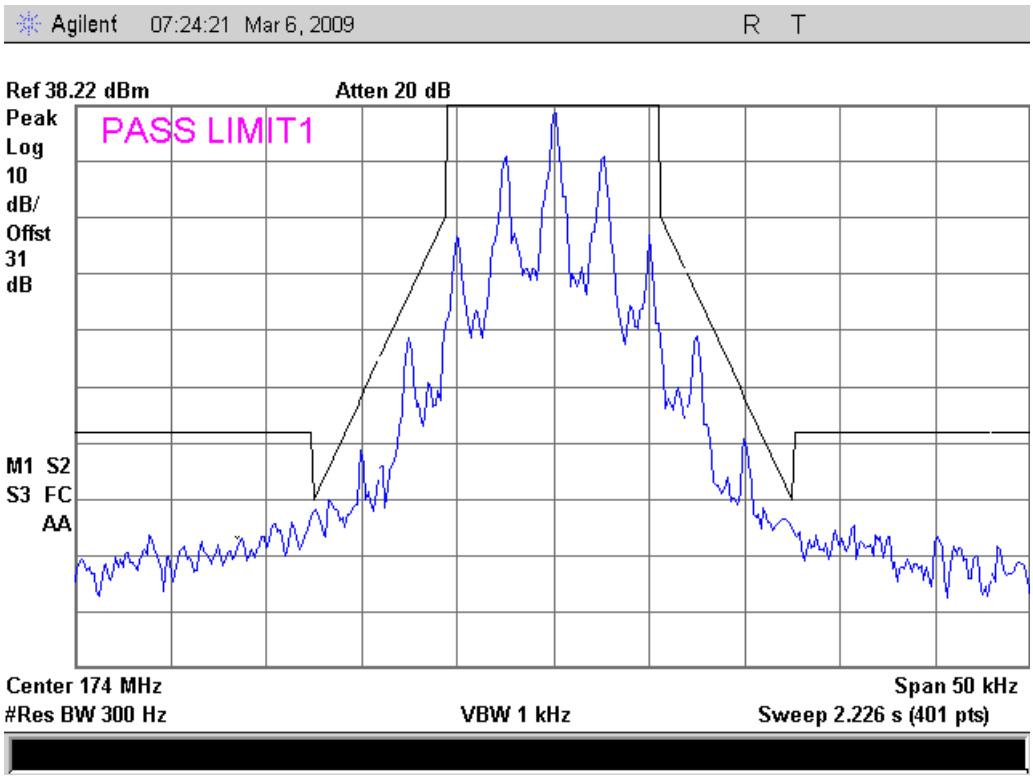
174 MHz Reference



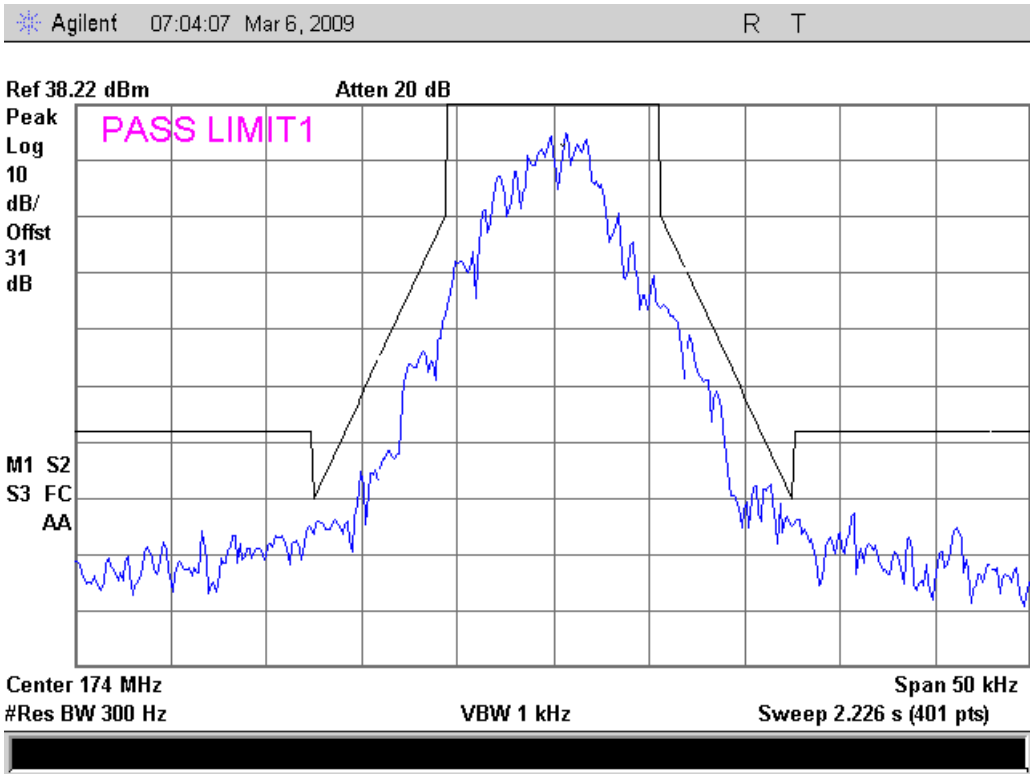
174 MHz 25KHz Mask B



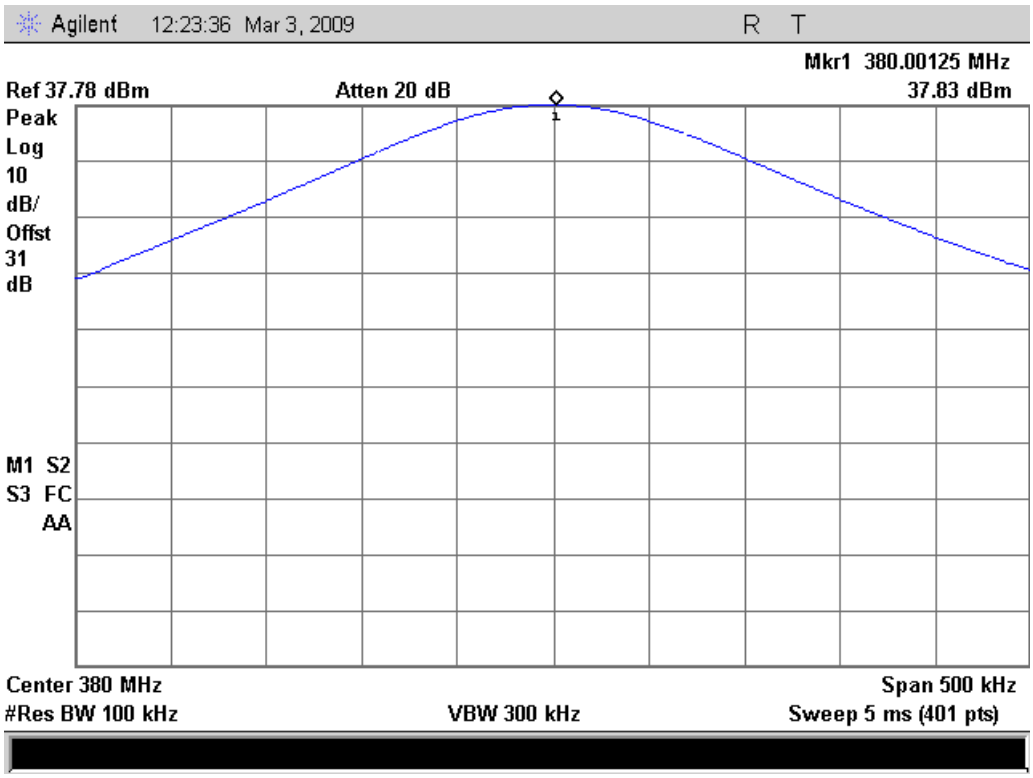
174 MHz 12.5kHz Mask D



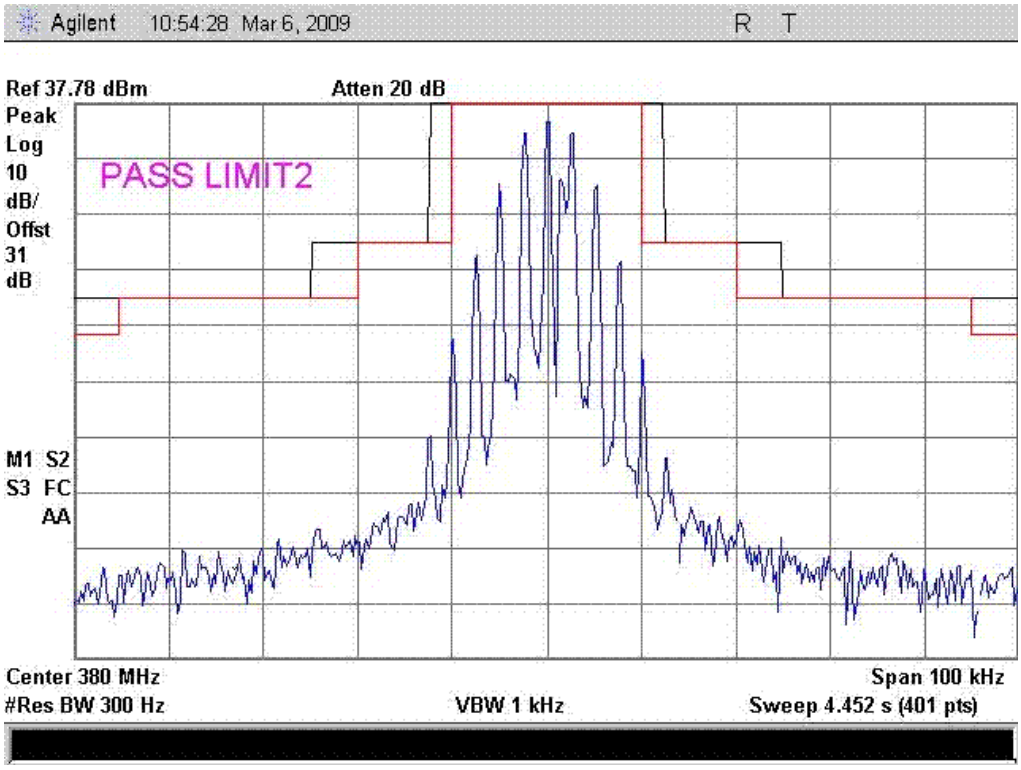
174 MHz Digital Mask D



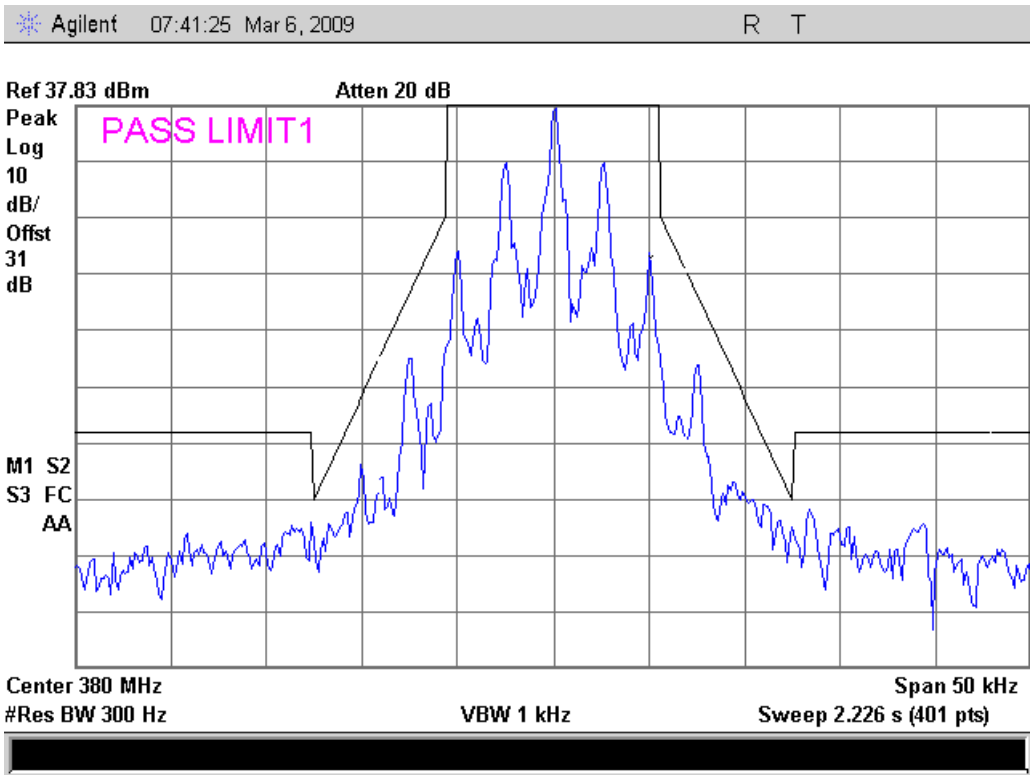
380 MHz Reference



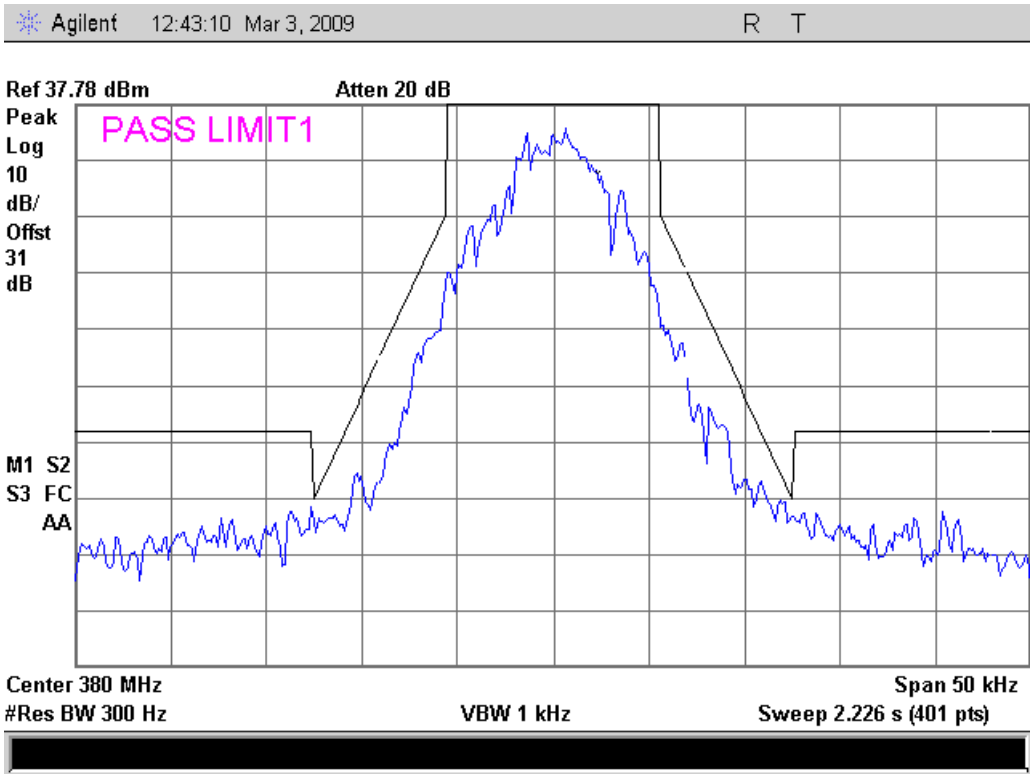
380 MHz 25KHz Mask B



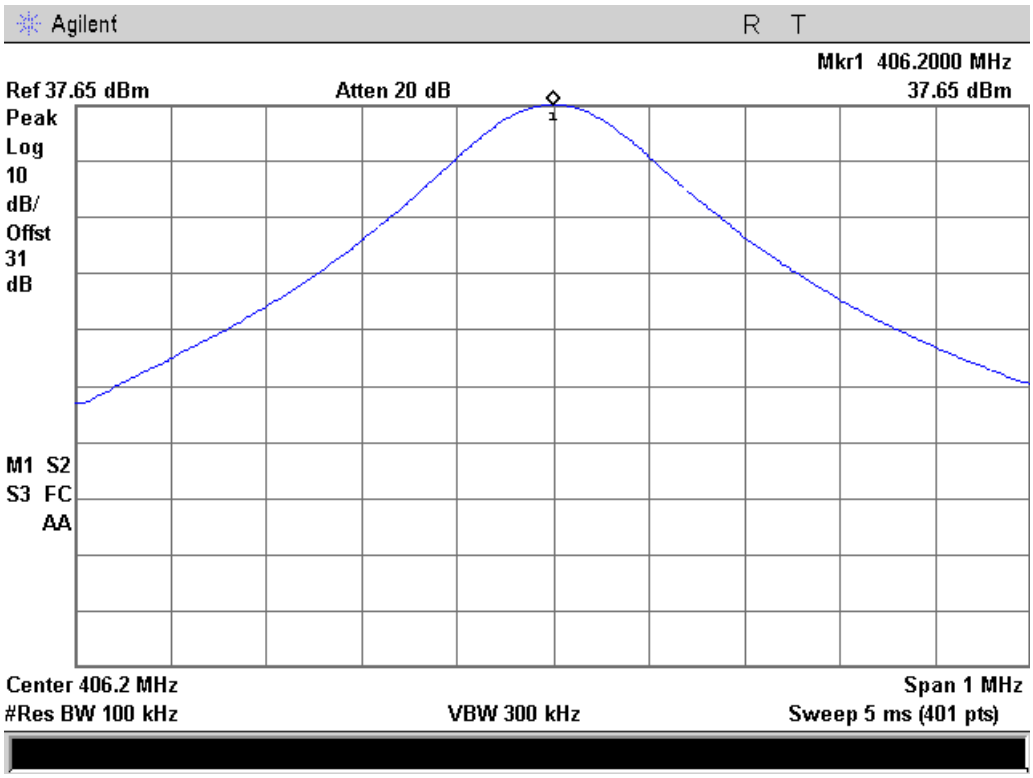
380 MHz 12.5kHz Mask D



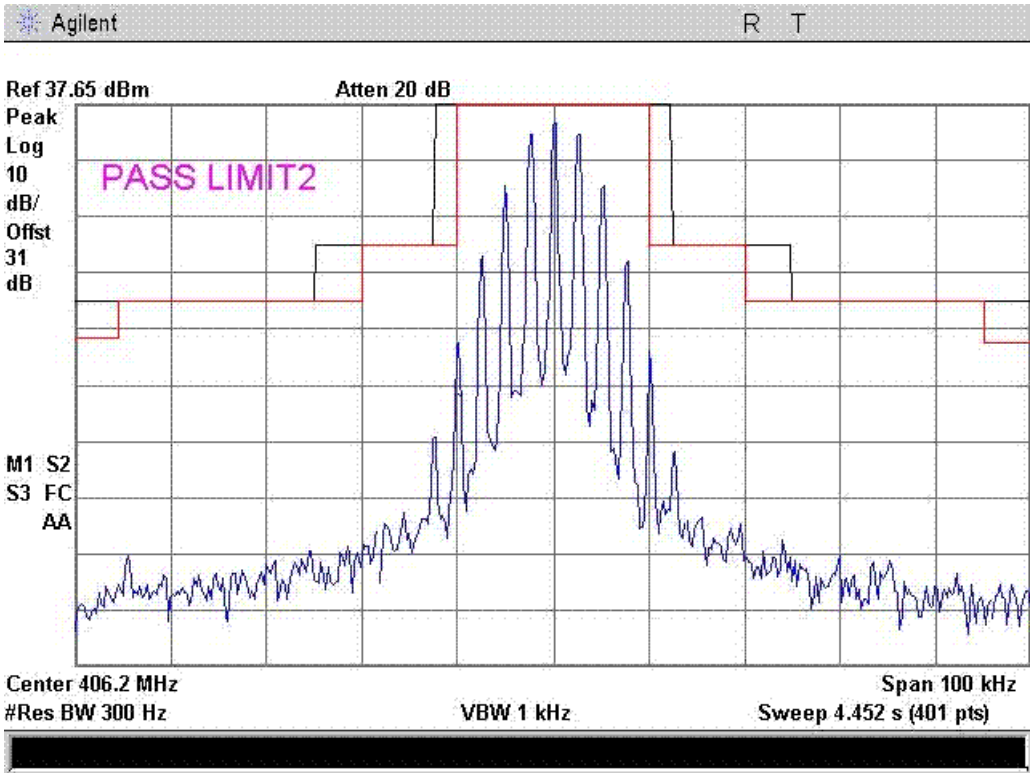
380 MHz Digital Mask D



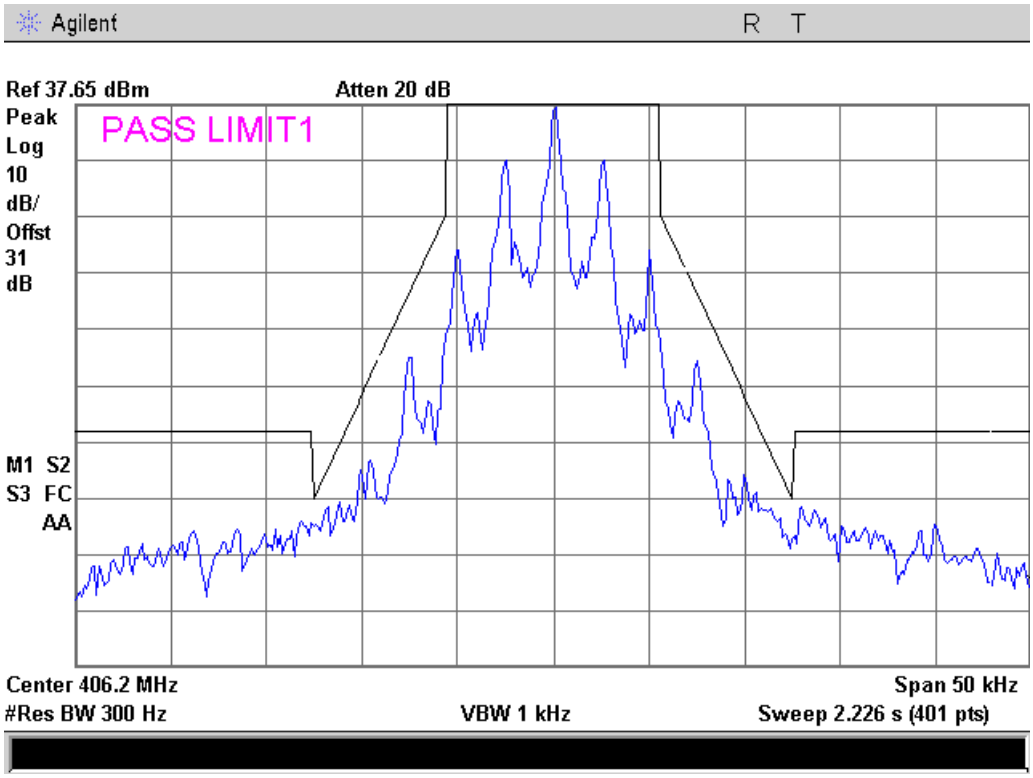
406.2 MHz Reference



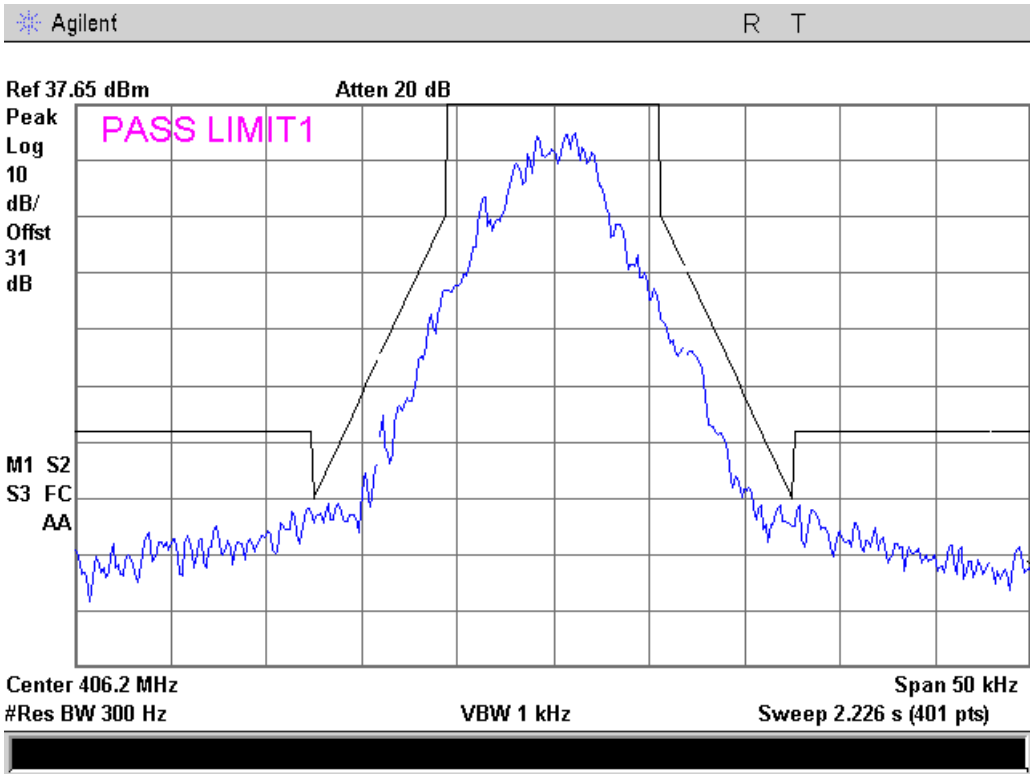
406.2 MHz 25KHz Mask B



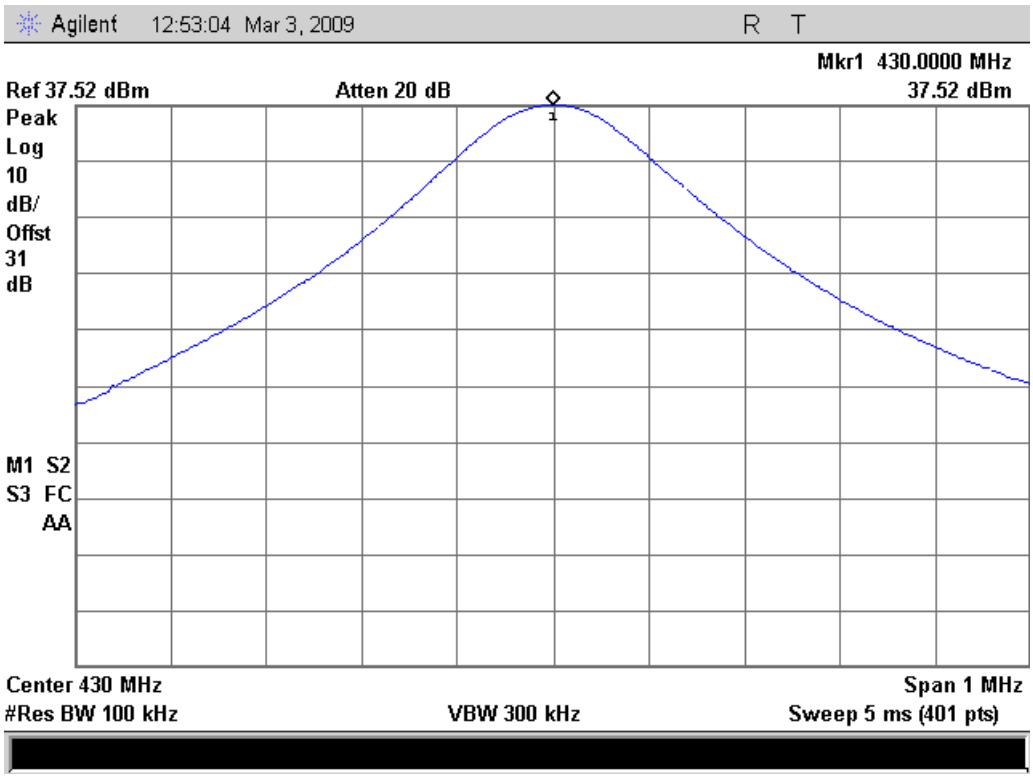
406.2 MHz 12.5kHz Mask D



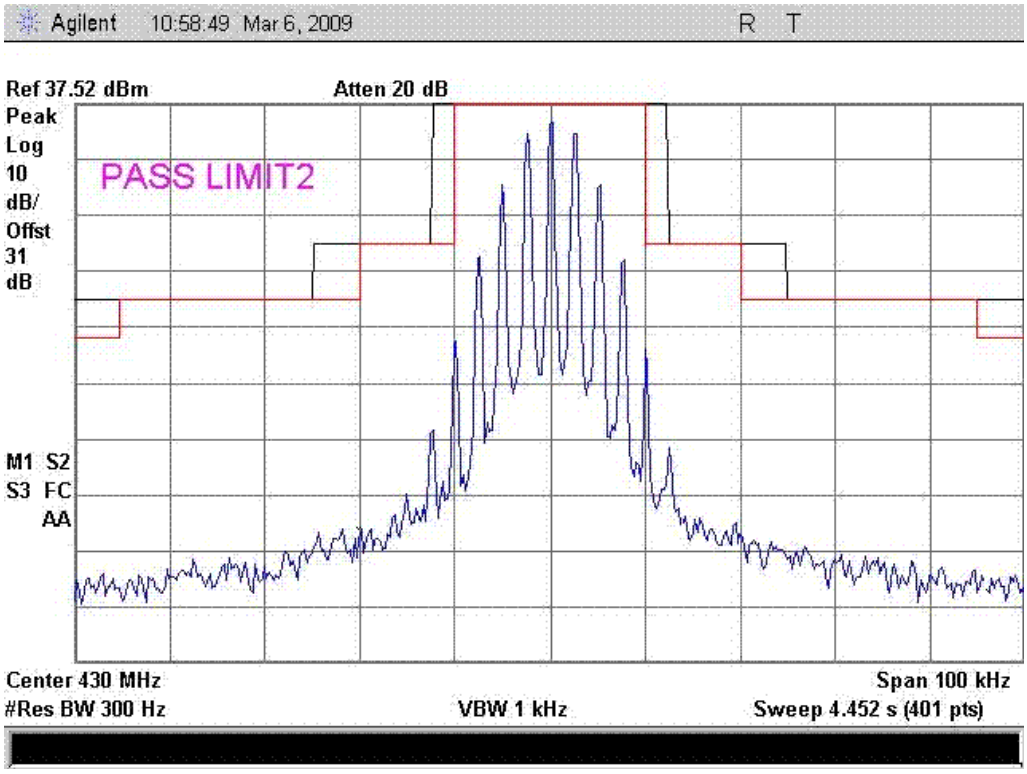
406.2 MHz Digital Mask D



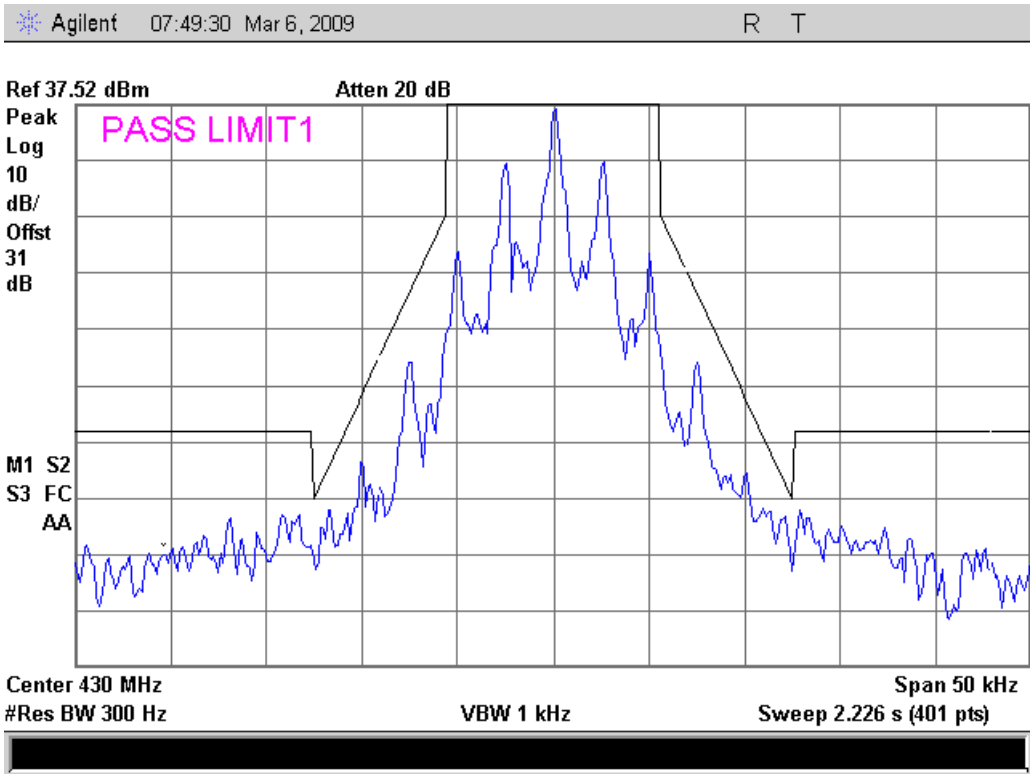
430 MHz Reference



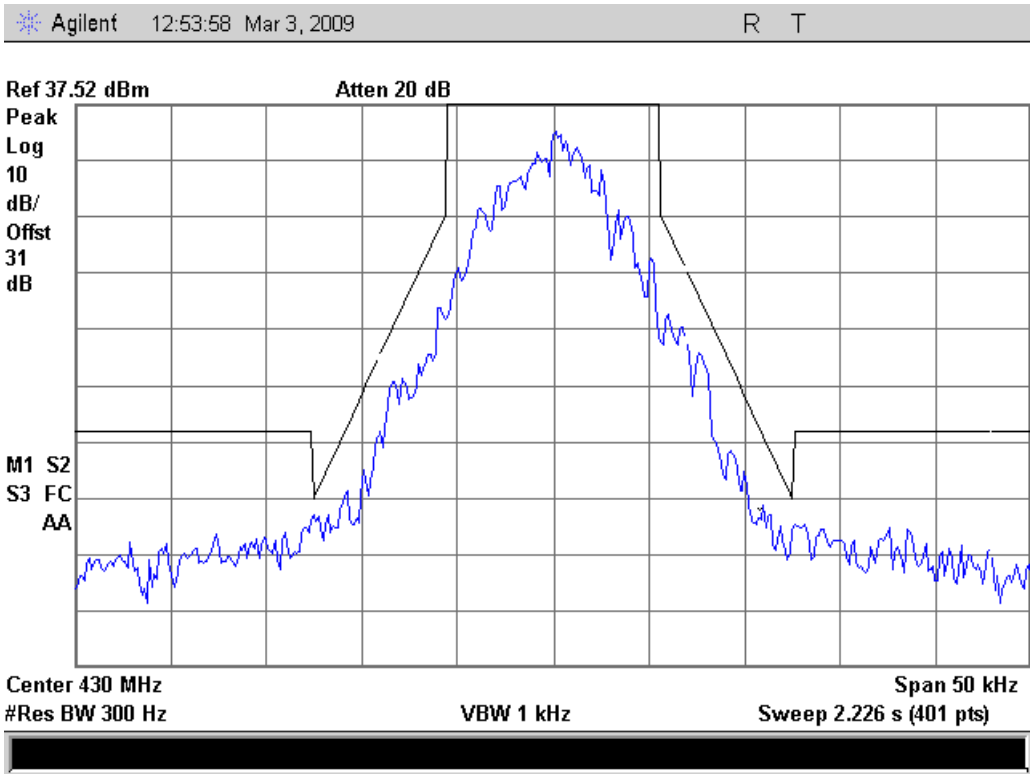
430 MHz 25KHz Mask B



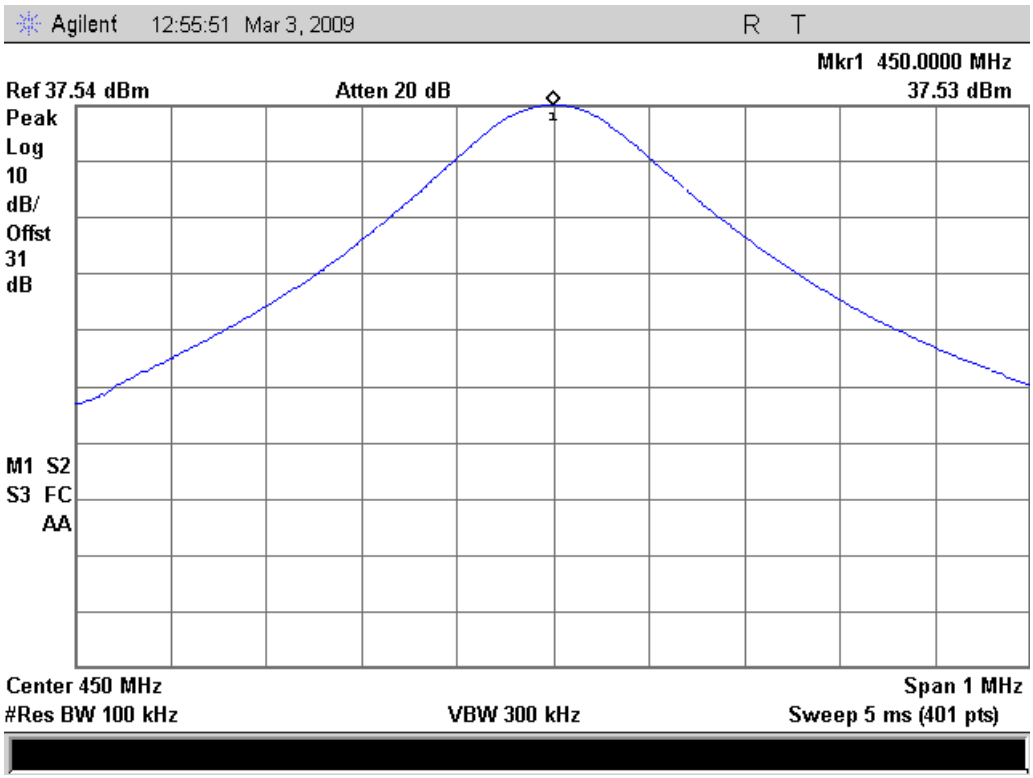
430 MHz 12.5kHz Mask D



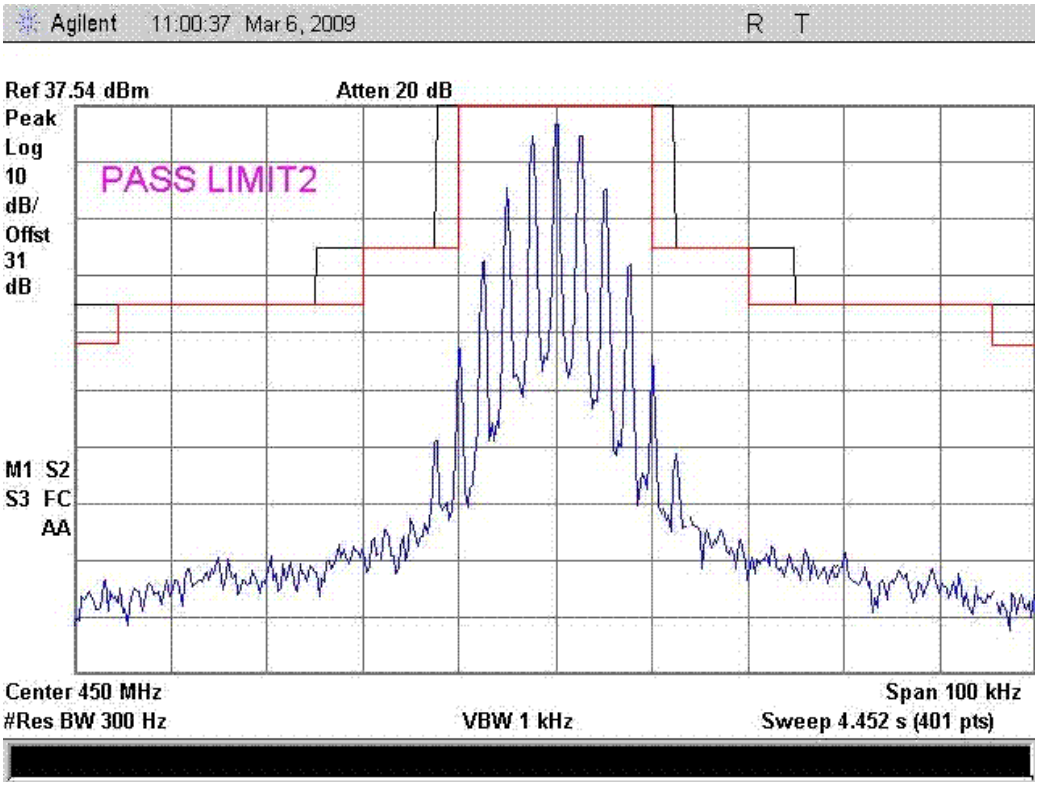
430 MHz Digital Mask D



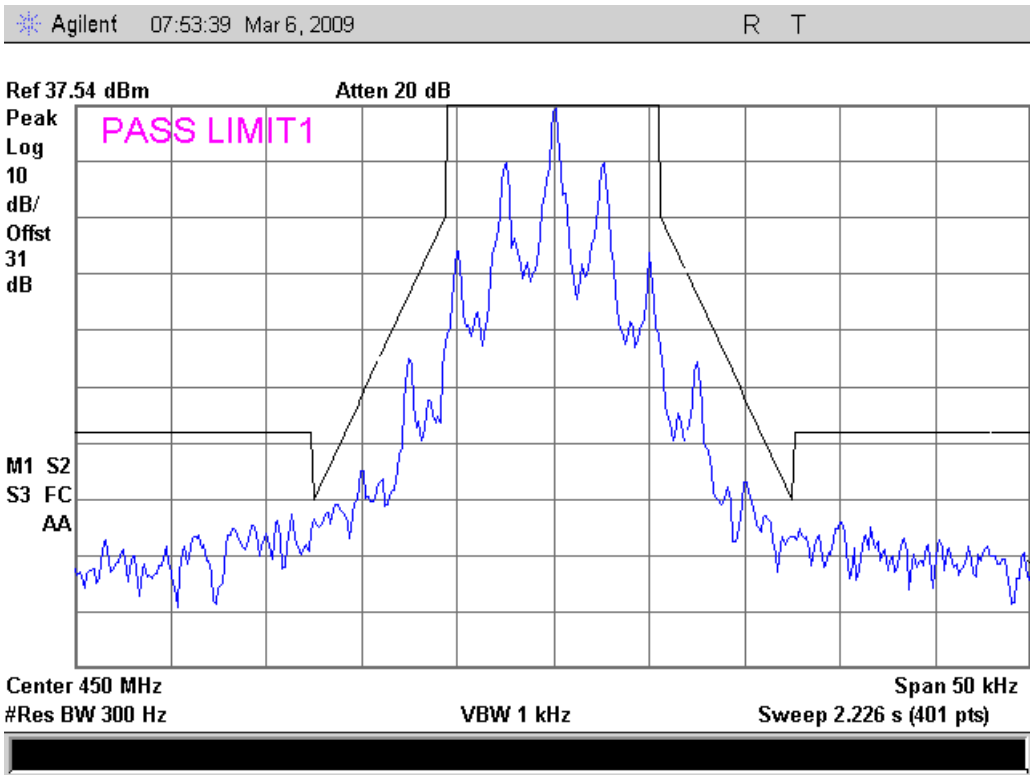
450 MHz Reference



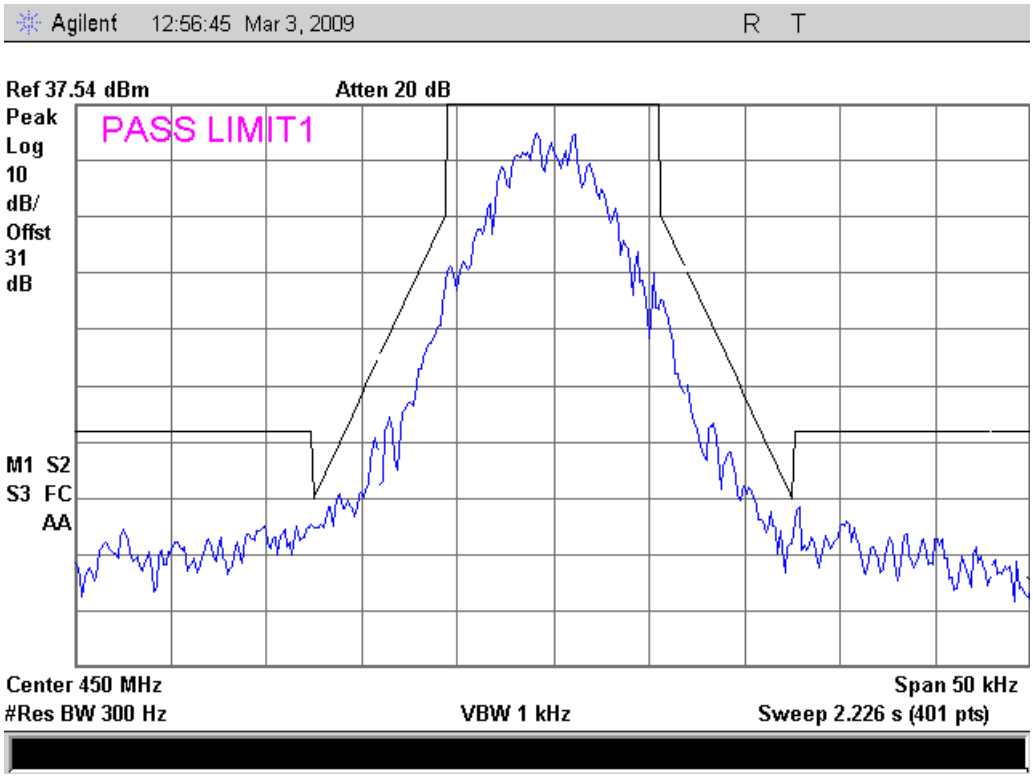
450 MHz 25KHz Mask B



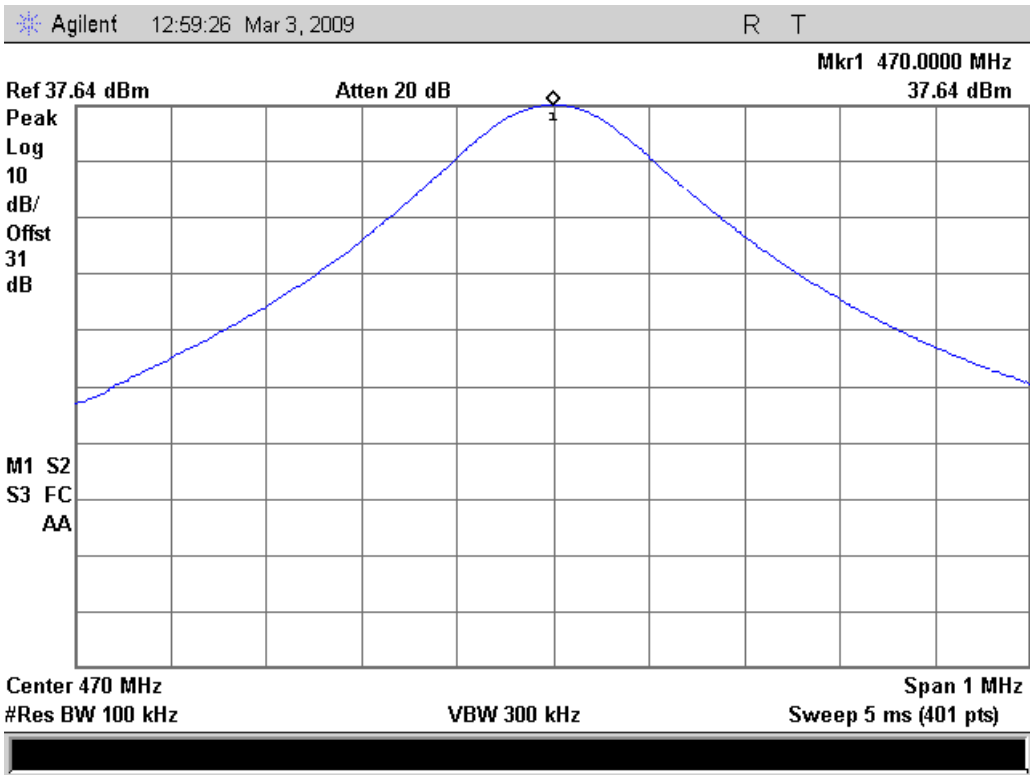
450 MHz 12.5kHz Mask D



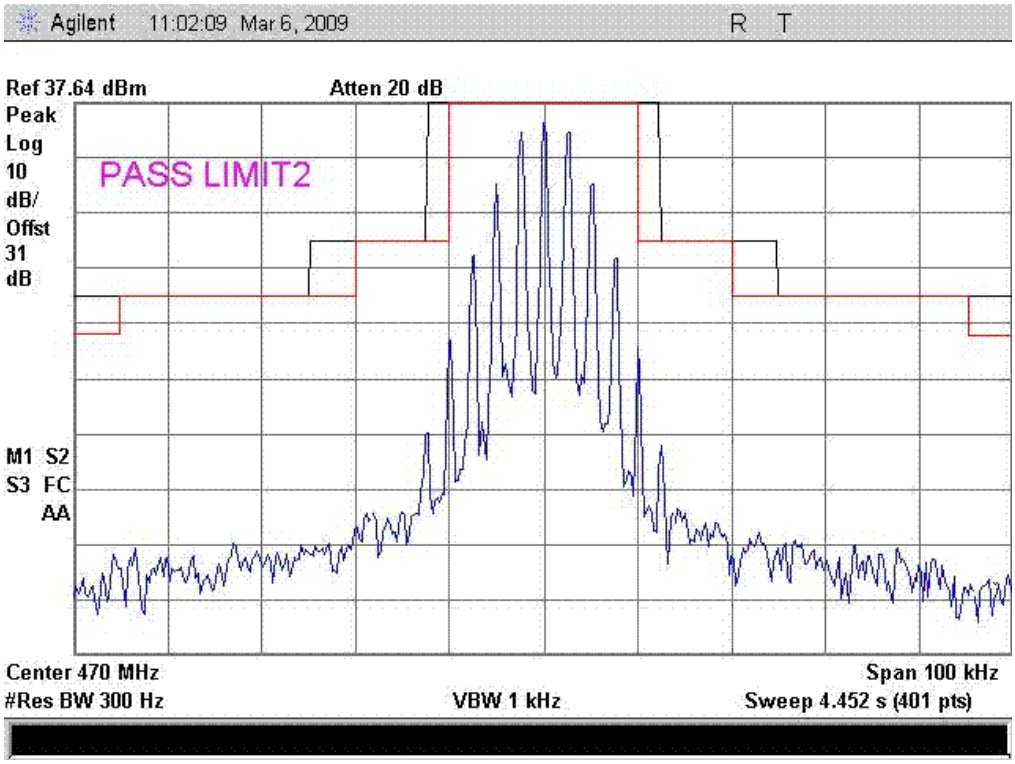
450 MHz Digital Mask D



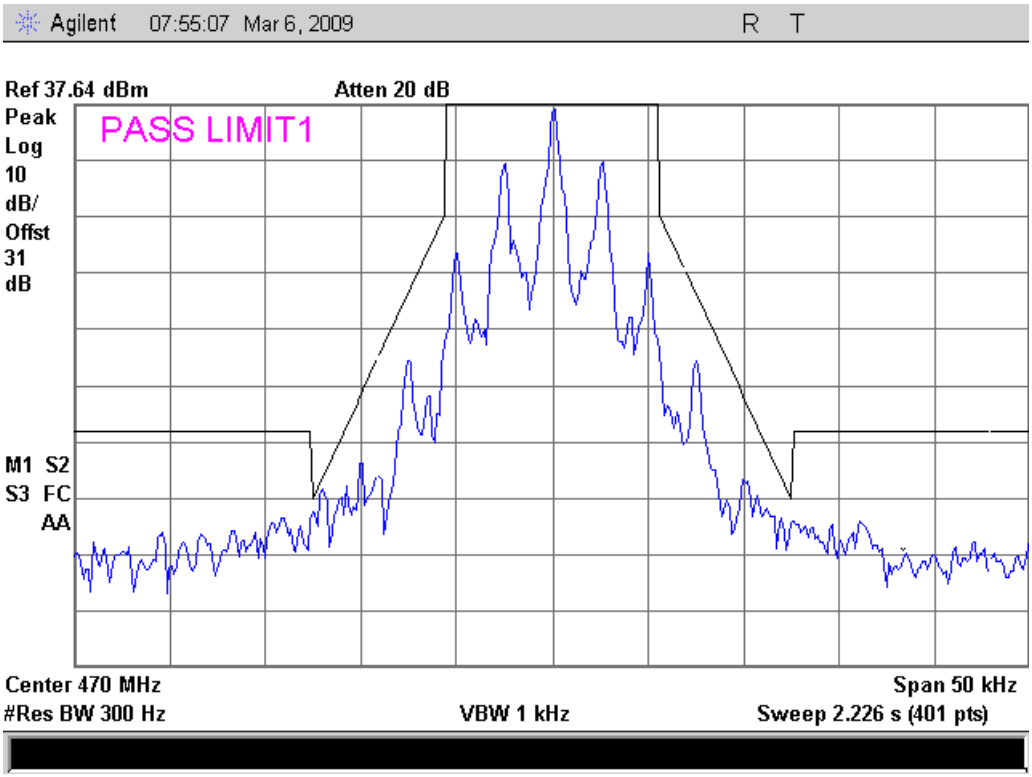
470 MHz Reference (part 22, 74)



