Flom Test Labs
EMI, EMC, RF Testing Experts Since 1963
toll-free: (866) 311-3268
fax: (480) 926-3598
http://www.flomlabs.com
info@flomlabs.com

Date: September 15, 2008

Applicant: Kenwood USA Corporation
Communications Division
3970 Johns Creek Court, Suite 100
Suwanee, GA 30024

Attention of: Joel E. Berger, Research & Development
JBerger@kenwoodusa.com
(678) 474-4722; FAX: (678) 474-4731

Mailing: Kenwood USA Corporation
Communications Division
3970 Johns Creek Court, Suite 100
Suwanee, GA 30024

Attention of: Joel E. Berger, Research & Development
JBerger@kenwoodusa.com
(678) 474-4722; FAX: (678) 474-4731

Equipment: NX-300-K2, NX-300-K4 TK-5320-K2, TK-5320-K4
FCC ID: ALH378501
FCC Rules: 22,74,90, RSS-119 Issue 9Jone 2007

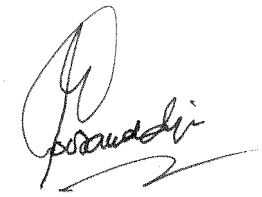
Gentlemen:

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

As you know, the FCC, after a TCB issues a Grant, still has 30 days to review a submission 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.

Should you need any clarification, just fax or phone. Thank you again for this order - it has been a pleasure to be of service.

Sincerely yours,



Hoosamuddin S. Bandukwala, Lab Director

enclosure(s)
HSB/mdw

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Memo

Date: September 15, 2008

Applicant: Kenwood USA Corporation
Communications Division
3970 Johns Creek Court, Suite 100
Suwanee, GA 30024

Equipment: NX-300-K2, NX-300-K4 TK-5320-K2, TK-5320-K4
FCC ID: ALH378501

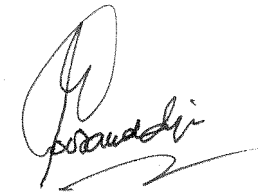
Please note that the enclosed Reports reflect the results of tests performed to the currently published Federal Communications Commissions Rules and Regulations.

Should the FCC's Examiners' interpretations request new and unpublished requirements, we will be pleased to provide them. We will invoice you accordingly, i.e. for the time spent on re-testing, providing the amended pages and/or Reports and for the time necessary to be spent on electronic filing. We will of course provide you with copies of any of the additions.

We regret any added expense to the Applicants, but of late the FCC continues to change their requirements without any prior written publication and/or notices.

As in the past, we will continue to provide all liaison with the FCC necessary for the successful conclusion of your project and the receipt of your Grant of Equipment Authorization.

Sincerely yours,



Hoosamuddin S. Bandukwala, Lab Director

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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.

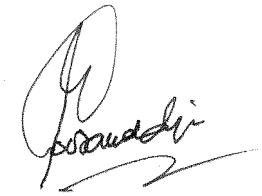
3. The FCC can set aside any action; modify or set aside any action, within 30 days. (FCC Rule 1.108, 1.113).

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).

M. Flom Associates, Inc.



Hoosamuddin S. Bandukwala, Lab Director

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

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info@flomlabs.com

Date: September 15, 2008

Federal Communications Commission
Via: Electronic Filing

Attention: Authorization & Evaluation Division

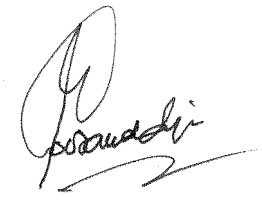
Applicant: Kenwood USA Corporation
Equipment: NX-300-K2, NX-300-K4 TK-5320-K2, TK-5320-K4
FCC ID: ALH378501
FCC Rules: 22,74,90, RSS-119 Issue9, June 2007

Gentlemen:

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

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

Sincerely yours,



Hoosamuddin S. Bandukwala, Lab Director

enclosure(s)
cc: Applicant
HSB/mdw

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Test Report

for

Model: NX-300-K2, NX-300-K4, TK-5320-K2, TK-5320-K4

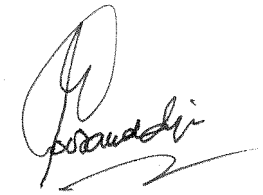
to

Federal Communications Commission

Rule Part(s) 22,74,90, RSS-119 Issue9, June 2007

Date of report: September 15, 2008

On the Behalf of the Applicant:	Kenwood USA Corporation
At the Request of:	Kenwood USA Corporation Communications Division 3970 Johns Creek Court, Suite 100 Suwanee, GA 30024
Attention of:	Joel E. Berger, Research & Development JBerger@kenwoodusa.com (678) 474-4722; FAX: (678) 474-4731



Supervised by: Hoosamuddin S. Bandukwala, Lab Director

Revision History

Revision	Date	Revised By	Reason for revision
1.0	September 15, 2008	M.Wyman	Original Document
2.0	September 26, 2008	M.Wyman	TCB Questions answered

List of Exhibits

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

Applicant: Kenwood USA Corporation

FCC ID: ALH378501

By Applicant:

1. Letter of Authorization

2. Confidentiality Request: 0.457 And 0.459

3. Part 90.203(e) & (g) Attestation

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

5. Photographs, 2.1033(c)(12)

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

7. 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.

Testimonial
and
Statement of Certification

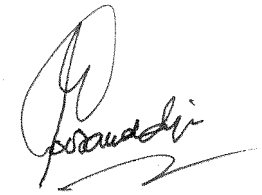
This is to Certify:

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: Hoosamuddin S. Bandukwala, Lab Director

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

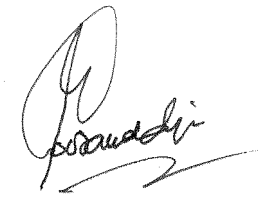
Table of Contents

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:	d0890012
d) Client:	Kenwood USA Corporation Communications Division 3970 Johns Creek Court, Suite 100 Suwanee, GA 30024
e) Identification:	NX-300-K2, NX-300-K4 TK-5320-K2, TK-5320-K4
EUT Description:	UHF FM Handheld/Portable/Mobile Transceiver
f) EUT Condition:	Not required unless specified in individual tests.
g) Report Date: EUT Received:	September 15, 2008
h, j, k):	As indicated in individual tests.
i) Sampling method:	No sampling procedure used.
l) Uncertainty:	In accordance with FTL internal quality manual.

m) Supervised by:



Hoosamuddin S. Bandukwala, Lab Director

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.

Accessories used during testing:

Type	Quantity	Manufacturer	Model	Serial No.	FCC ID
Charger	1	Kenwood	KNB-53	---	---
Microphone	1	Kenwood	KMC-41	---	---

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:

_____ 15 – Radio Frequency Devices (unlicensed)
_____ 21 – Domestic Public Fixed Radio Services
__x__ 22 – Public Mobile Services
_____ 22 Subpart H - Cellular Radiotelephone Service
_____ 22.901(d) - Alternative technologies and auxiliary services
_____ 23 – International Fixed Public Radiocommunication services
_____ 24 – Personal Communications Services
__x__ 74 Subpart H - Low Power Auxiliary Stations
_____ 80 – Stations in the Maritime Services
_____ 80 Subpart E - General Technical Standards
_____ 80 Subpart F - Equipment Authorization for Compulsory Ships
_____ 80 Subpart K - Private Coast Stations and Marine Utility Stations
_____ 80 Subpart S - Compulsory Radiotelephone Installations for Small Passenger Boats
_____ 80 Subpart T - Radiotelephone Installation Required for Vessels on the Great Lakes
_____ 80 Subpart U - Radiotelephone Installations Required by the Bridge-to-Bridge Act
_____ 80 Subpart V - Emergency Position Indicating Radio Beacons (EPIRB'S)
_____ 80 Subpart W - Global Maritime Distress and Safety System (GMDSS)
_____ 80 Subpart X - Voluntary Radio Installations
_____ 87 – Aviation Services
__x__ 90 – Private Land Mobile Radio Services
_____ 94 – Private Operational-Fixed Microwave Service
_____ 95 Subpart A - General Mobile Radio Service (GMRS)
_____ 95 Subpart C - Radio Control (R/C) Radio Service
_____ 95 Subpart D - Citizens Band (CB) Radio Service
_____ 95 Subpart E - Family Radio Service
_____ 95 Subpart F - Interactive Video and Data Service (IVDS)
_____ 97 - Amateur Radio Service
_____ 101 – Fixed Microwave Services

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

Please refer to www.a2la.org for current scope of accreditation.

Certificate number: 2152.01

ACCREDITED
CERT NO: 2152-01

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

List of General Information Required for Certification

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

22,74,90, RSS-119 Issue9Sub-part 2.1033

(c)(1):

Name and Address of Applicant:	Kenwood USA Corporation Communications Division 3970 Johns Creek Court, Suite 100 Suwanee, GA 30024
Manufacturer:	Kenwood Corporation 14-6, Dogenzaka 1-Chome Shibuya-ku, Tokyo 150, Japan OR Kenwood Electronics Technologies PTE Ltd. 1 Ang Mo Kio Street 63 Singapore 569110

(c)(2): **FCC ID**: ALH378501

Model Number: NX-300-K2, NX-300-K4, TK-5320-K2, TK-5320-K4

(c)(3):**Instruction Manual(s):** Please see attached exhibits

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

(c)(5): **Frequency Range, MHz**: (FCC) 406.1 – 470MHz
(IC) 406.1 – 430 450 – 470MHz

(c)(6): **Power Rating, Watts**: 1.0 to 5.0

____ Switchable ____ Variable ____ N/A

FCC Grant Note:

(c)(7): **Maximum Power Rating, Watts**: 5.0

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	=	2.0
Collector Voltage, Vdc	=	7.5
Supply Voltage, Vdc	=	7.5

(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

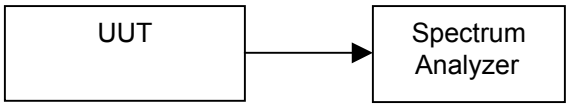
Name of Test: Carrier Output Power (Conducted)
Specification: 2.1046(a)
Test Equipment Utilized: i00049 **Test Date:** 09/11/08

Measurement Procedure

A) The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the unmodulated output power was measured by means of an RF Power Meter.

B) Measurement accuracy is ±3%.

Transmitter Test Set-Up: RF Power Output



Measurement Results
(Worst case)

Frequency of Carrier, MHz = FCC- 406.1 – 470MHz
IC 406.1 – 430 , 450 – 470MHz
Ambient Temperature = 23°C ± 3°C

Frequency, Mhz	RF Power, dBm	RF Power, Watts
FCC		
406.100000	36.8	5.0
438.100000	37.0	5.0
470.000000	36.9	5.0
IC		
406.100000	36.8	5.0
430.000000	36.9	5.0
IC		
450.000000	37.0	5.0
470.000000	36.9	5.0

Performed by: Michael Wyman

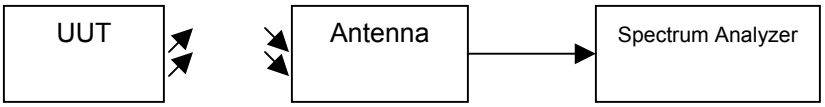
Name of Test: RF Power Output (Radiated)
Specification: 2.1046(a)
Test Equipment Utilized: I00049 **Test Date:** 09/12/08

Measurement Procedure (Radiated)

1. The EUT was placed and was terminated to a 50 ohm load, on an open area test site. Its radiated field strength at a known distance was measured by means of a spectrum analyzer. Equivalent loading was calculated from the equation $P_t=((E \times R)^2/49.2)$ watts, where R = 3m.

2. Measurement accuracy is ±1.5 dB.

Test Setup Radiated Output Power



Measurement Results

g0890029: 2008-Sep-15 Mon 10:40:00
State: 2:High Power (FCC) Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Meter, dBuV/m	CF, dB	ERP, dBm	ERP, Watts
406.100000	406.020000	106.3	20.23	29.2	0.83
438.000000	437.972400	110.2	19.35	32.2	1.66
470.000000	470.090000	111.9	19.6	34.1	2.57
State:3 High Power (IC)					
406.200000	406.020000	106.3	20.23	29.2	0.83
430.000000	429.870000	109.7	19.26	31.6	1.44
450.000000	450.040000	109.3	19.1	31.0	1.26
470.000000	470.090000	111.9	19.6	34.1	2.57