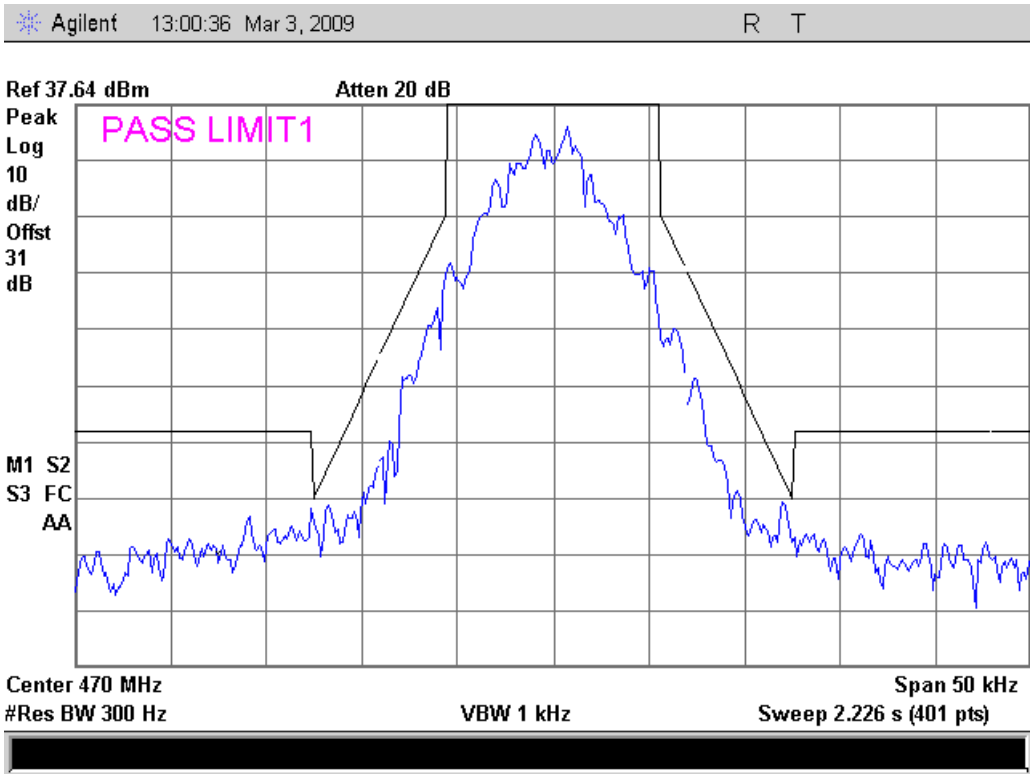
470 MHz 25KHz Mask B (part 22, 74)



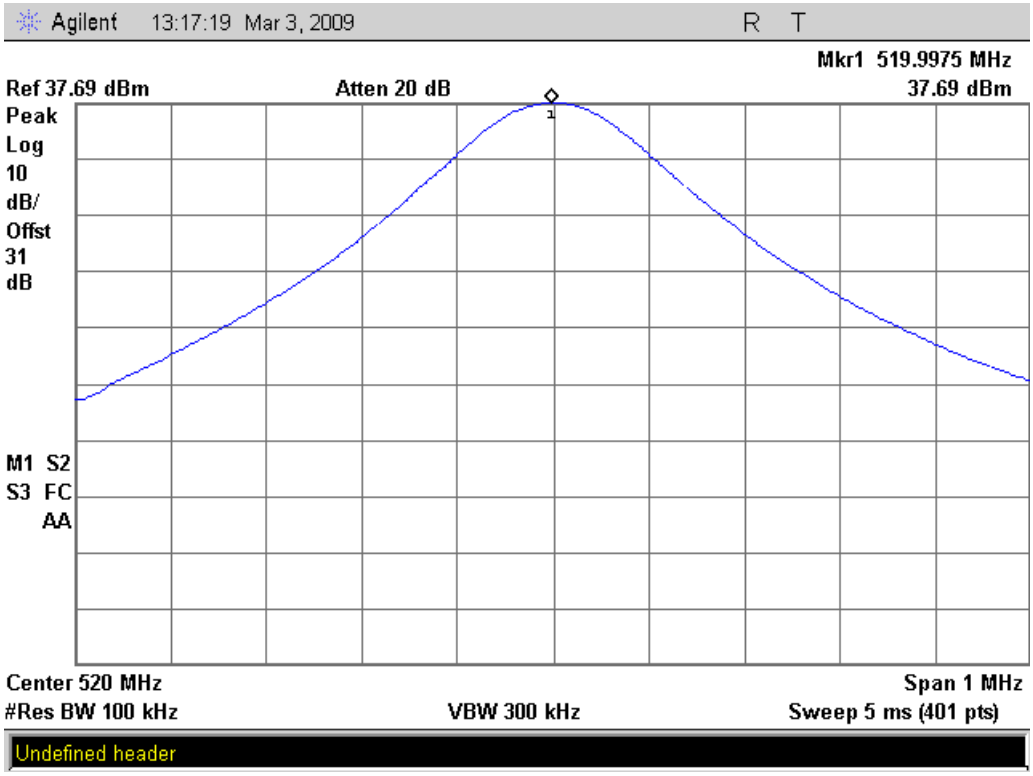
470 MHz 12.5kHz Mask D (part 22, 74)



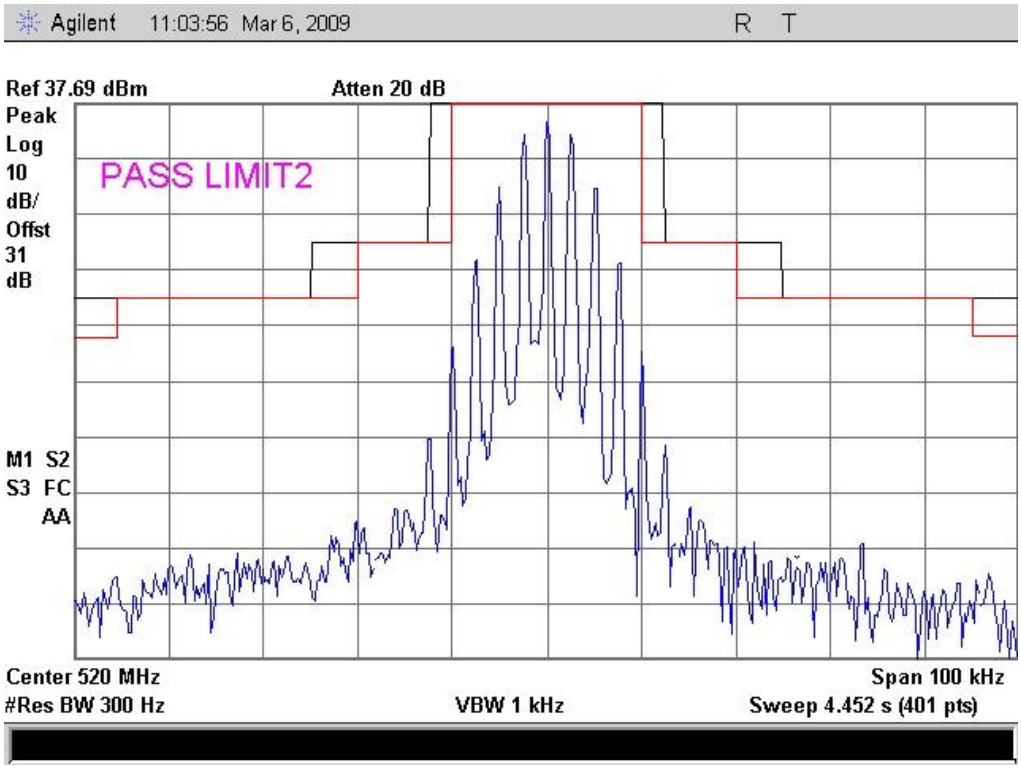
470 MHz Digital Mask D (part 22, 74)



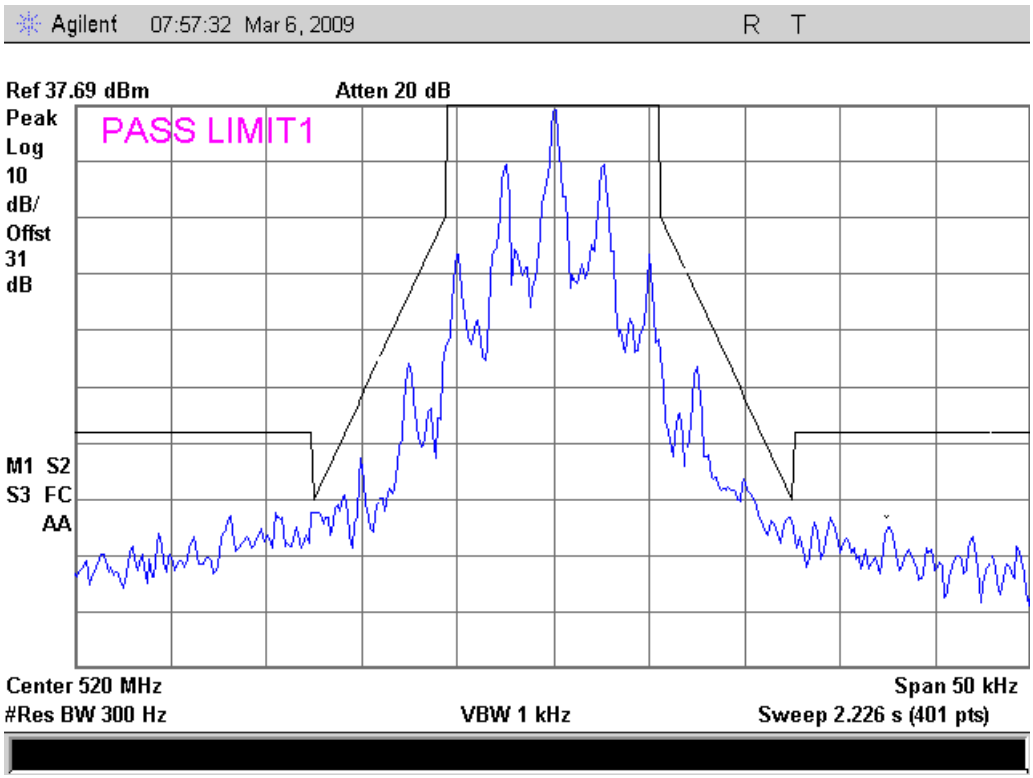
520 MHz Reference



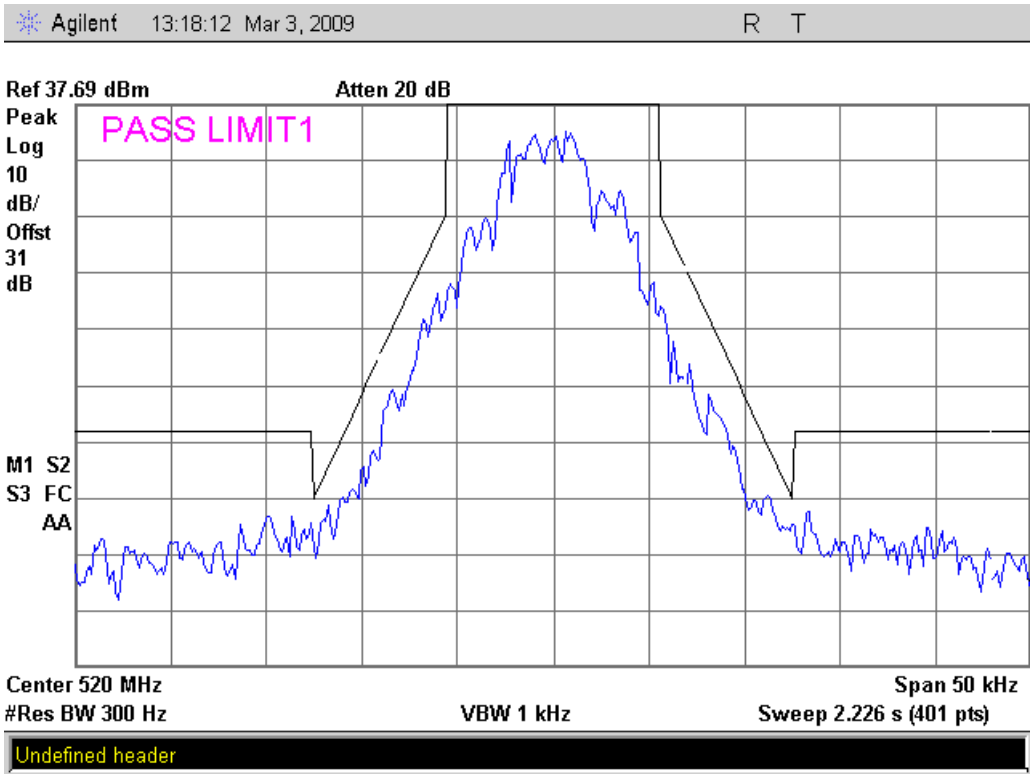
520 MHz 25KHz Mask B



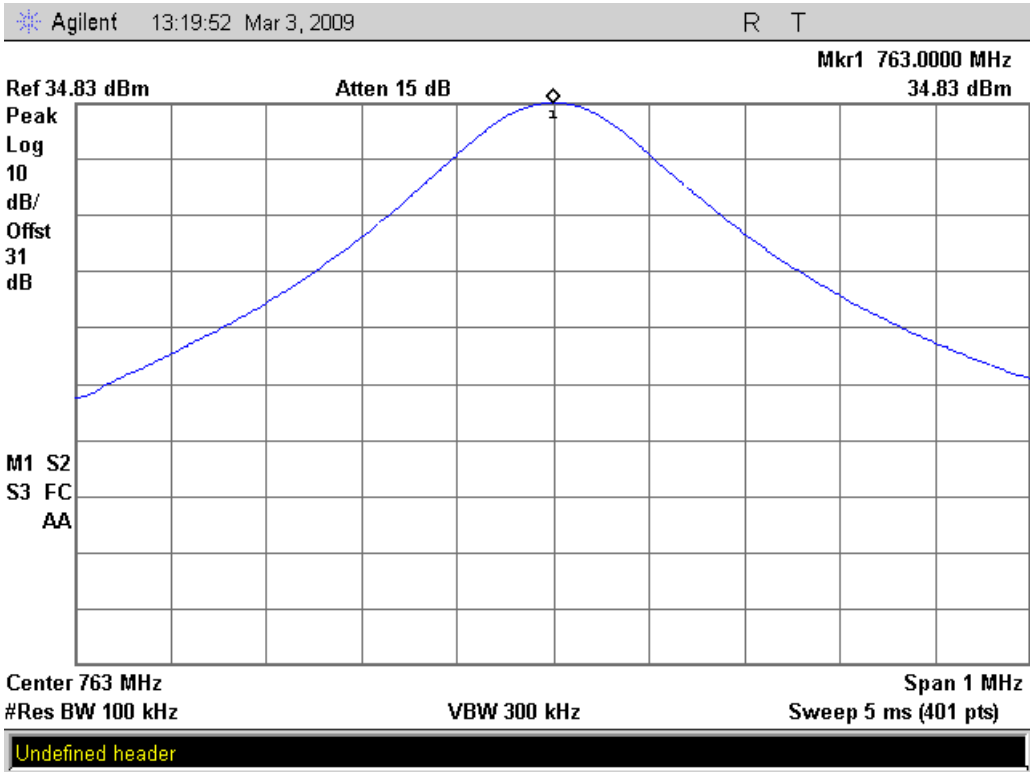
520 MHz 12.5kHz Mask D



520 MHz Digital Mask D



763 MHz Reference



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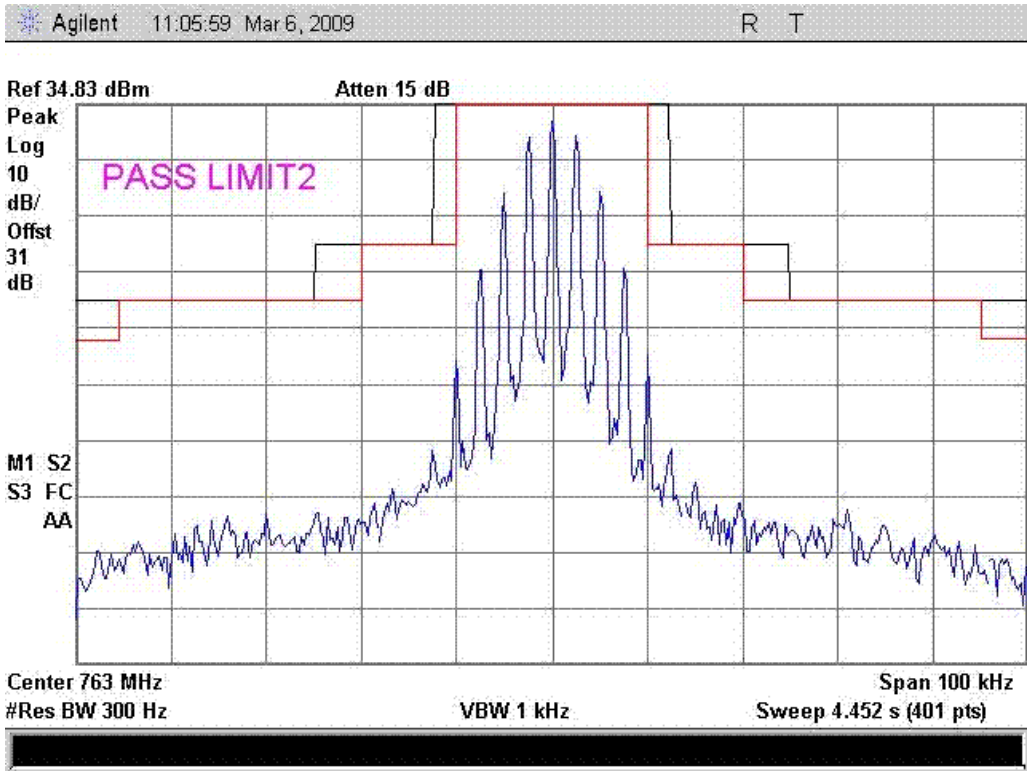
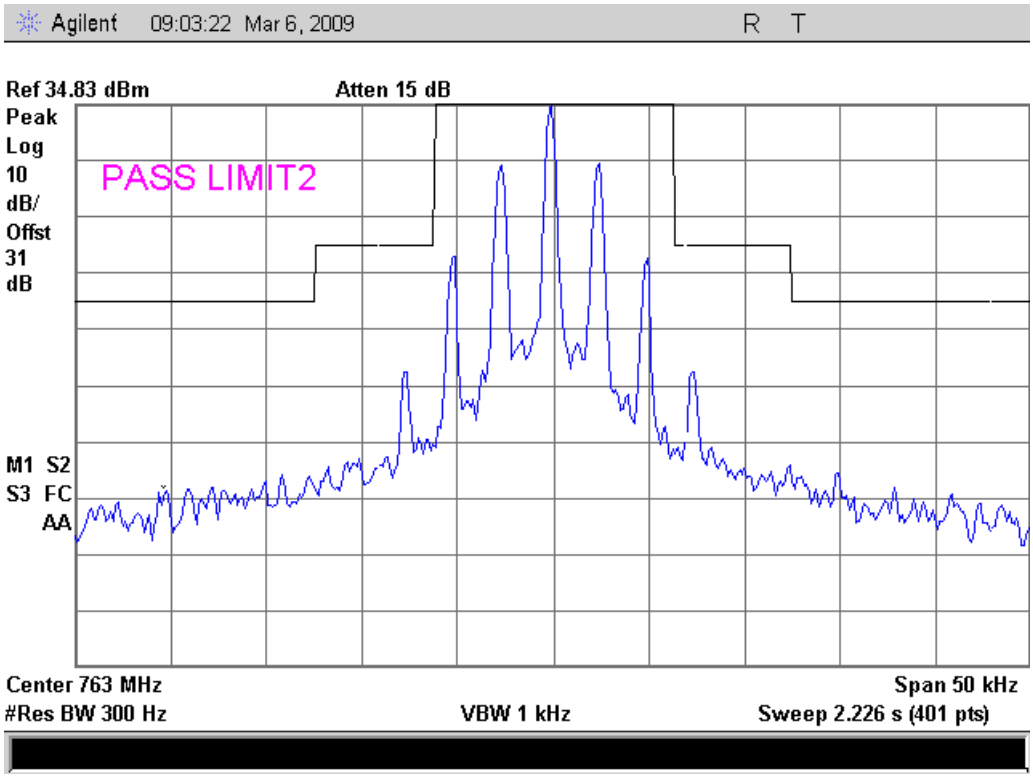
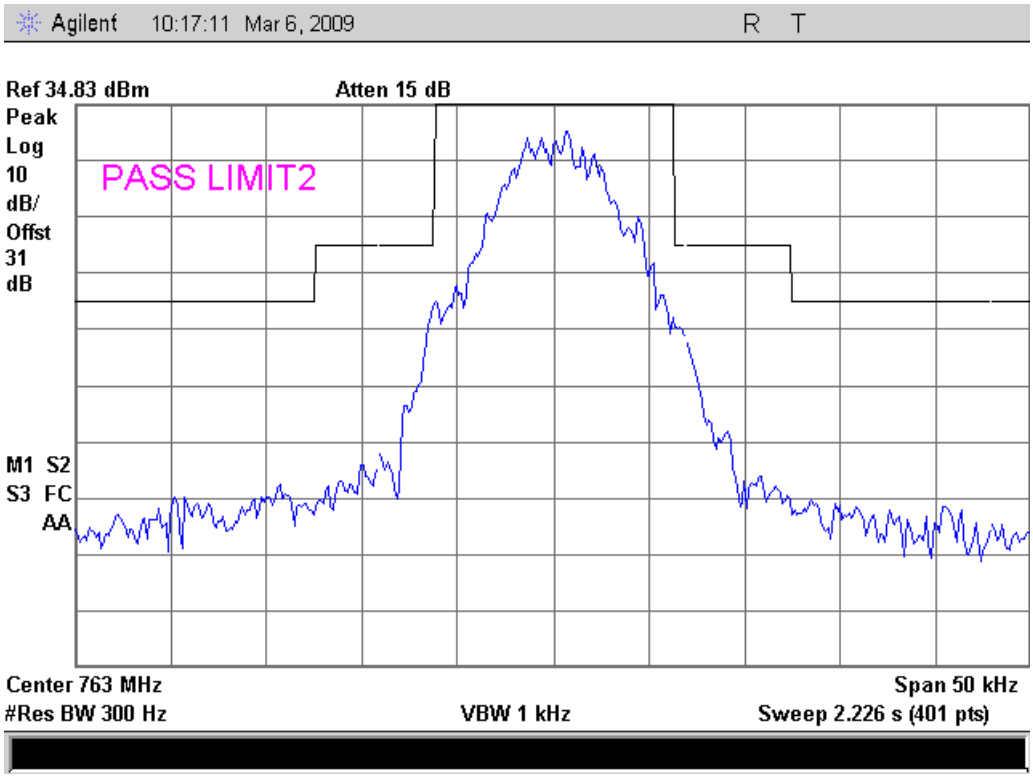


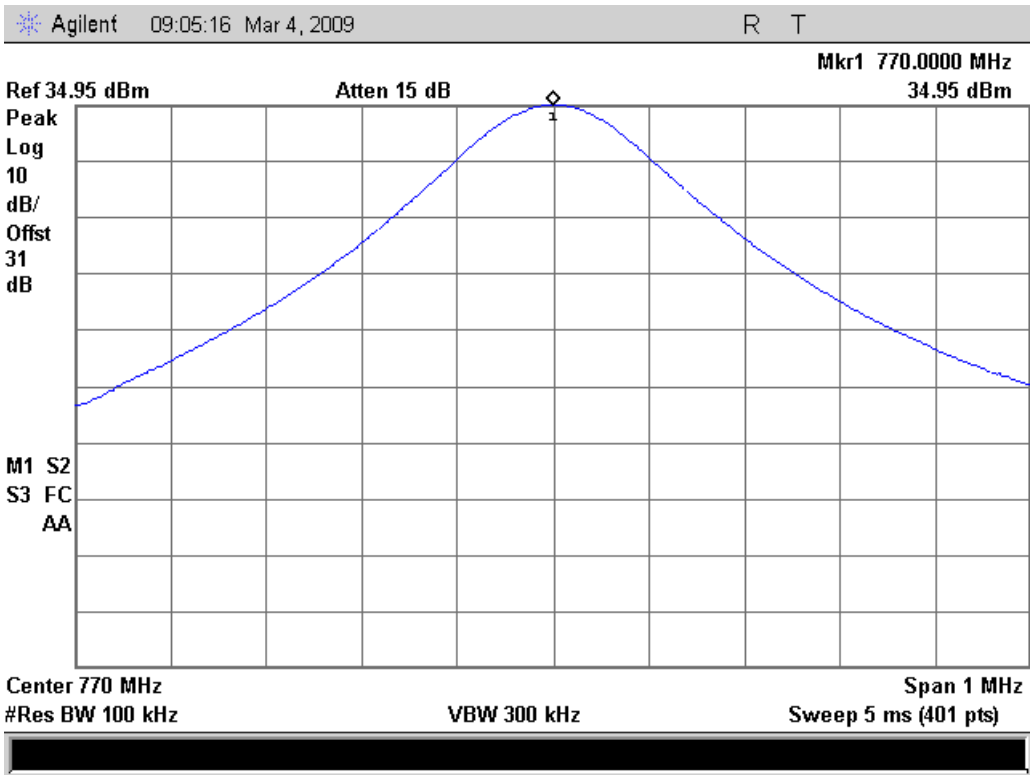
763 MHz 12.5kHz Mask B



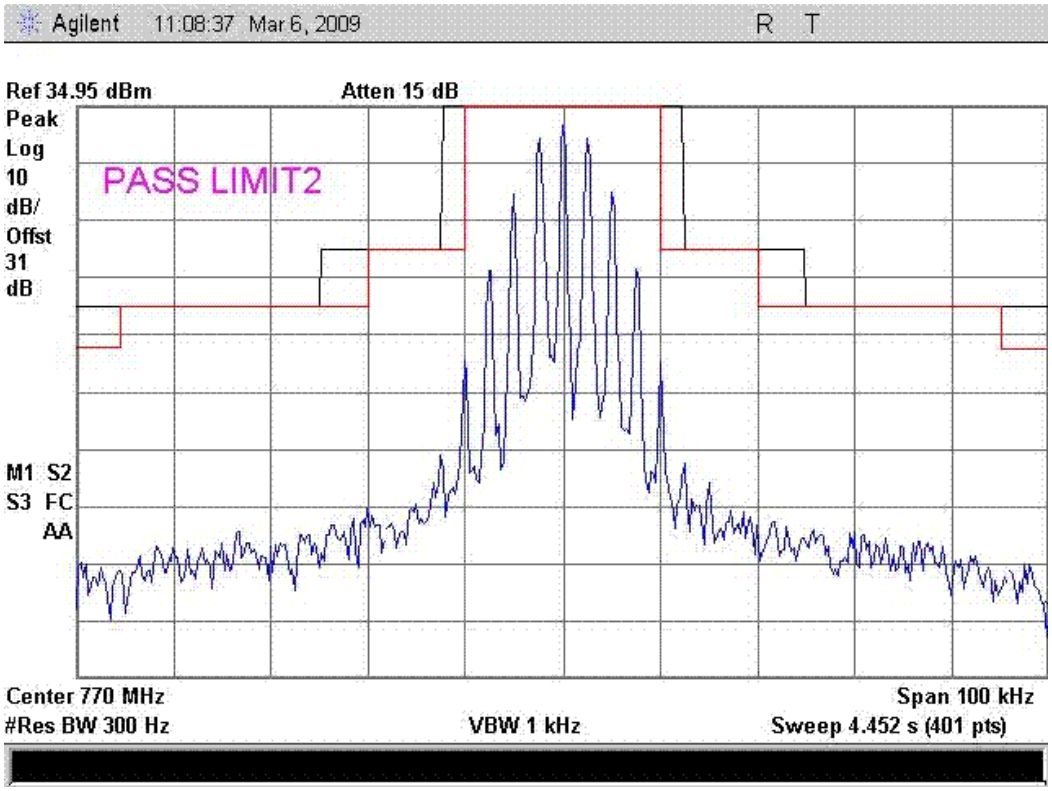
763 MHz Digital Mask B



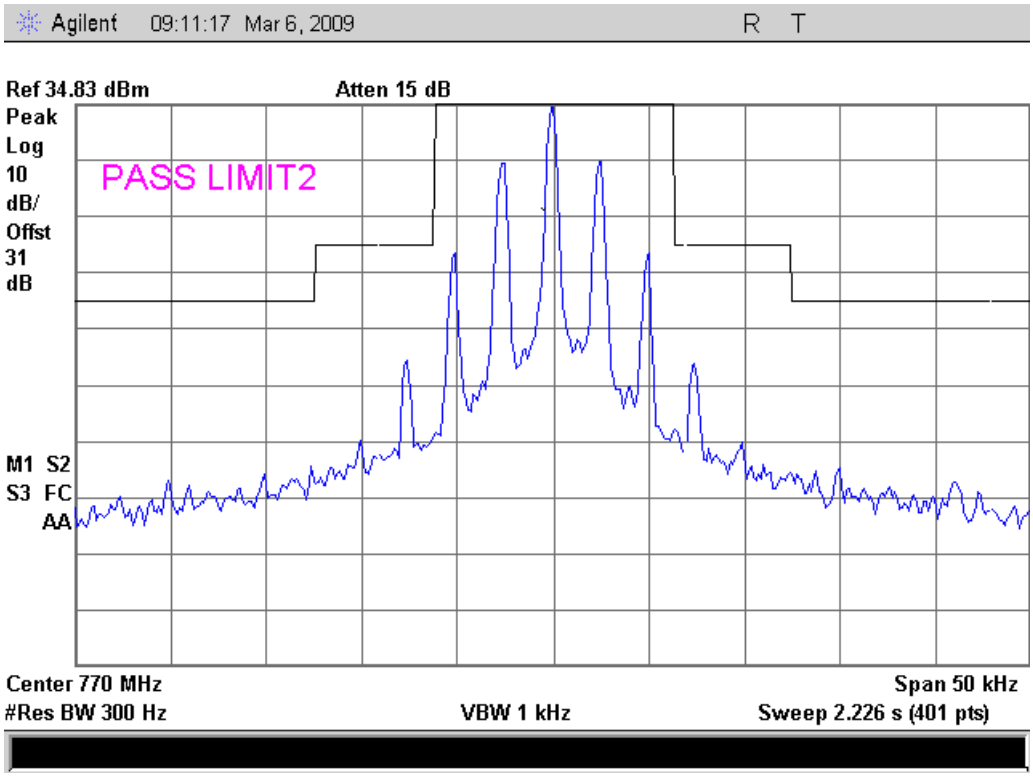
770 MHz Reference



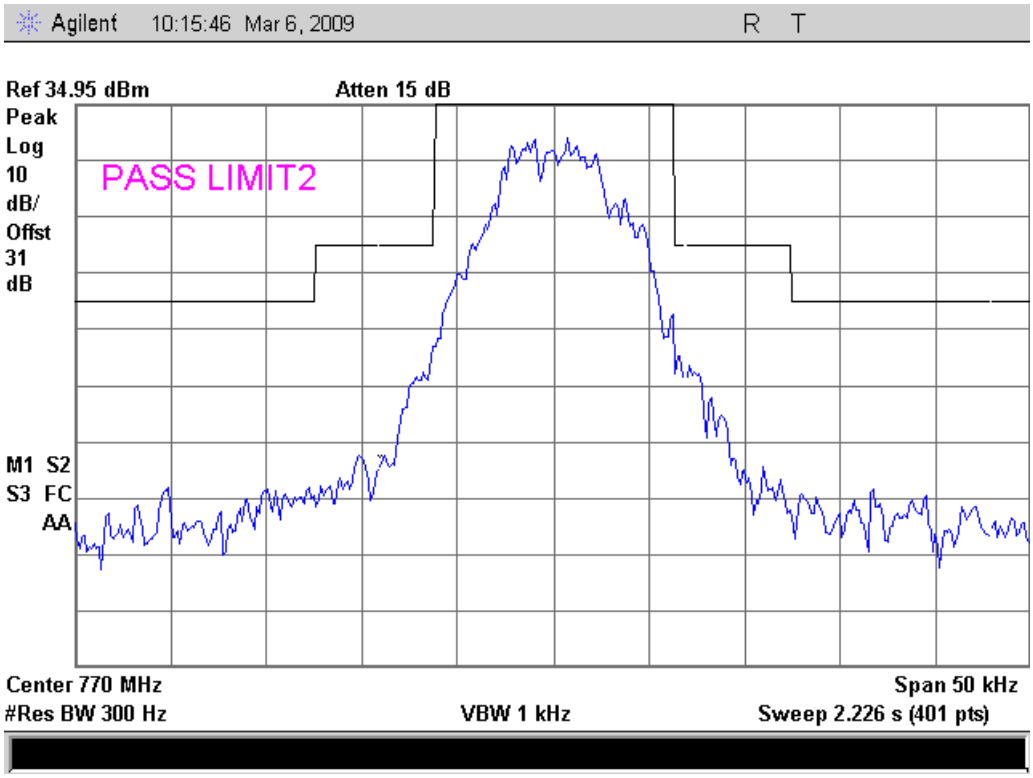
770 MHz 25KHz Mask B



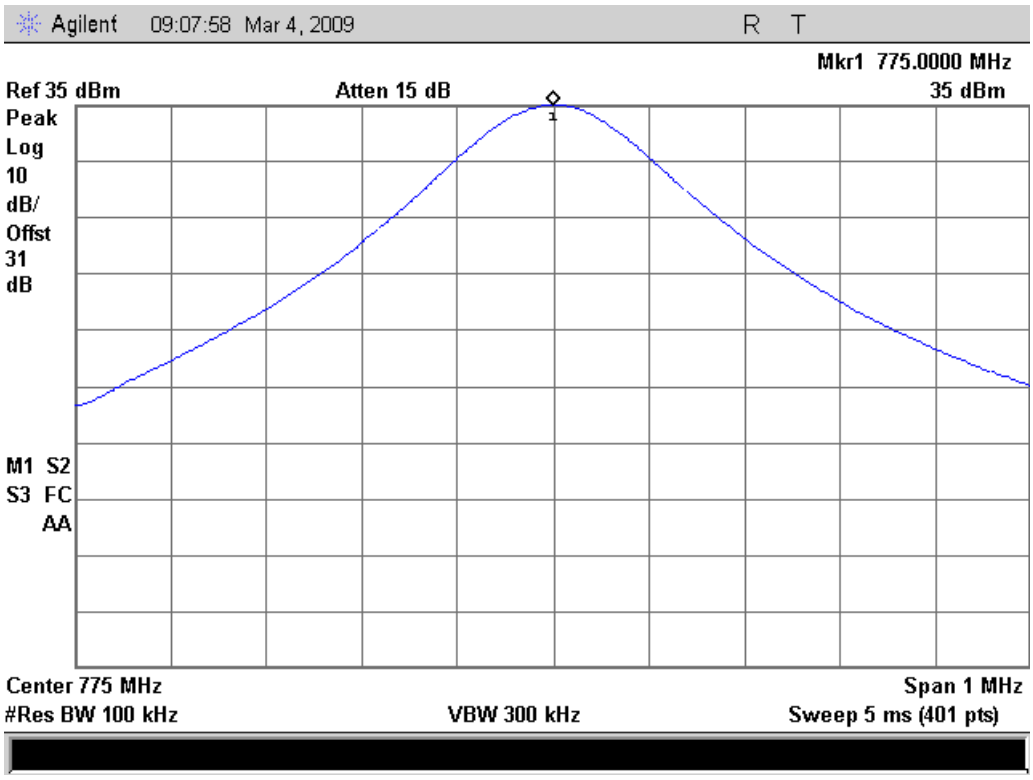
770 MHz 12.5kHz Mask B



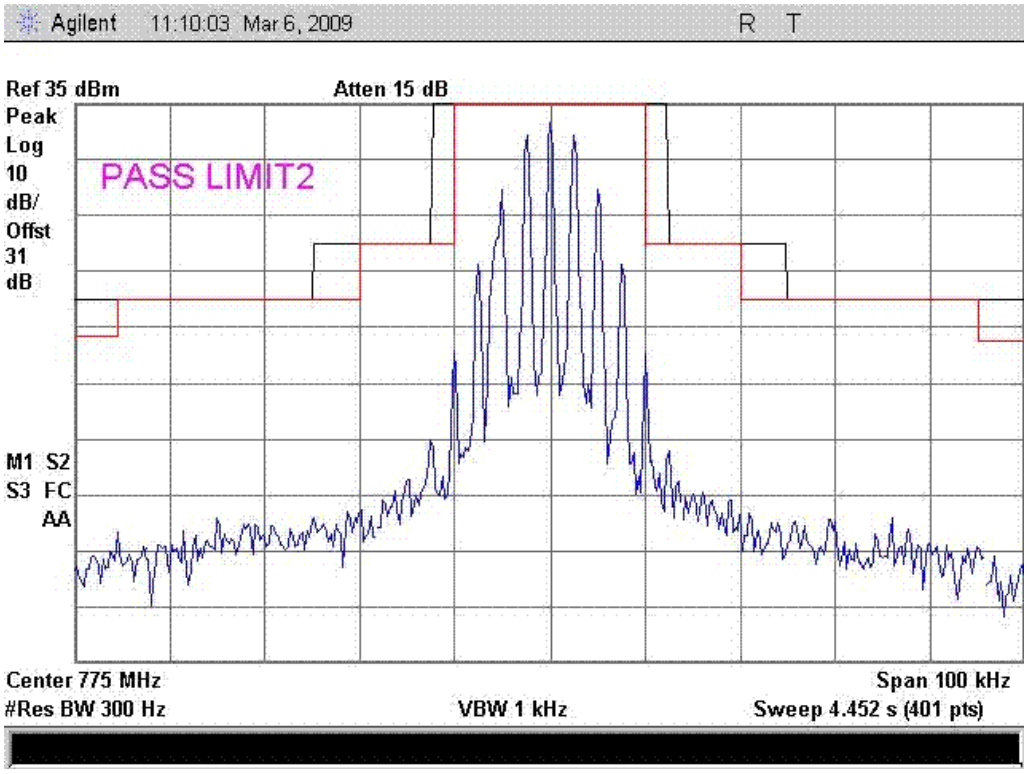
770 MHz Digital Mask B



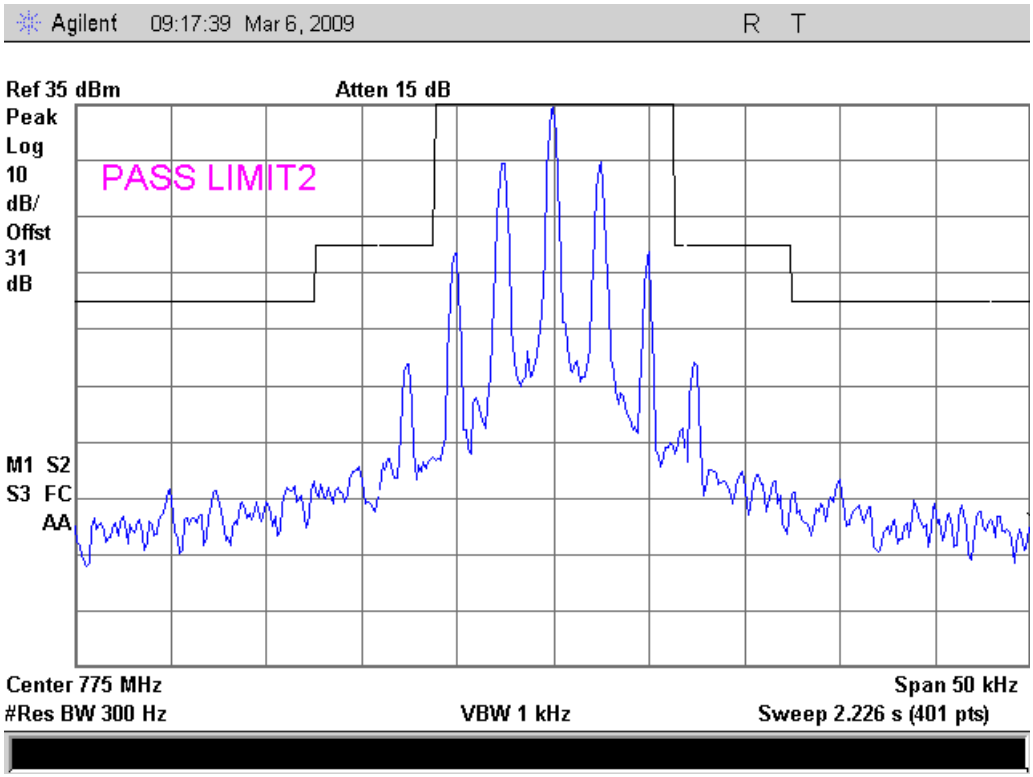
775 MHz Reference



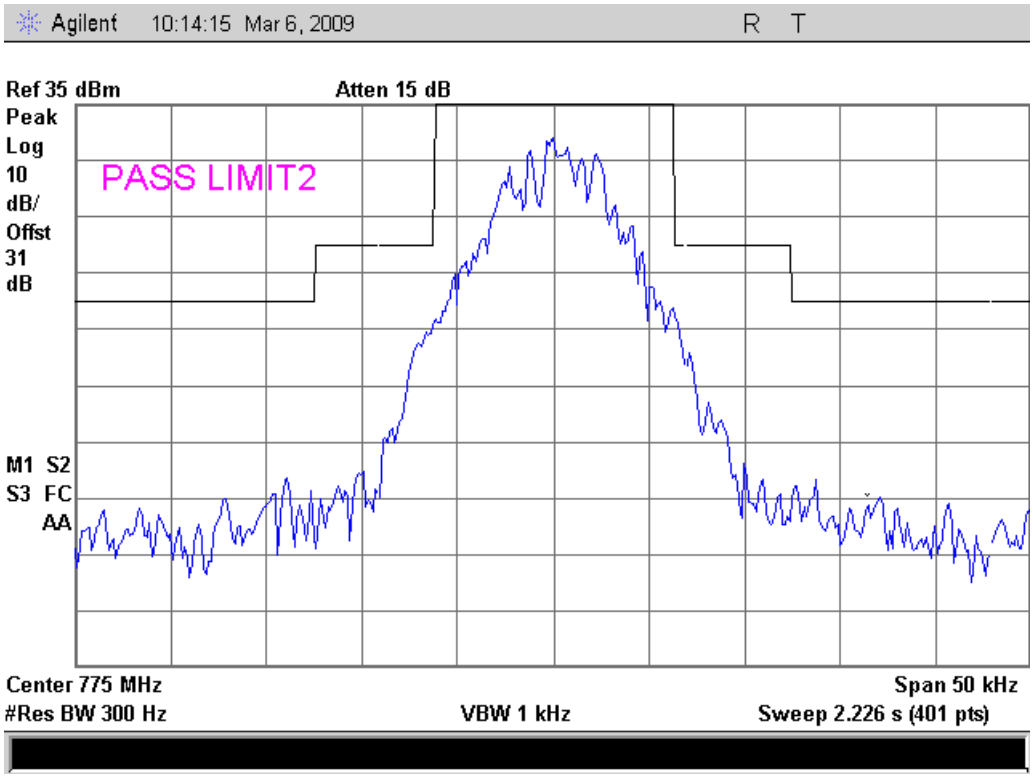
775 MHz 25KHz Mask B



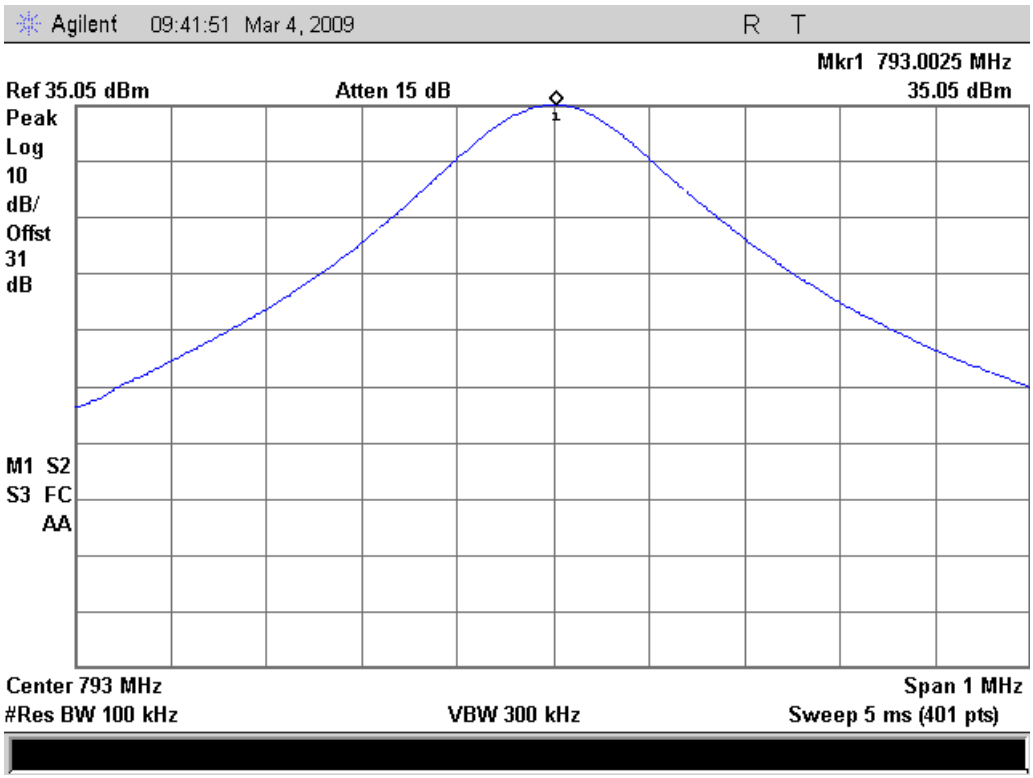
775 MHz 12.5kHz Mask B



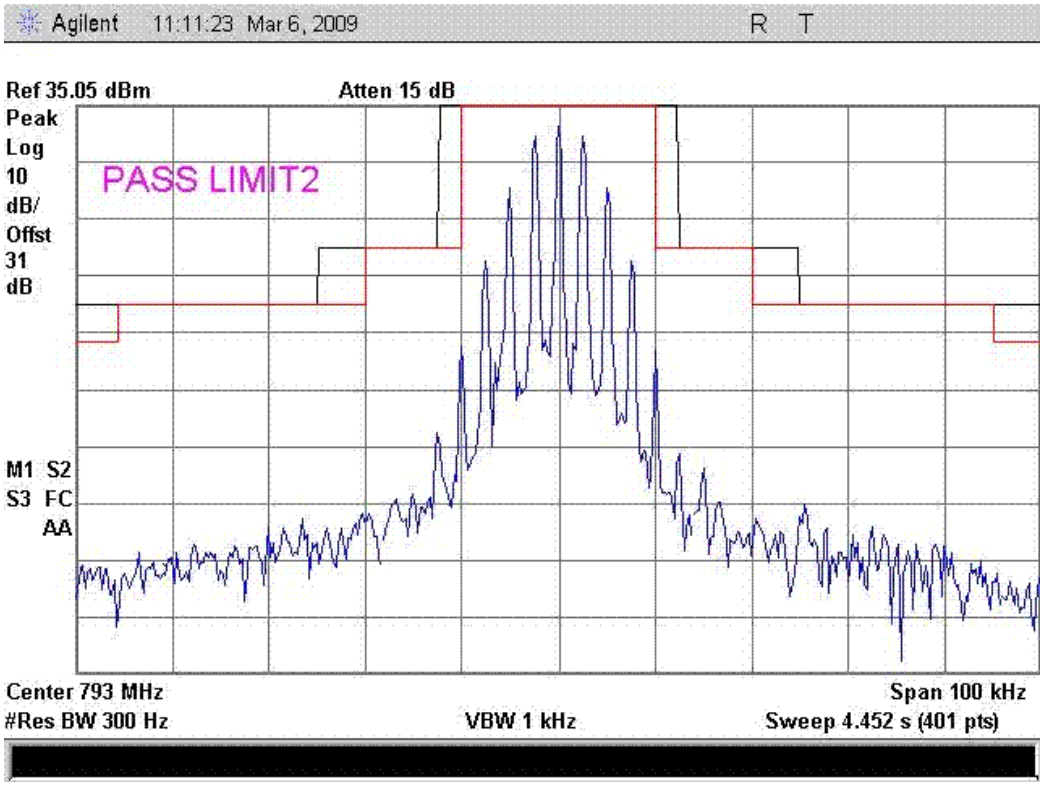
775 MHz Digital Mask B



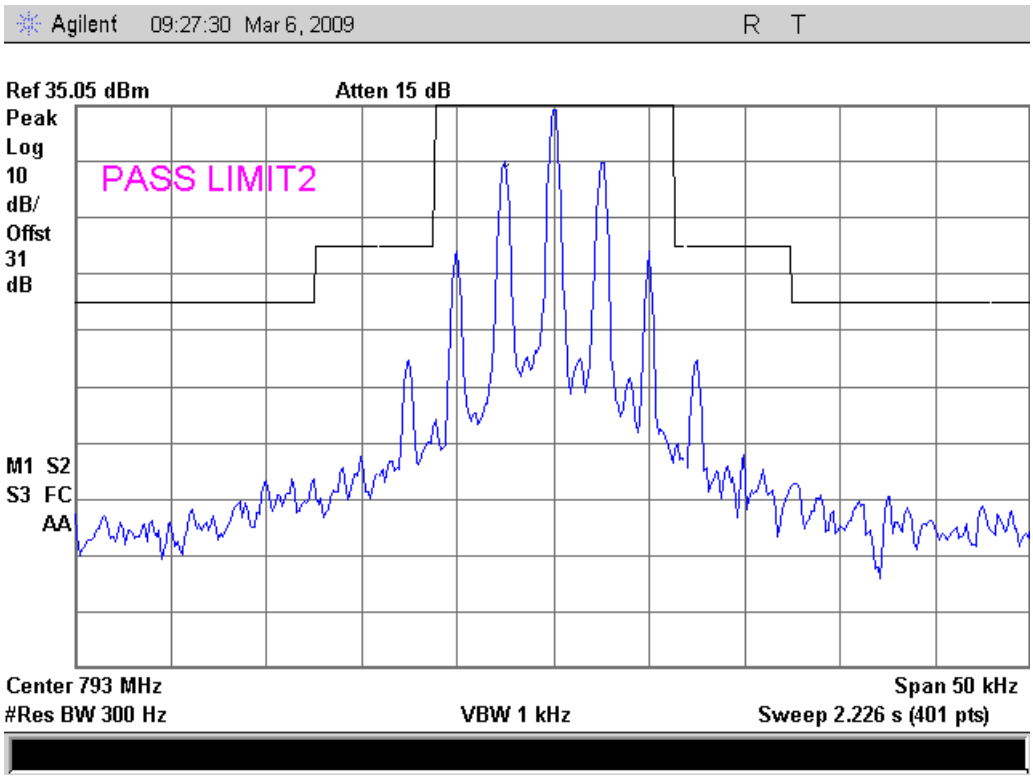
793 MHz Reference



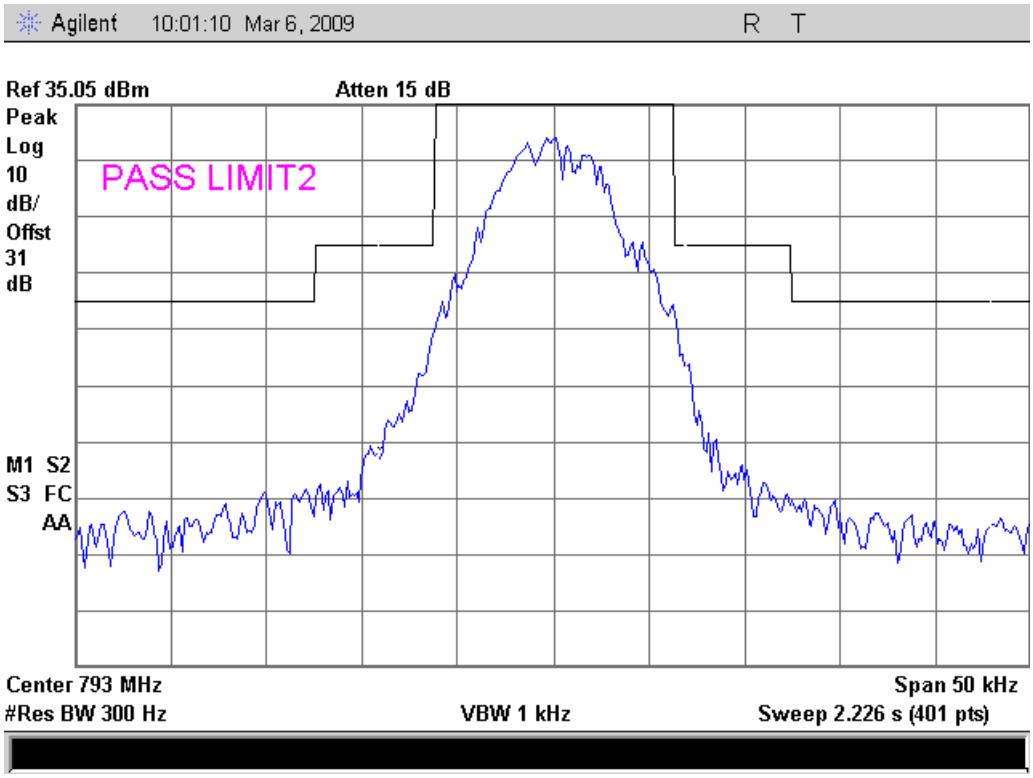
793 MHz 25KHz Mask B



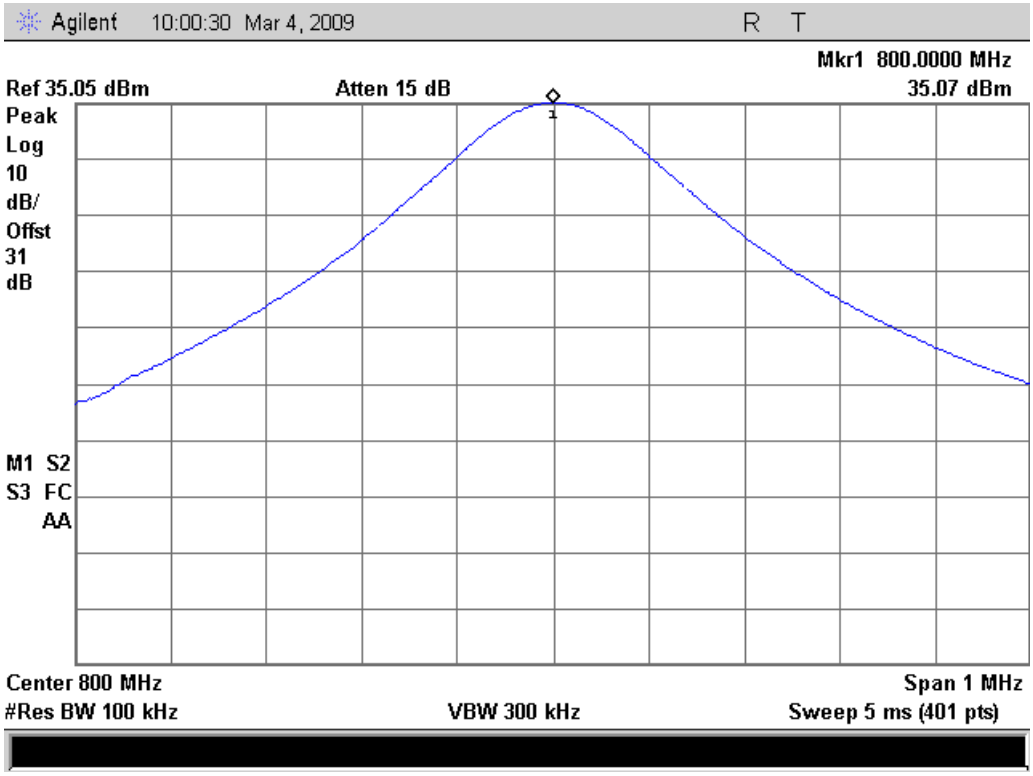
793 MHz 12.5kHz Mask B



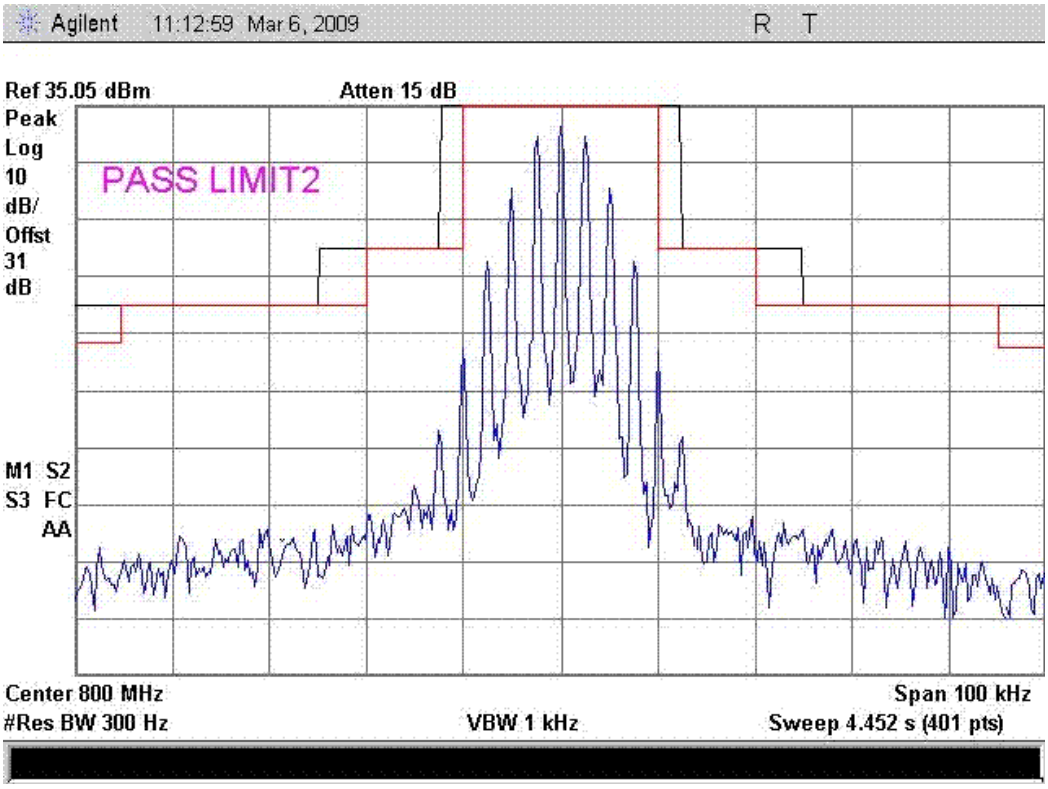
793 MHz Digital Mask B



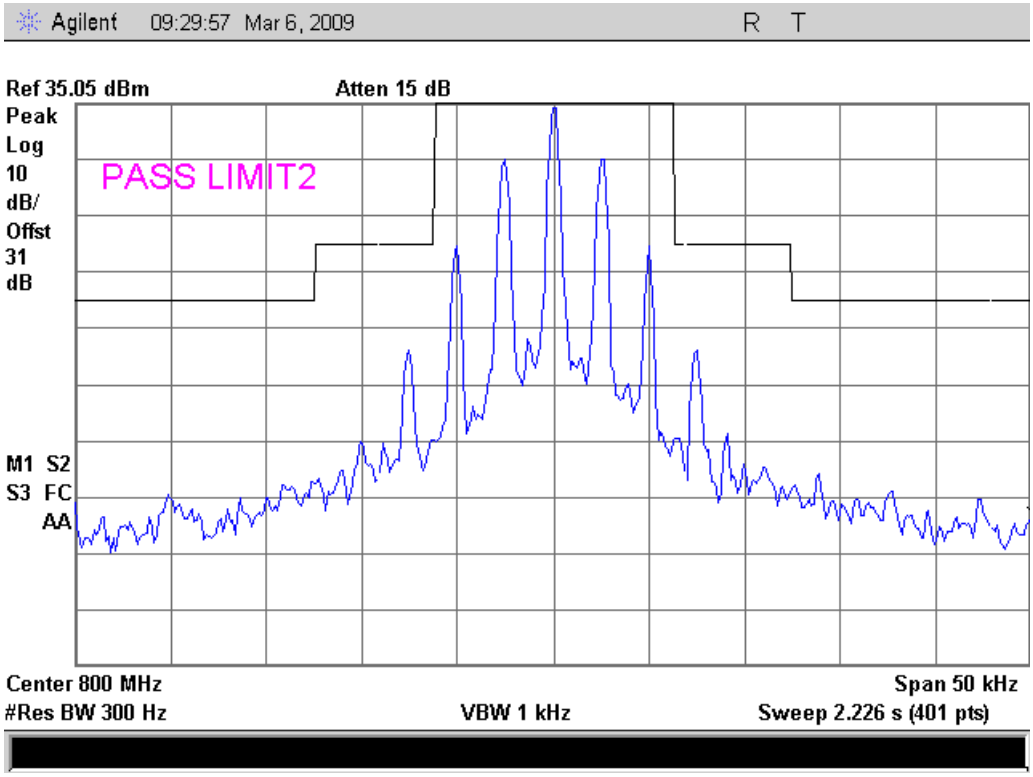
800 MHz Reference



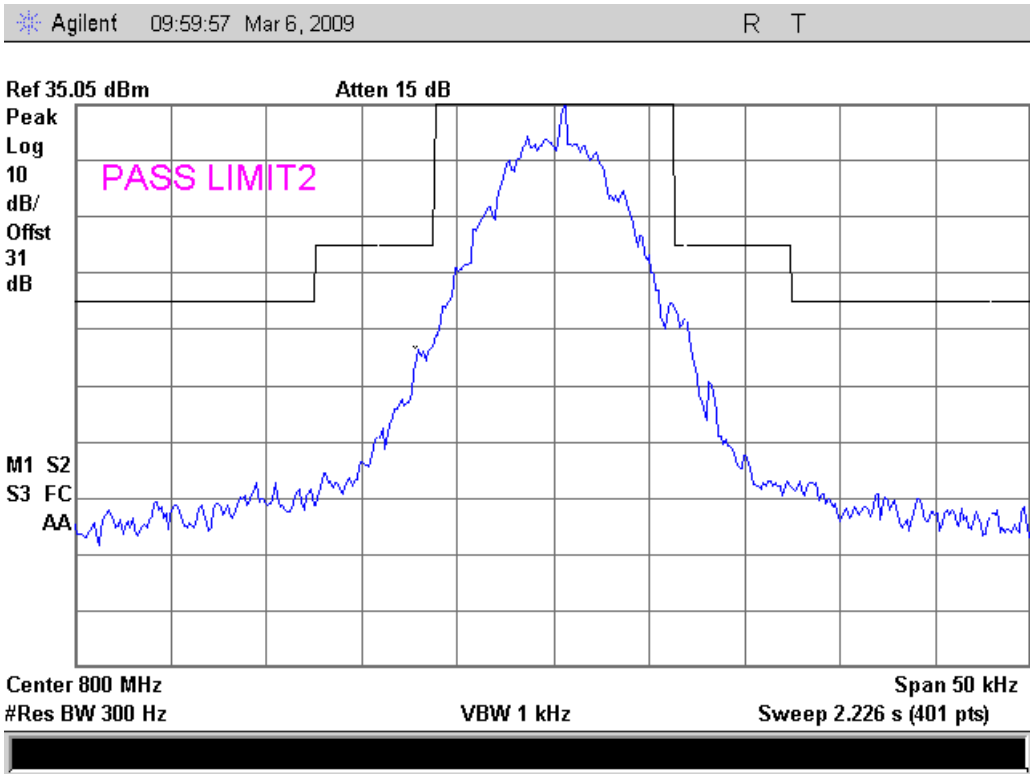
800 MHz 25KHz Mask B



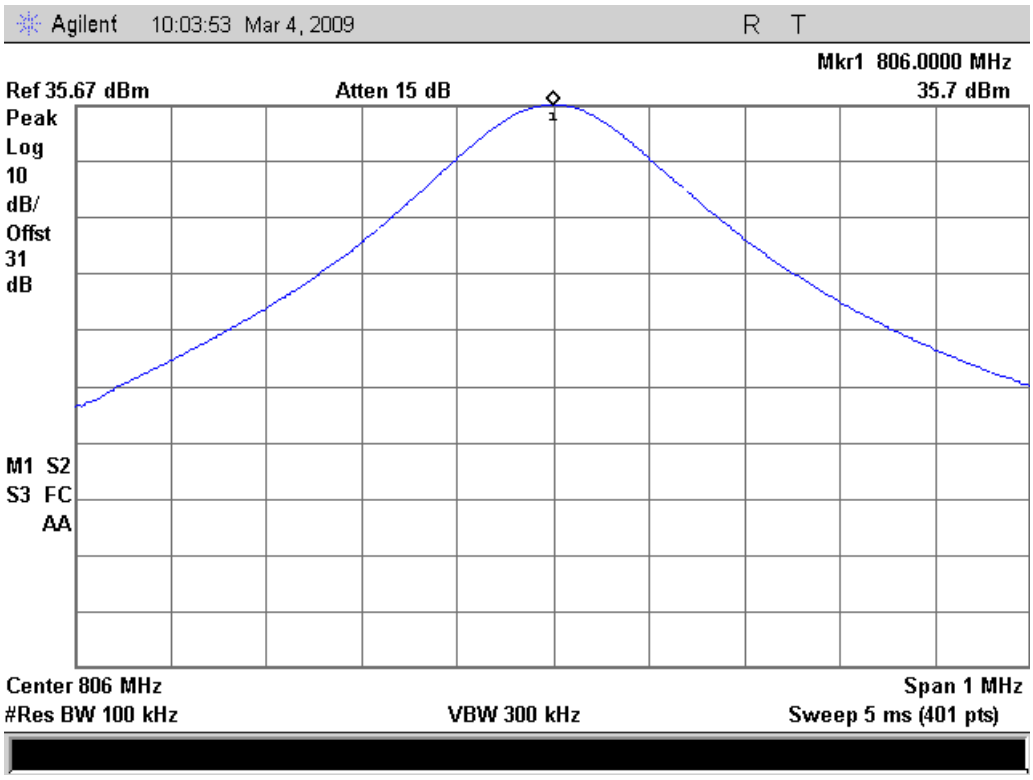
800 MHz 12.5kHz Mask B



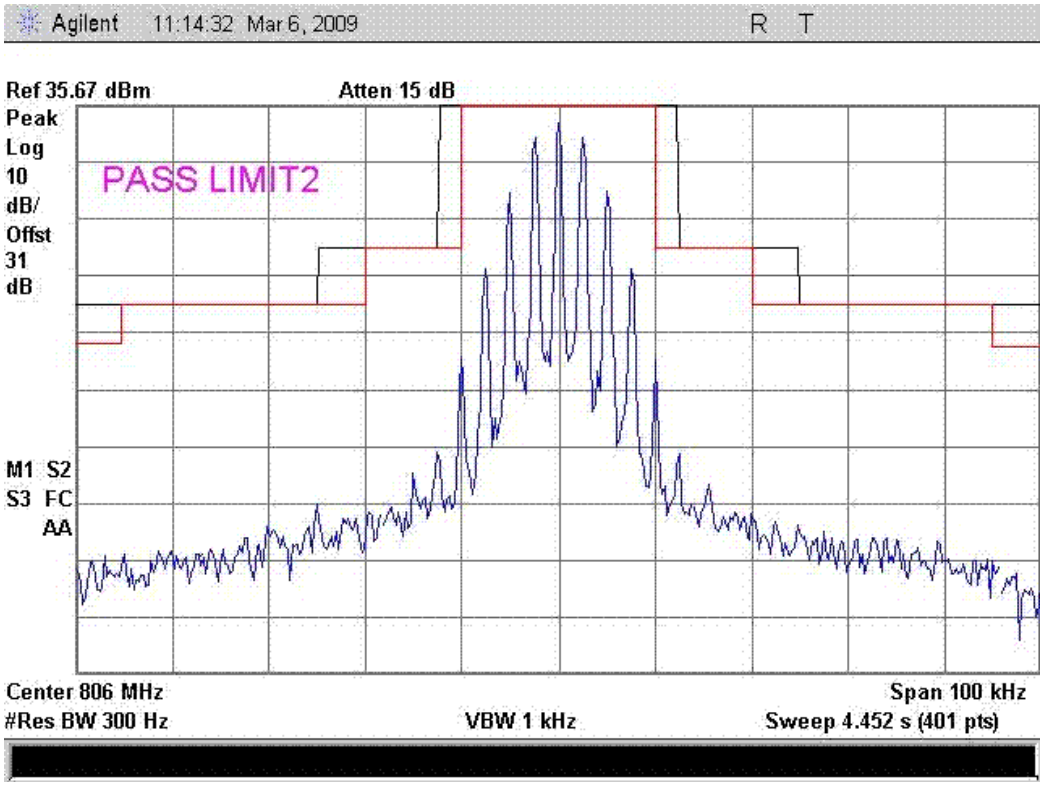
800 MHz Digital Mask B



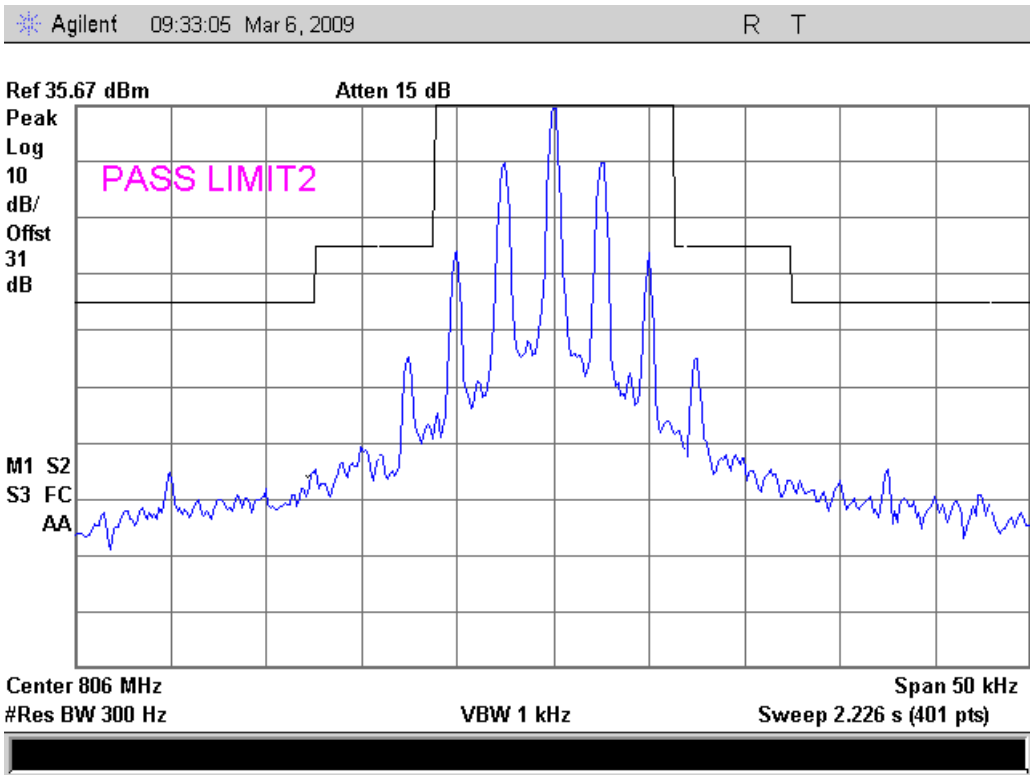
806 MHz Reference



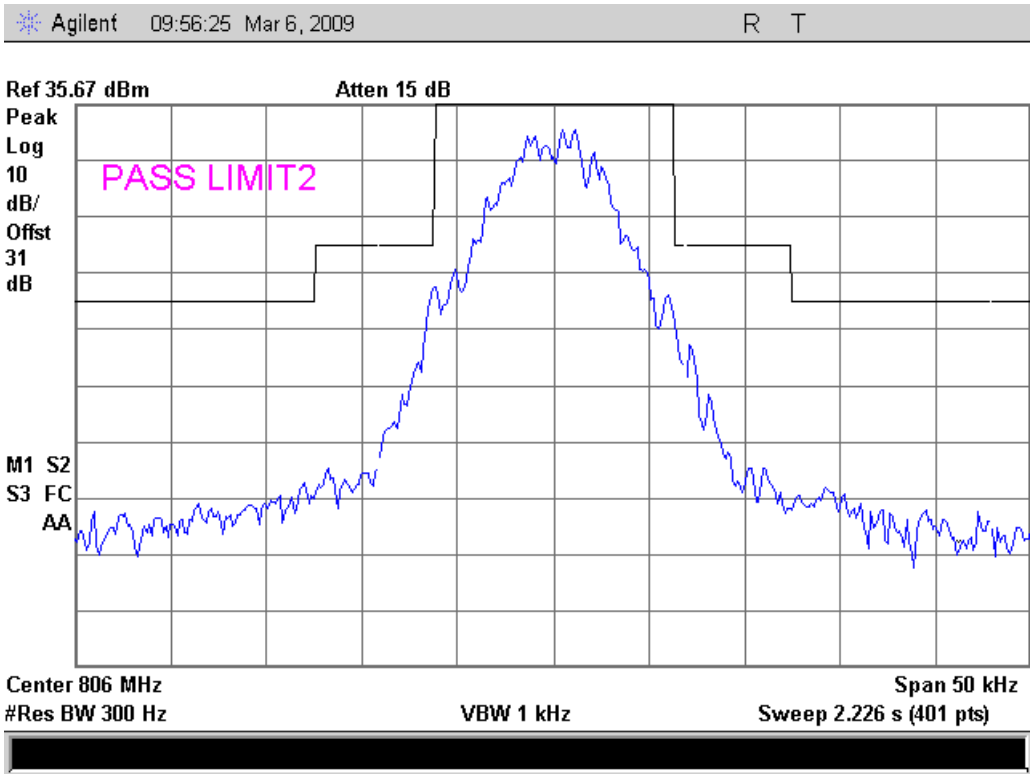
806 MHz 25KHz Mask B



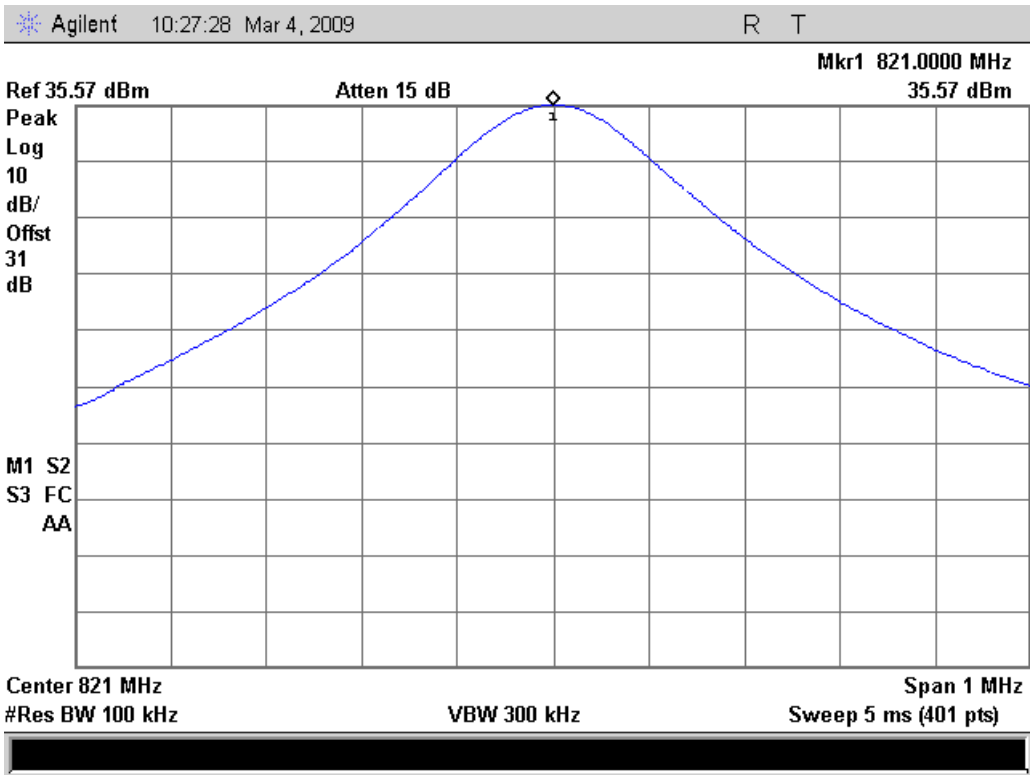
806 MHz 12.5kHz Mask B



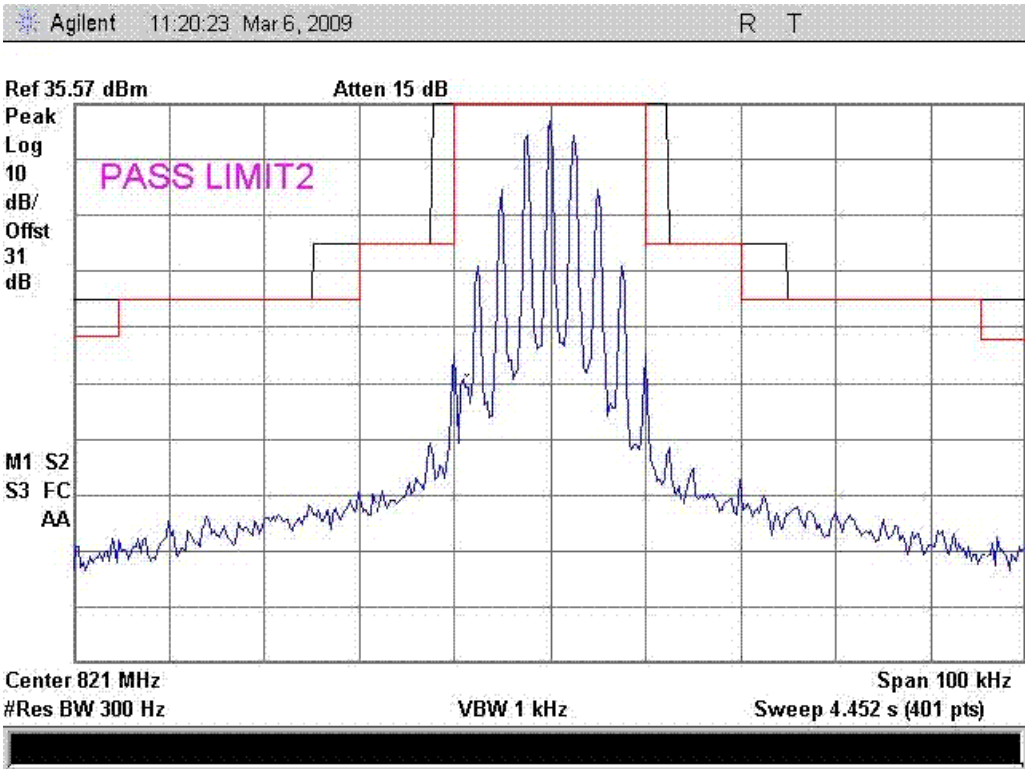
806 MHz Digital Mask B



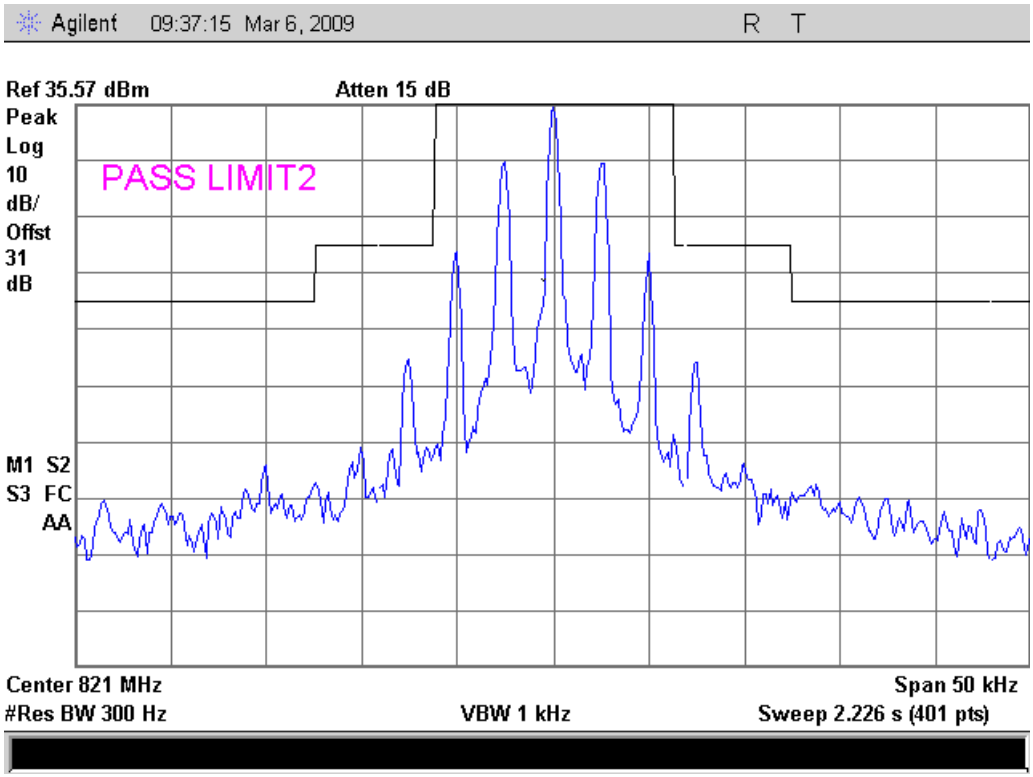
821 MHz Reference



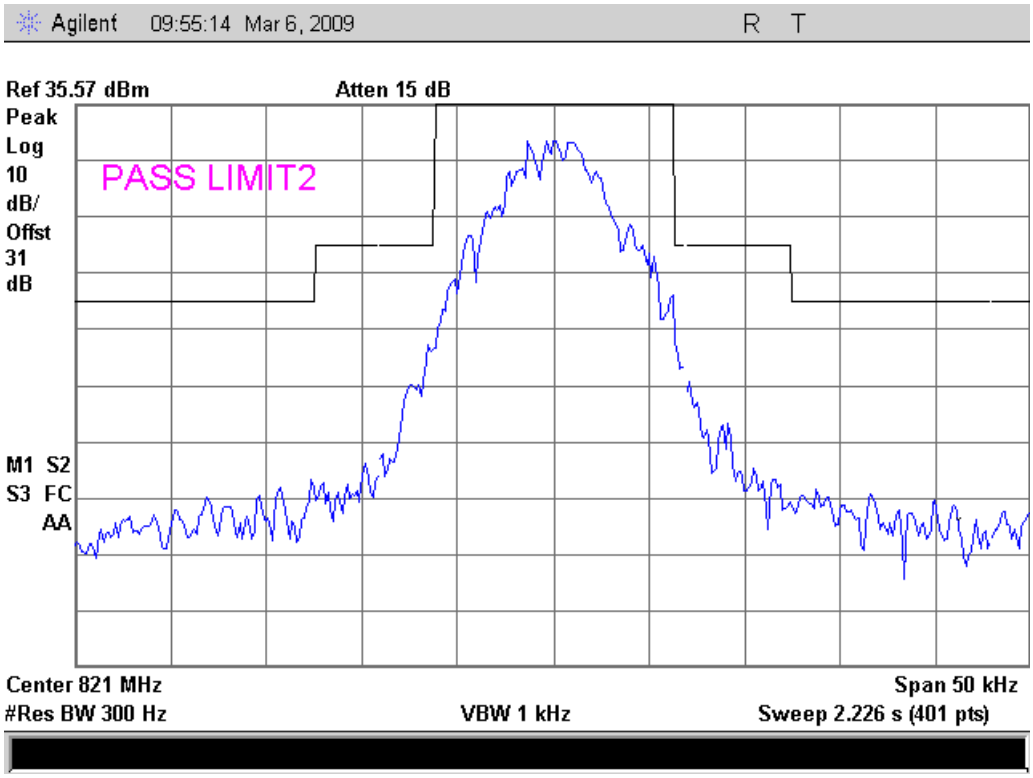
821 MHz 25KHz Mask B



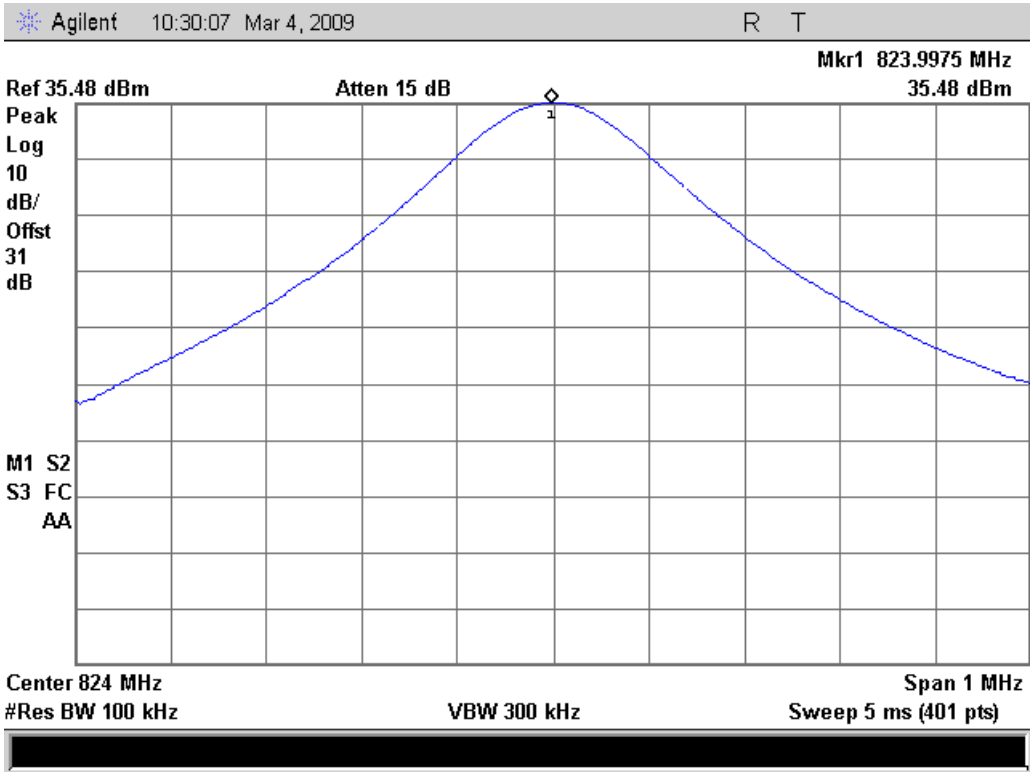
821 MHz 12.5kHz Mask B



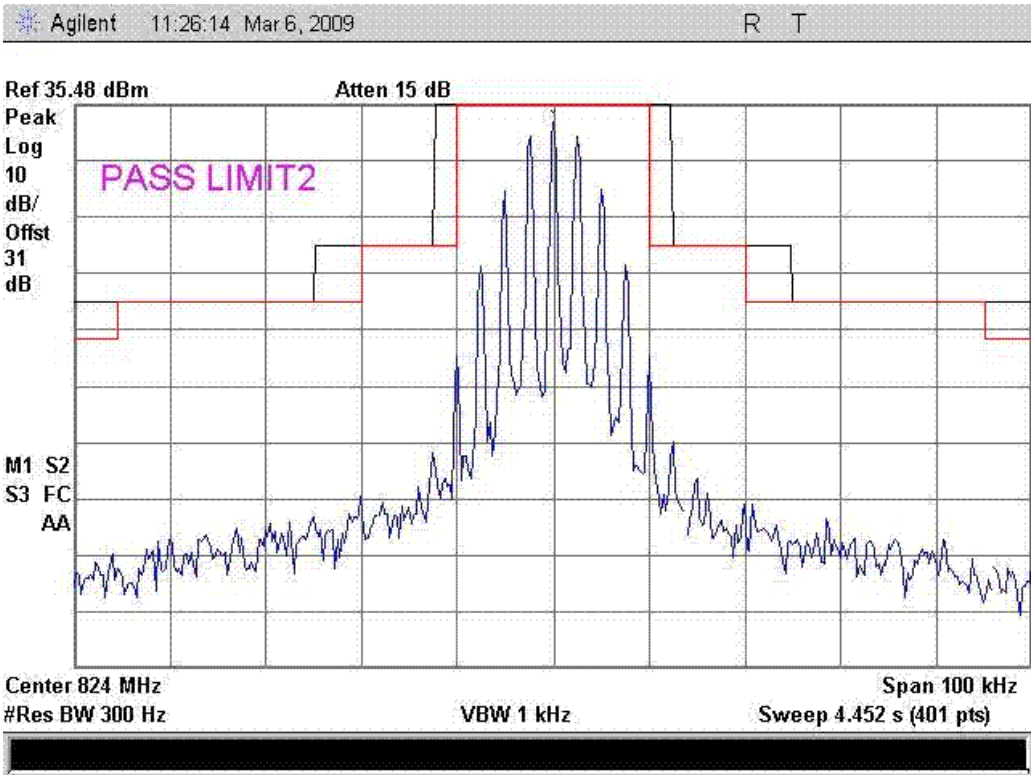
821 MHz Digital Mask B



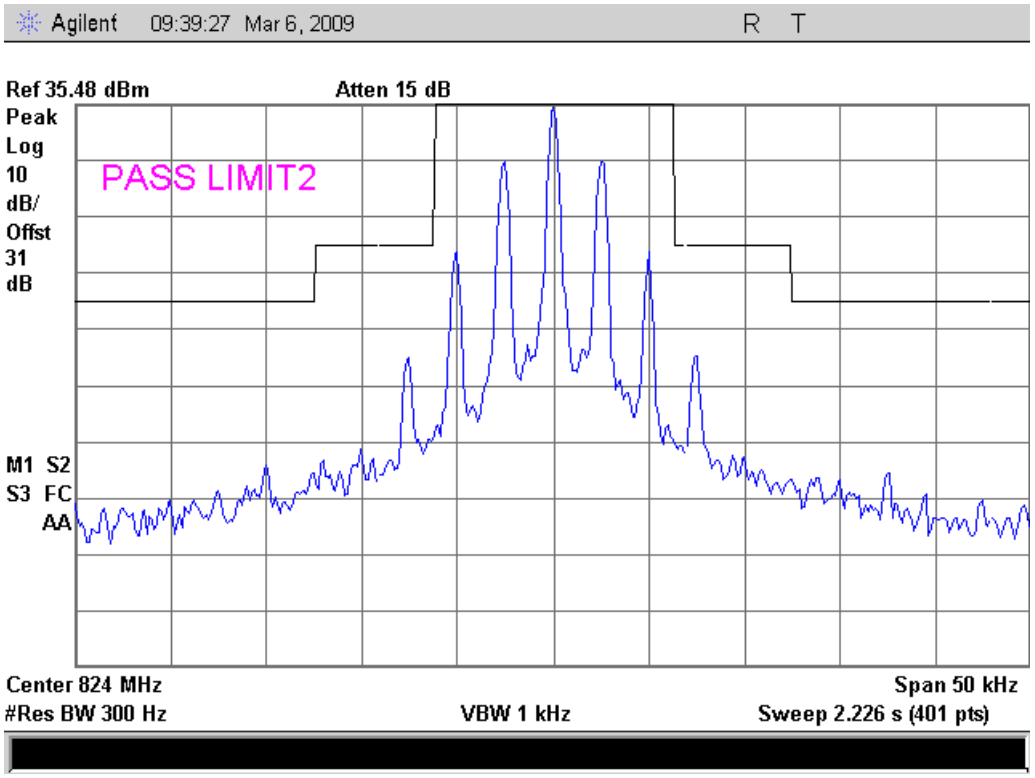
824 MHz Reference



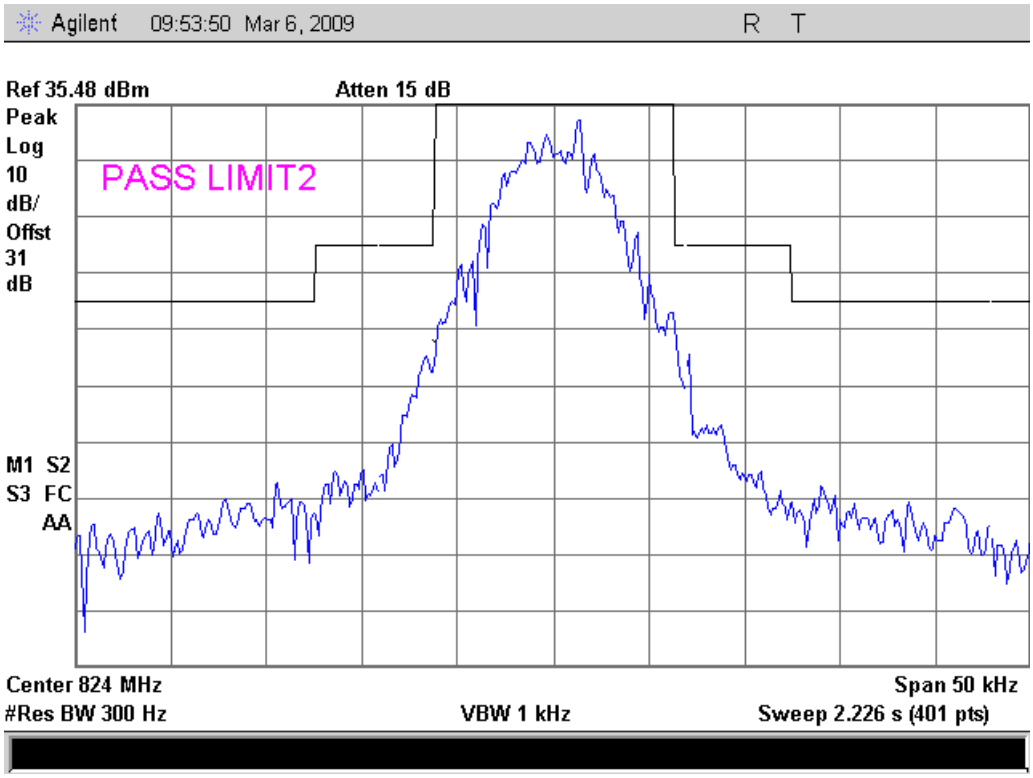
824 MHz 25KHz Mask B



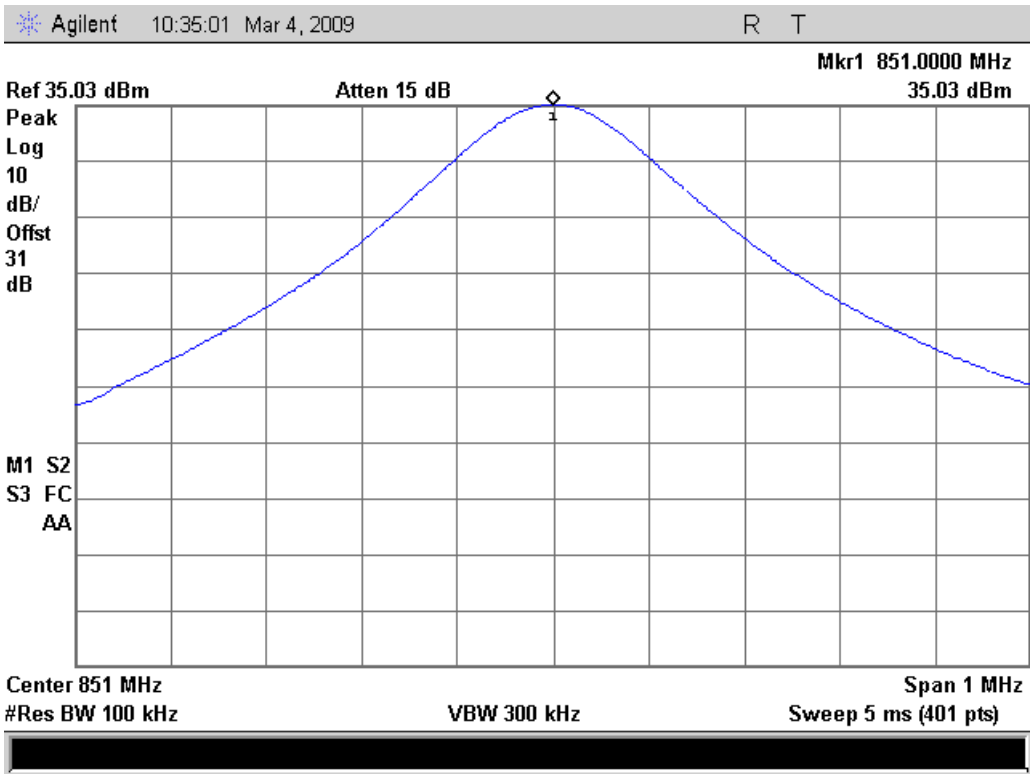
824 MHz 12.5kHz Mask B



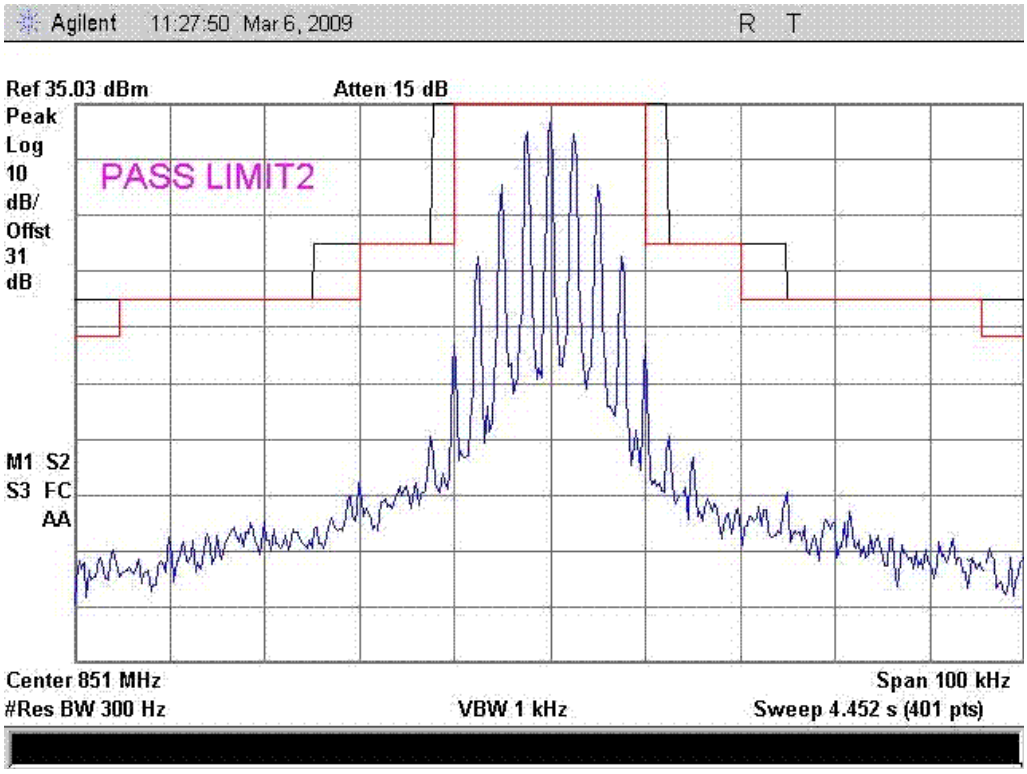
824 MHz Digital Mask B



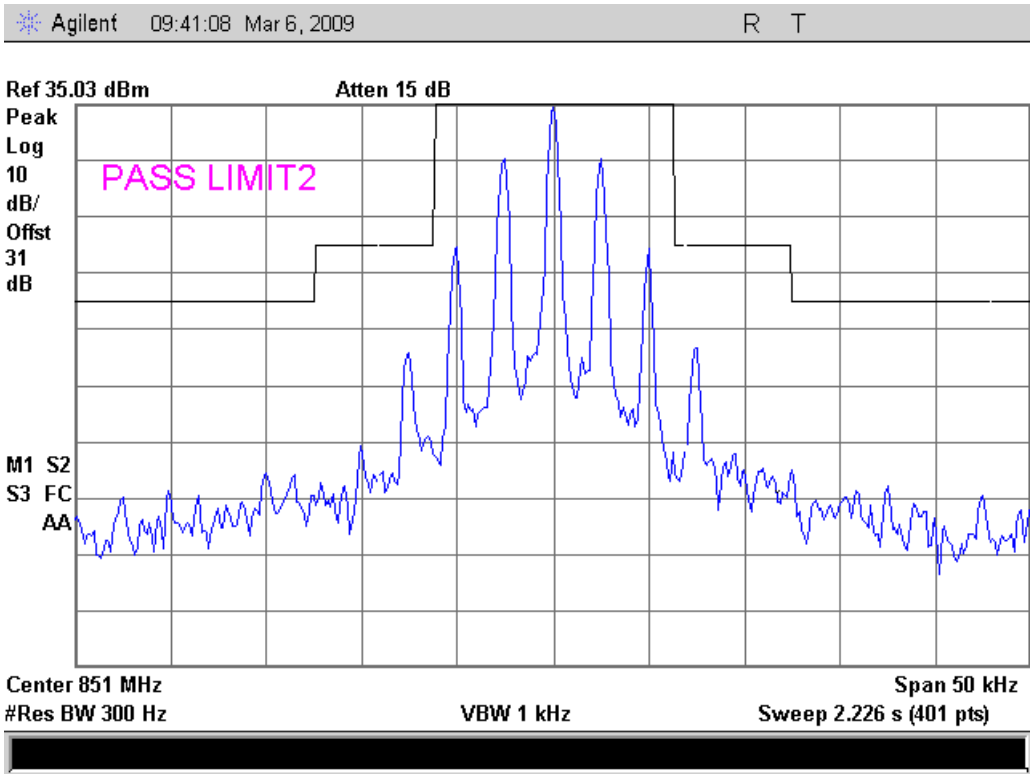
851 MHz Reference



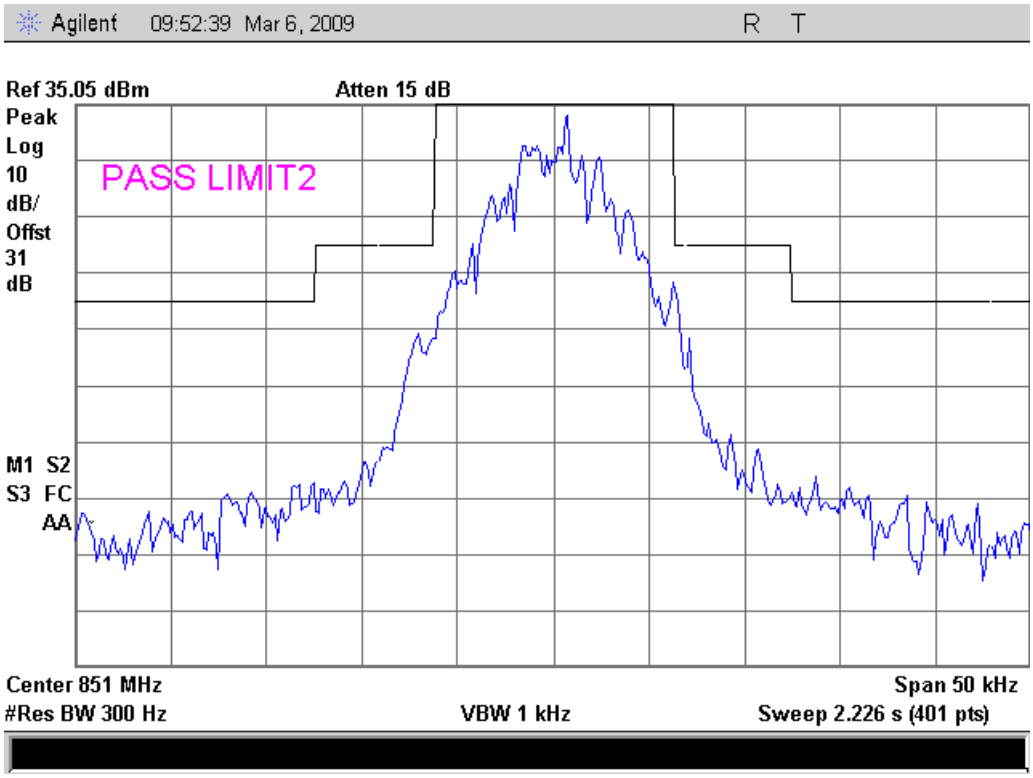
851 MHz 25KHz Mask B



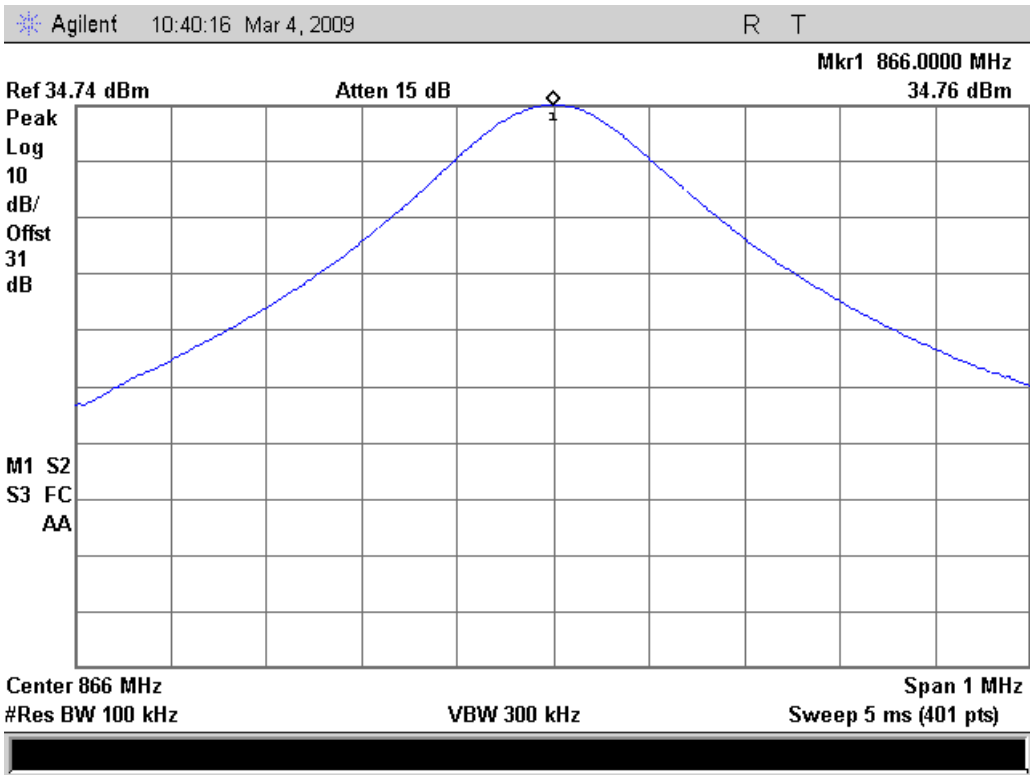
851 MHz 12.5kHz Mask B



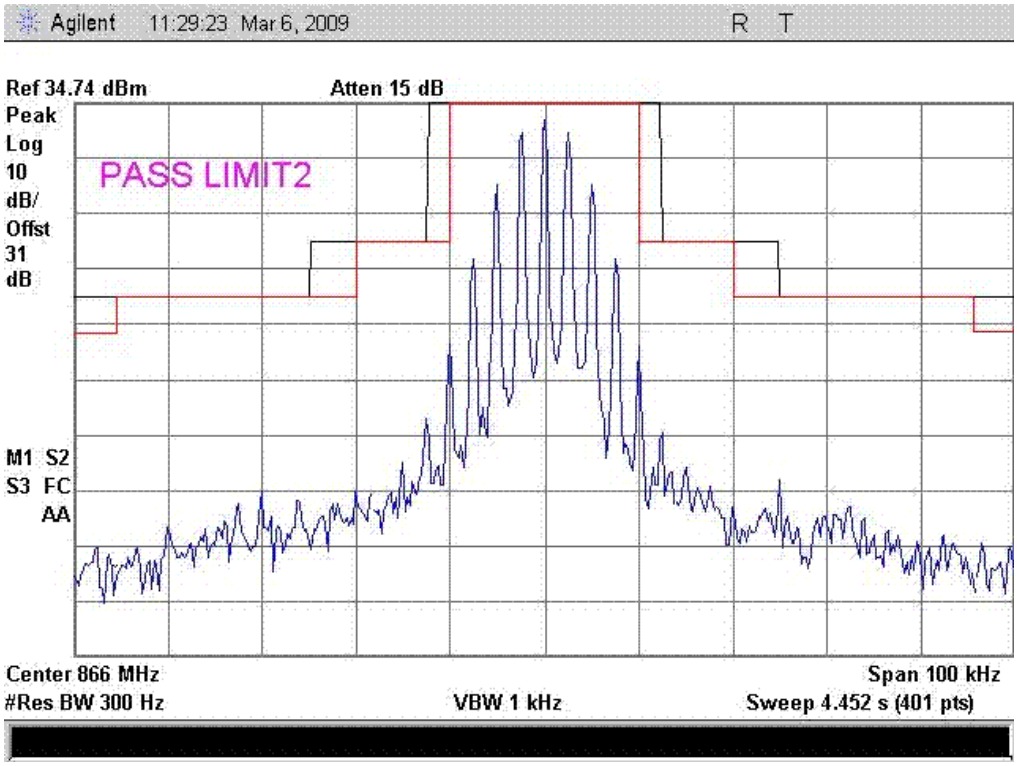
851 MHz Digital Mask B



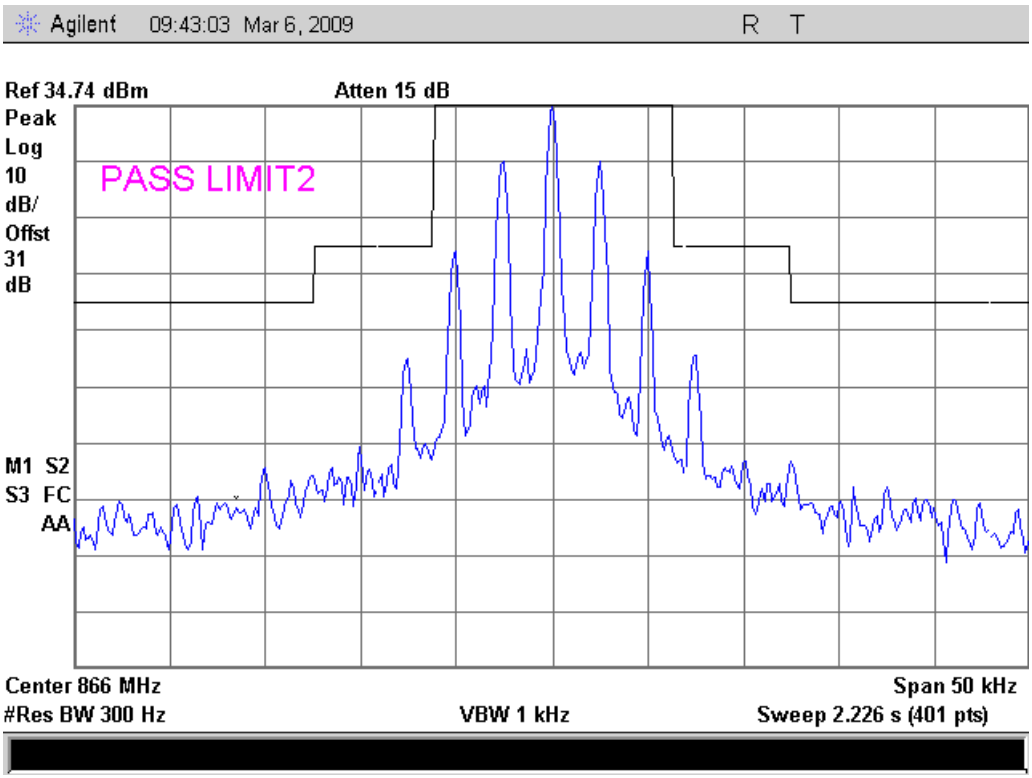