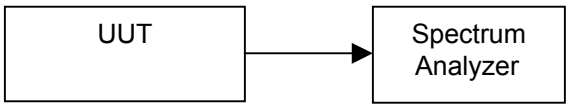
Name of Test: Unwanted Emissions (Transmitter Conducted)
Specification: 2.1051
Test Equipment Utilized: i00049 **Test Date:** 09/15/08

Measurement Procedure

A) The emissions were measured for the worst case as follows:
1). within a band of frequencies defined by the carrier frequency plus and minus one channel.
2). from the lowest frequency generated in the EUT and to at least the 10th harmonic of the carrier frequency, or 40 GHz, whichever is lower.

B) The magnitude of spurious emissions that are attenuated more than 20 dB below the permissible value need not be specified.

Transmitter Test Set-Up: Spurious Emission



Measurement Results

Summary:

Frequency of carrier, MHz	=	406, 438, 470MHz (FCC) 406, 430MHz – 450, 470MHz (IC)
Spectrum Searched, GHz	=	0 to 10 x F_C
Maximum Response, Hz	=	
All Other Emissions	=	≥ 20 dB Below Limit
Limit(s), dBc		

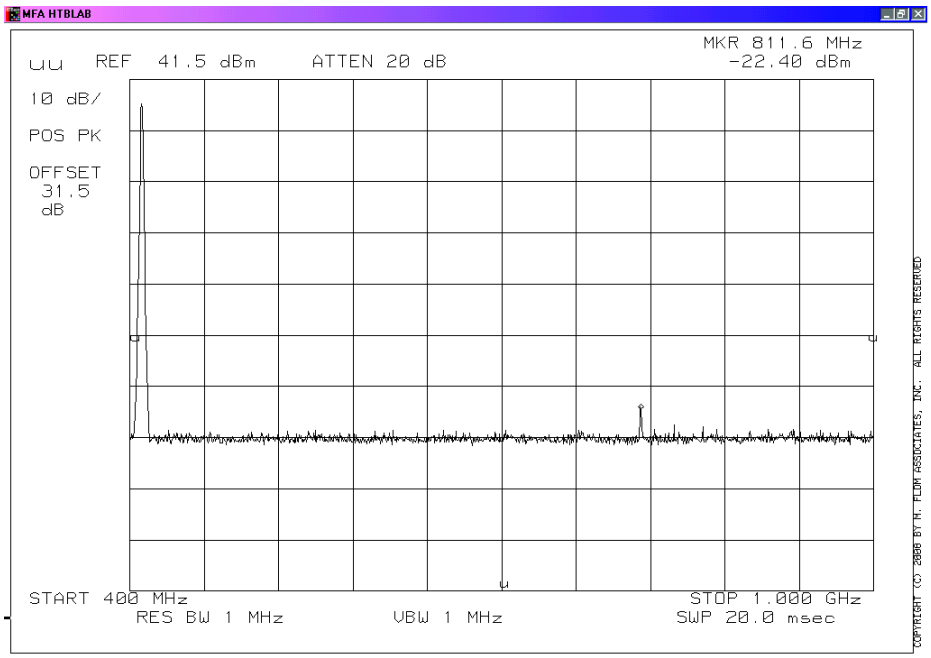
Graphical Results follow:

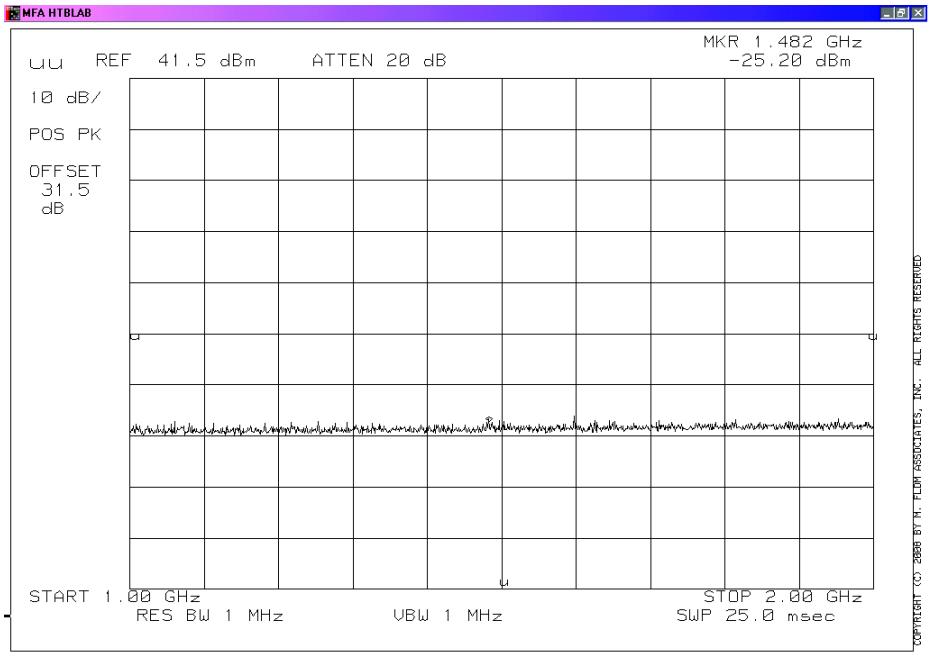
Measurement Results

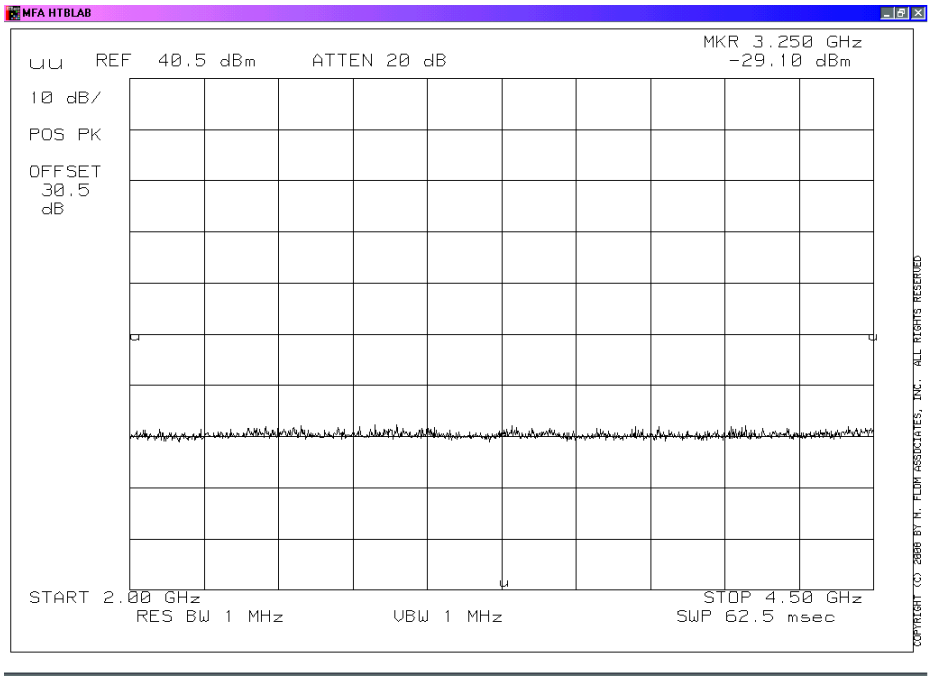
State: General

Ambient Temperature: 23°C ± 3°C

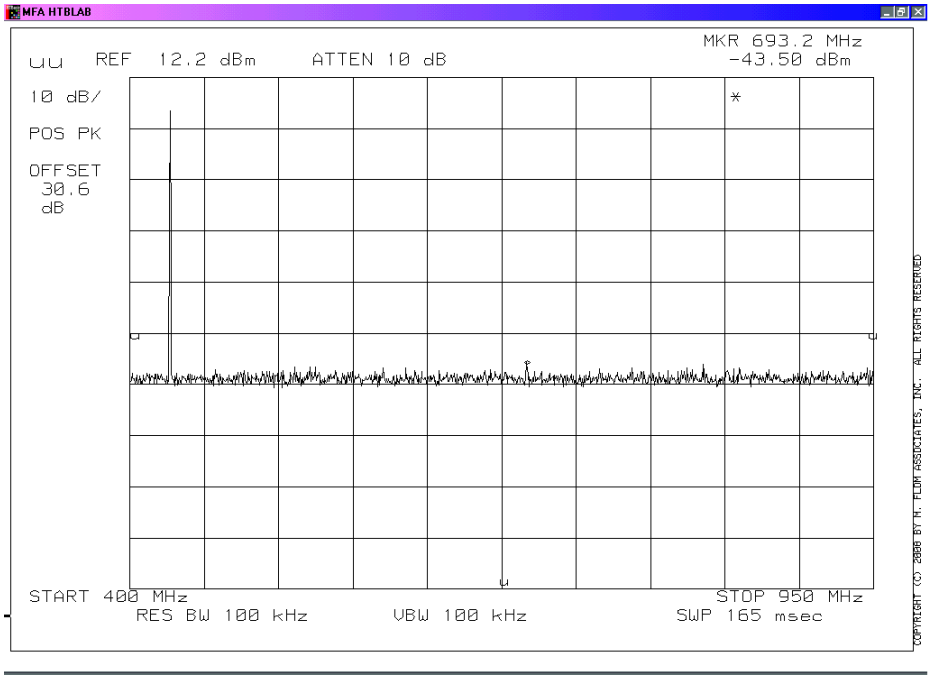
406MHz Panorama

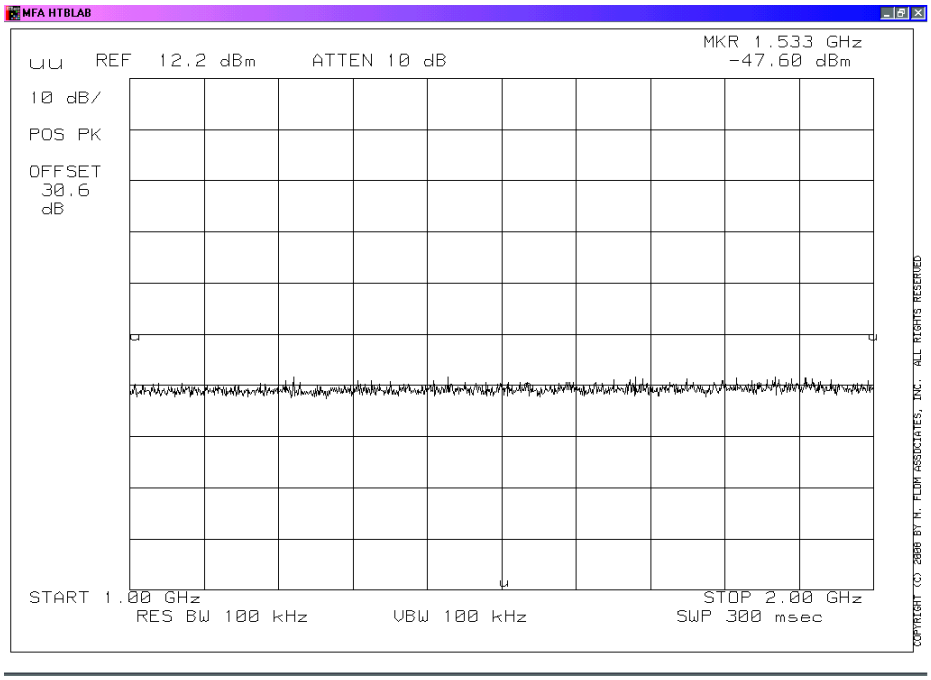





MFA HTBLAB
REF 40.5 dBm
ATTEN 20 dB
MKR 3.250 GHz
-29.10 dBm
10 dB/
POS PK
OFFSET
30.5
dB
START 2.00 GHz
RES BW 1 MHz
VBW 1 MHz
STOP 4.50 GHz
SWP 62.5 msec
COPYRIGHT (C) 2000 BY M. FLOM ASSOCIATES, INC. ALL RIGHTS RESERVED