866 MHz Reference



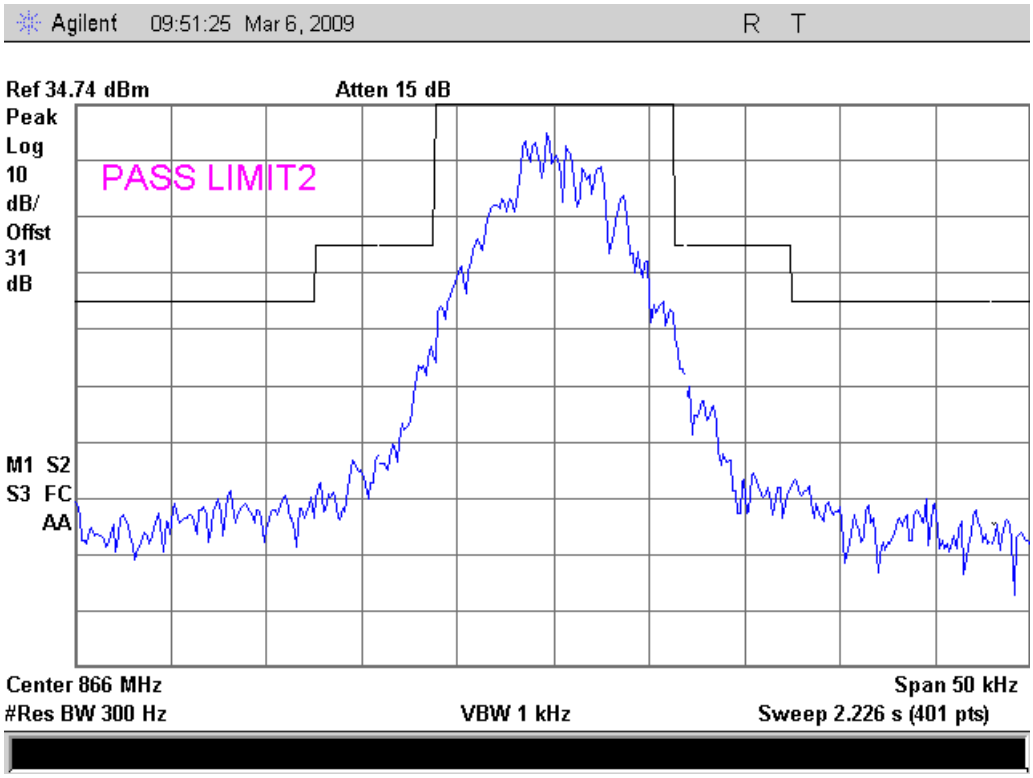
866 MHz 25KHz Mask B



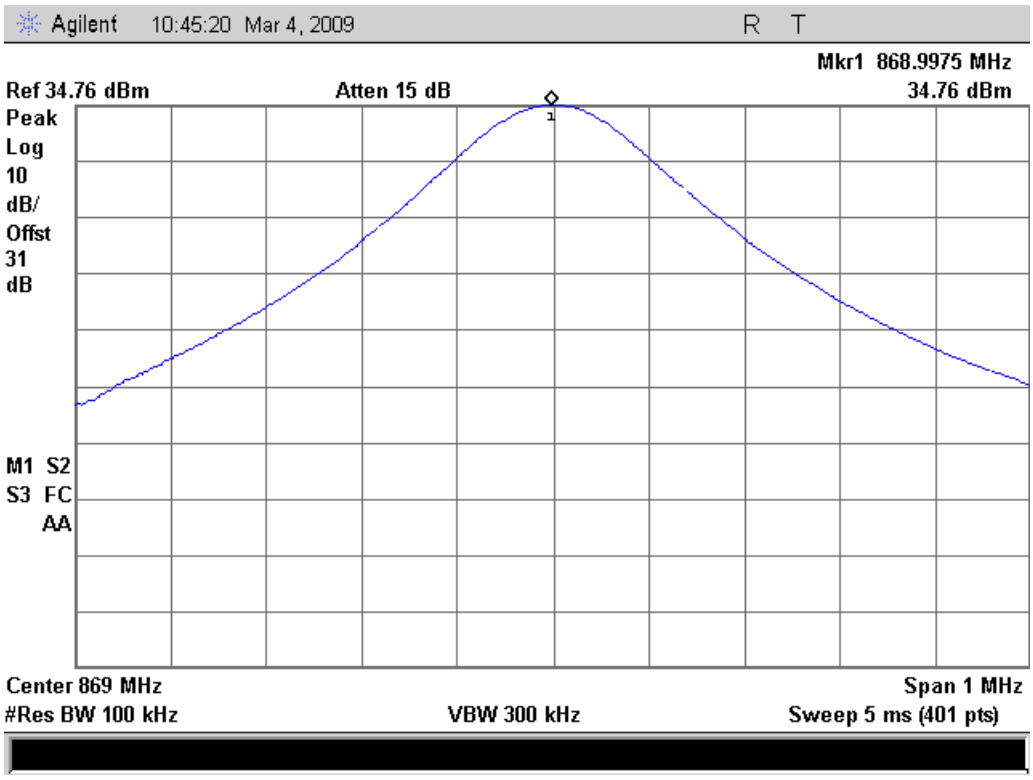
866 MHz 12.5kHz Mask B



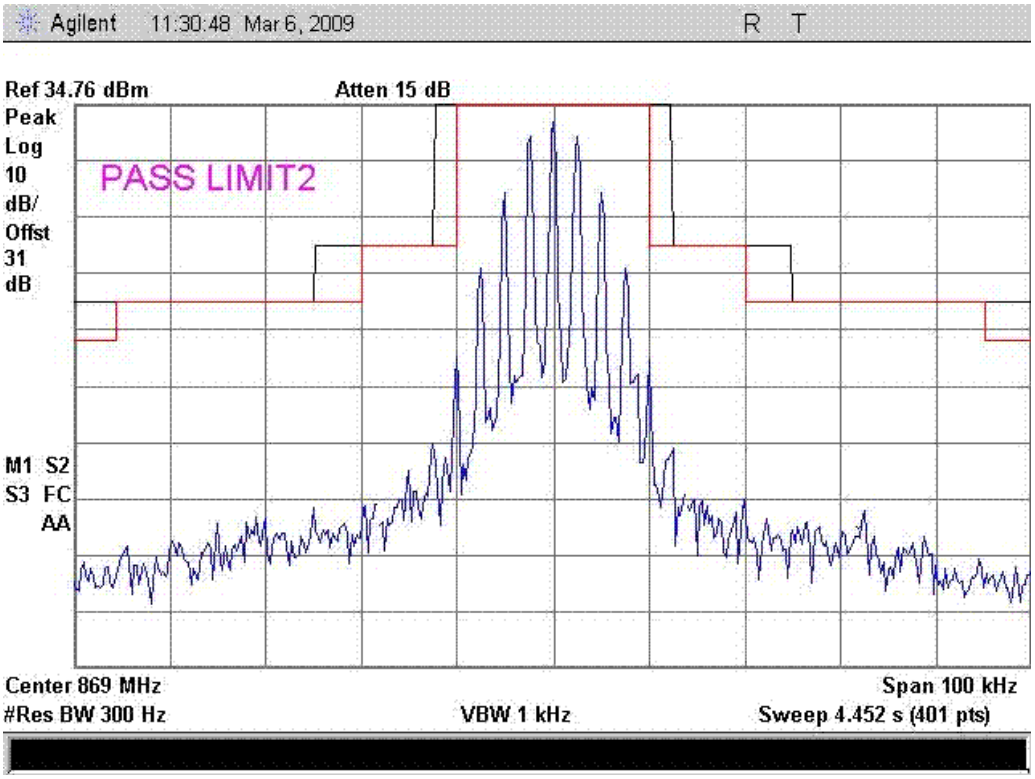
866 MHz Digital Mask B



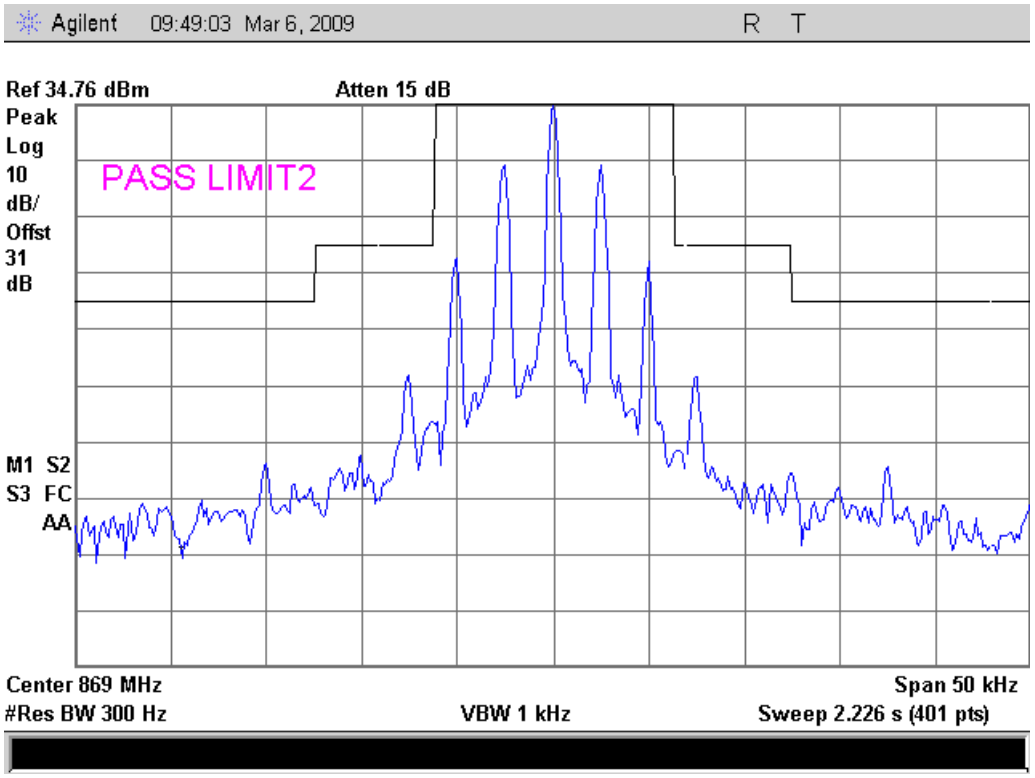
869 MHz Reference



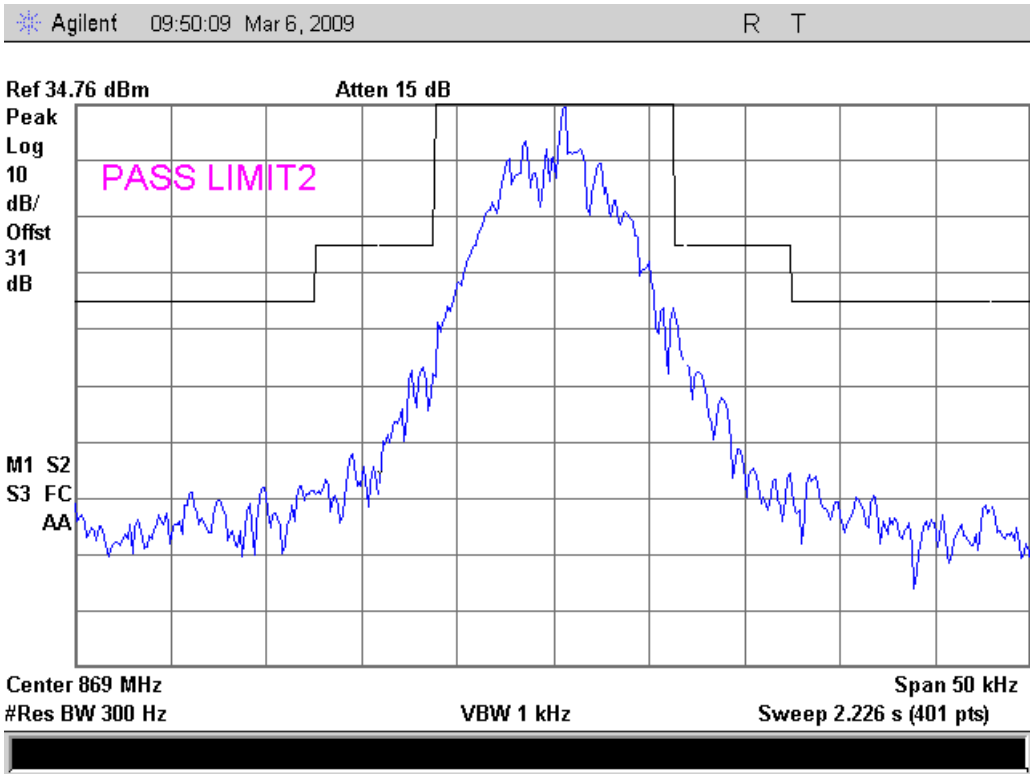
869 MHz 25KHz Mask B



869 MHz 12.5kHz Mask B



869 MHz Digital Mask B

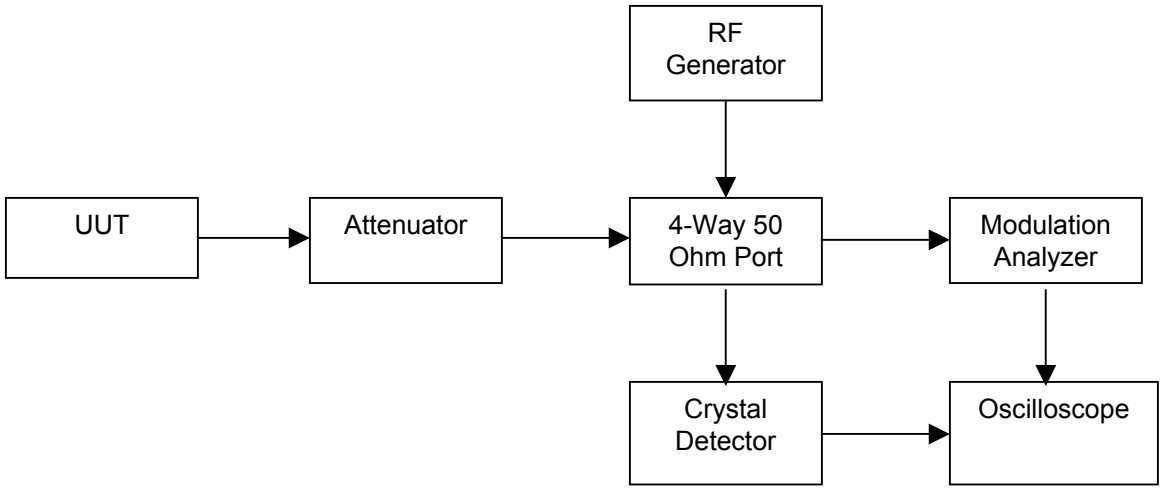


Name of Test: Transient Frequency Behavior
Specification: 90.214 **Engineer: G Gorbin**
Test Equipment Utilized: i00159, i00266, i00318, i00321, i00324 **Test Date: 3/3/2009**

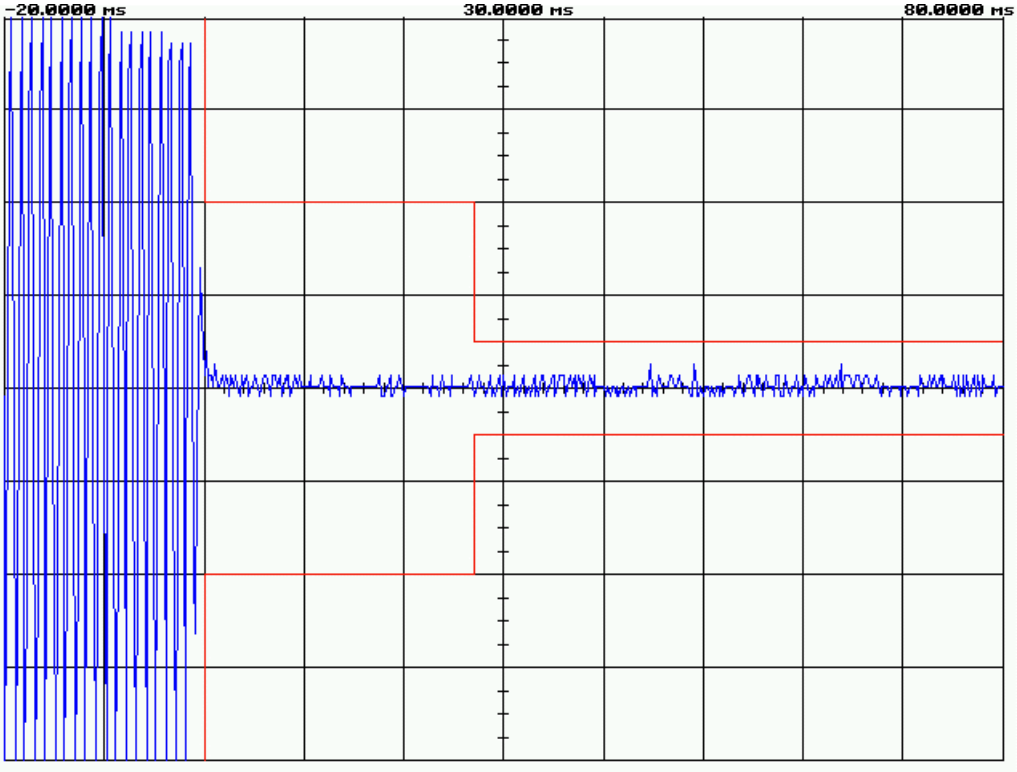
Measurement Procedure

The EUT was setup as shown on the attached page, following TIA-603-C steps a, b, and c as a *guide*. An RF signal generator modulated with a 1 kHz tone and the deviation set to the bandwidth under test tuned to the same frequency as the UUT at a level 30 dBc. An oscilloscope setup using TIA-603 steps j and k was utilized to monitor the carrier on and off time.

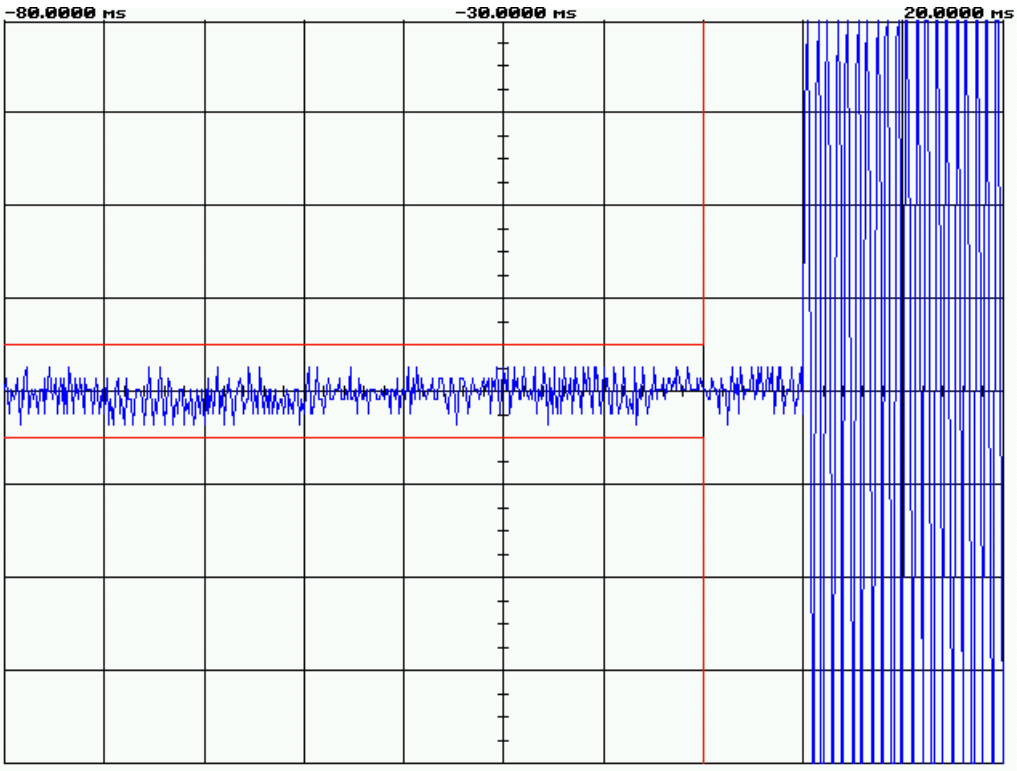
Test Setup



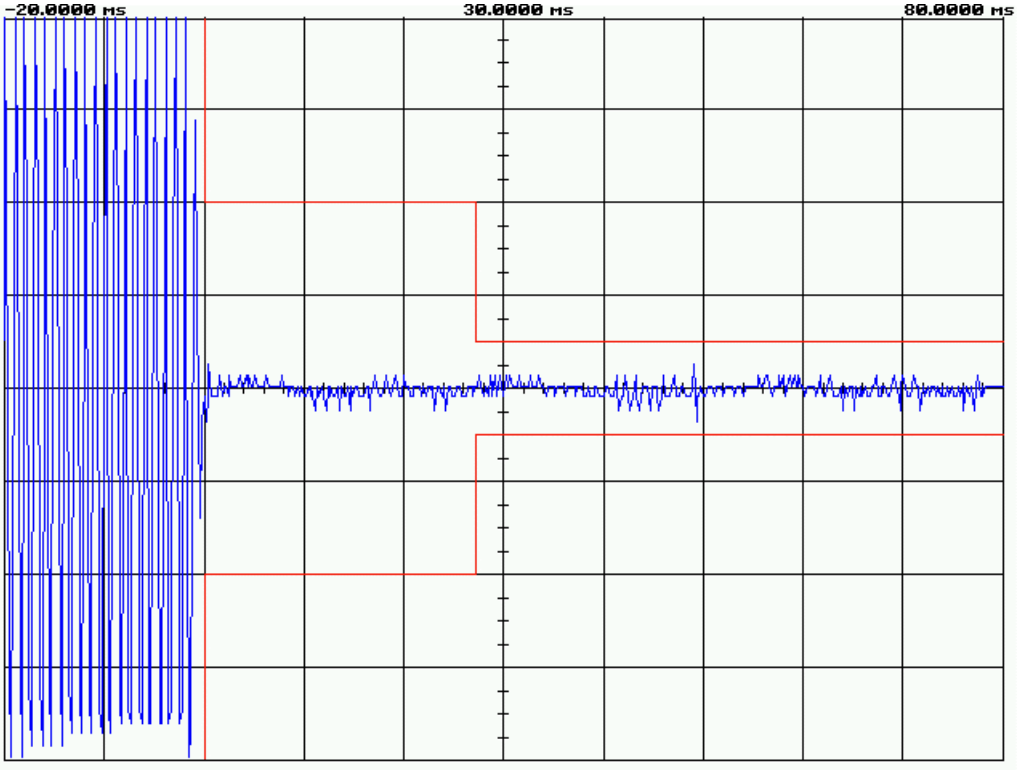
150 MHz On Time 25 KHz



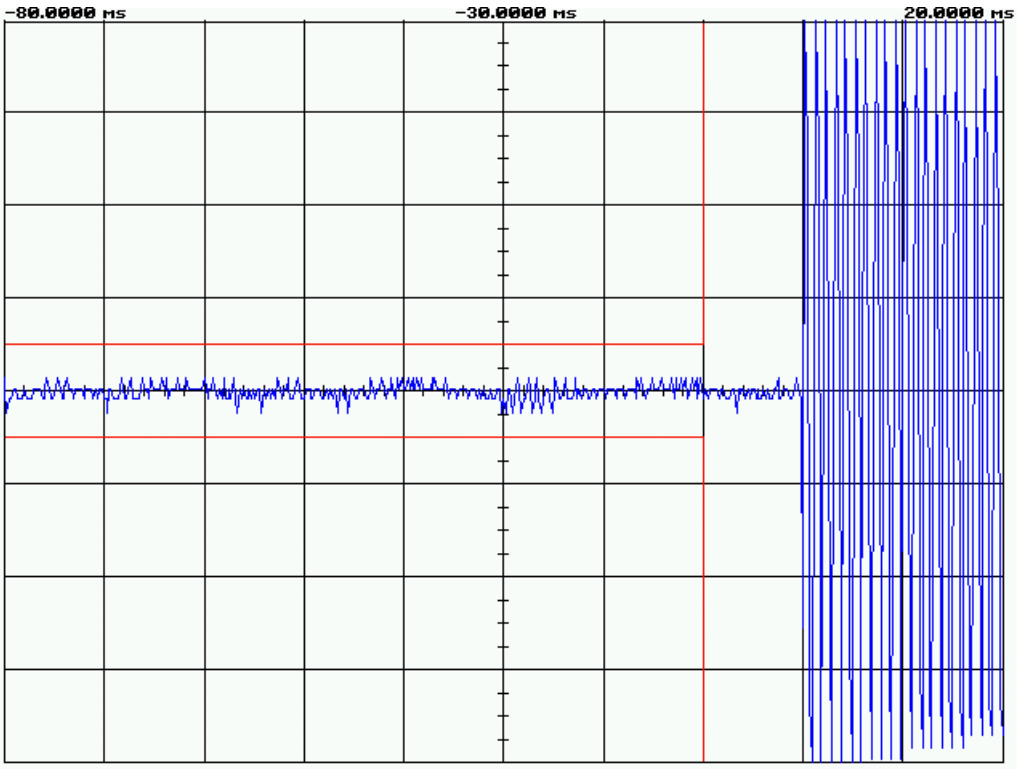
150 MHz Off Time 25 KHz



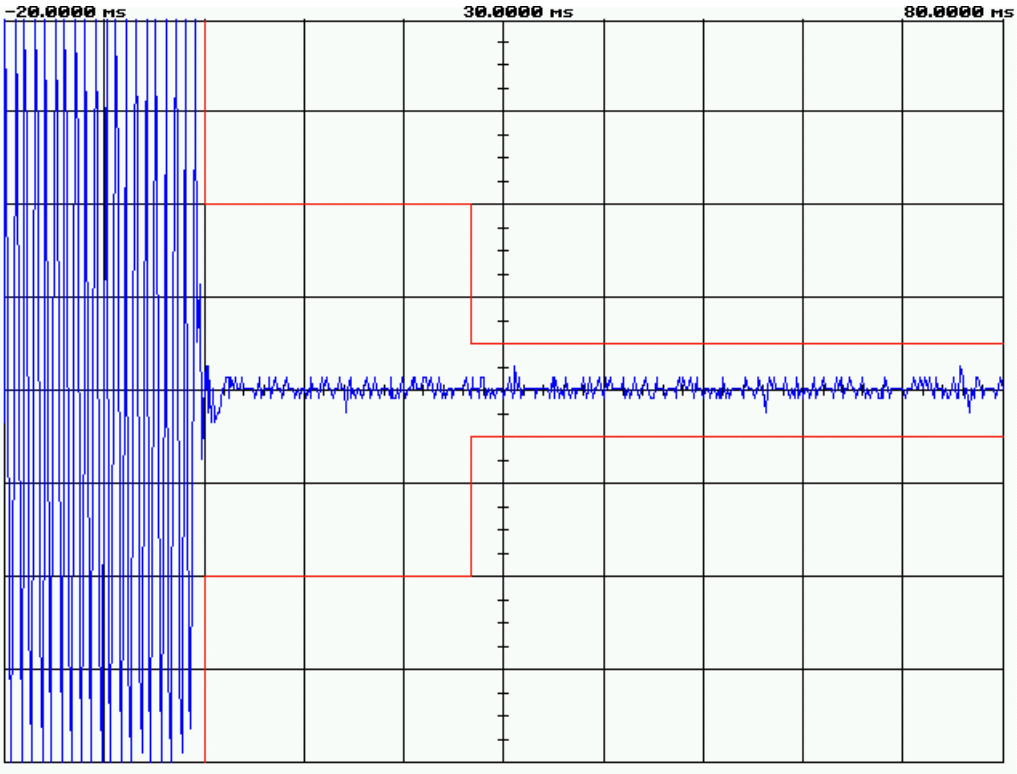
150 MHz On Time 12.5 KHz



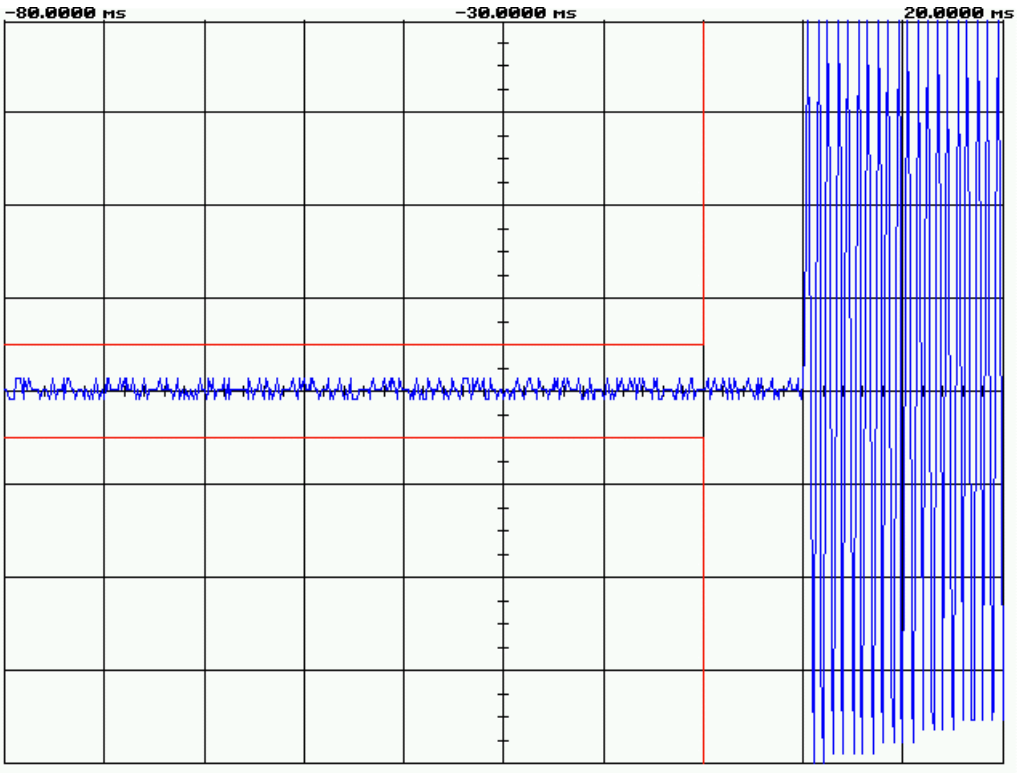
150 MHz Off Time 12.5 KHz



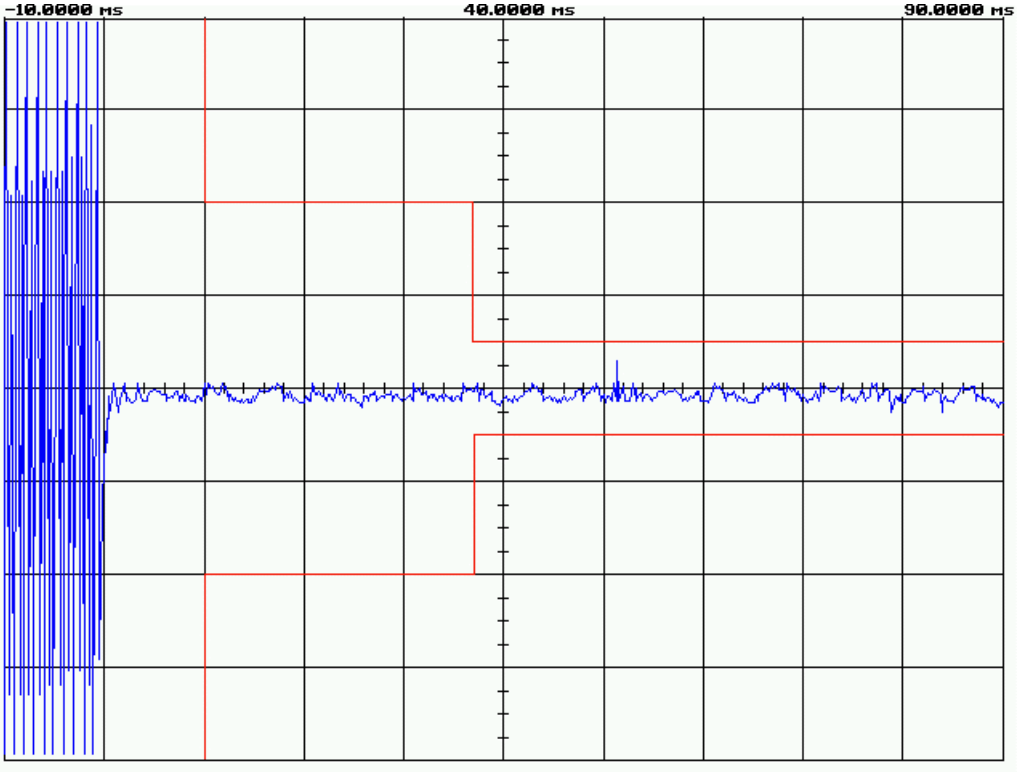
430 MHz On Time 25 KHz



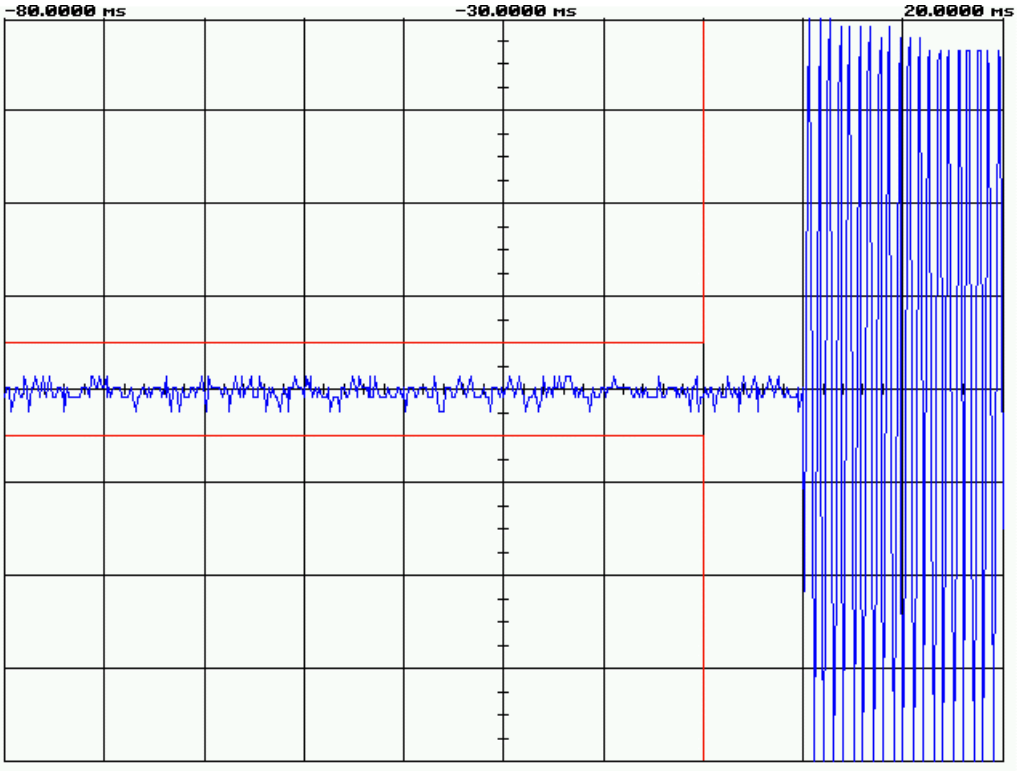
430 MHz Off Time 25 KHz



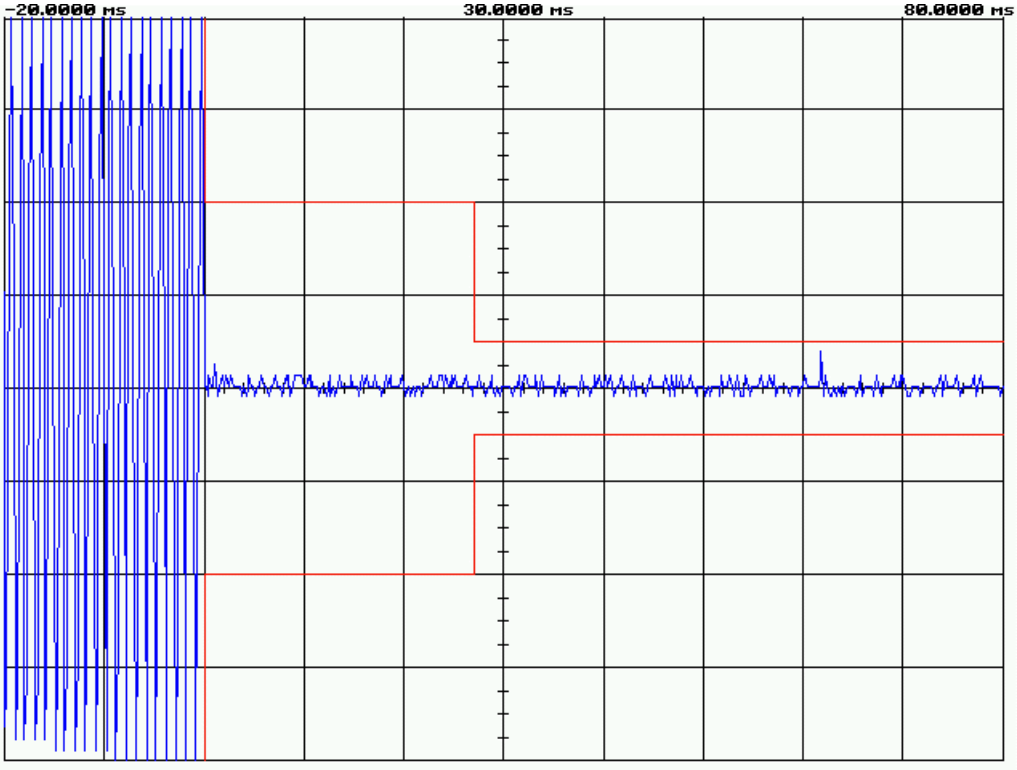
430 MHz On Time 12.5 KHz



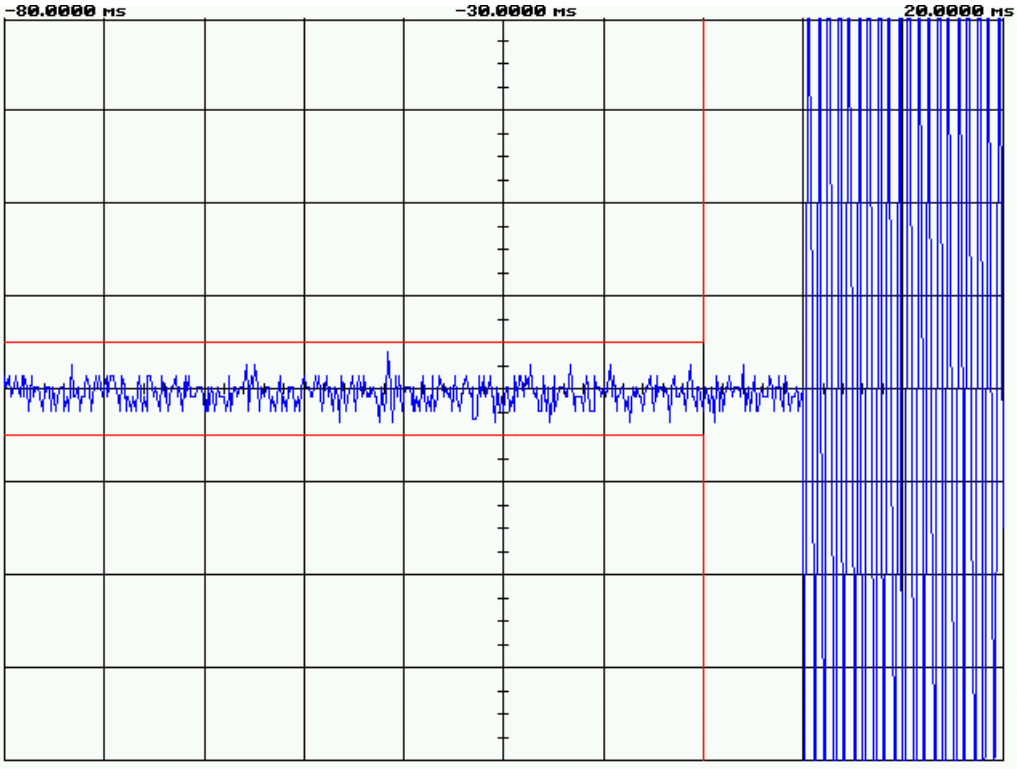
430 MHz Off Time 12.5 KHz



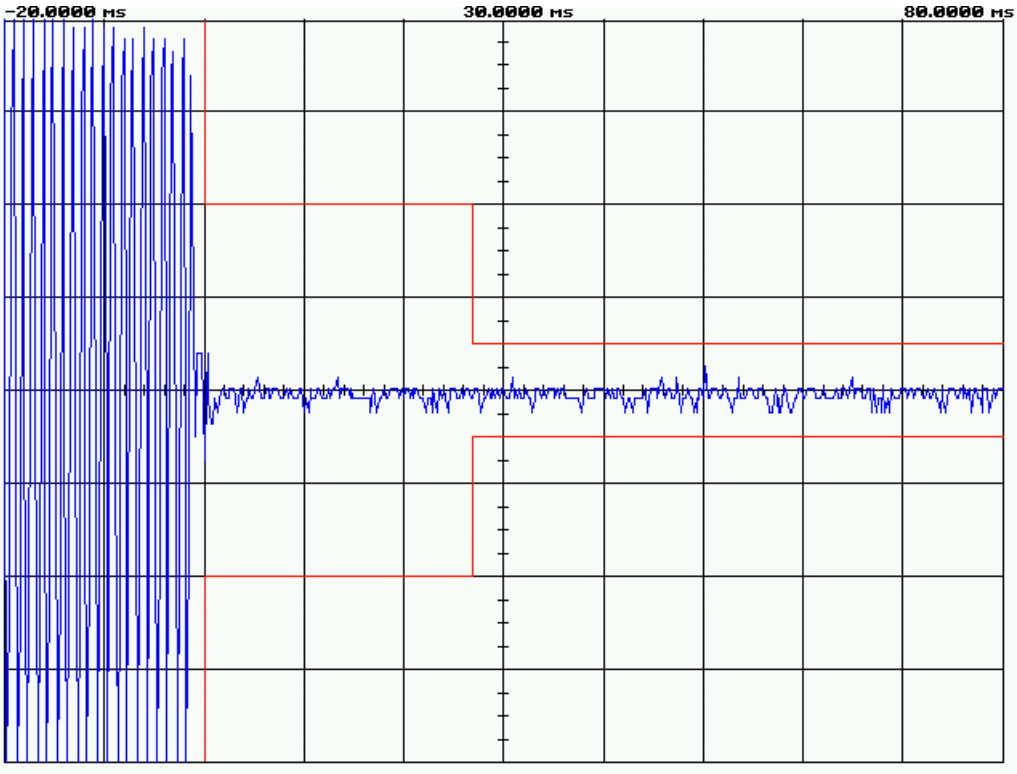
450 MHz On Time 25 KHz



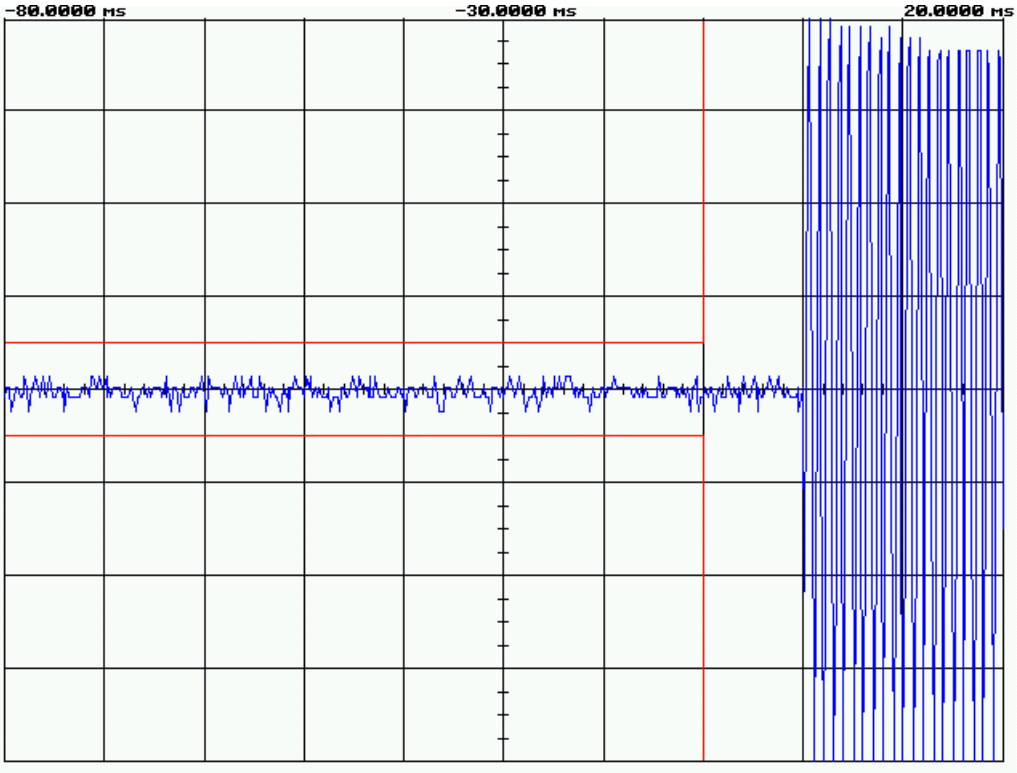
450 MHz Off Time 25 KHz



450 MHz On Time 12.5 KHz



450 MHz Off Time 12.5 KHz

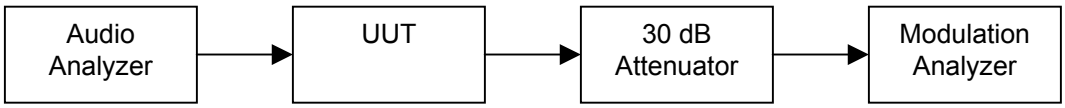


Name of Test: Audio Low Pass Filter (Voice Input)
2.1047 2.1047 **Engineer: J Erhard**
Test Equipment Utilized: i00321, i00324 **Test Date: 3/12/2009**

Measurement Procedure

A) The UUT and test equipment were set up such that the audio input was connected at the input to the modulation limiter, and the modulated stage.
B) The audio output was connected at the output to the modulated stage.

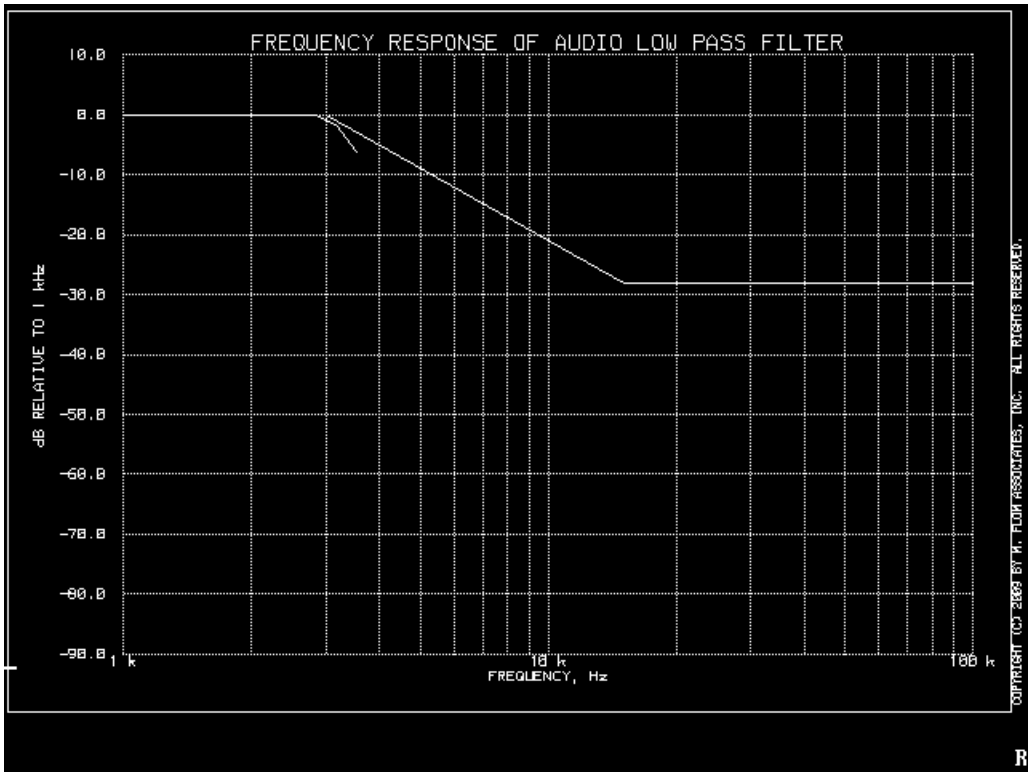
Transmitter Test Set-Up



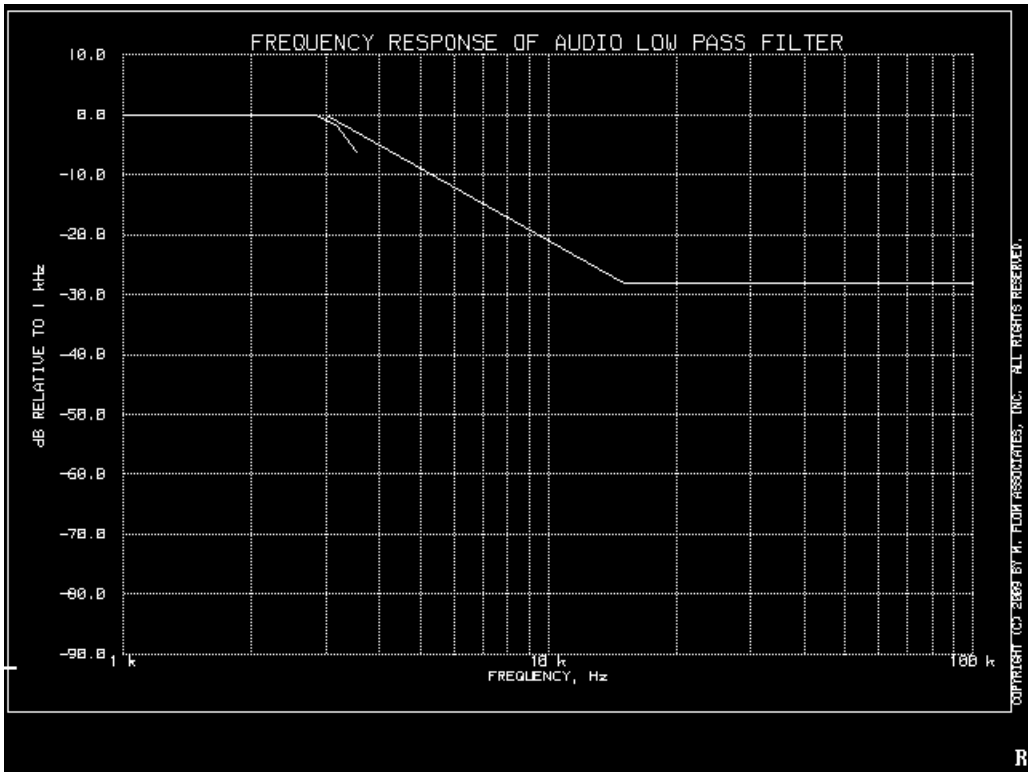
Measurement Results

This unit is a digital radio and the roll-off for the filter is very linear in the operational band and sharp out of the band, this response is identical for all bands of operation.

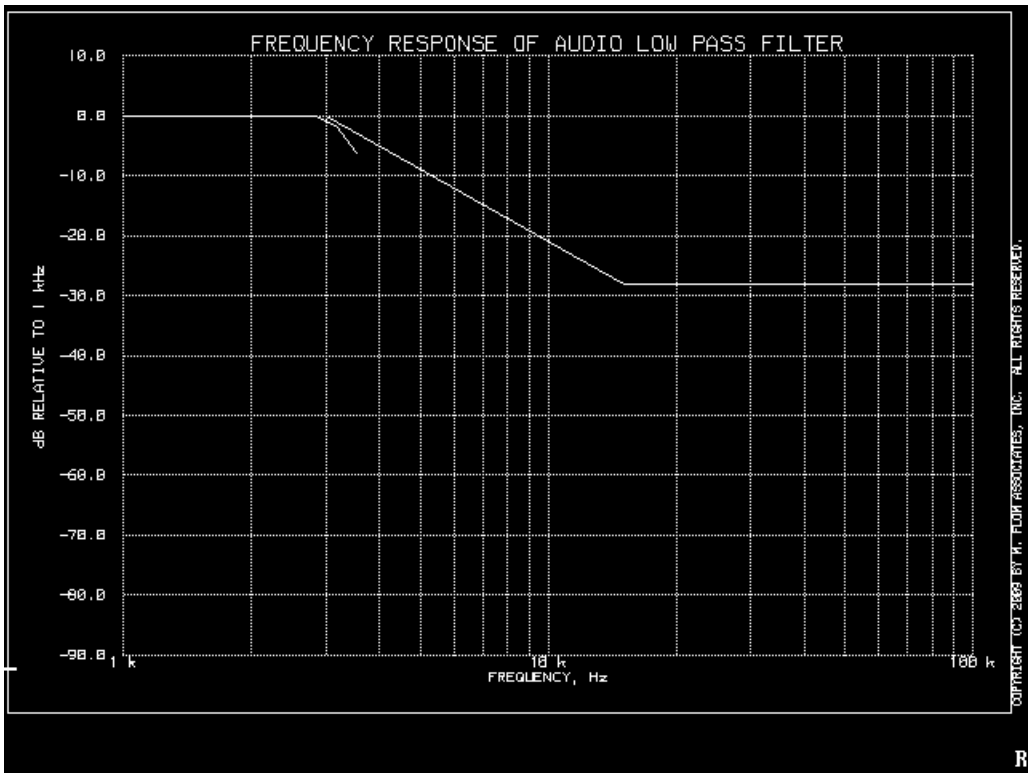
150 MHz



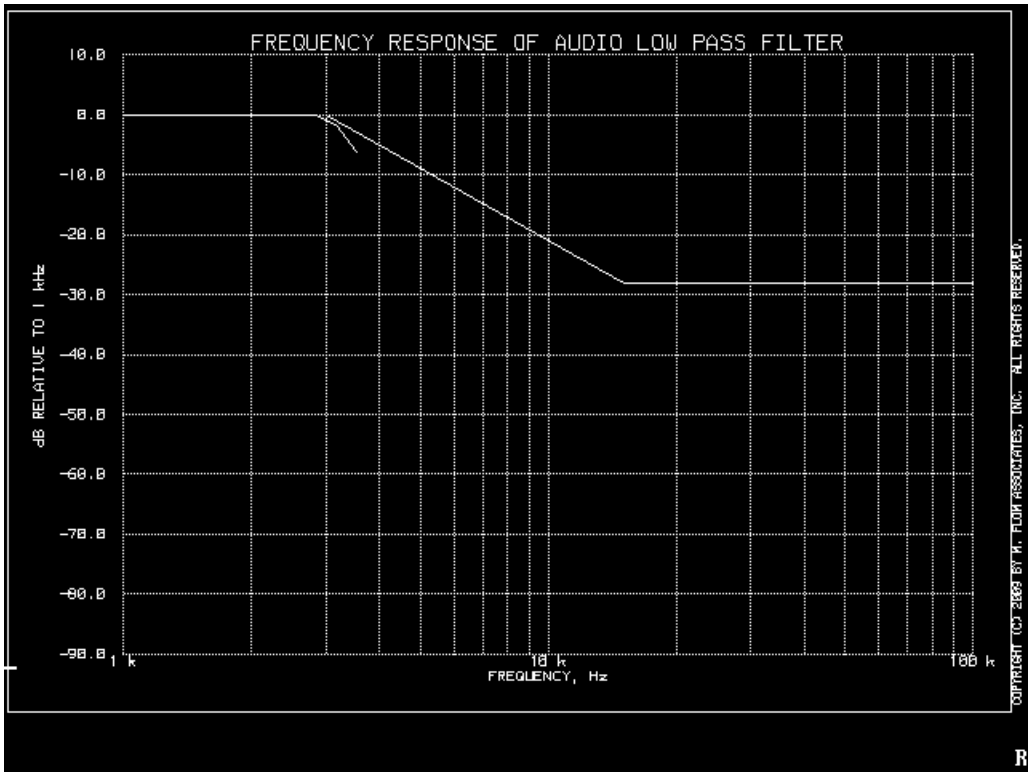
430 MHz



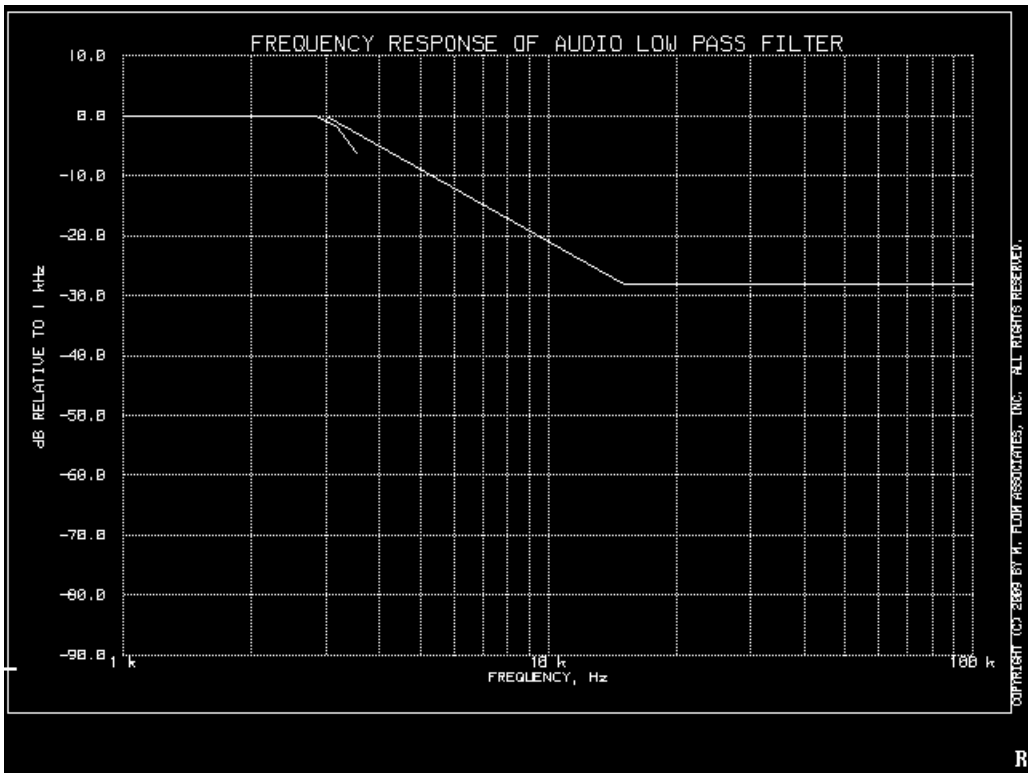
450 MHz



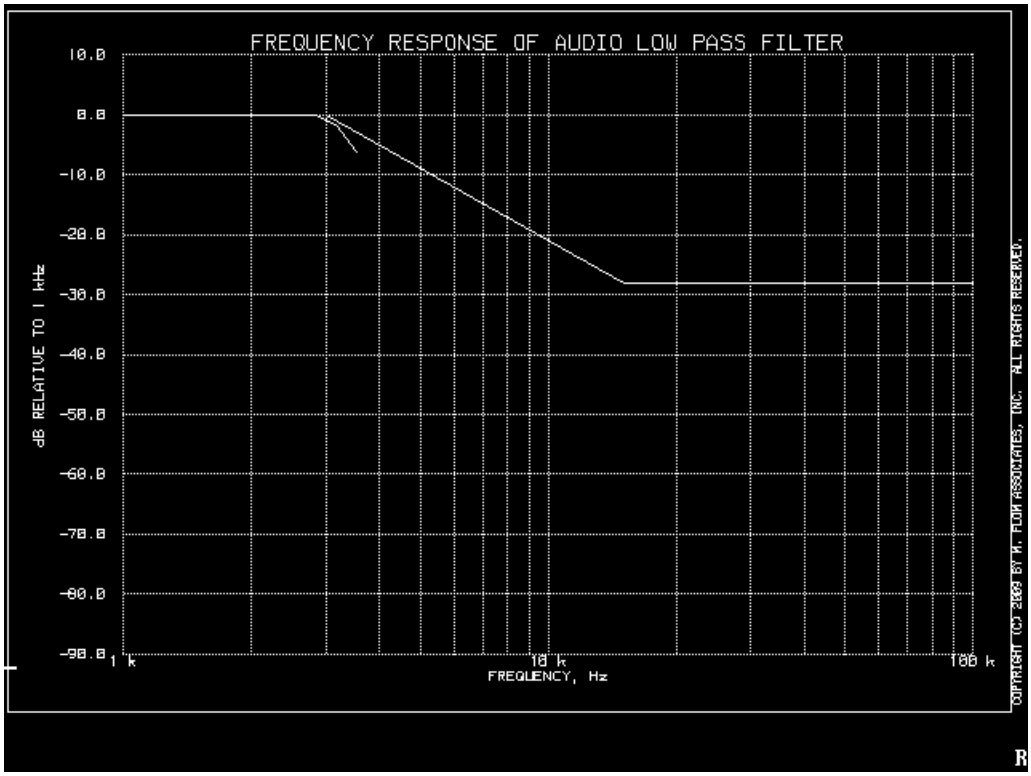
770 MHz



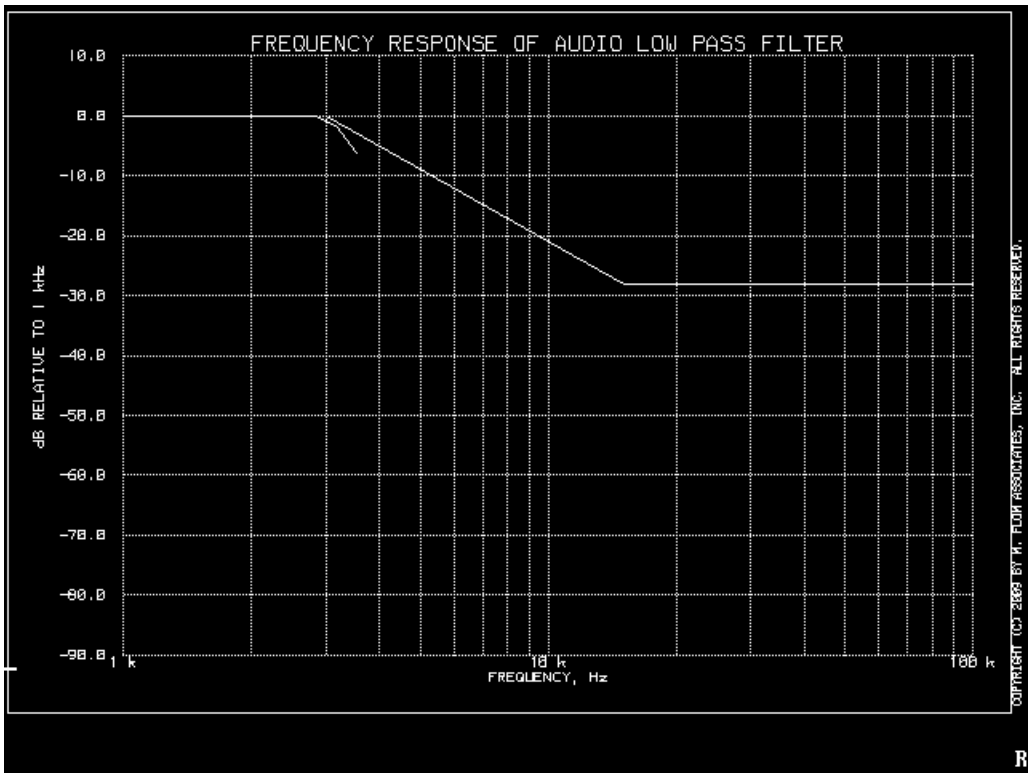
800 MHz



821 MHz



866 MHz

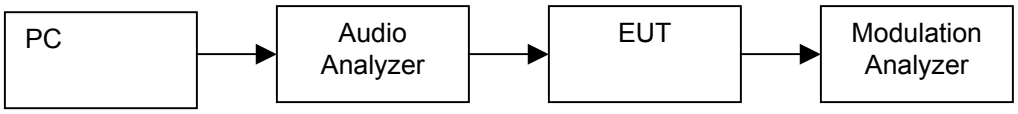


Name of Test: Audio Frequency Response
Specification: 2.1047 **Engineer: J Erhard**
Test Equipment Utilized: i00321, i00324 **Test Date: 3/12/2009**

Measurement Procedure

A) The EUT and test equipment were set up as shown below.
B) The audio signal generator was connected to the audio input circuit/microphone of the EUT.
C) The audio signal input was adjusted to obtain 20% modulation at 1 kHz, and this point was taken as the 0 dB reference level.
D) With input levels held constant and below limiting at all frequencies, the audio signal generator was varied from 100 Hz to 50 kHz.
E) The response in dB relative to 1 kHz was measured, using the HP 8901A Modulation Meter.

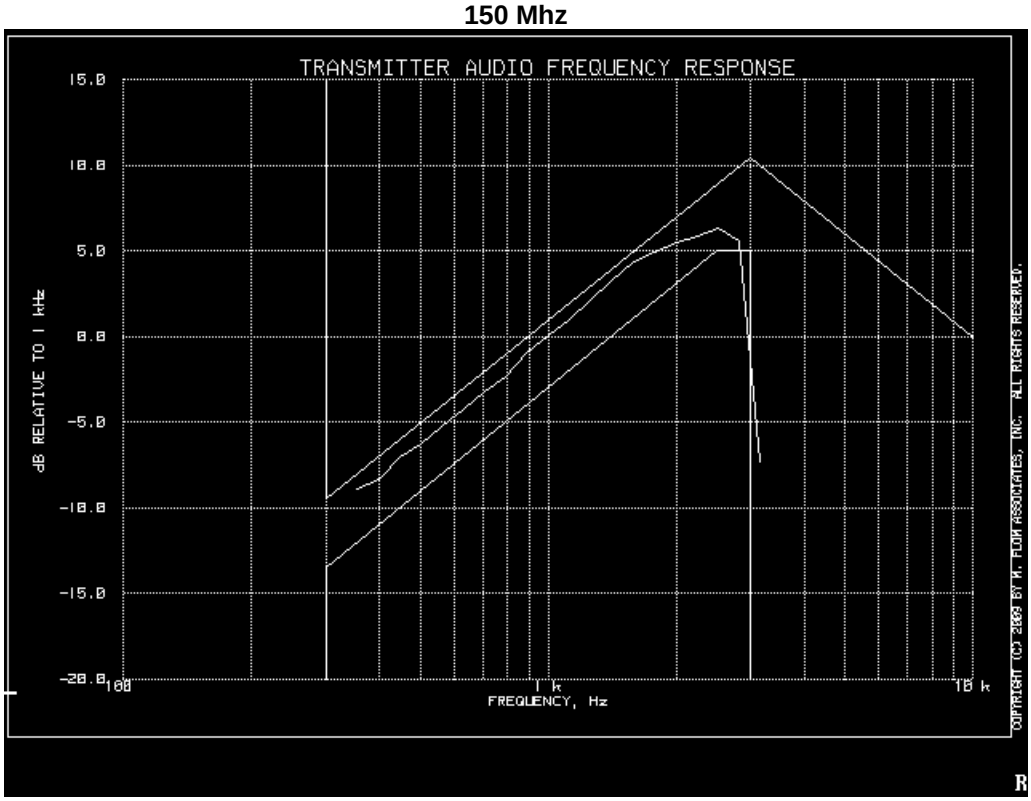
Test Setup



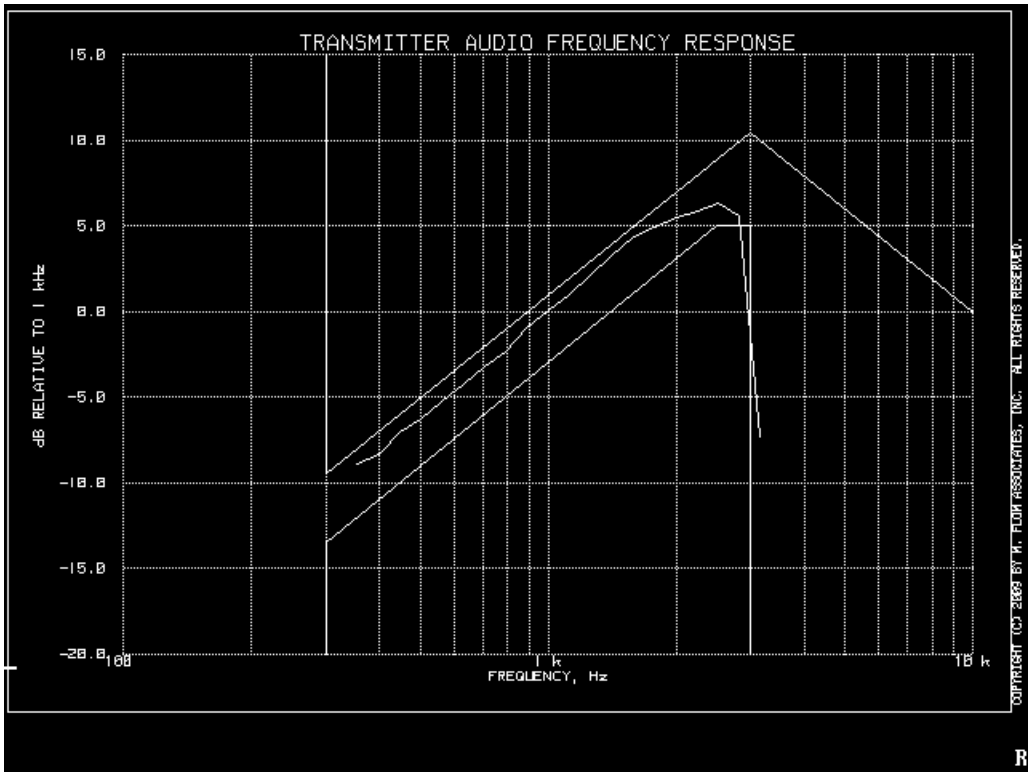
This unit is a digital radio and the audio response is digitally controlled and identical for all bands of operation.

Test Results

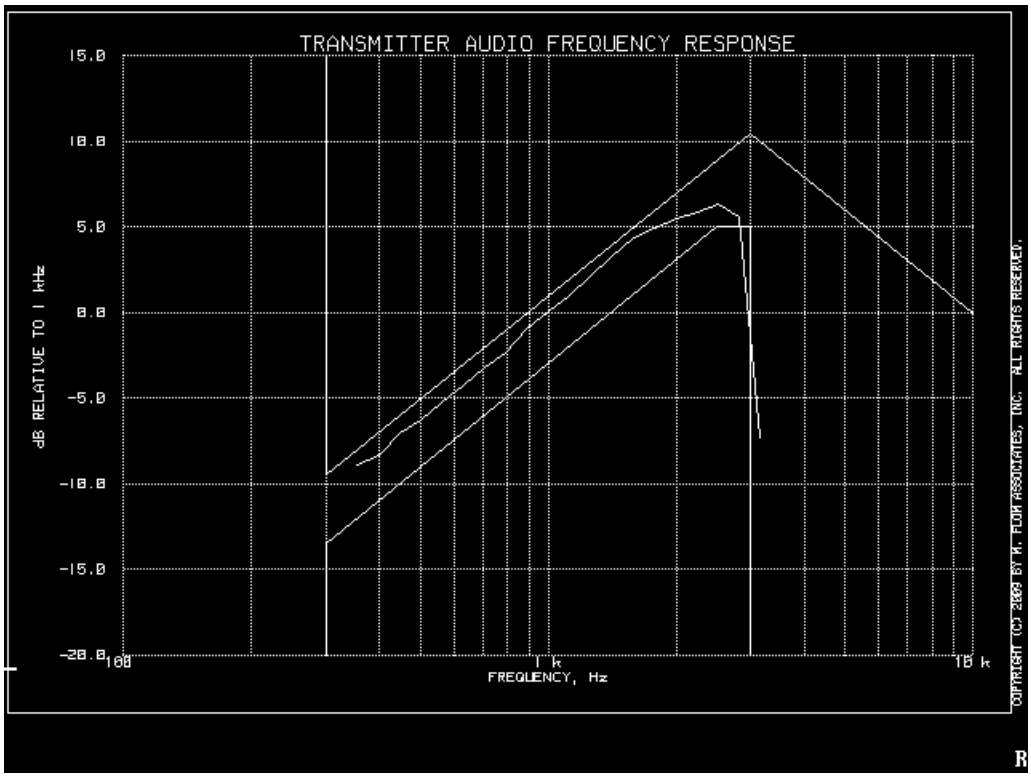
150 Mhz



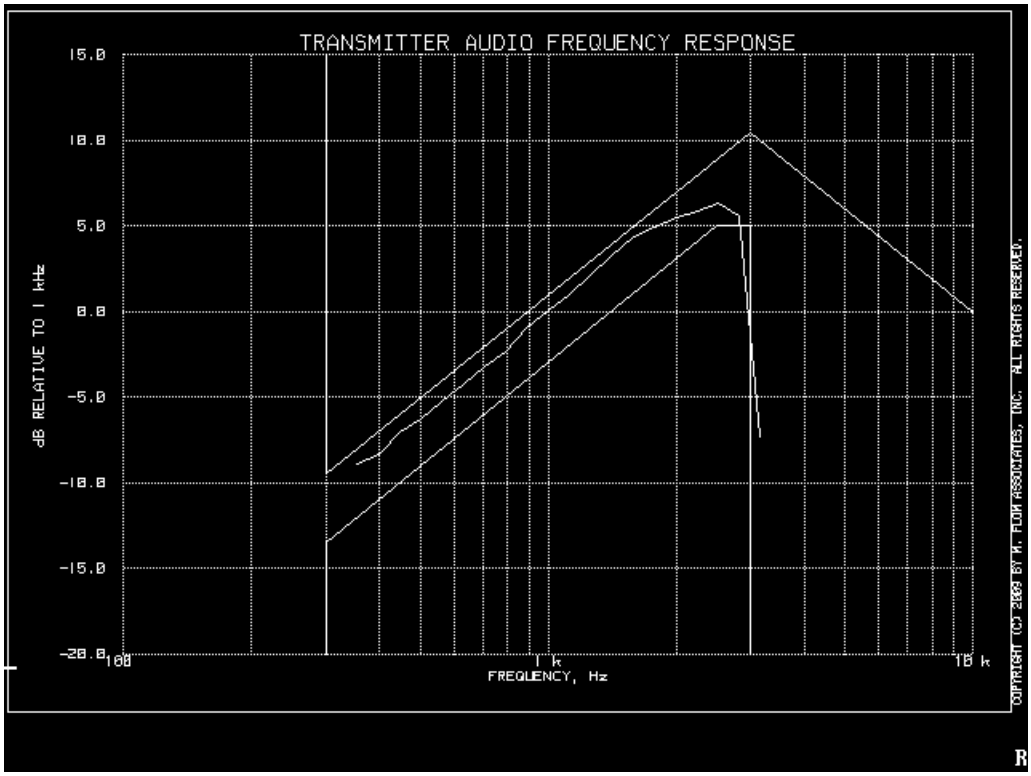
430 MHz



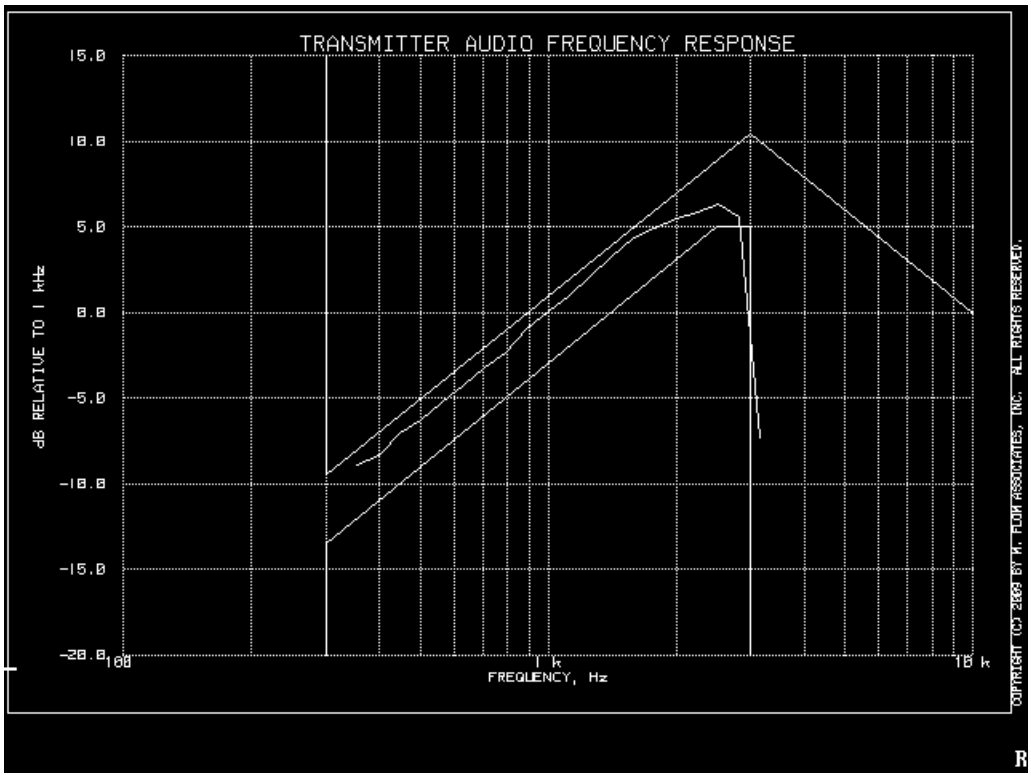
450 MHz



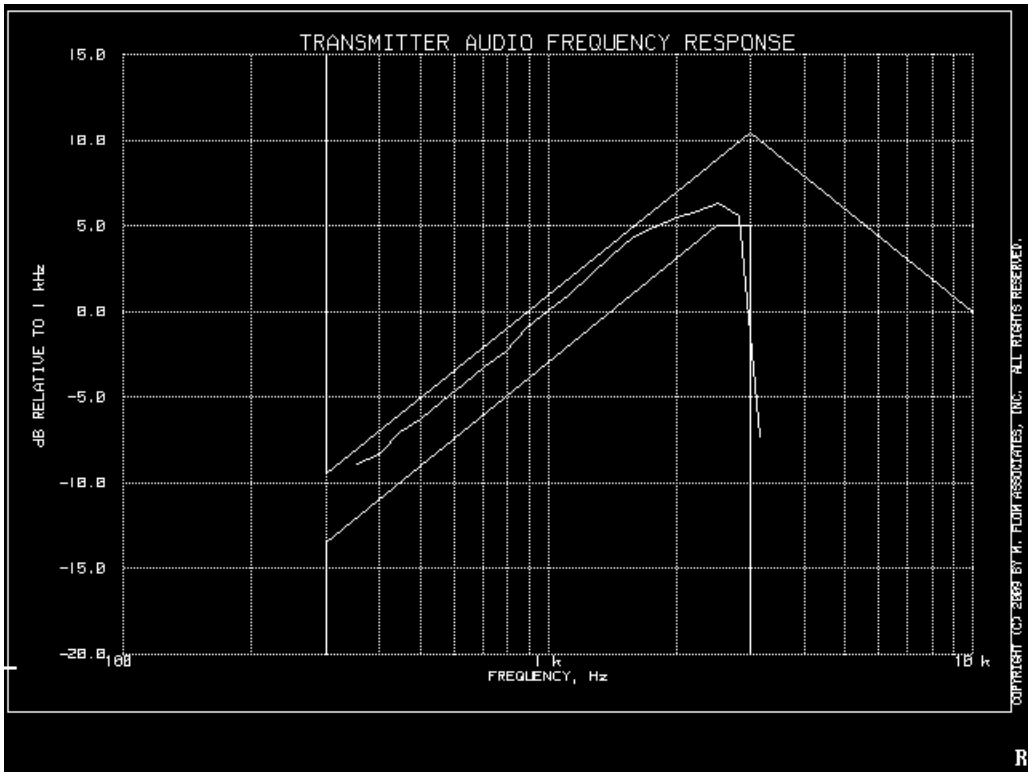
770 MHz



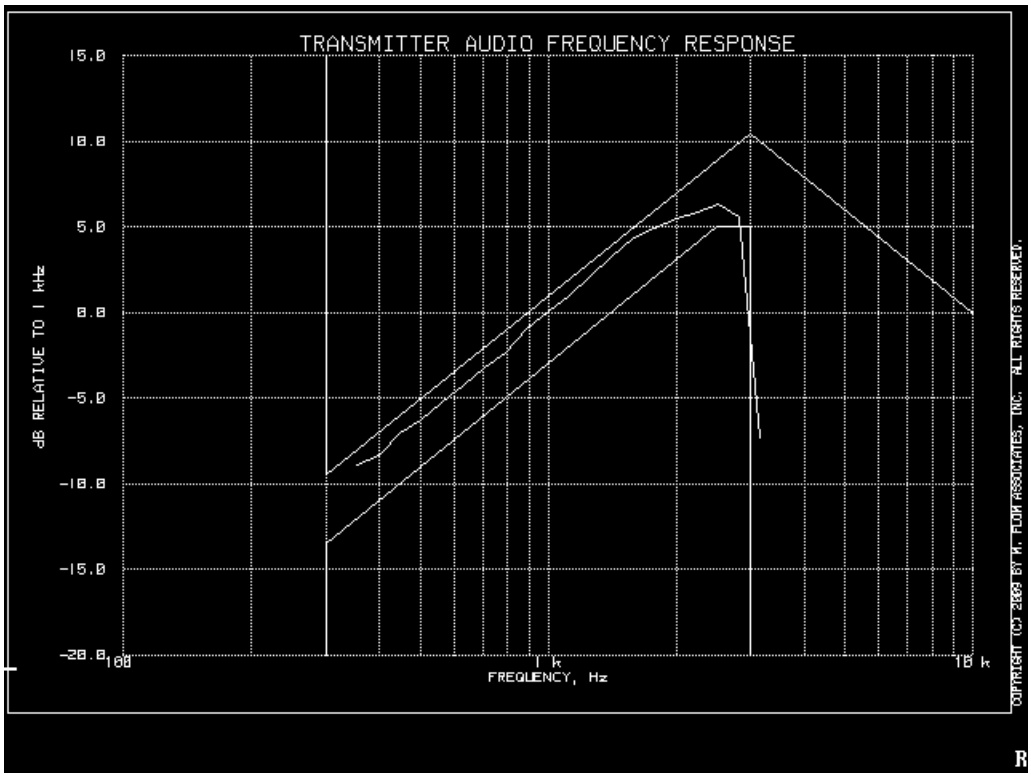
800 MHz



821 MHz



866 MHz

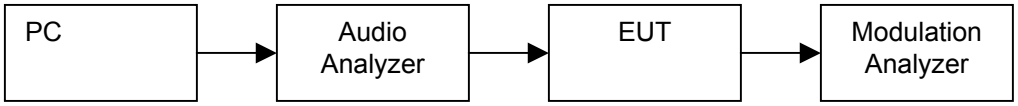


Name of Test: Modulation Limiting
Specification: 2.1047(a) **Engineer: G Corbin**
Test Equipment Utilized: i00321, i00324 **Test Date: 3/5/2009**

Measurement Procedure

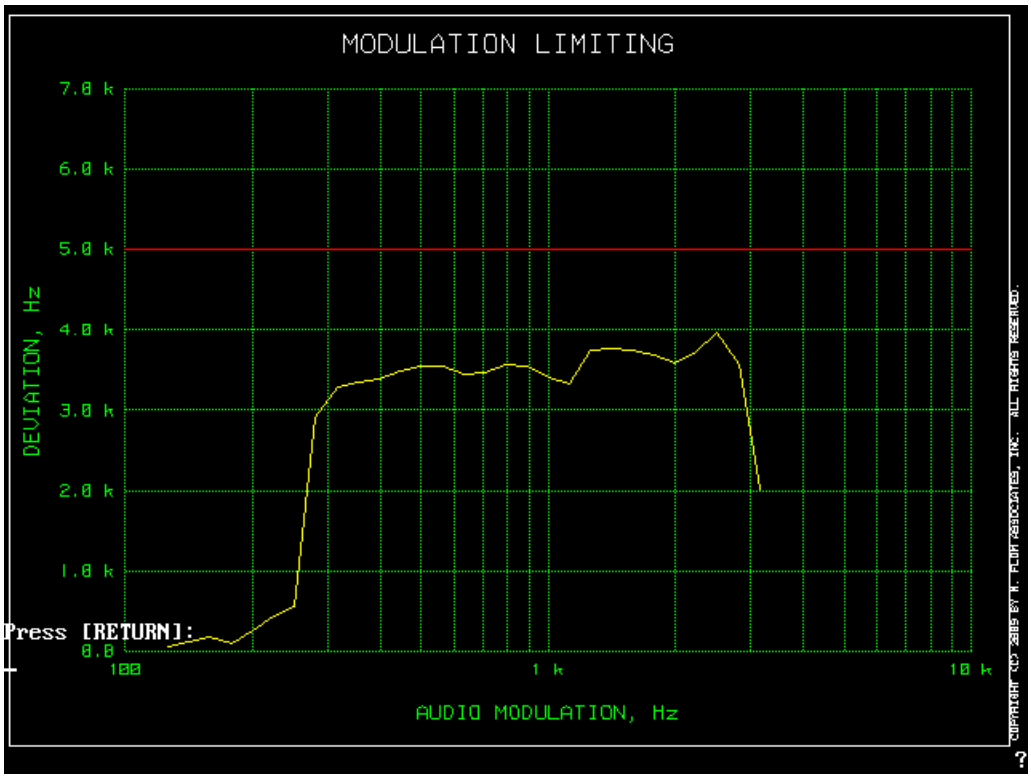
A) The signal generator was connected to the input of the EUT as shown below.
B) The modulation response was measured for each of three frequencies (one of which was the frequency of maximum response), and the input voltage was varied and was observed on an HP 8901A Modulation Analyzer.
C) The input level was varied from 30% modulation (±1.5 kHz deviation) to at least 20 dB higher than the saturation point.
D) Measurements were performed for both negative and positive modulation and the respective results were recorded.

Test Setup



150 MHz
25kHz swept frequency positive peaks

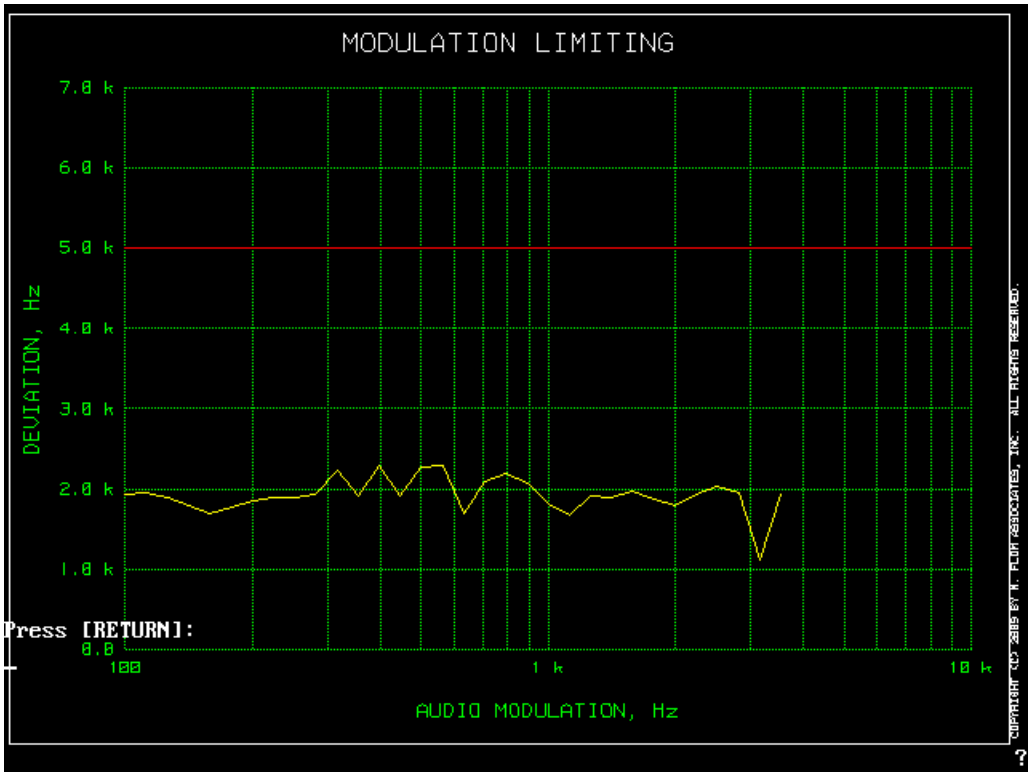
25kHz swept frequency negative peaks



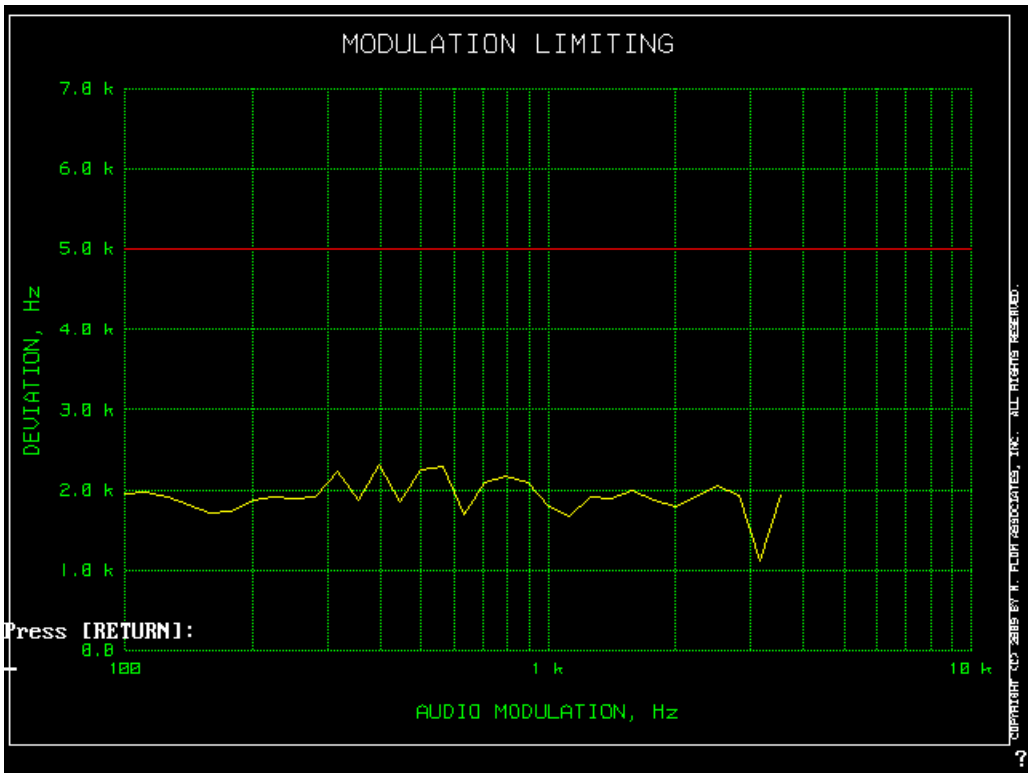
25kHz swept amplitude positive peaks

25kHz swept amplitude negative peaks

12.5kHz swept frequency positive peaks



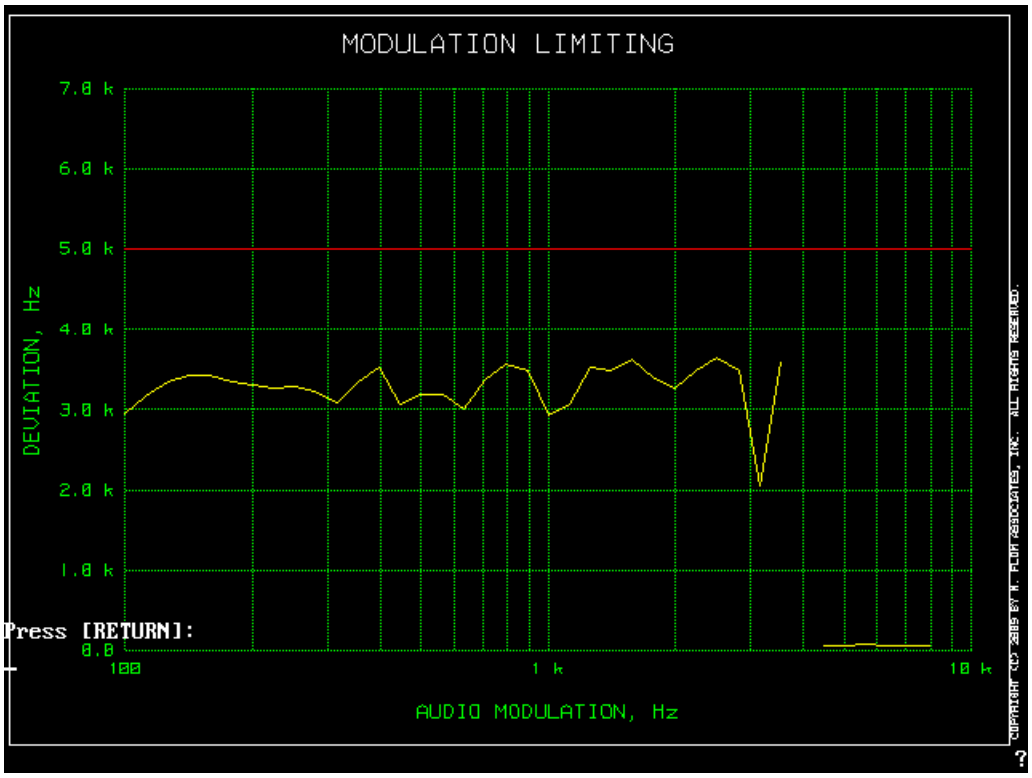
12.5kHz swept frequency negative peaks



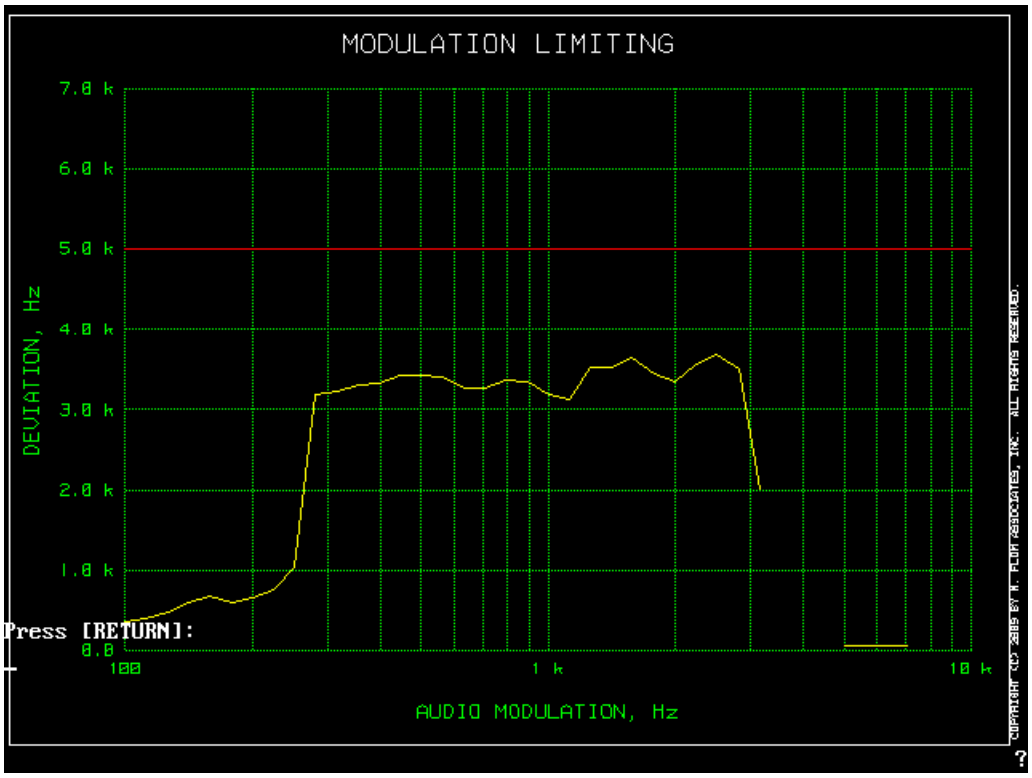
12.5kHz swept amplitude positive peaks

12.5kHz swept amplitude negative peaks

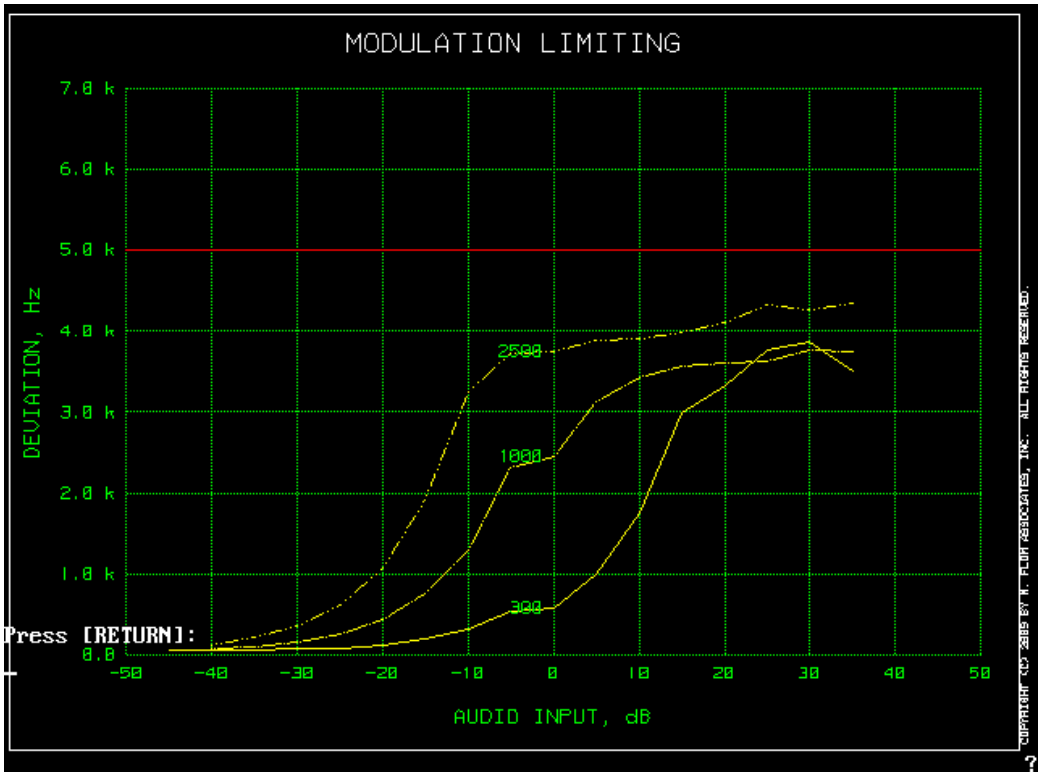
430 MHz
25kHz swept frequency positive peaks