430MHz Panorama

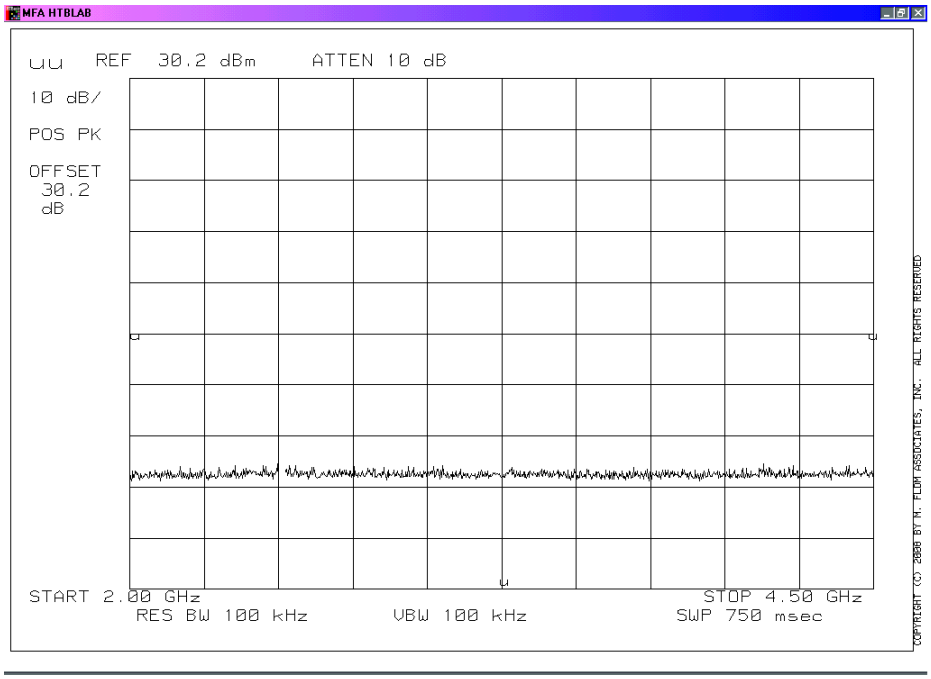




Measurement Results

State: General

Ambient Temperature: 23°C ± 3°C

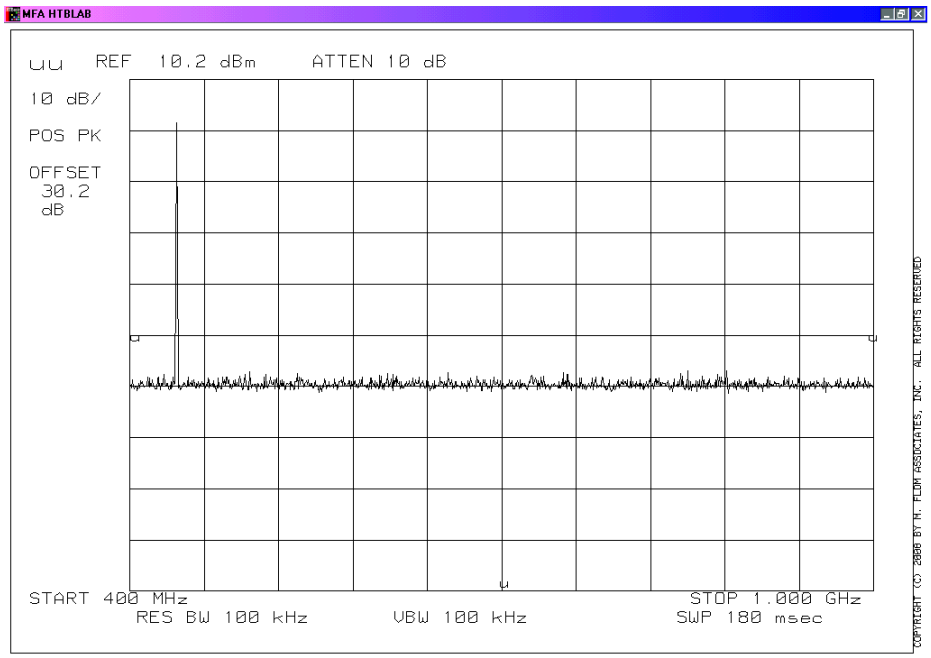