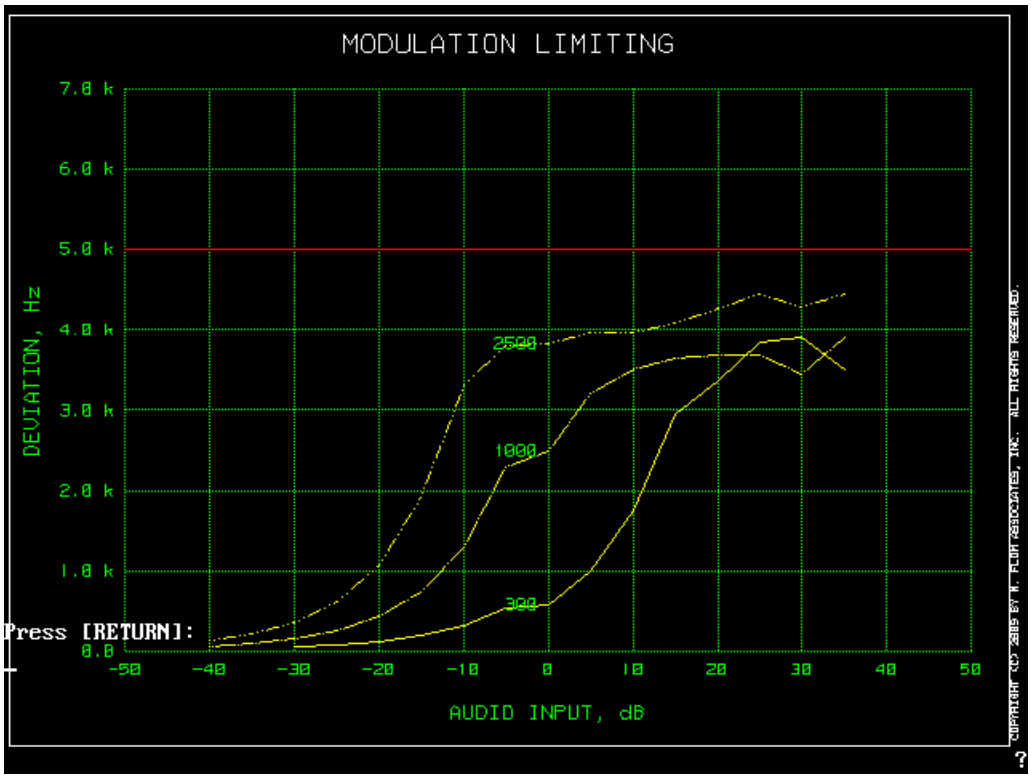
25kHz swept frequency negative peaks



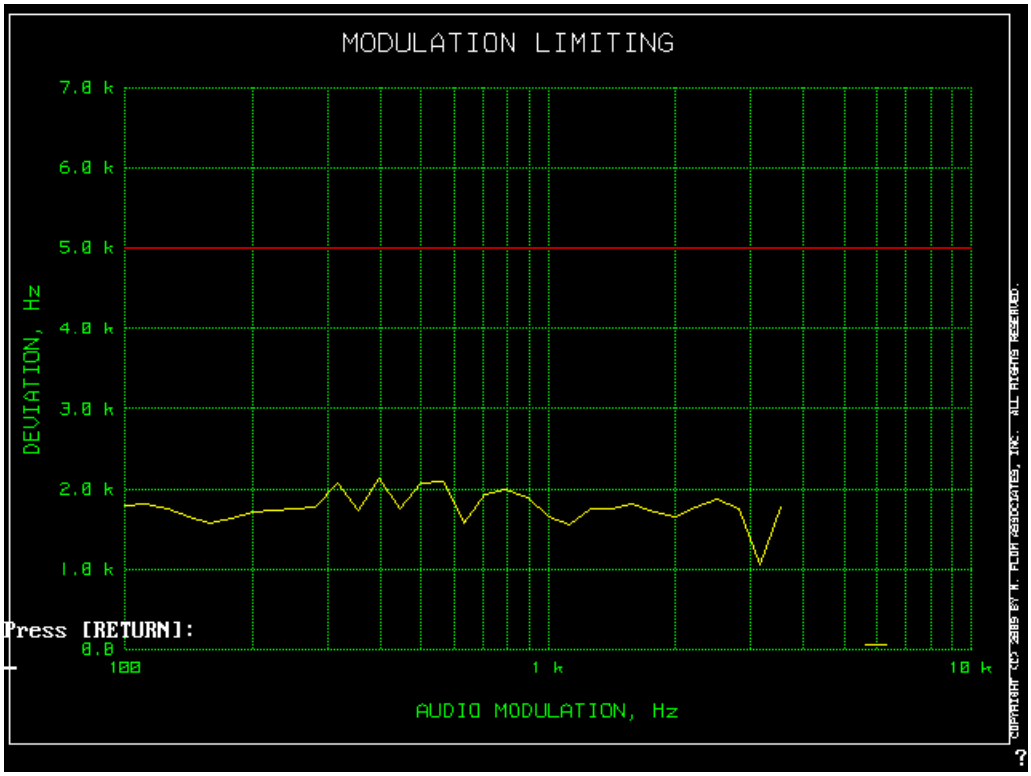
25kHz swept amplitude positive peaks



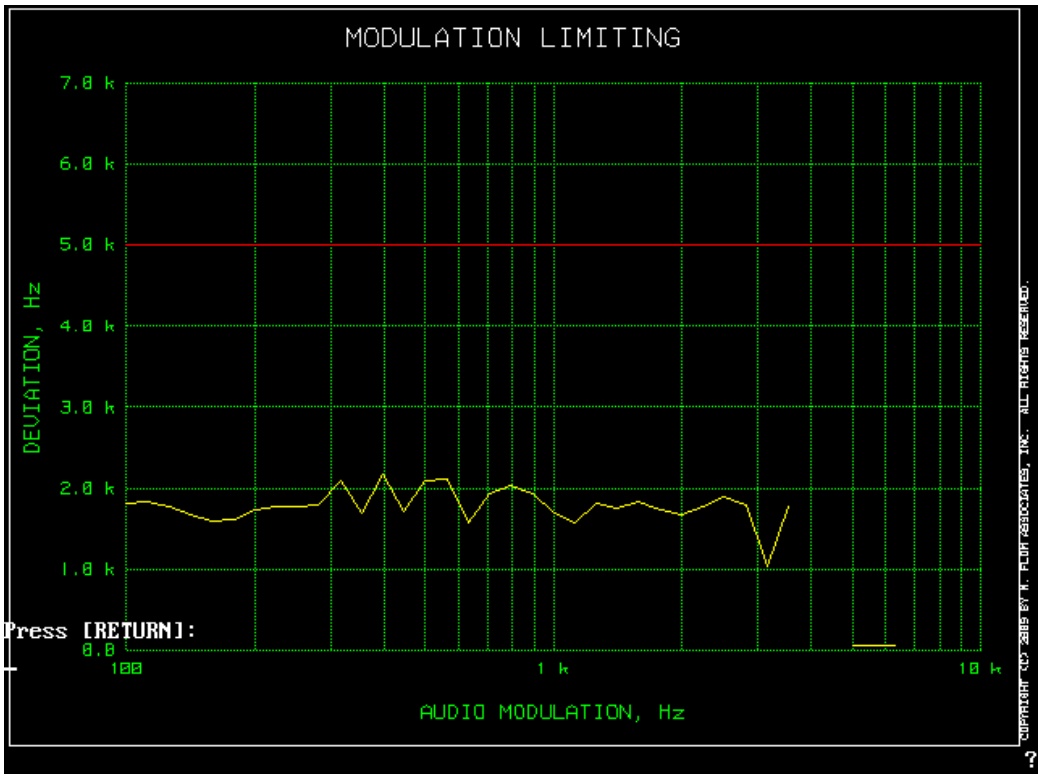
25kHz swept amplitude negative peaks



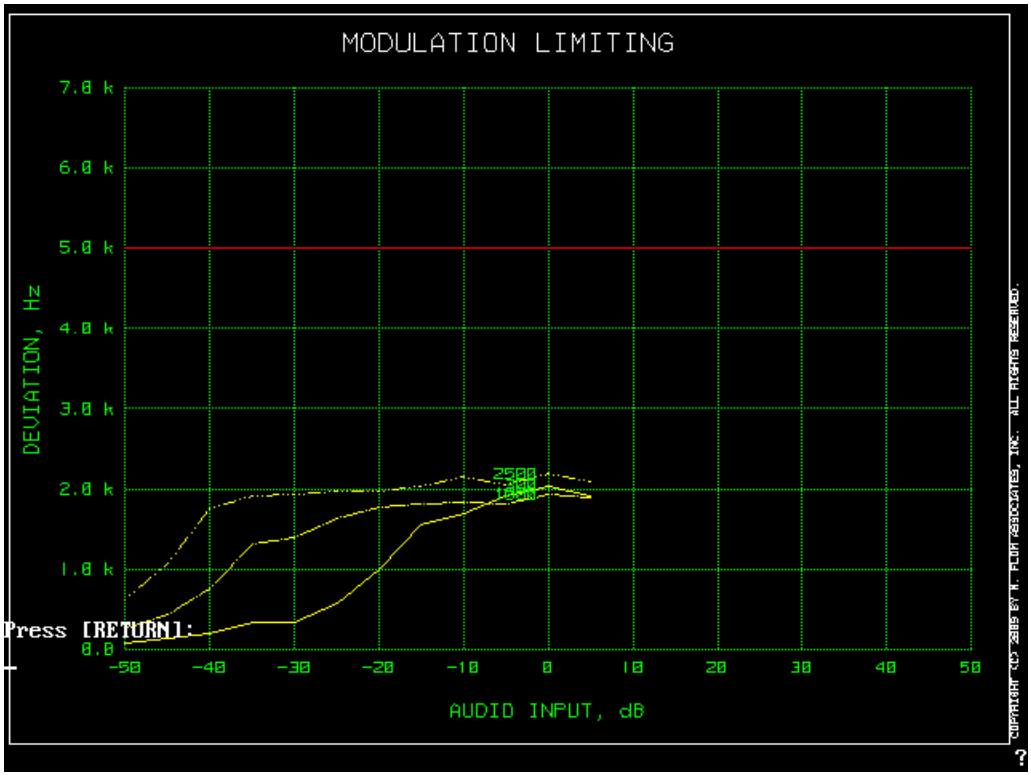
12.5kHz swept frequency positive peaks



12.5kHz swept frequency negative peaks

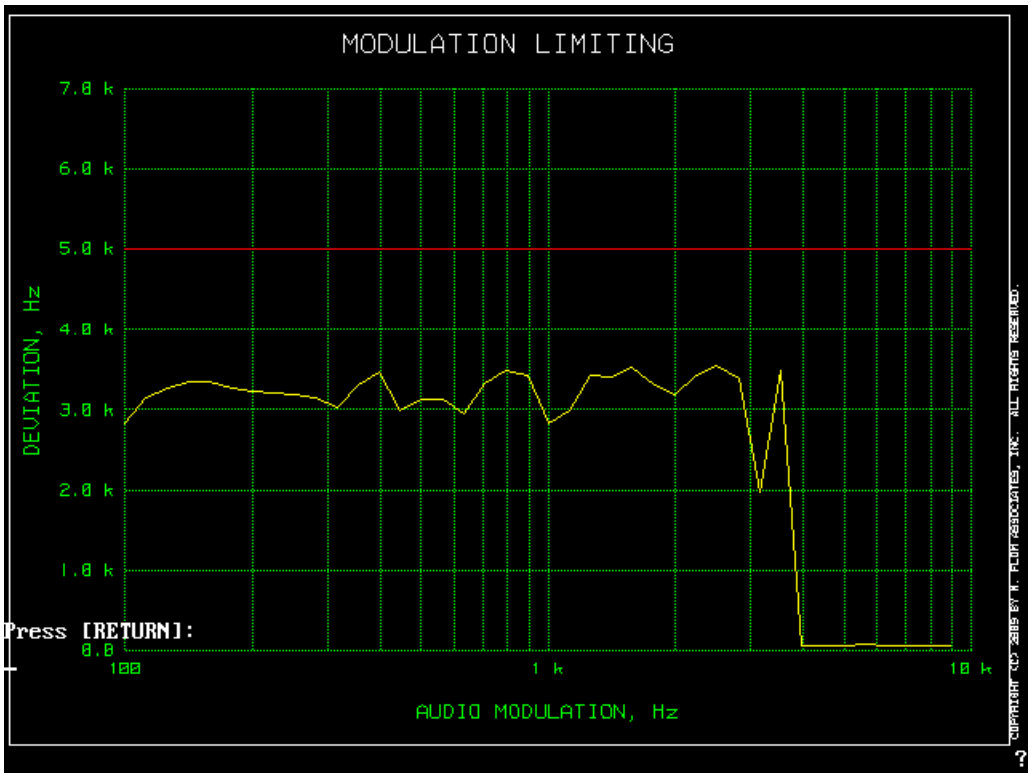


12.5kHz swept amplitude positive peaks

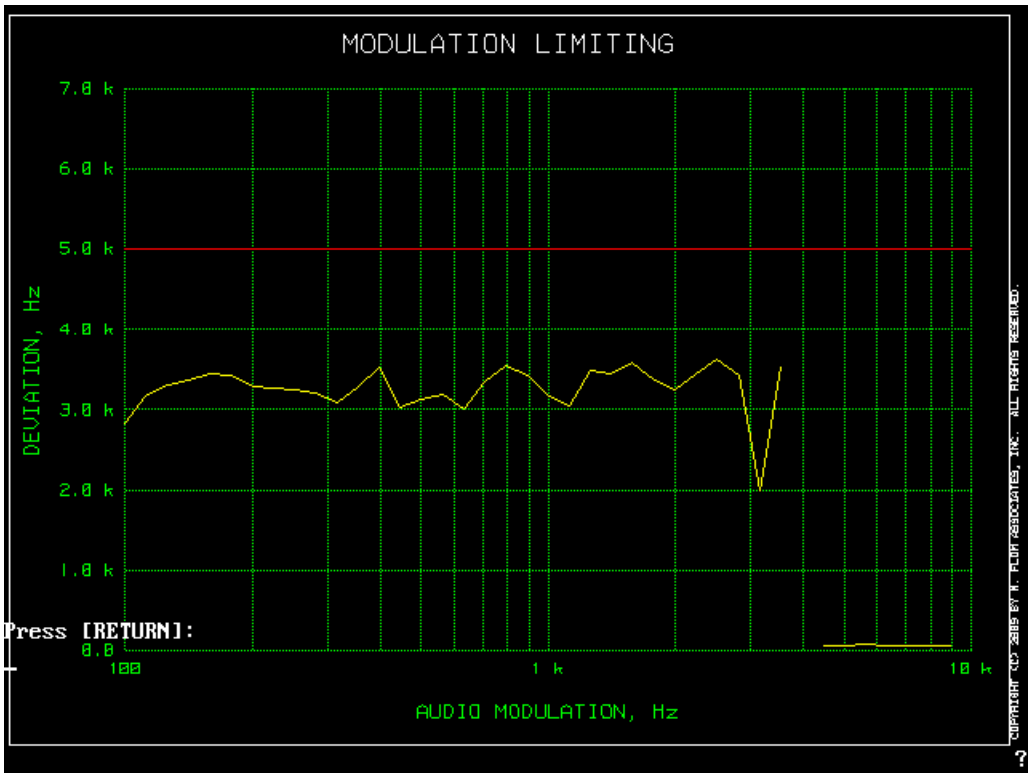


12.5kHz swept amplitude negative peaks

450 MHz
25kHz swept frequency positive peaks

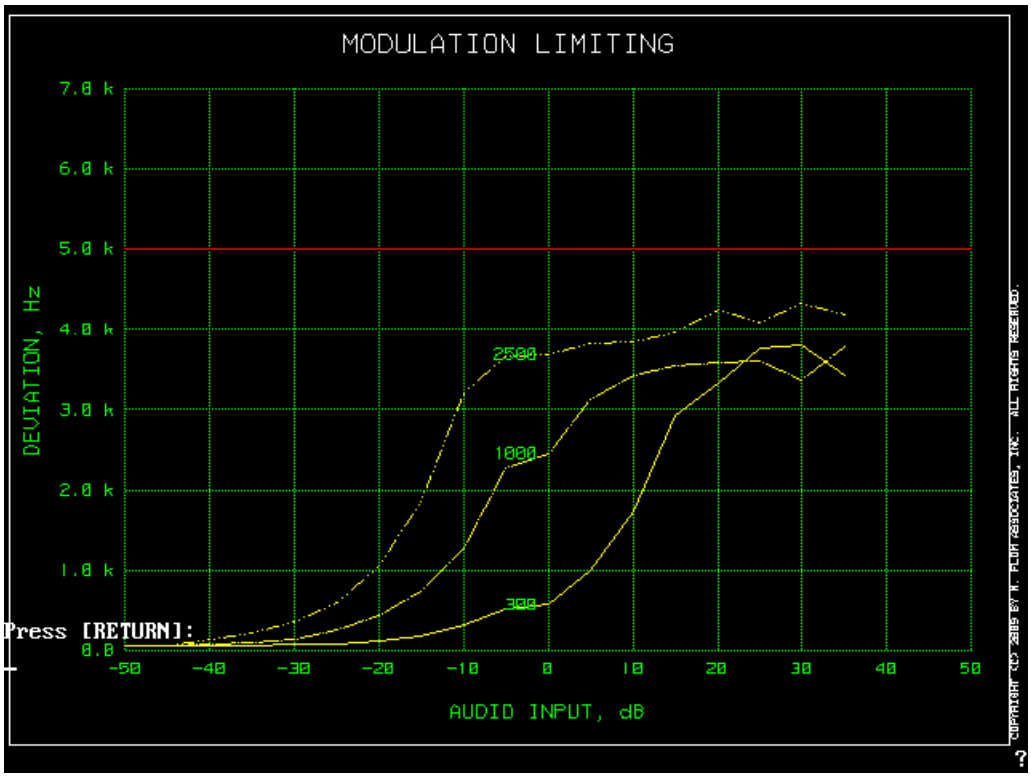


25kHz swept frequency negative peaks

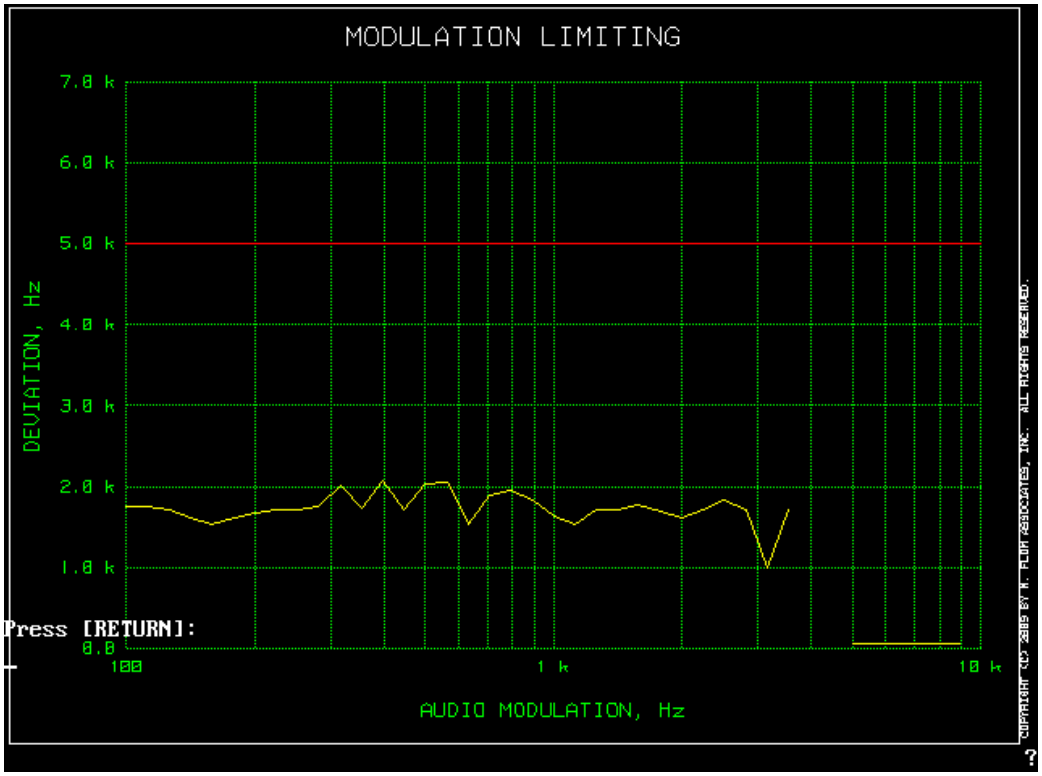


25kHz swept amplitude positive peaks

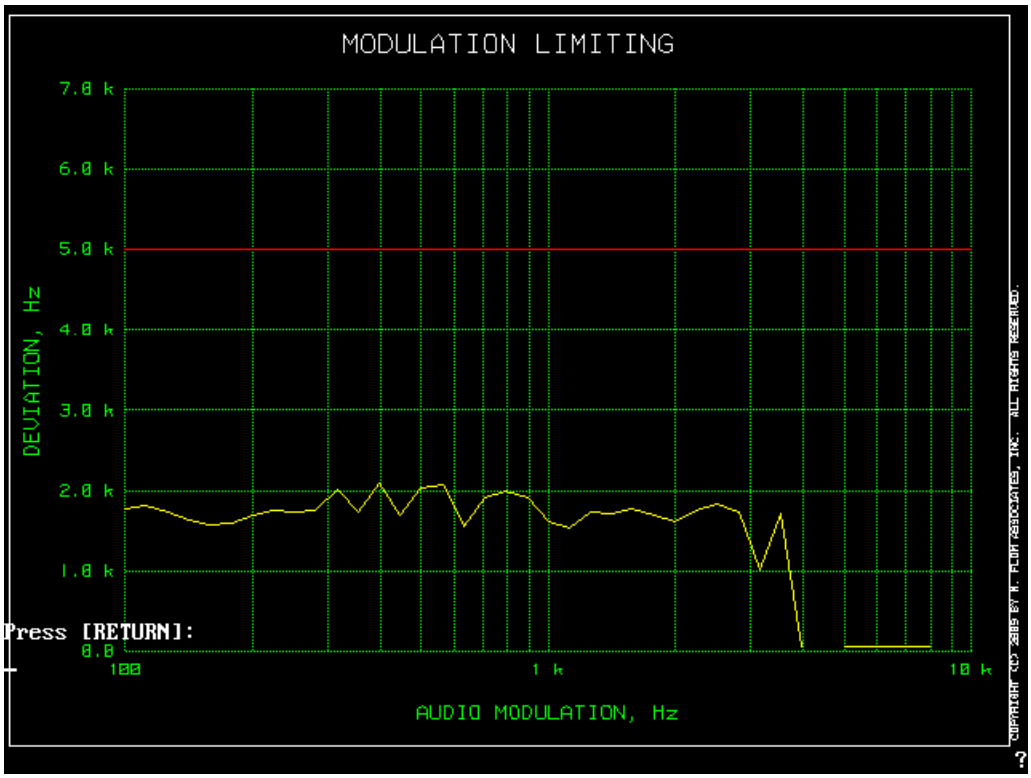
25kHz swept amplitude negative peaks



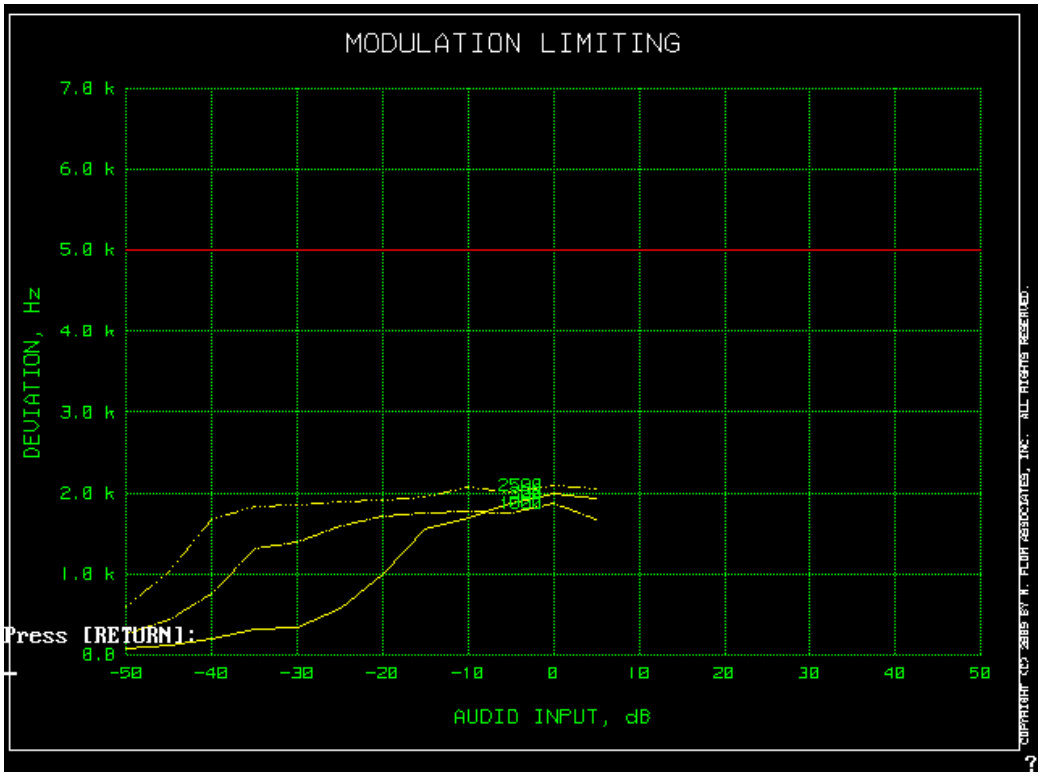
12.5kHz swept frequency positive peaks



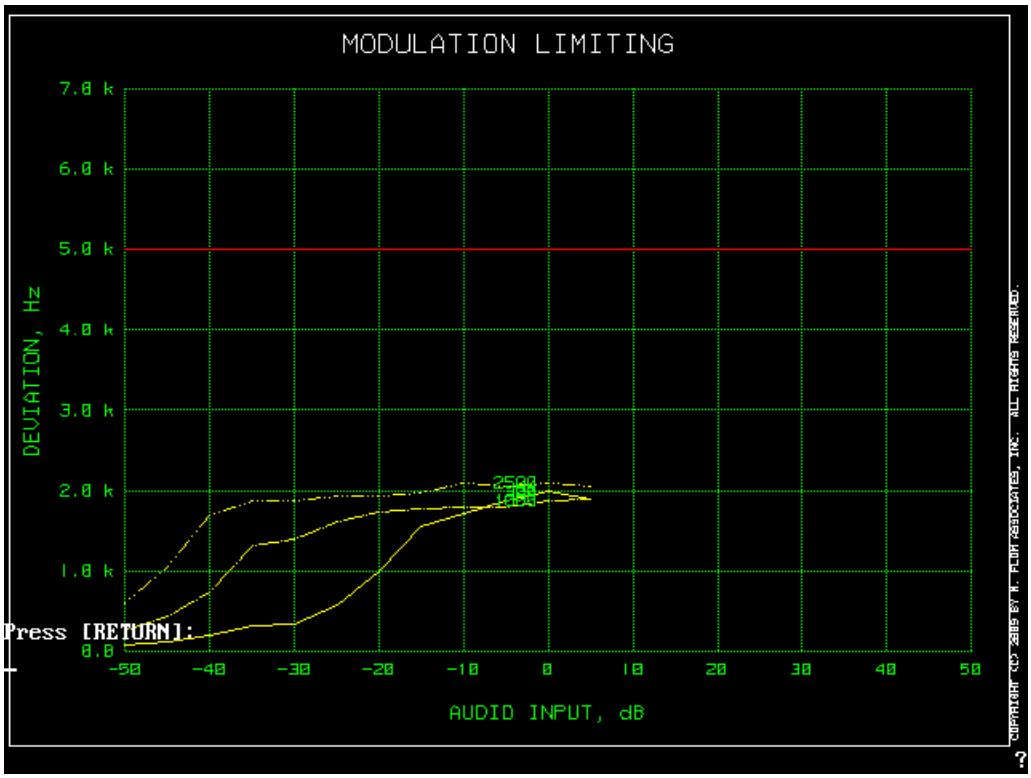
12.5kHz swept frequency negative peaks



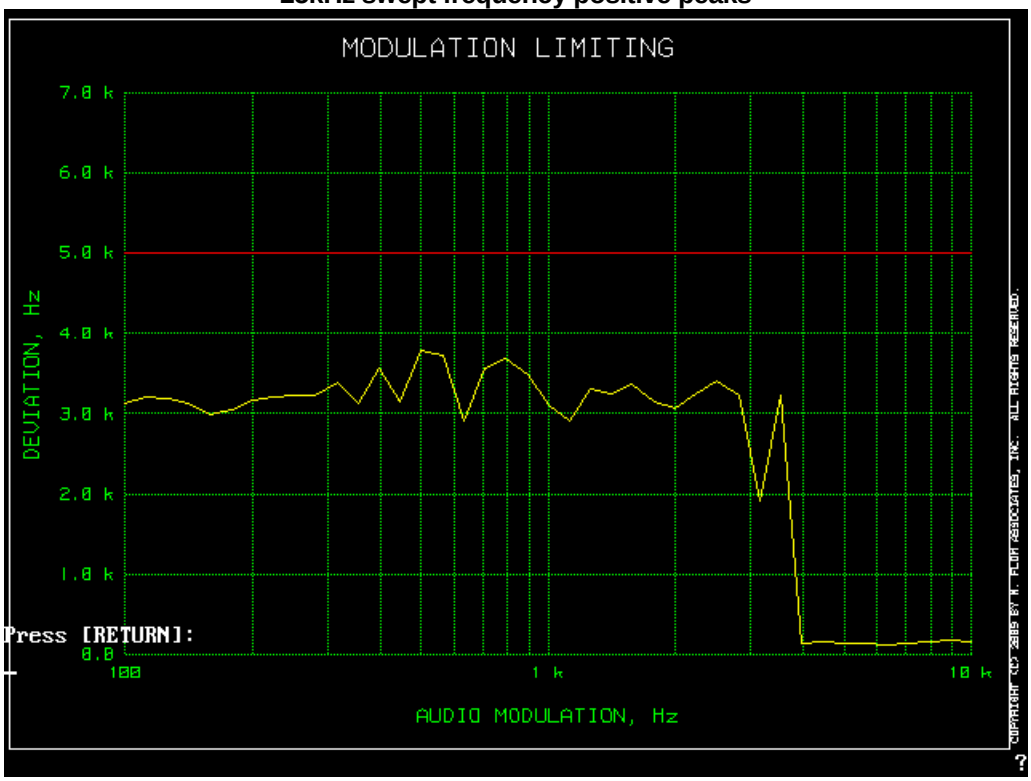
12.5kHz swept amplitude positive peaks



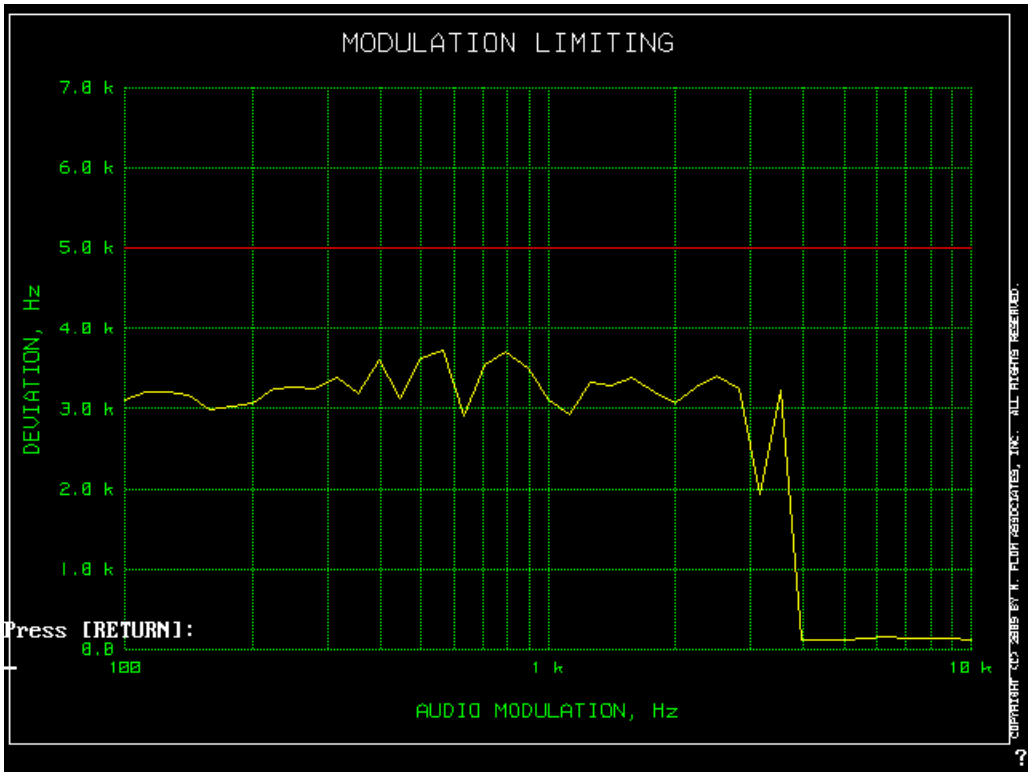
12.5kHz swept amplitude negative peaks



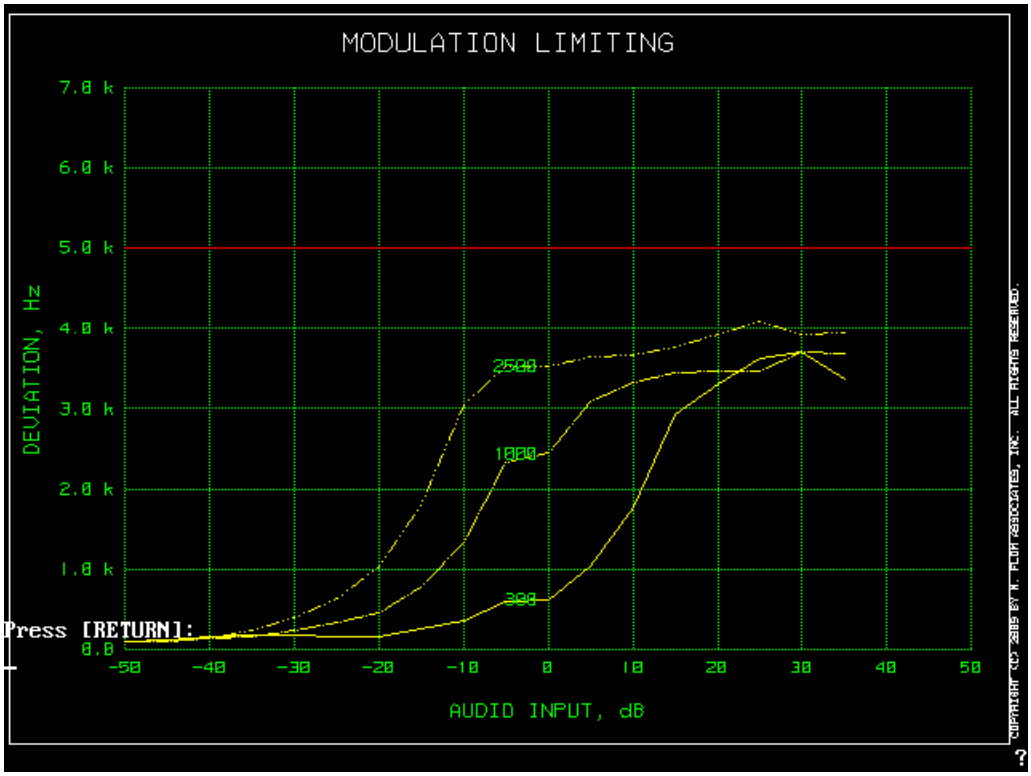
770 MHz
25kHz swept frequency positive peaks



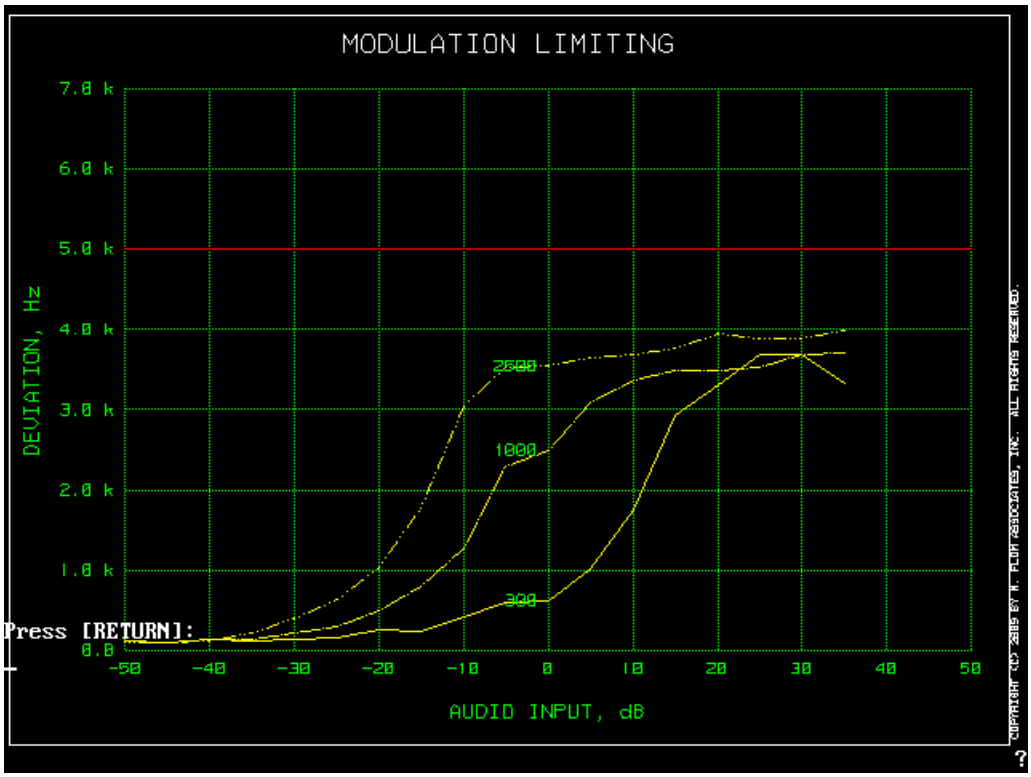
25kHz swept frequency negative peaks



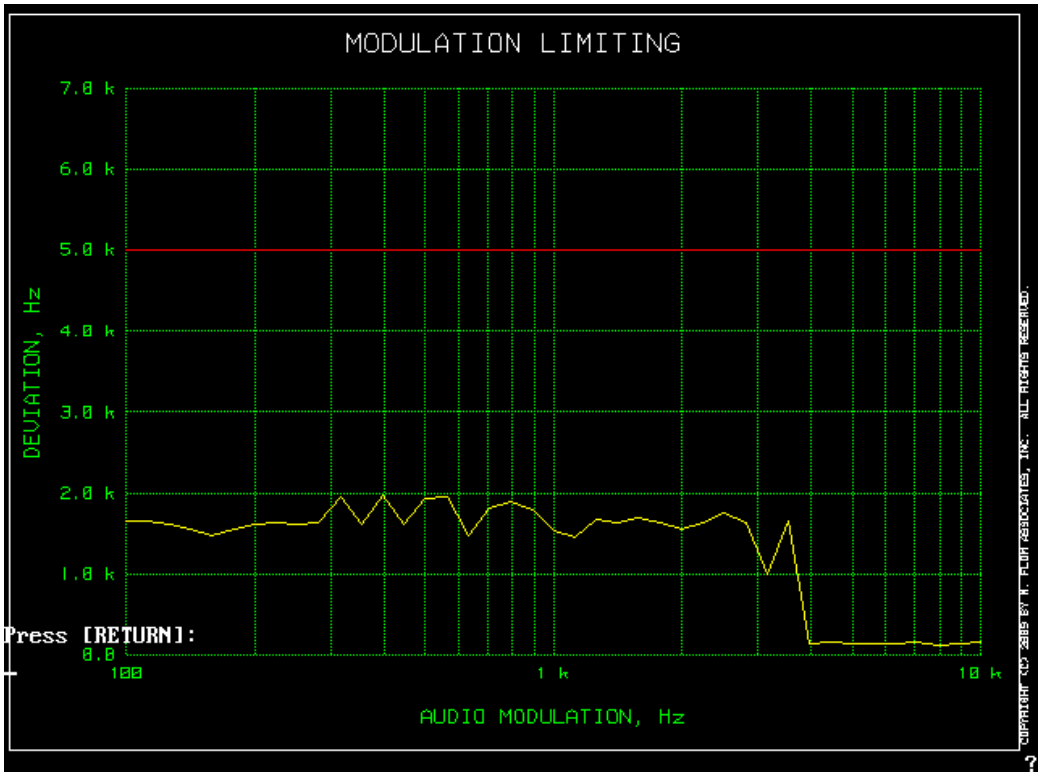
25kHz swept amplitude positive peaks



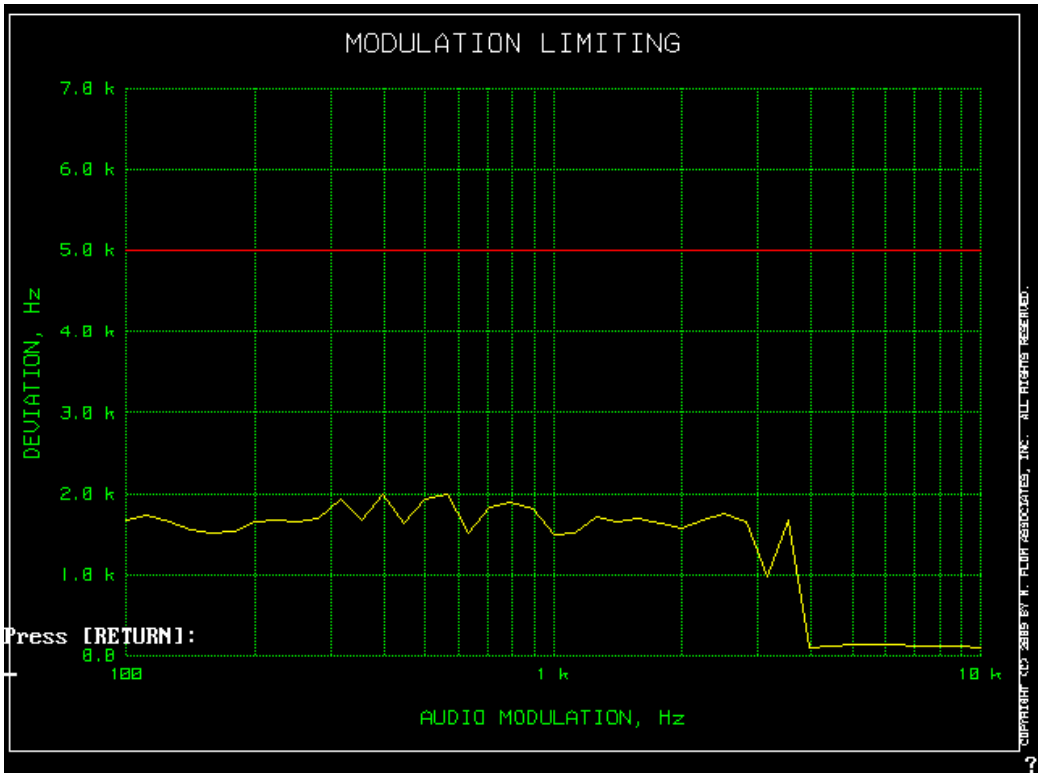
25kHz swept amplitude negative peaks



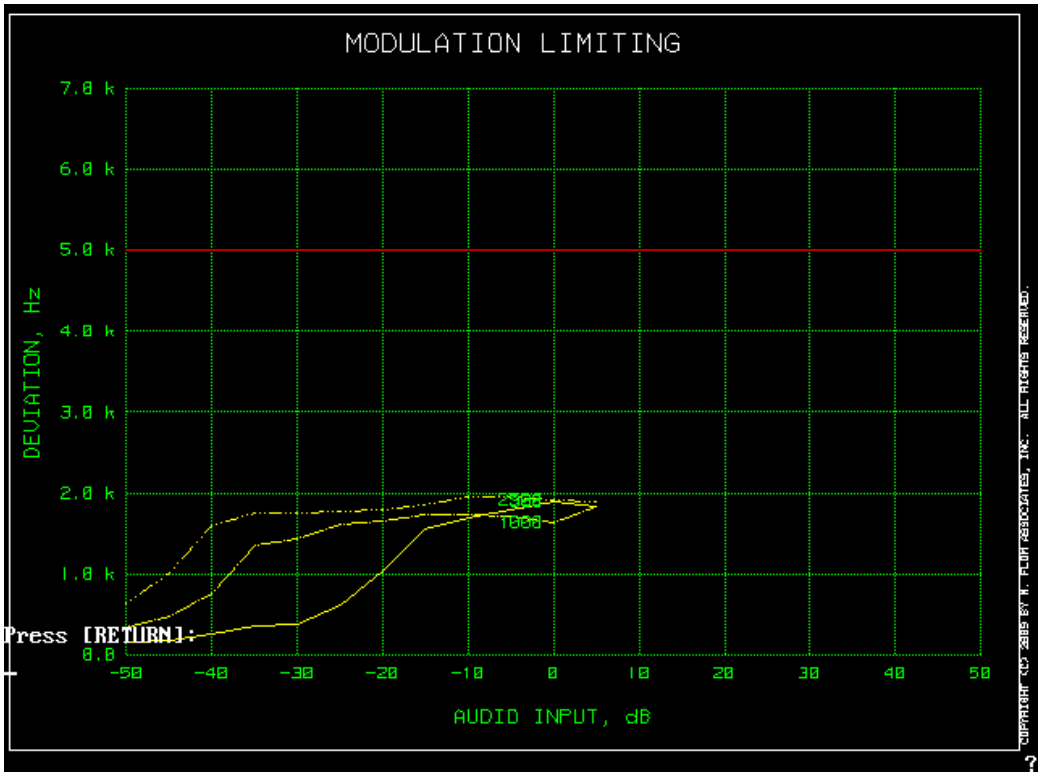
12.5kHz swept frequency positive peaks



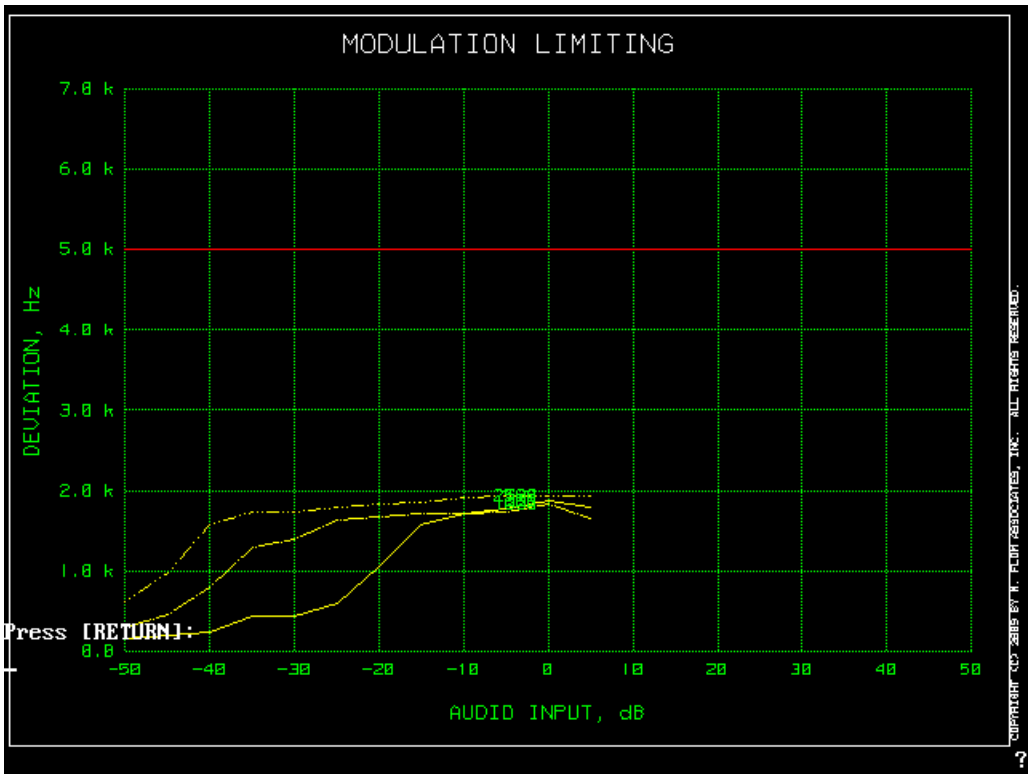
12.5kHz swept frequency negative peaks



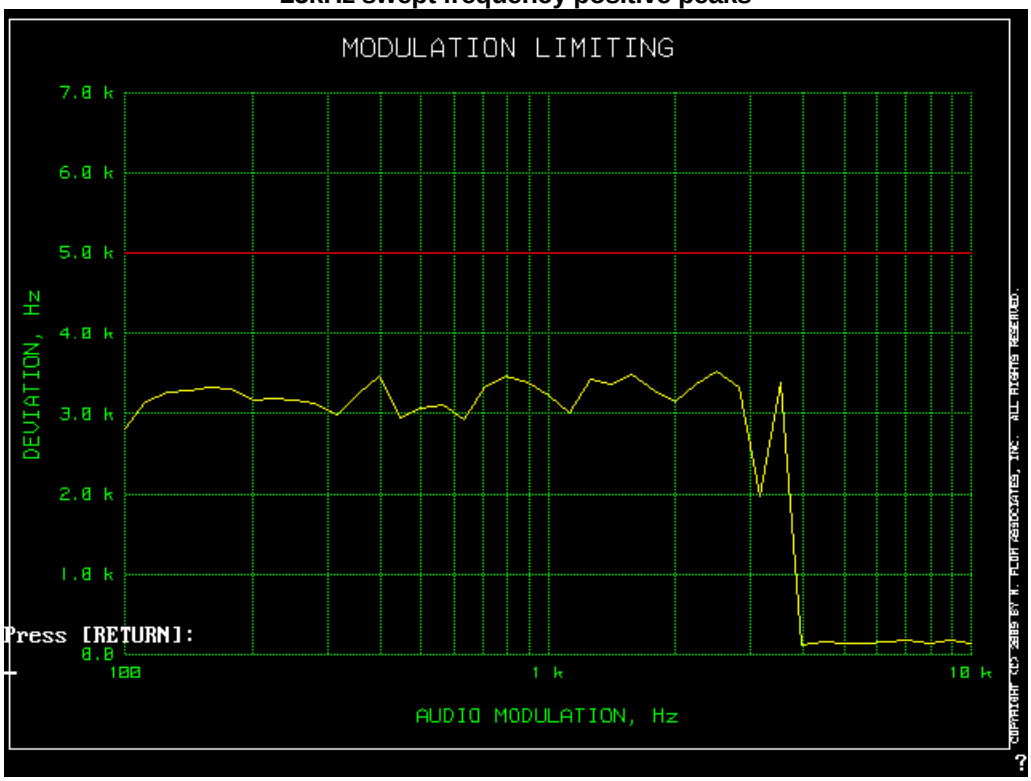
12.5kHz swept amplitude positive peaks



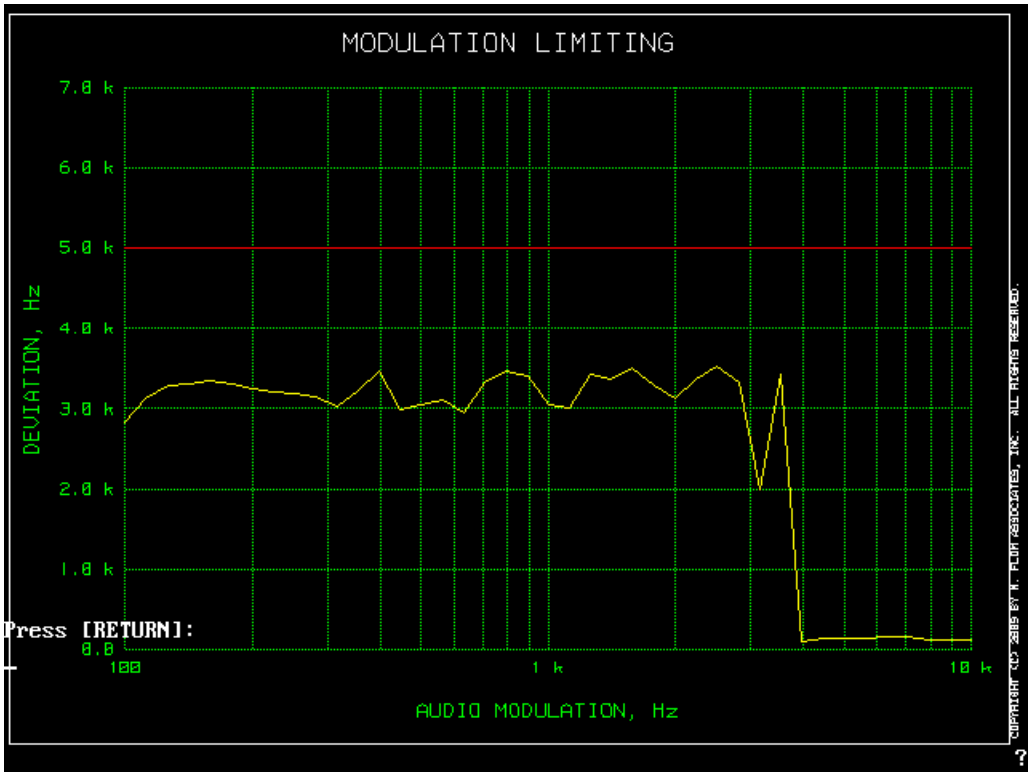
12.5kHz swept amplitude negative peaks



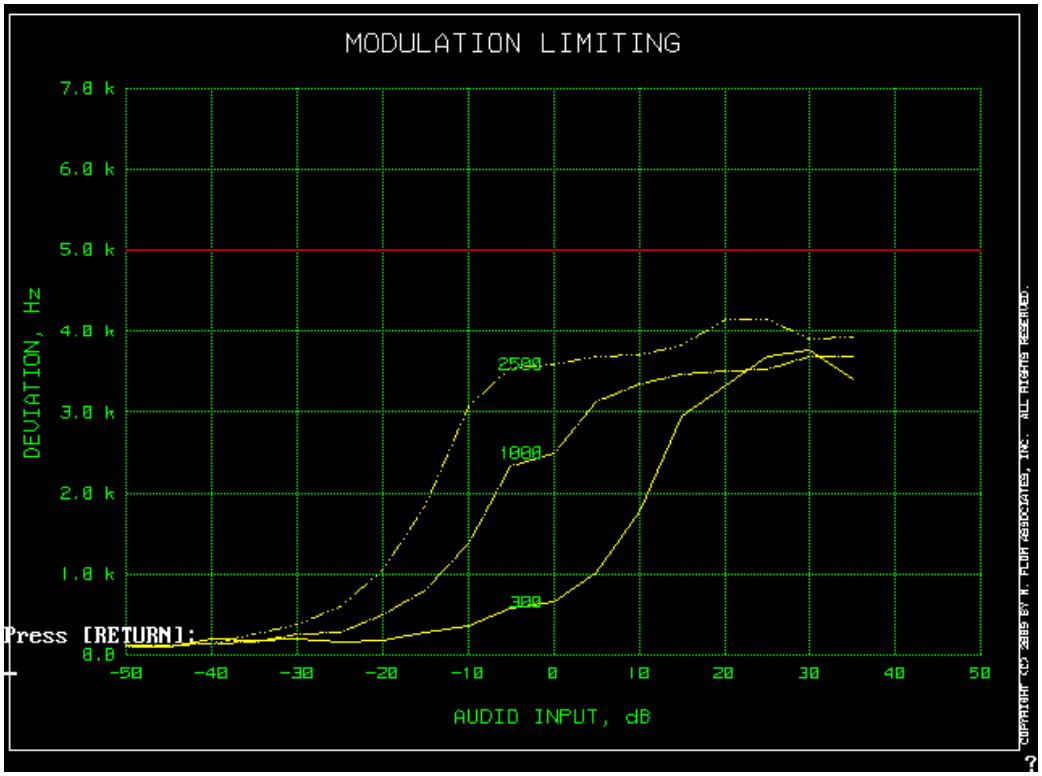
800 MHz
25kHz swept frequency positive peaks



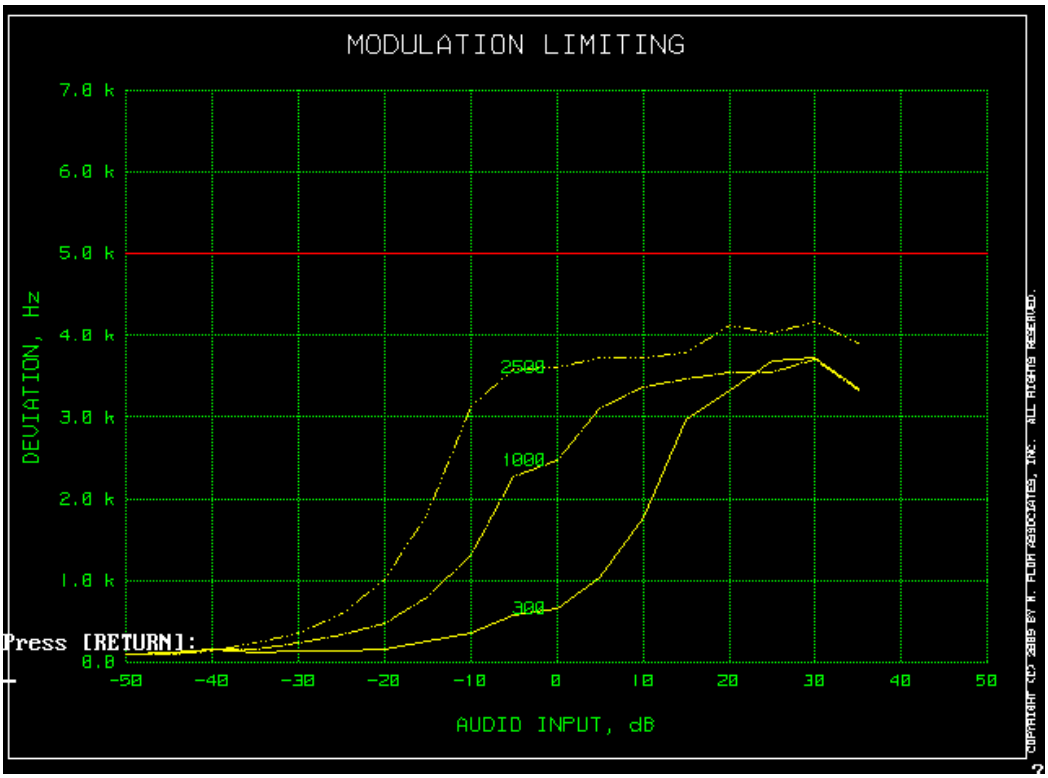
25kHz swept frequency negative peaks



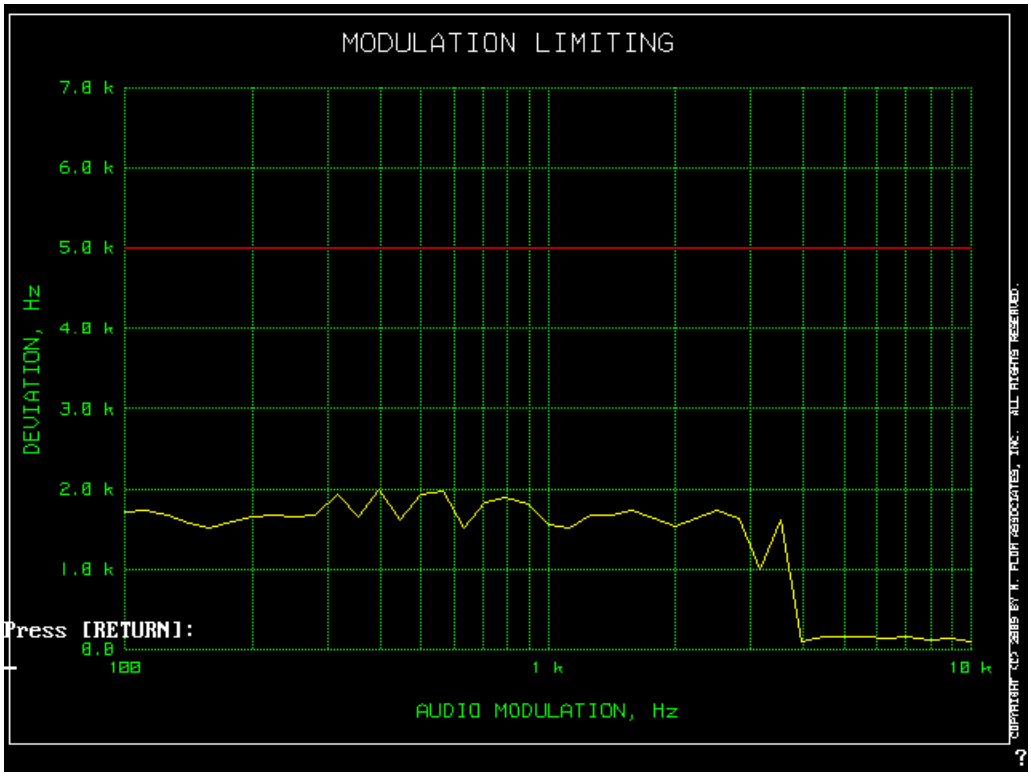
25kHz swept amplitude positive peaks



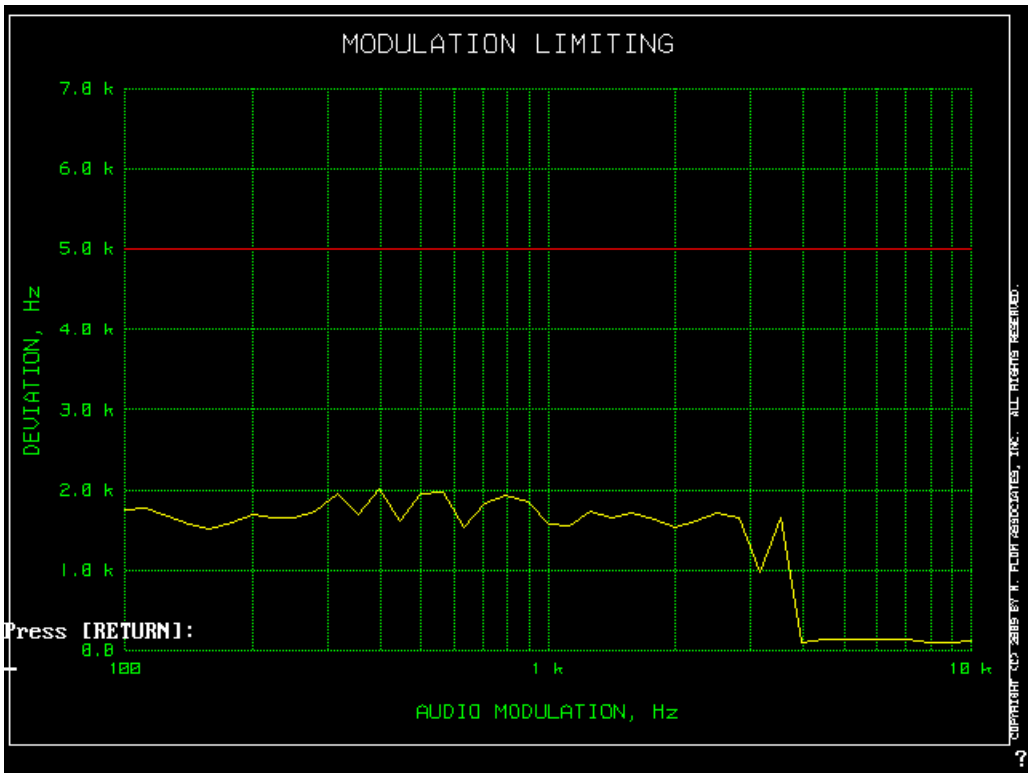
25kHz swept amplitude negative peaks



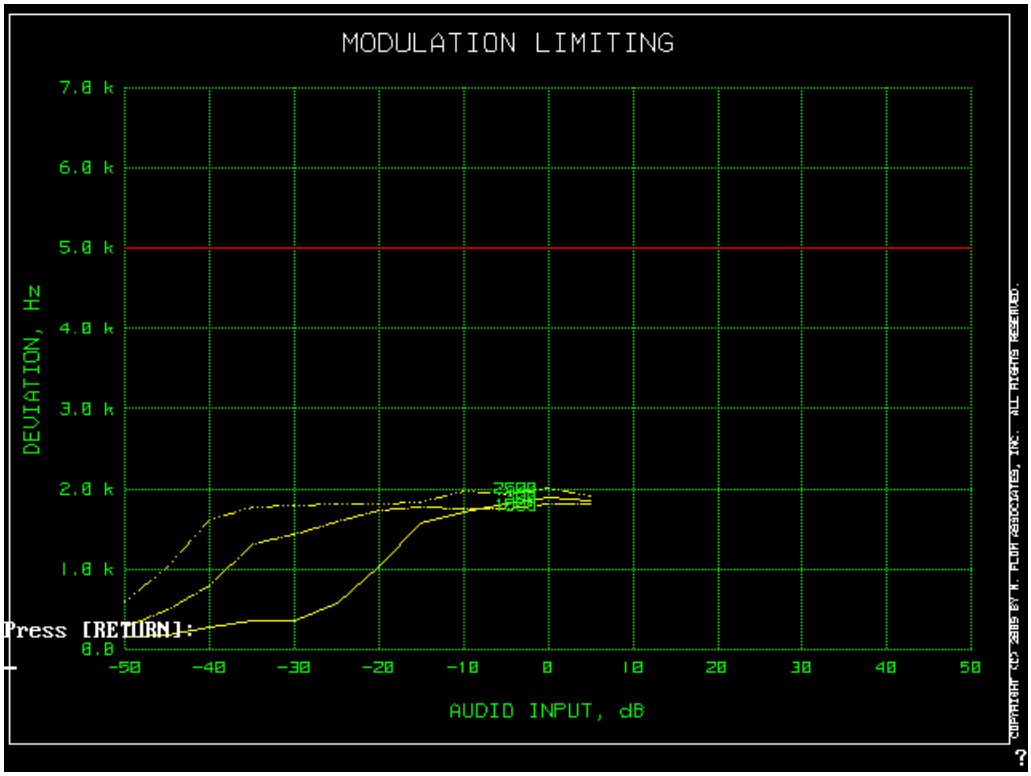
12.5kHz swept frequency positive peaks



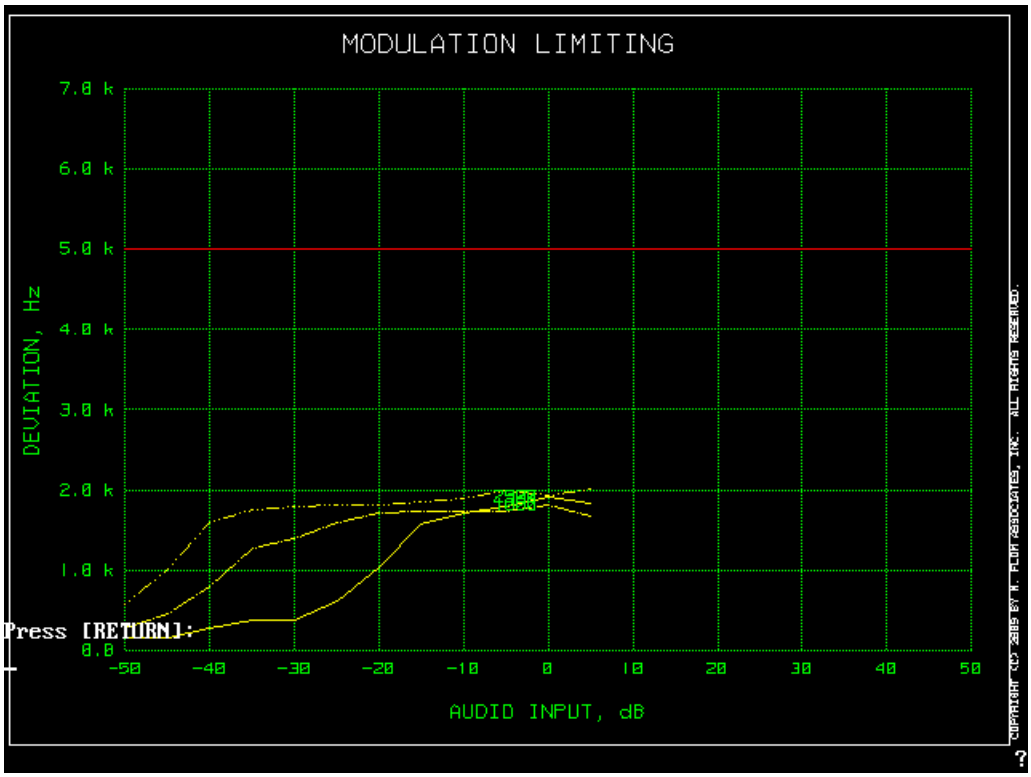
12.5kHz swept frequency negative peaks



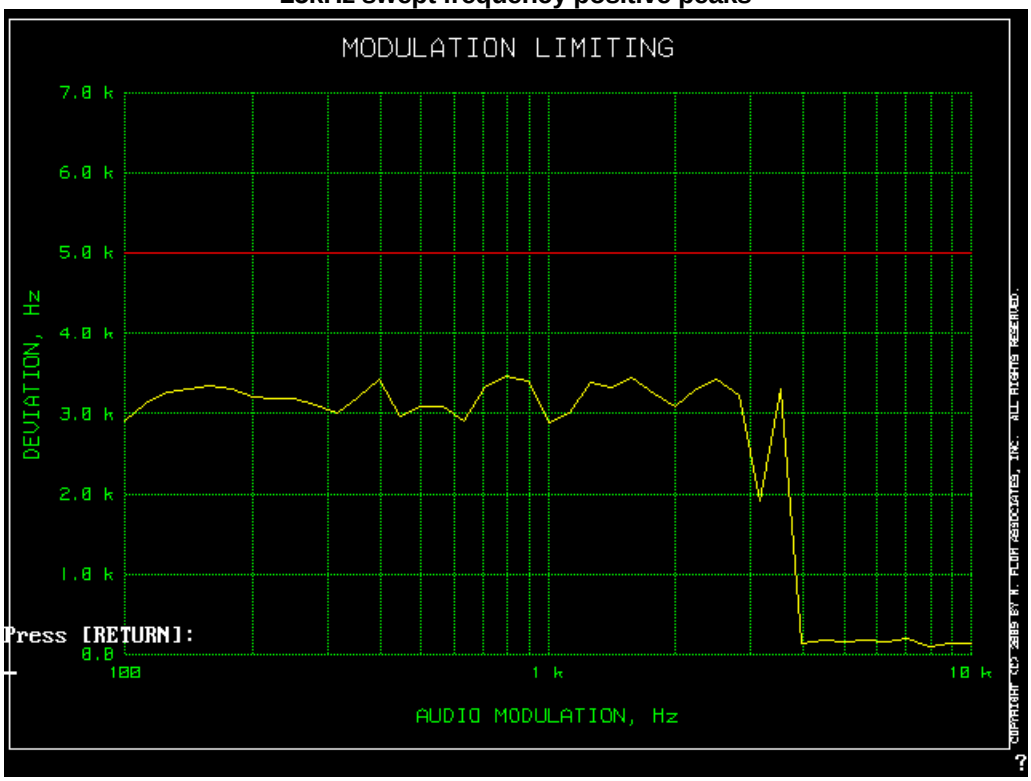
12.5kHz swept amplitude positive peaks



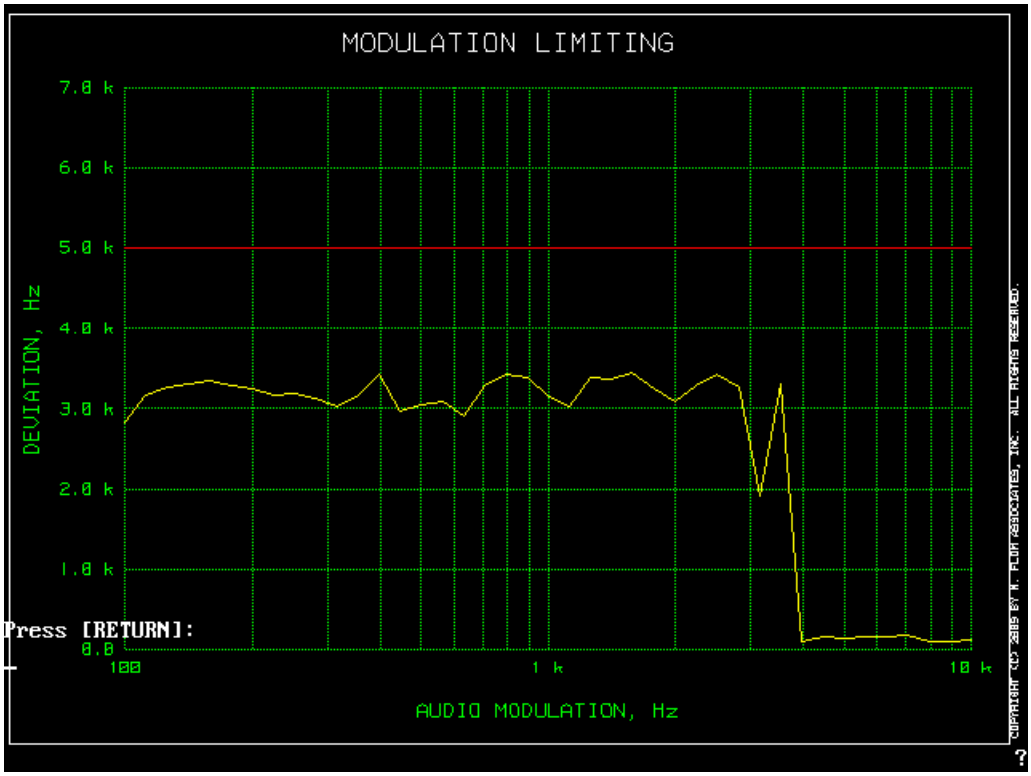
12.5kHz swept amplitude negative peaks



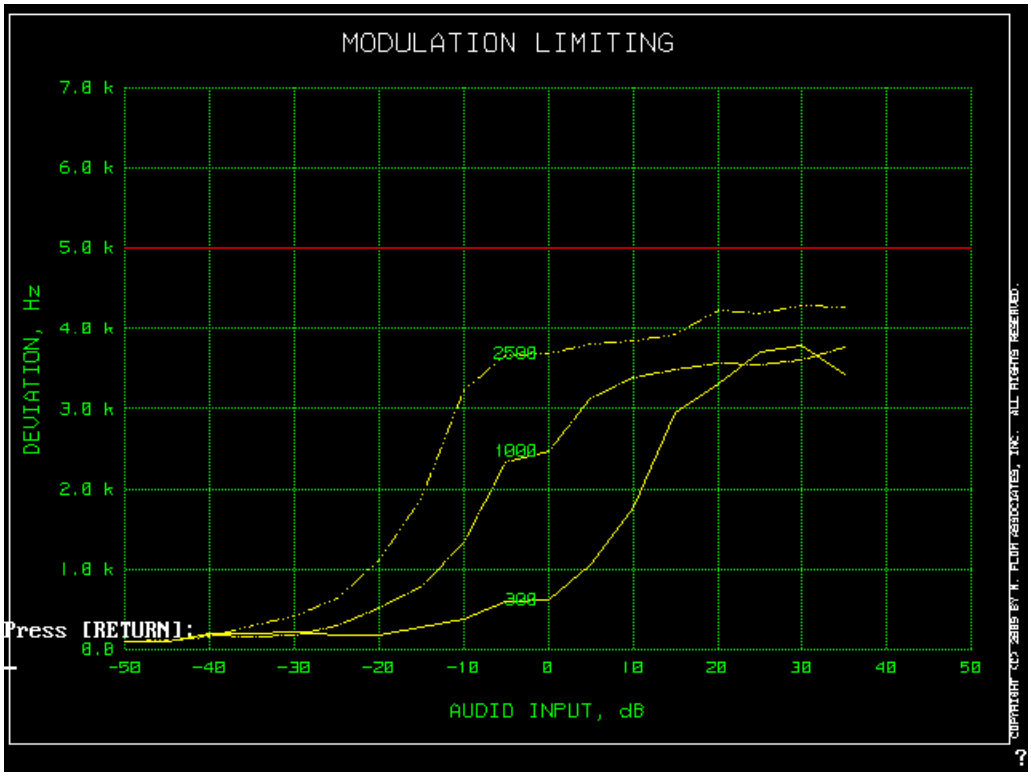
821 MHz
25kHz swept frequency positive peaks



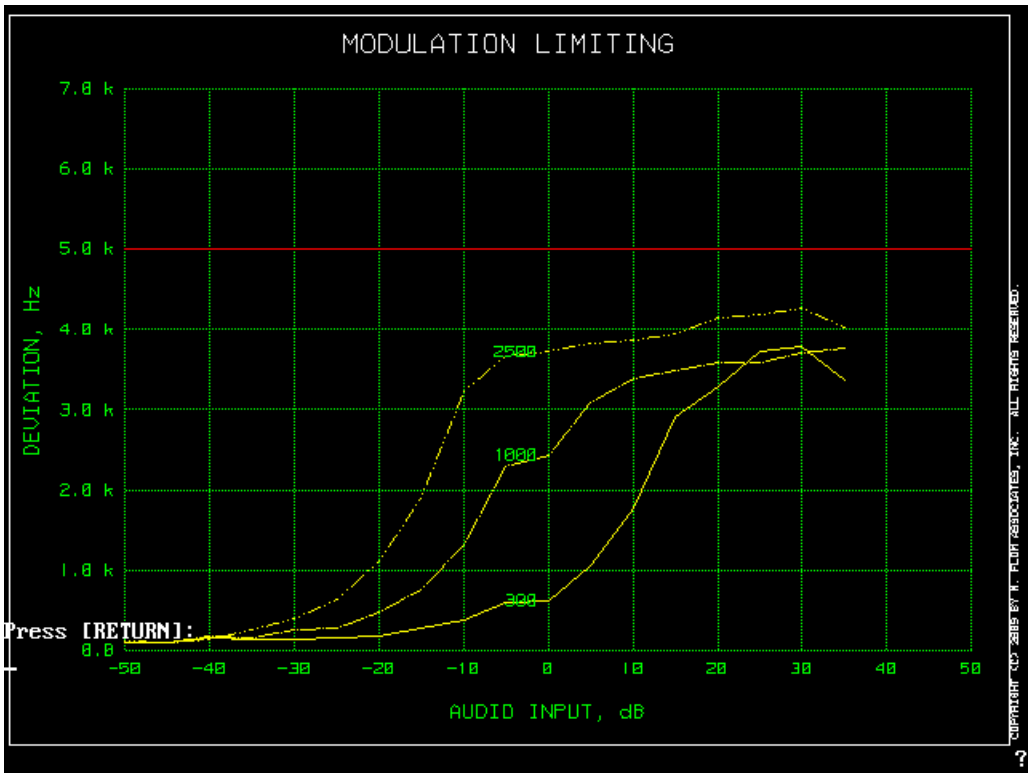
25kHz swept frequency negative peaks



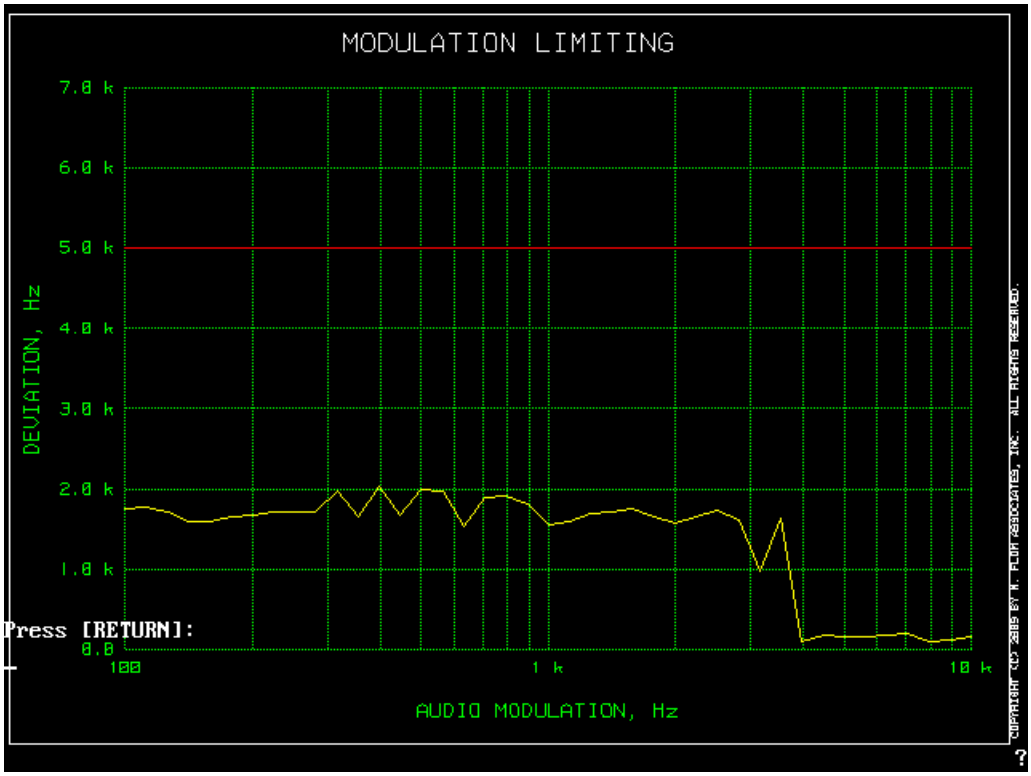
25kHz swept amplitude positive peaks



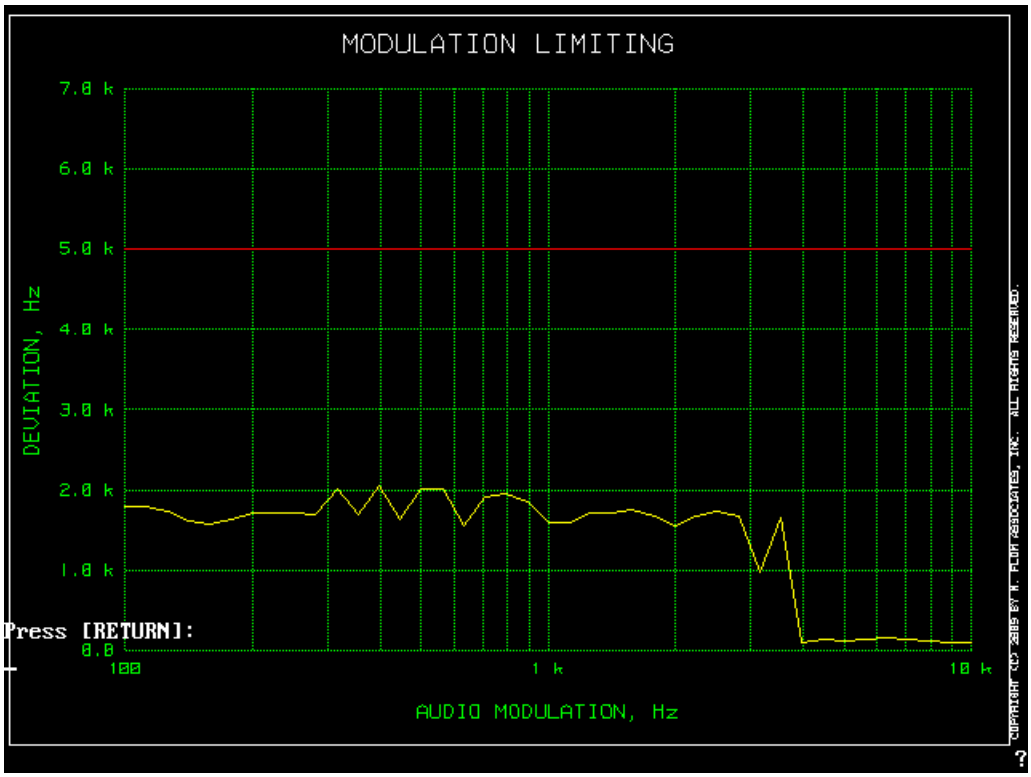
25kHz swept amplitude negative peaks



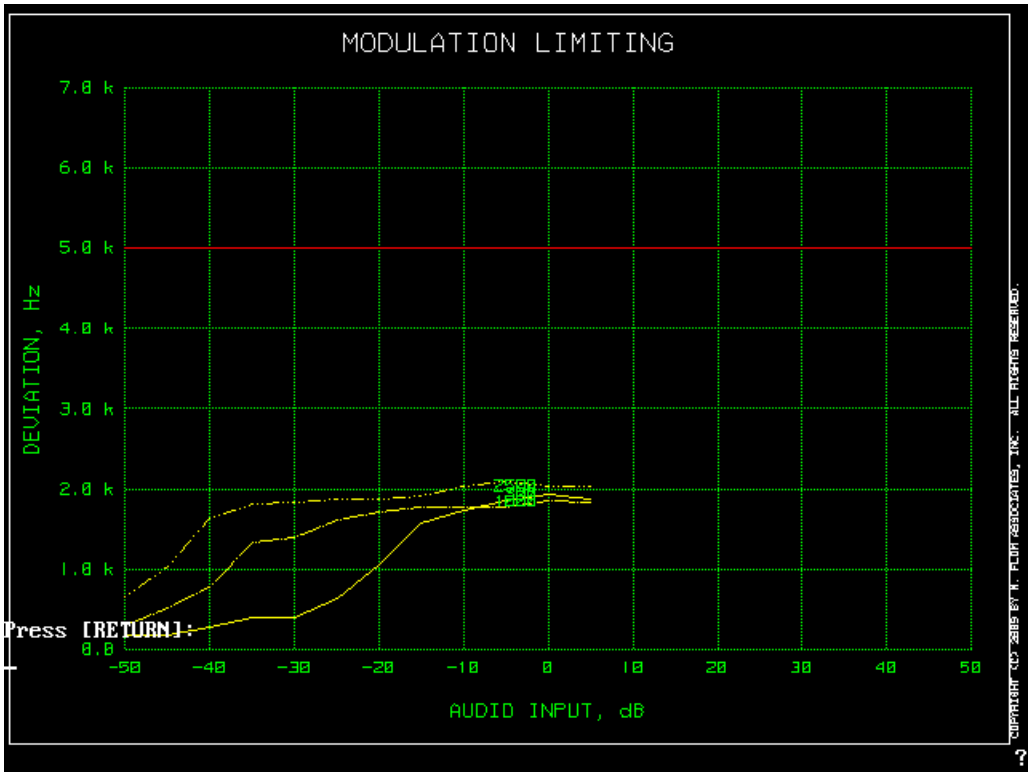
12.5kHz swept frequency positive peaks



12.5kHz swept frequency negative peaks

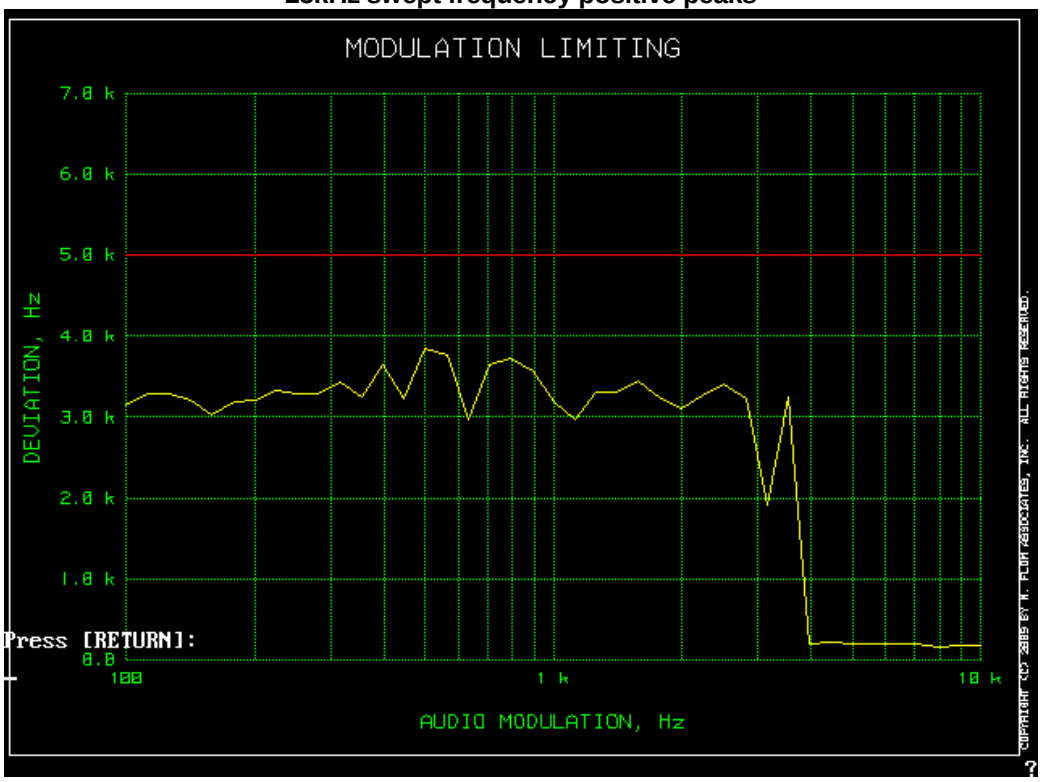


12.5kHz swept amplitude positive peaks

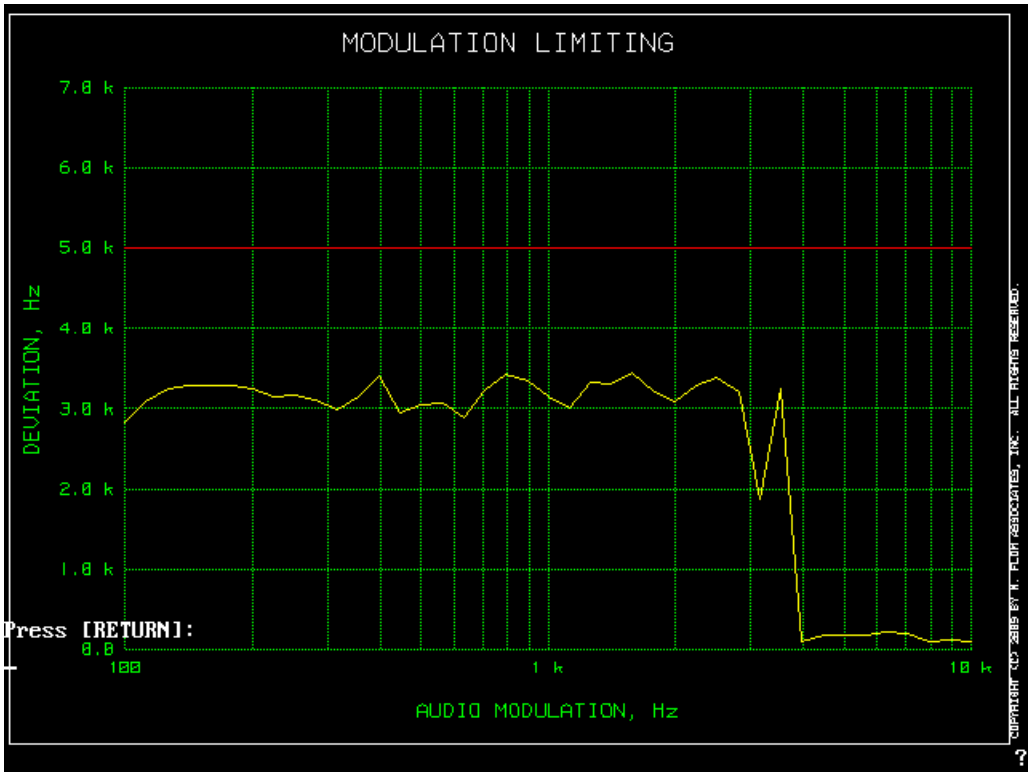


12.5kHz swept amplitude negative peaks

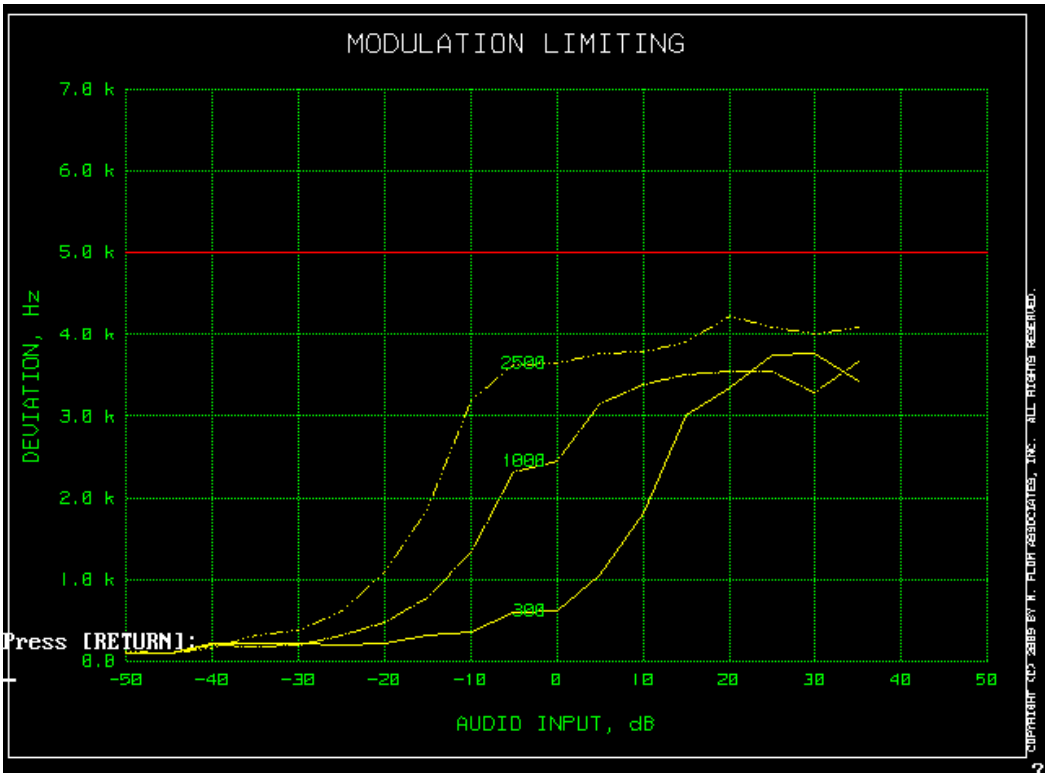
866 MHz
25kHz swept frequency positive peaks



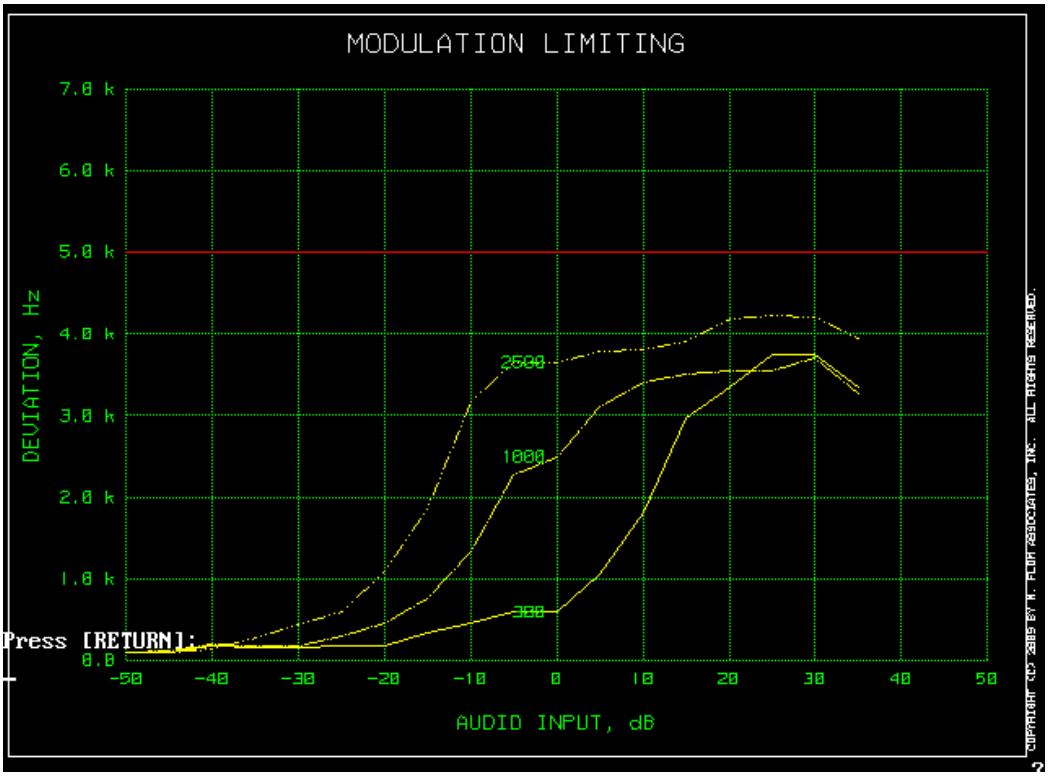
25kHz swept frequency negative peaks



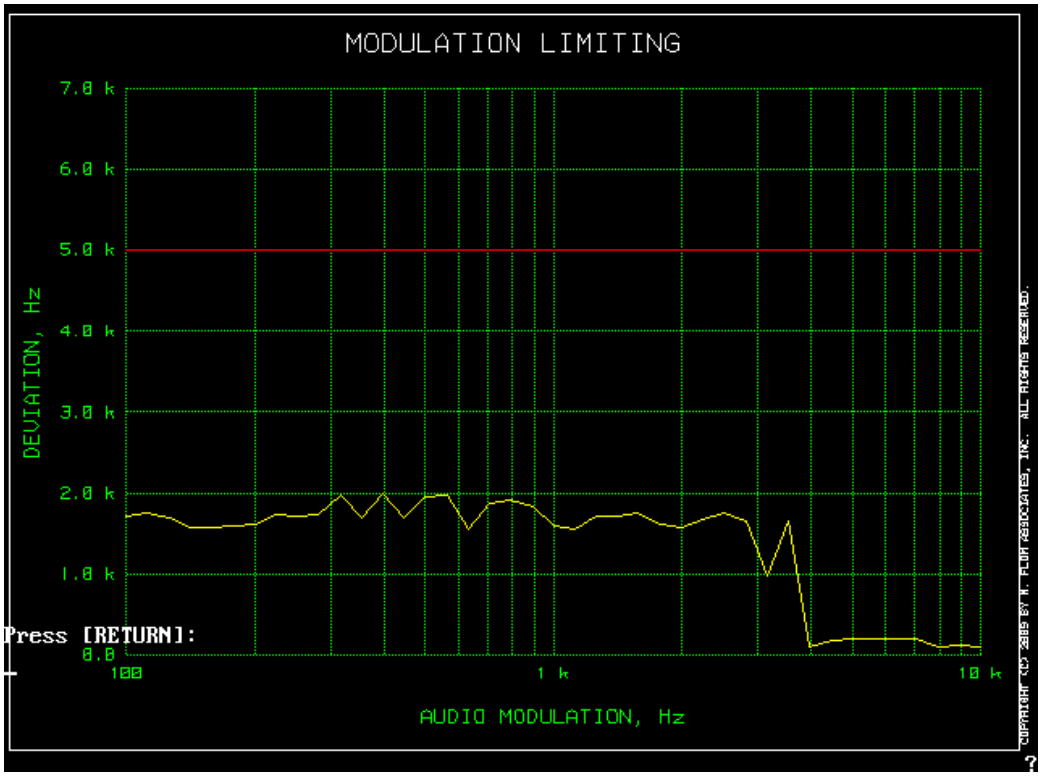
25kHz swept amplitude positive peaks



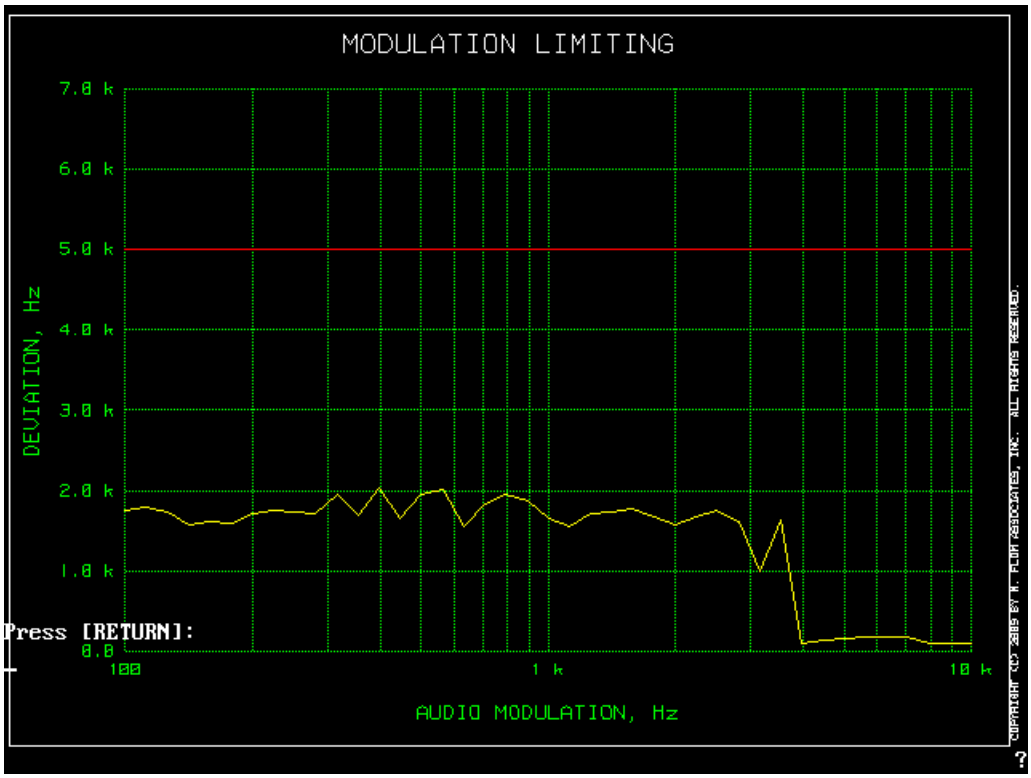
25kHz swept amplitude negative peaks



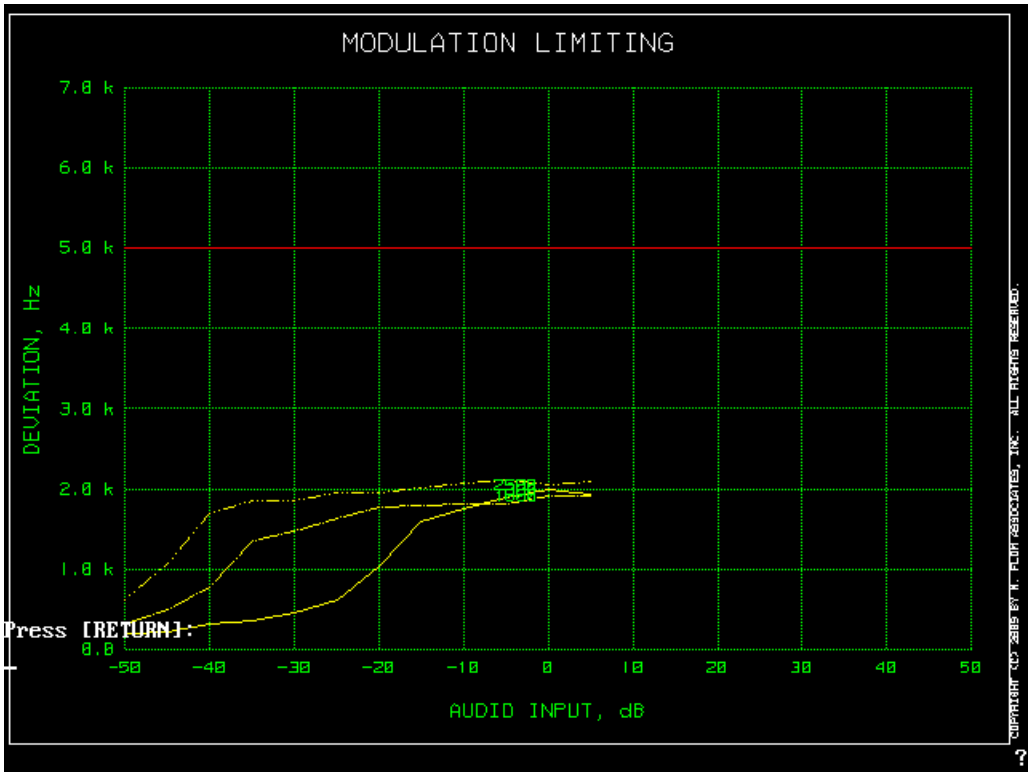
12.5kHz swept frequency positive peaks



12.5kHz swept frequency negative peaks



12.5kHz swept amplitude positive peaks



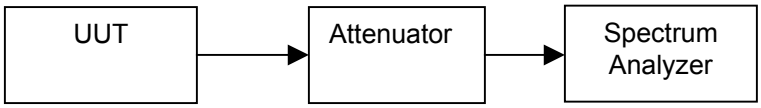
12.5kHz swept amplitude negative peaks

Name of Test: Adjacent Channel Power Rejection Ratio
Specification: 90.543(a) **Engineer: J Erhard**
Test Equipment Utilized: i00118, i00324,i00331 **Test Date: 3/11/2009**

Measurement Procedure

The Unit Under Test (UUT) was connected to a spectrum analyzer with integrated Adjacent Channel Power measurement capability. The adjacent channel power was measured according to part 90.543 using the TIA-603 method and compared to the limit to ensure proper operation.

Measurement Setup



775 MHz 12.5 KHz

Frequency Offset kHz	Low Frequency MHz	Measured ACPR dBc	Upper Frequency MHz	Measured ACPR dBc	Limit dBc	Result
9.375	774.990625	-44.76	775.009375	-45.01	-40	Pass
15.625	774.984375	-63.52	775.015625	-64.16	-60	Pass
21.875	774.978125	-67.07	775.021875	-66.96	-60	Pass
37.500	774.962500	-64.75	775.037500	-64.93	-60	Pass
62.500	774.937500	-71.22	775.062500	-71.24	-65	Pass
87.500	774.912500	-73.93	775.087500	-73.95	-65	Pass
150.00	774.850000	-71.51	775.150000	-71.59	-65	Pass
250.00	774.750000	-74.73	775.250000	-74.84	-65	Pass
350.00	774.650000	-76.29	775.350000	-76.15	-65	Pass
400.00	774.600000	-82.05	775.400000	-81.91	-75	Pass

This transmit frequency does not have a paired receive band. The 775 MHz power reference is 35 dBm.

775 MHz 25 KHz

Frequency Offset kHz	Low Frequency MHz	Measured ACPR dBc	Upper Frequency MHz	Measured ACPR dBc	Limit dBc	Result
15.625	774.984375	-62.63	775.015625	-62.58	-40	Pass
21.875	774.978125	-66.34	775.021875	-66.22	-60	Pass
37.500	774.962500	-64.18	775.037500	-64.16	-60	Pass
62.500	774.937500	-70.45	775.062500	-70.60	-65	Pass
87.500	774.912500	-73.49	775.087500	-73.33	-65	Pass
150.000	774.850000	-70.81	775.150000	-70.97	-65	Pass
250.000	774.750000	-73.91	775.250000	-74.02	-65	Pass
350.000	774.650000	-75.40	775.350000	-75.36	-65	Pass
400.000	774.600000	-81.08	775.400000	-80.93	-75	Pass

This transmit frequency does not have a paired receive band. The 775 MHz power reference is 35 dBm.

800 MHz 12.5 KHz

Frequency Offset kHz	Low Frequency MHz	Measured ACPR dBc	Upper Frequency MHz	Measured ACPR dBc	Limit dBc	Result
9.375	799.990625	-41.51	800.009375	-45.83	-40	Pass
15.625	799.984375	-63.24	800.015625	-63.61	-60	Pass
21.875	799.978125	-66.92	800.021875	-67.16	-60	Pass
37.500	799.962500	-65.74	800.037500	-65.19	-60	Pass
62.500	799.937500	-71.94	800.062500	-71.75	-65	Pass
87.500	799.912500	-74.73	800.087500	-74.48	-65	Pass
150.00	799.850000	-72.33	800.150000	-72.13	-65	Pass
250.00	799.750000	-75.02	800.250000	-74.98	-65	Pass
350.00	799.650000	-76.13	800.350000	-76.21	-65	Pass
400.00	799.600000	-81.86	800.400000	-81.91	-75	Pass
Paired band	770 MHz	-105.47	770 MHz	-105.47	-100	Pass

The 775 MHz power reference is 35.07 dBm.

800 MHz 25 KHz

Frequency Offset kHz	Low Frequency MHz	Measured ACPR dBc	Upper Frequency MHz	Measured ACPR dBc	Limit dBc	Result
15.625	799.984375	-62.85	800.015625	-62.45	-40	Pass
21.875	799.978125	-64.43	800.021875	-66.47	-60	Pass
37.500	799.962500	-64.55	800.037500	-64.60	-60	Pass
62.500	799.937500	-71.25	800.062500	-70.98	-65	Pass
87.500	799.912500	-73.56	800.087500	-73.55	-65	Pass
150.000	799.850000	-71.28	800.150000	-71.45	-65	Pass
250.000	799.750000	-74.27	800.250000	-74.21	-65	Pass
350.000	799.650000	-75.69	800.350000	-75.48	-65	Pass
400.000	799.600000	-80.86	800.400000	-80.94	-75	Pass
Paired band	770 <Hz	-105.30	770 MHz	-105.30	-100	Pass

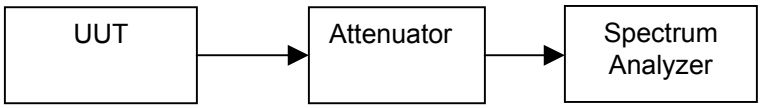
The 775 MHz power reference is 35.07 dBm.

Name of Test: Adjacent Channel Power Rejection Ratio
Specification: 90.543(e) **Engineer: J Erhard**
Test Equipment Utilized: **Test Date: 3/11/2009**

Measurement Procedure

The Unit Under Test (UUT) was connected to a spectrum analyzer with integrated Adjacent Channel Power measurement capability. The adjacent channel power was measured according to part 90.543 using the TIA-603 method and compared to the limit to ensure proper operation.

Measurement Setup



Frequency Band MHz	ACPR dBc	Limit dBc	Result
763 – 768	-93.2	-69	Pass
793 – 798	-93.7	-69	Pass

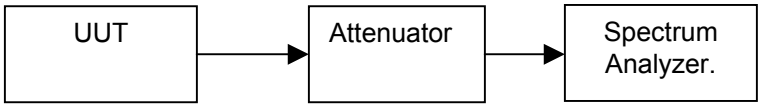
The power reference for the 763 – 768 band is 35.0 dBm.
The power reference for the 793 – 798 band is 35.07 dBm.

Name of Test: Adjacent Channel Power Rejection Ratio
Specification: 90.543(f) **Engineer: J Erhard**
Test Equipment Utilized: **Test Date: 3/11/2009**

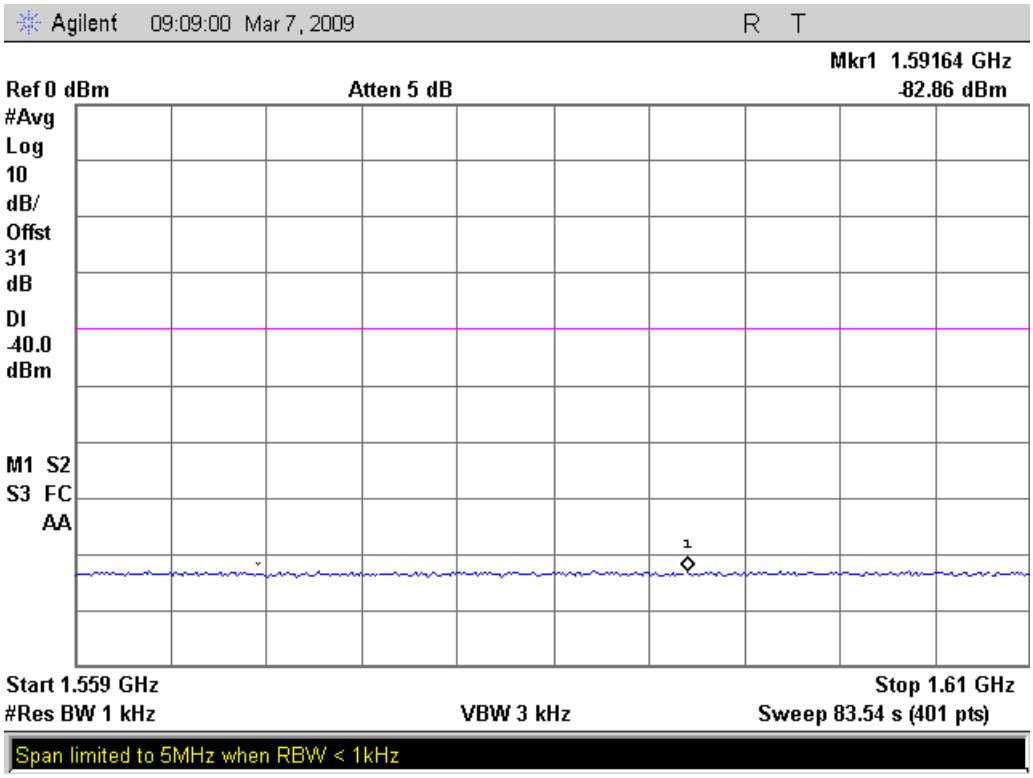
Measurement Procedure

The Unit Under Test (UUT) was connected to a spectrum analyzer. Spurious emissions in the band defined by 90.543(f) was measured and compared to the limit to ensure proper operation. The limit of 70dBw/MHz was converted to dBm then measured in a 1 kHz RBW. The specification indicated that a 700 Hz RBW is to be used and a correction factor of 1.54 dB was input into the analyzer to obtain a correct value.

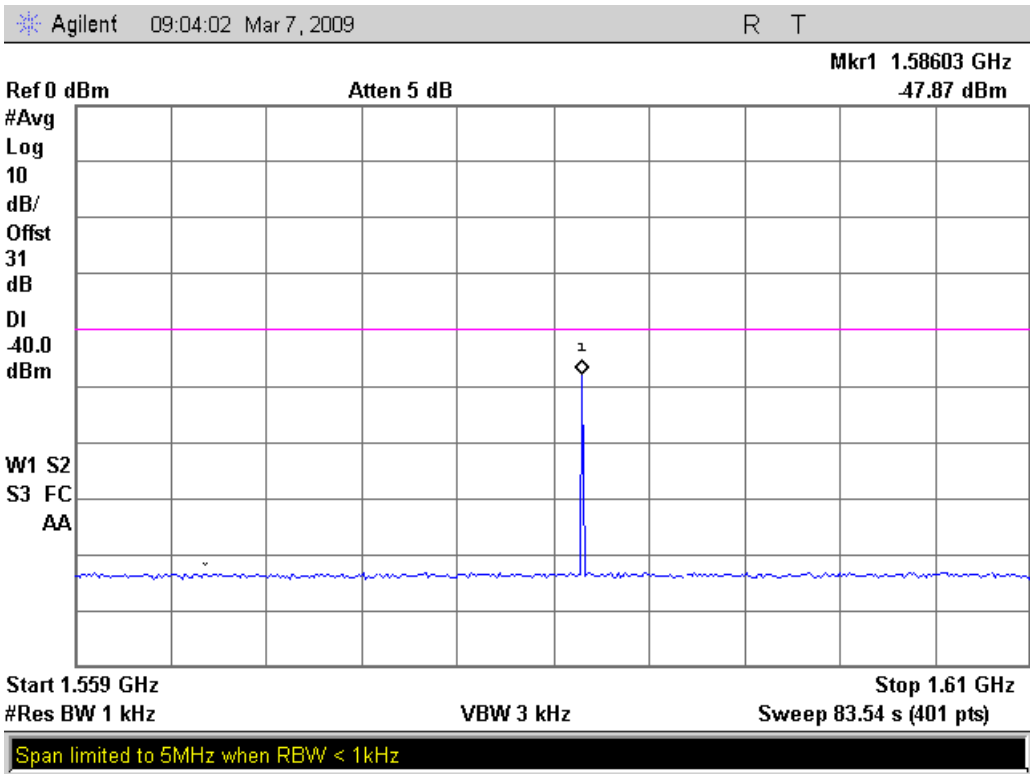
Measurement Setup



Test Results
775 MHz



793 MHz

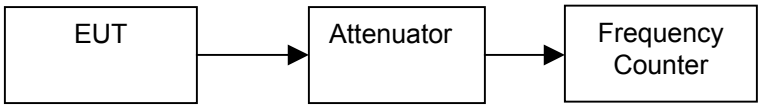


Name of Test: Frequency Stability (Temperature Variation)
Specification: 90.213 **Engineer: M Sechrist**
Test Equipment Utilized: i00005, i00019, i00027 **Test Date: 2/26/2009**

Measurement Procedure

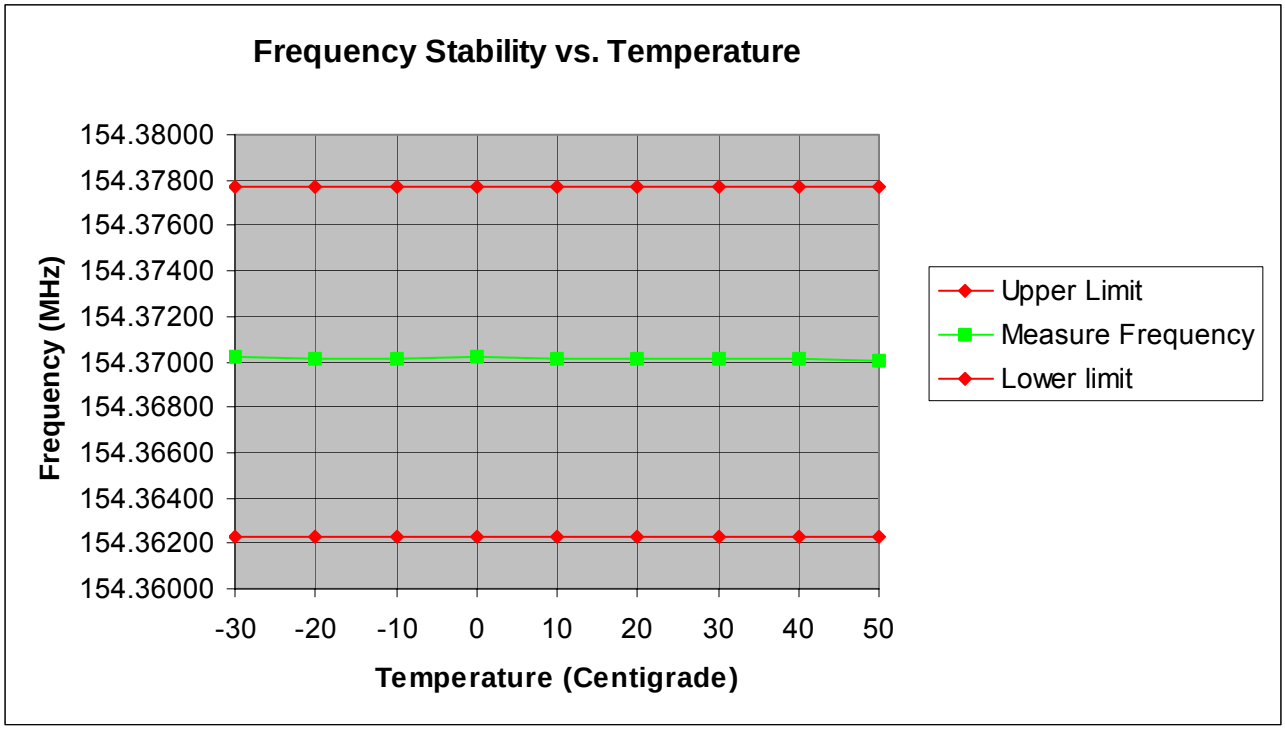
The EUT was placed in an environmental test chamber and the RF output was connected directly to a frequency counter. The temperature was varied from -30ºC to 50ºC in 10ºC increments. After a sufficient time for temperature stabilization the RF output frequency was measured.

Measurement Setup

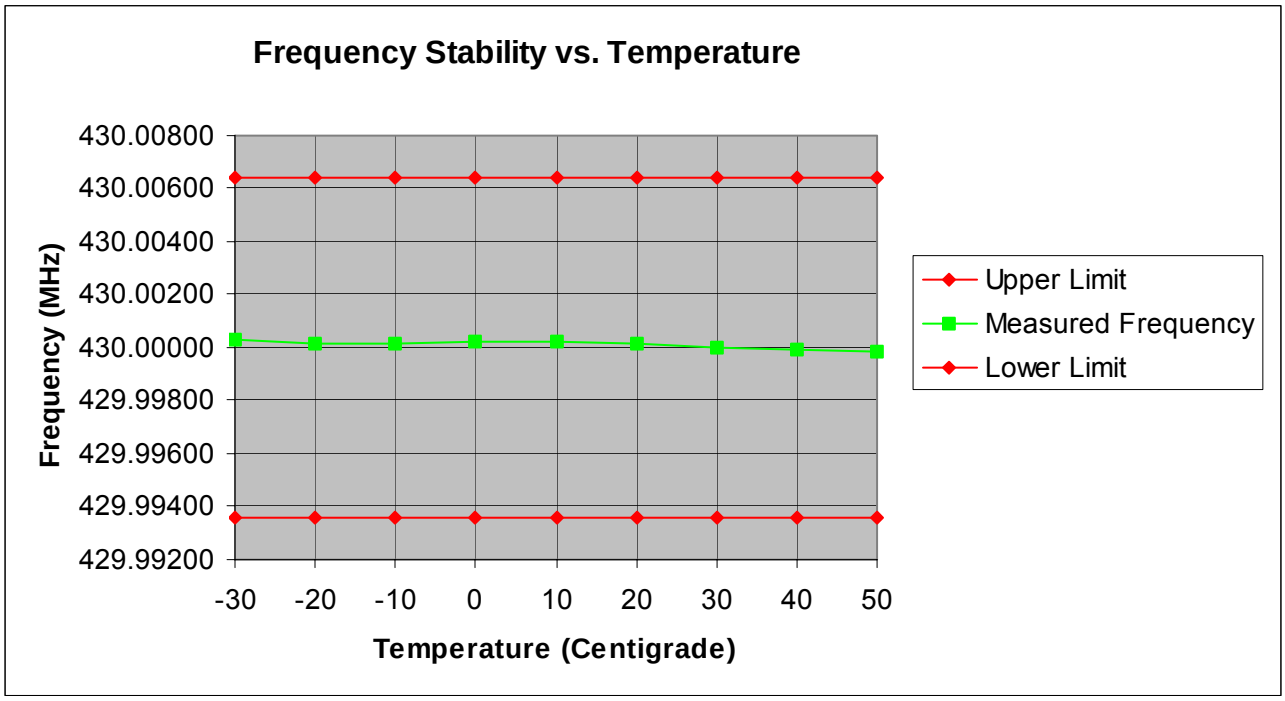


Measurement Results

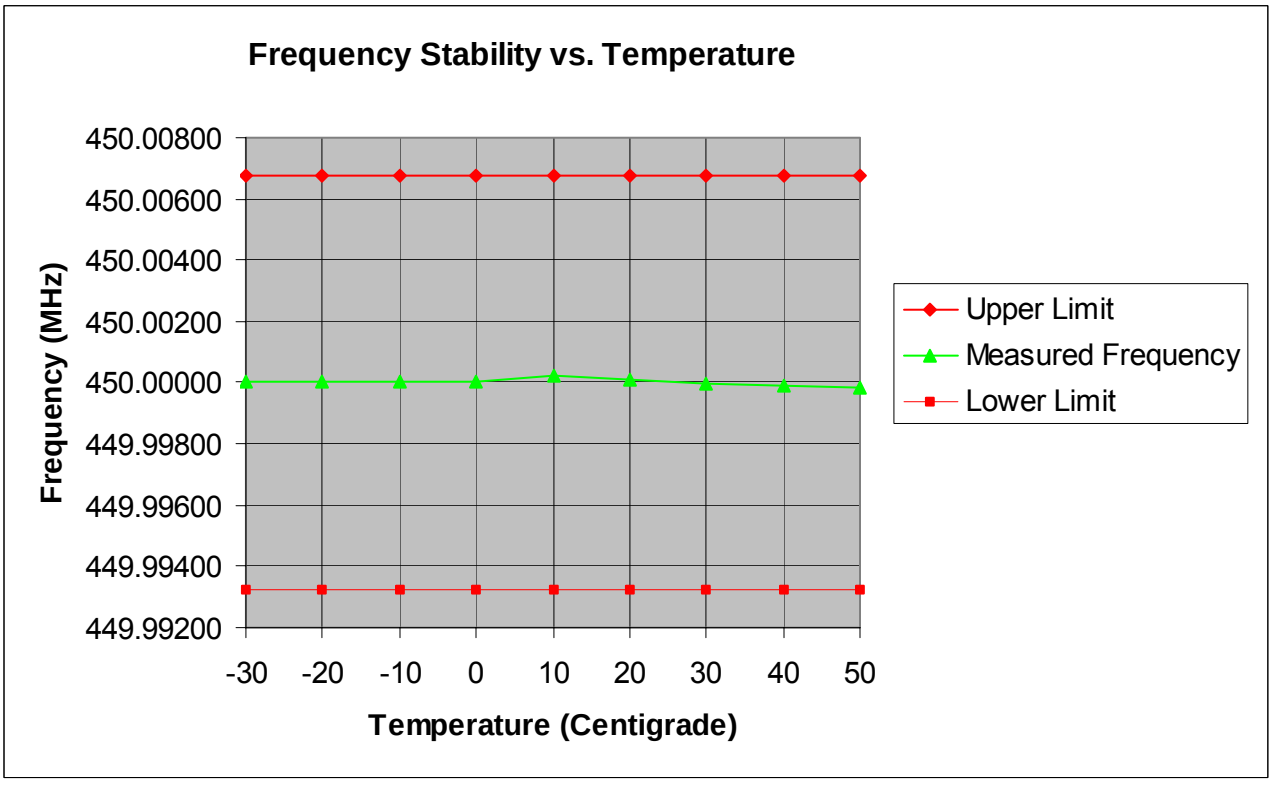
154 MHz



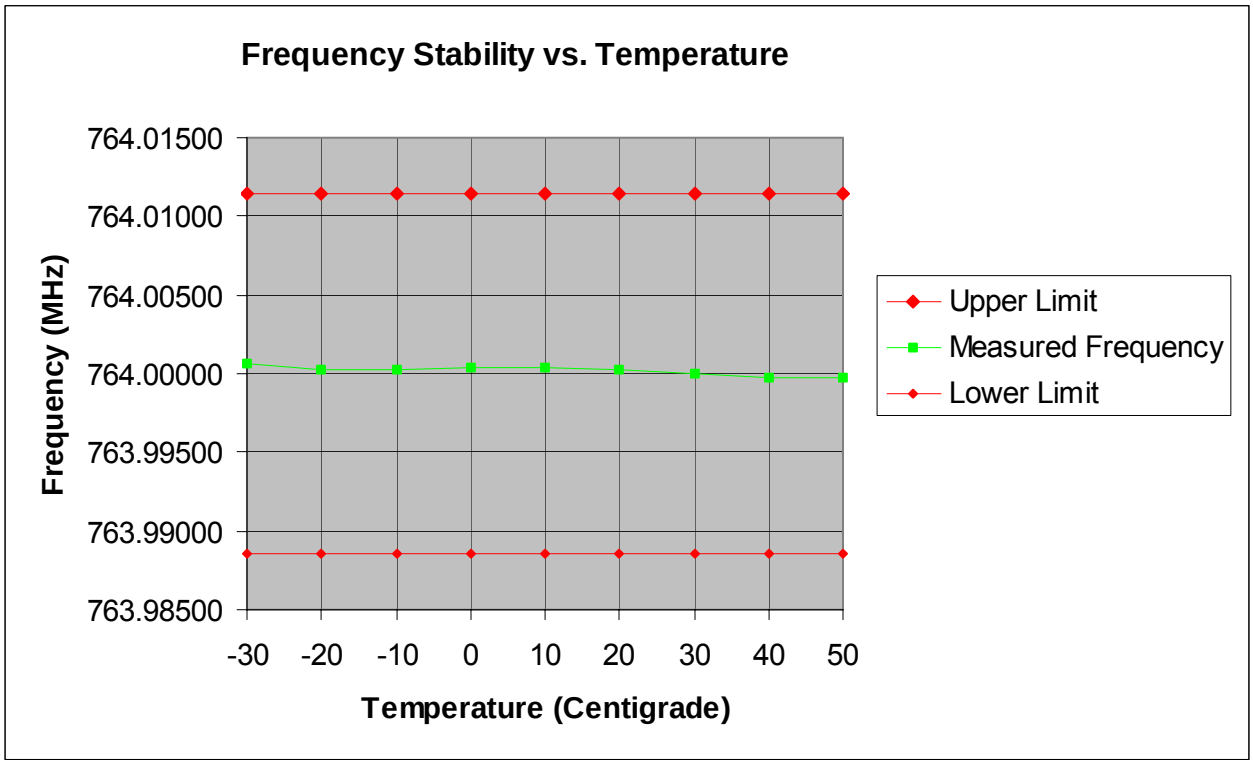
430 MHz



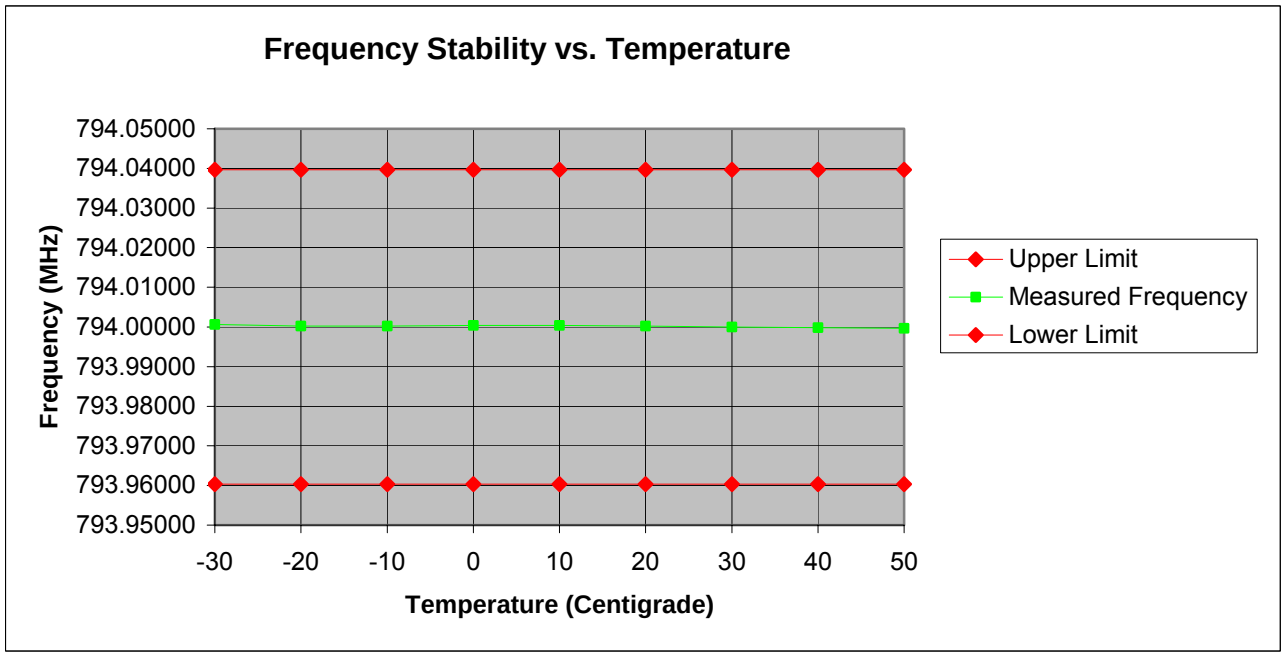
450 MHz



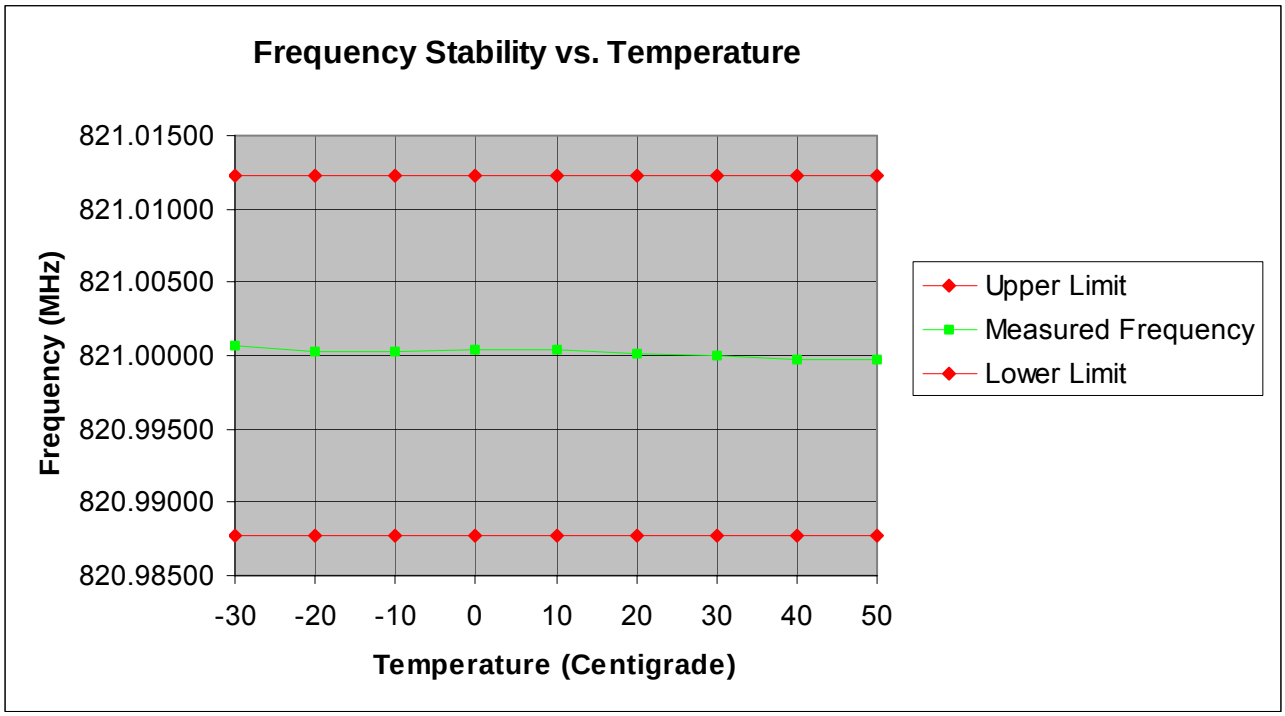
764 MHz



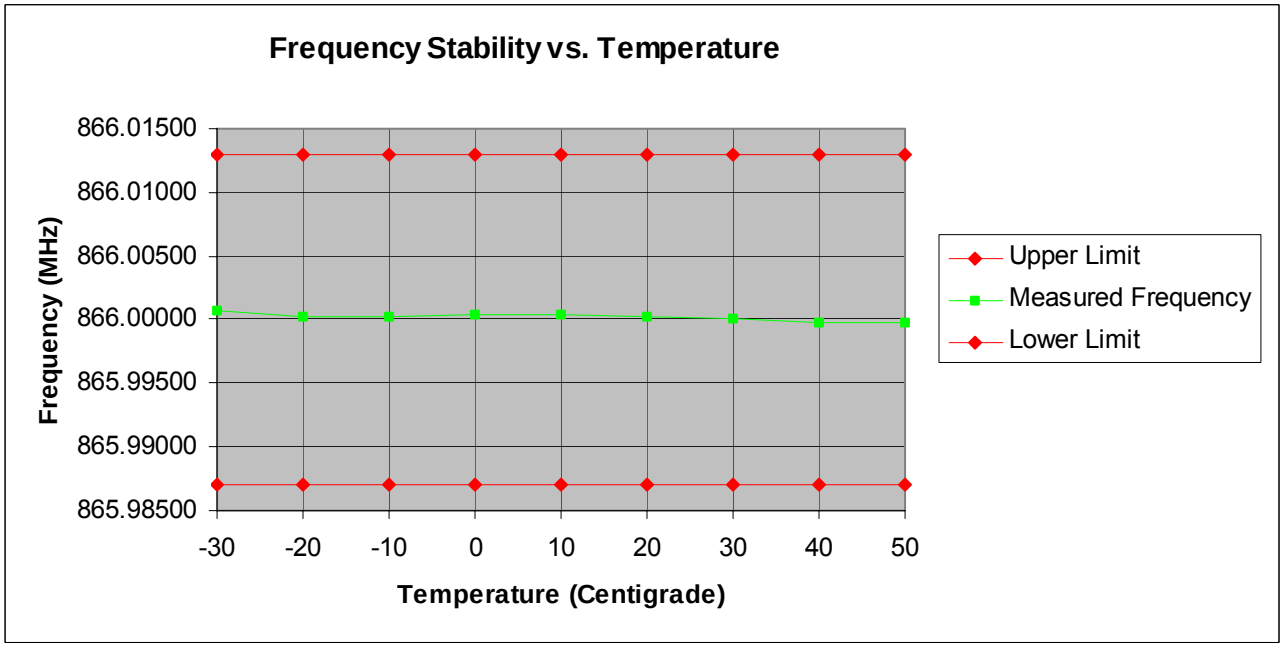
794 MHz



821 MHz



866 MHz

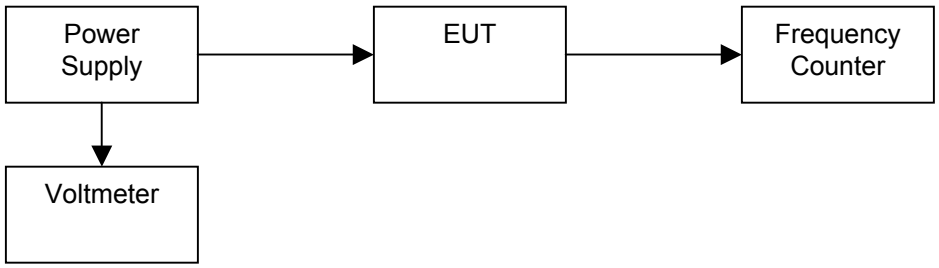


Name of Test: Frequency Stability (Voltage Variation)
Specification: 90.213 **Engineer: M Sechrist**
Test Equipment Utilized: i00005, i00019, i00027 **Test Date: 2/26/2009**

Measurement Procedure

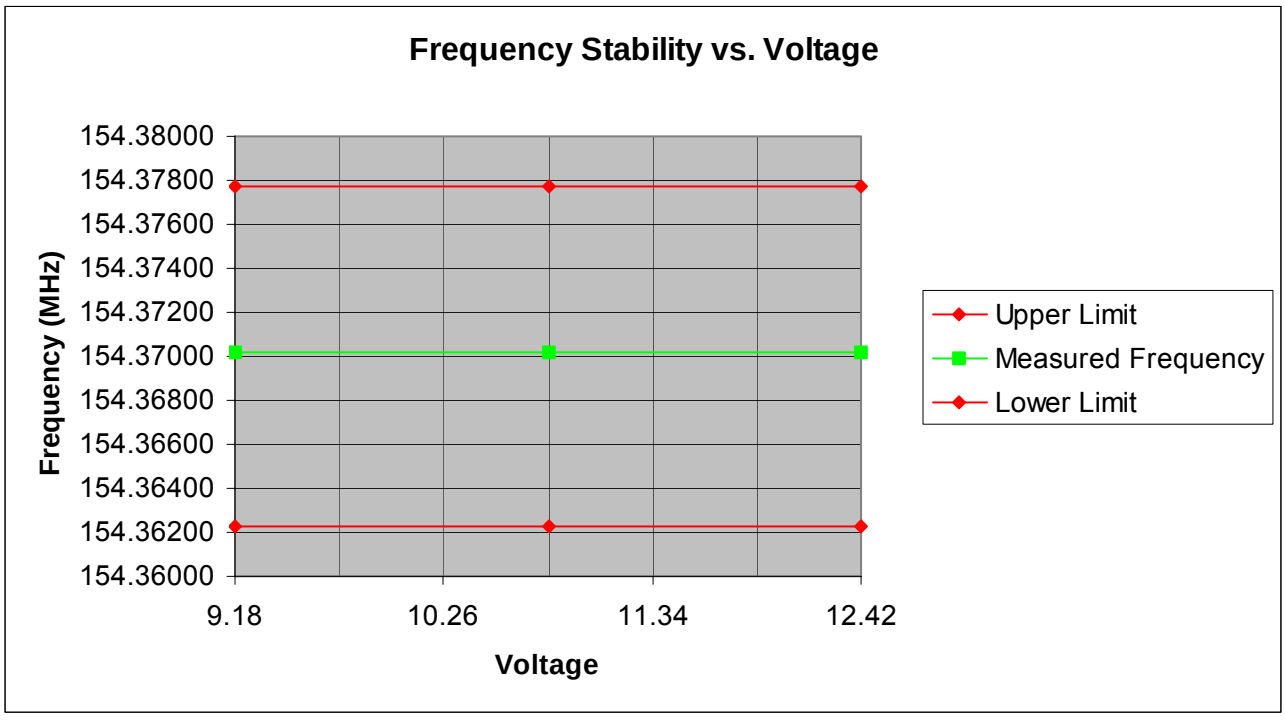
The EUT was placed in a temperature chamber at 25±5°C and connected directly to a frequency counter and variable power supply. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value and the RF output was measured.

Measurement Setup

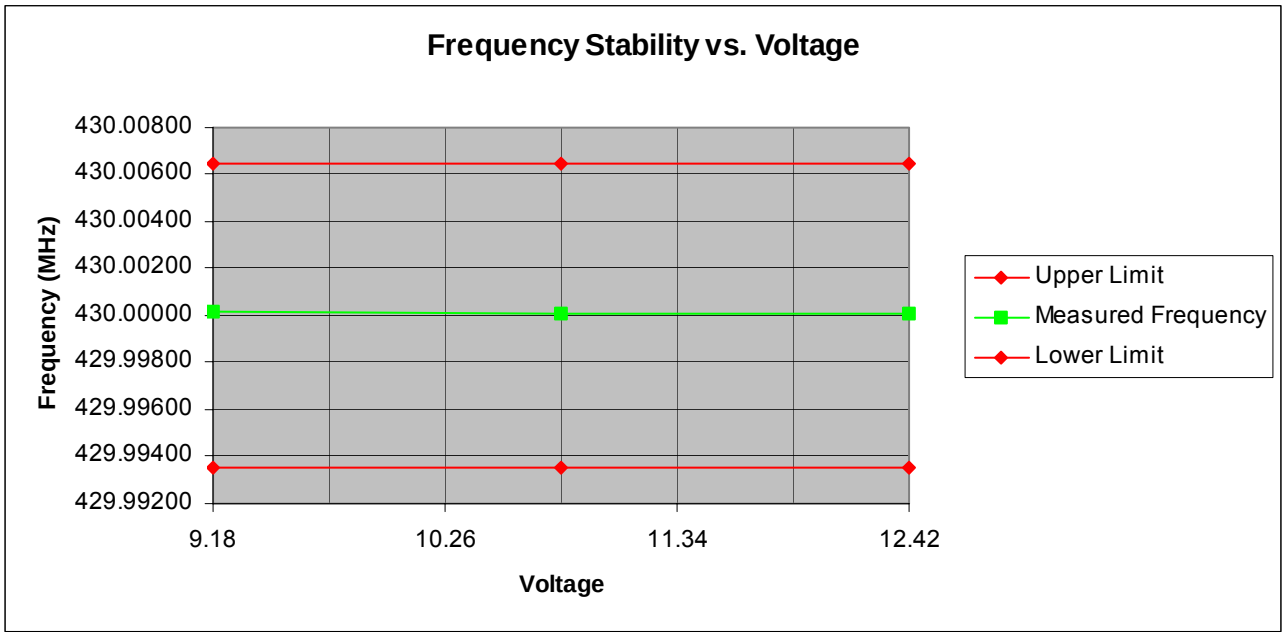


Measurement Results

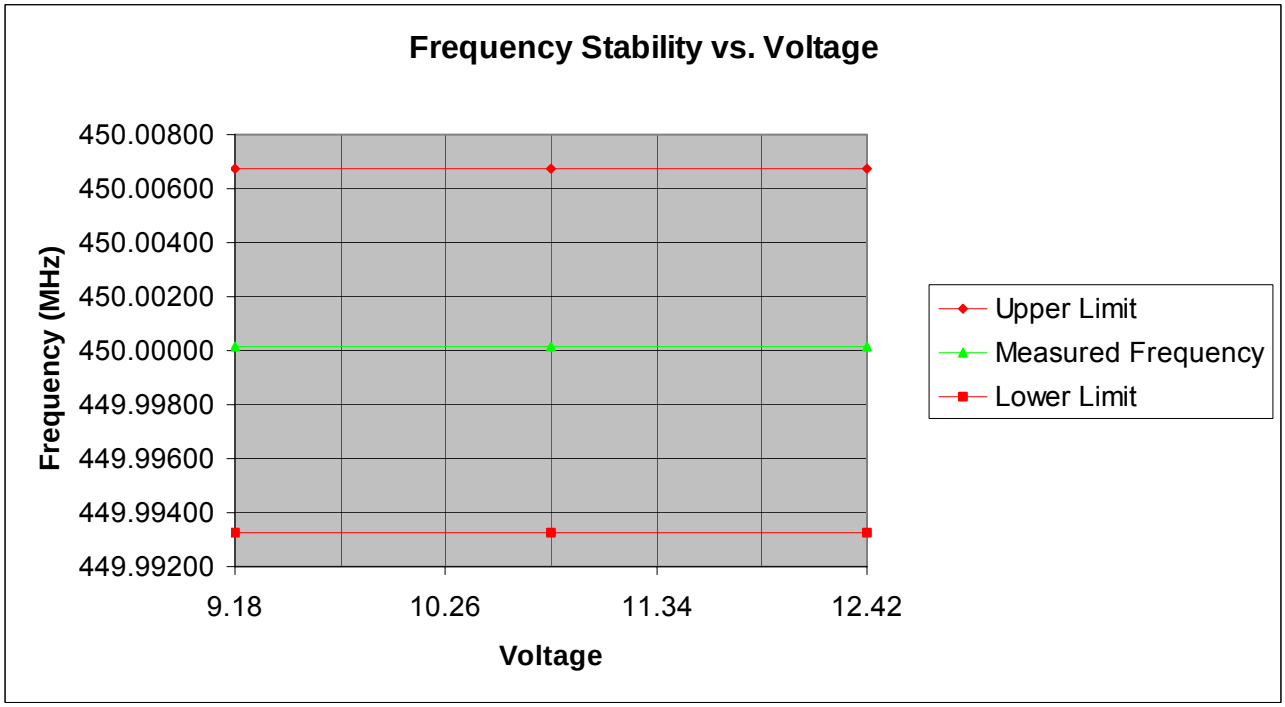
154 MHz



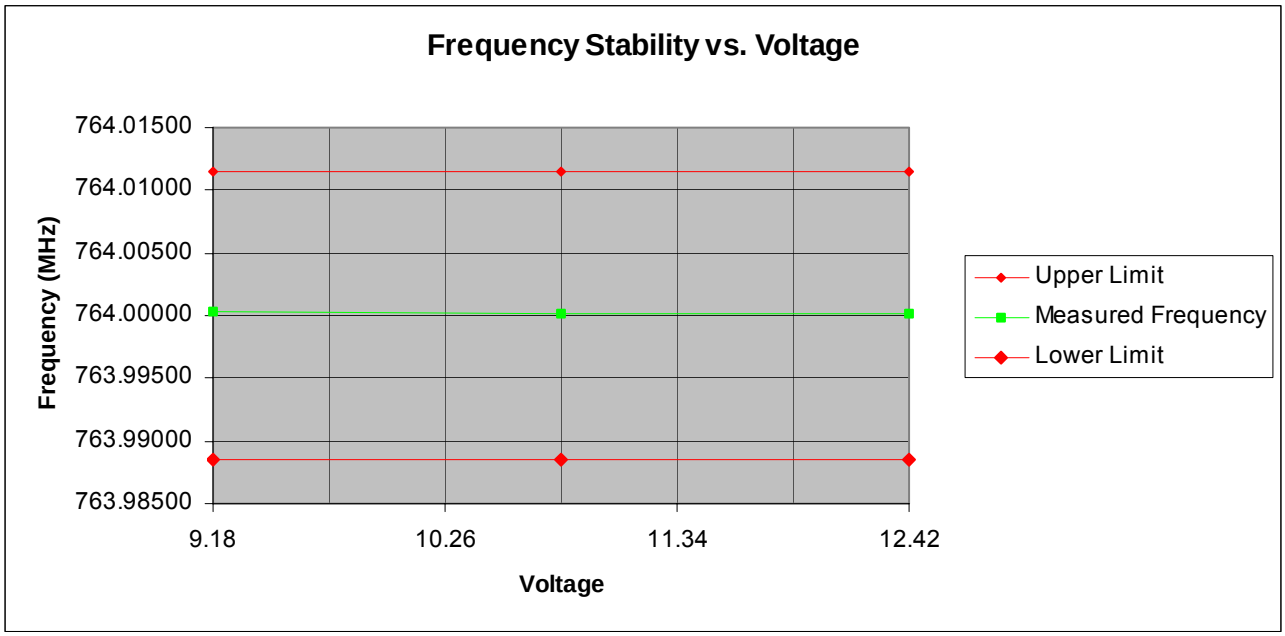
430 MHz



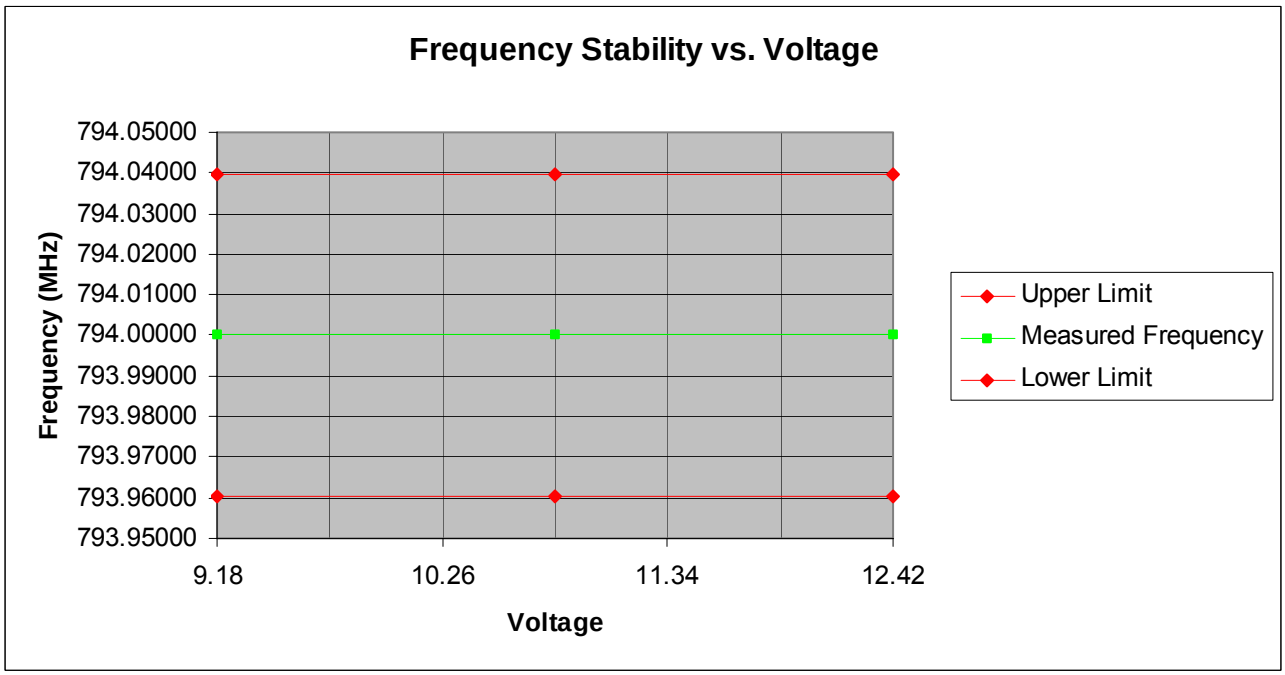
450 MHz



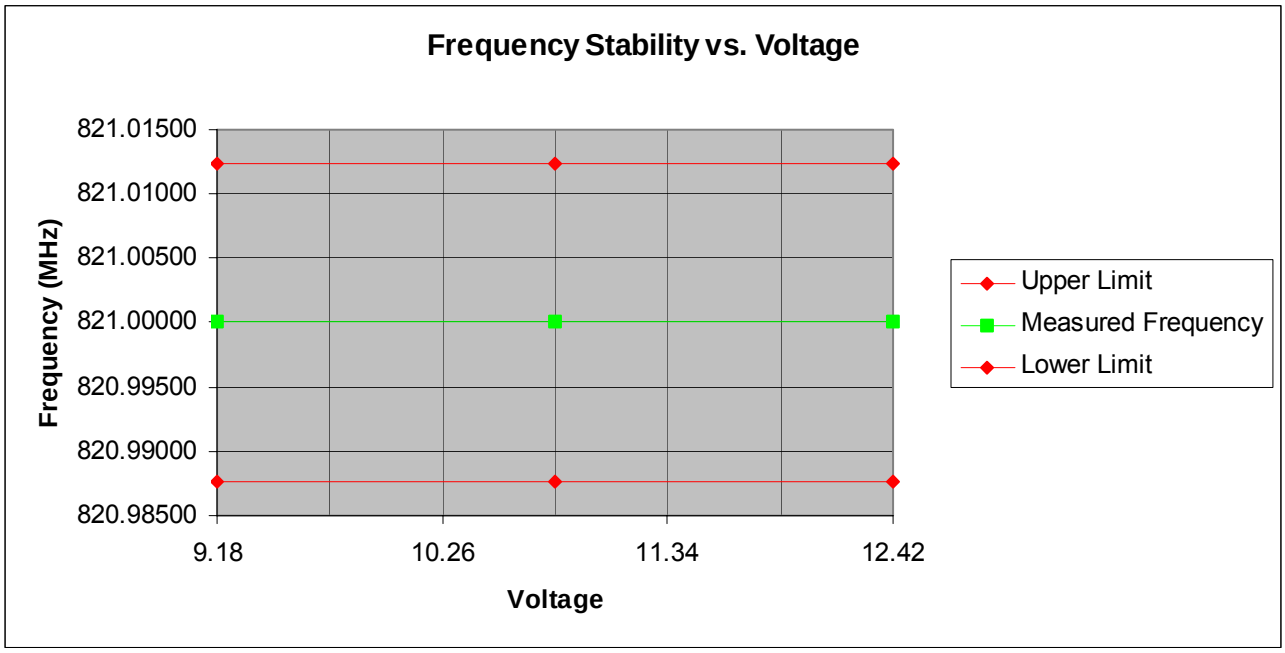
764 MHz



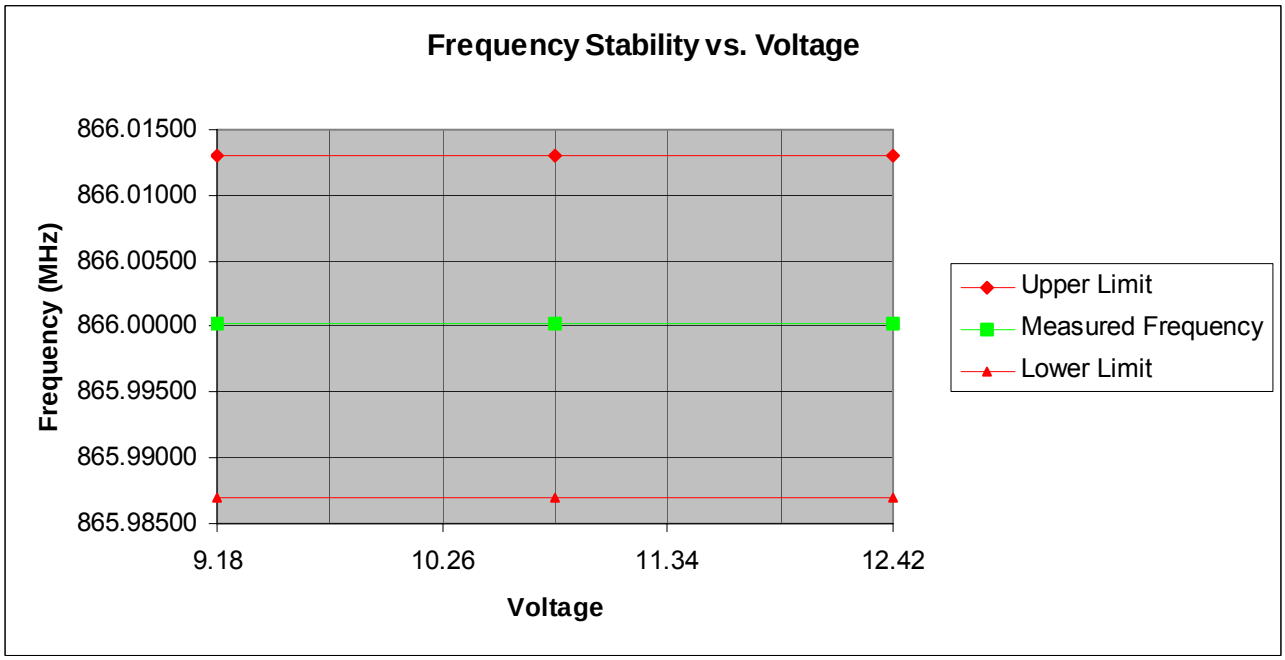
794 MHz



821 MHz



866 MHz

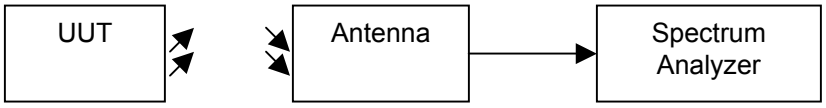


Name of Test: Receiver Spurious Emissions
Specification: RSS-Gen **Engineer: J Erhard**
Test Equipment Utilized i00049, i00088, i00089 **Test Date: 2/27/2009**

Test Procedure

The UUT was tested in an Open Area Test Site (OATS) set 3m from the receiving antenna. A spectrum analyzer was used to verify that the UUT met the requirements for Radiated 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. All emissions from 30 MHz to 3 times to highest receive frequency were examined.

Test Setup



Settings
RBW = 100 KHz
VBW = 100KHz
Detector – Quasi Peak
Sample Calculations
Corrected Value = Measured Value + Correction factor
Correction factor = ACF + Cable loss

Radiated Emissions

Emission Freq (MHz)	Measured Value (dBuV/m)	Correction Factor (dB)	Corrected Value (dBuV/m)	Limit (dBuV/m)	Margin dB
47.895	17.2	0.9	18.6	39.1	-20.6
147.300	17.2	4.3	21.5	43.5	-22.0
246.147	15.5	8.2	23.6	46.4	-22.8
439.147	15.4	8.8	24.2	46.4	-22.2
687.259	15.5	13.8	29.3	46.4	-17.1
912.437	20.5	17.4	37.9	46.4	-8.5

Test Equipment Utilized

Description	MFG	Model Number	FTL Asset Number	Last Cal Date	Cal Due Date
Power Supply	HP	6286A	i00005	NCR	NCR
Universal Counter	HP	5334B	i00019	1/26/09	1/26/10
Temperature Chamber	Tenney	Tenney Jr.	i00027	12/8/08	12/08/09
Spectrum Analyzer	HP	85462A	i00033	10/14/08	10/14/09
Monopole Antenna Set	Ailtech	DM-105A-T1, T2, T3	i00037, 39, 42, 48	Verified	Verified
Bi Con Antenna	EMCO	3109B	i00088	10/15/07	10/15/09
Log Periodic Antenna	Aprel	2001	i00089	10/22/07	10/22/09
Horn Antenna	Emco	3115	i00103	11/25/08	11/25/10
Function Generator	HP	33120A	i00118	Verified	Verified
Tunable Notch Filter	Eagle	TNF-1	i00124	NCR	NCR
Crystal Detector	HP	8472B	i00159	NCR	NCR
Power Meter	HP	E4418B	i00228	10/1/08	10/1/09
Signal Generator	R&S	SMT-03	i00266	NCR	NCR
Power sensor	HP	8485A	i00344	9/30/08	9/30/09
Digitizing Oscilloscope	HP	50402	i00318	9/23/08	9/23/09
Modulation Analyzer	HP	8901A	i00321	2/5/09	2/5/10
Audio Analyzer	HP	8903A	i00324	10/27/08	10/27/09
Spectrum Analyzer	Agilent	E4407B	i00331	11/3/08	11/3/09

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