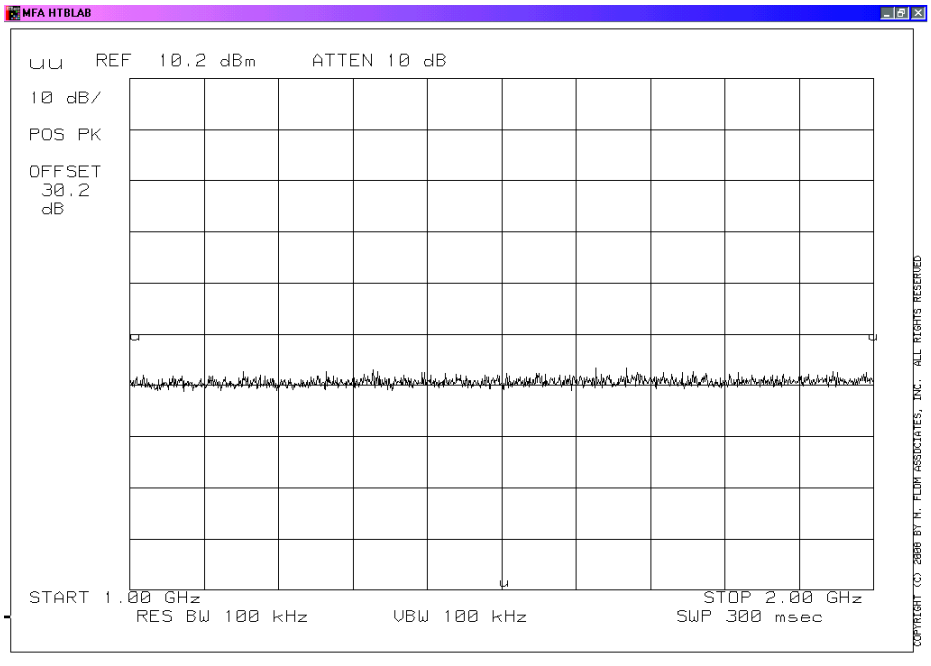
Measurement Results

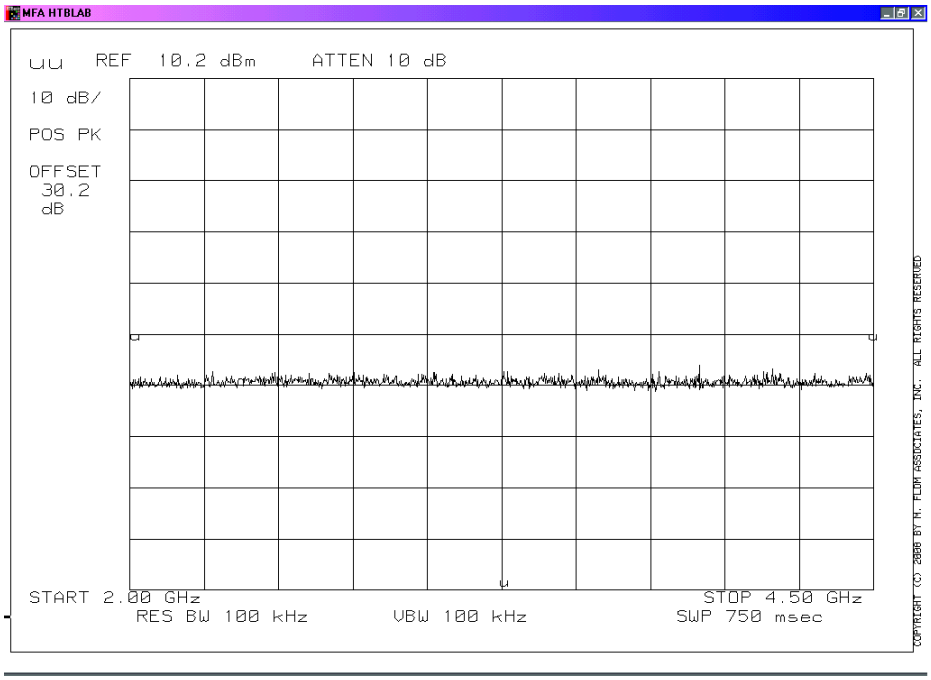
State: General

Ambient Temperature: 23°C ± 3°C

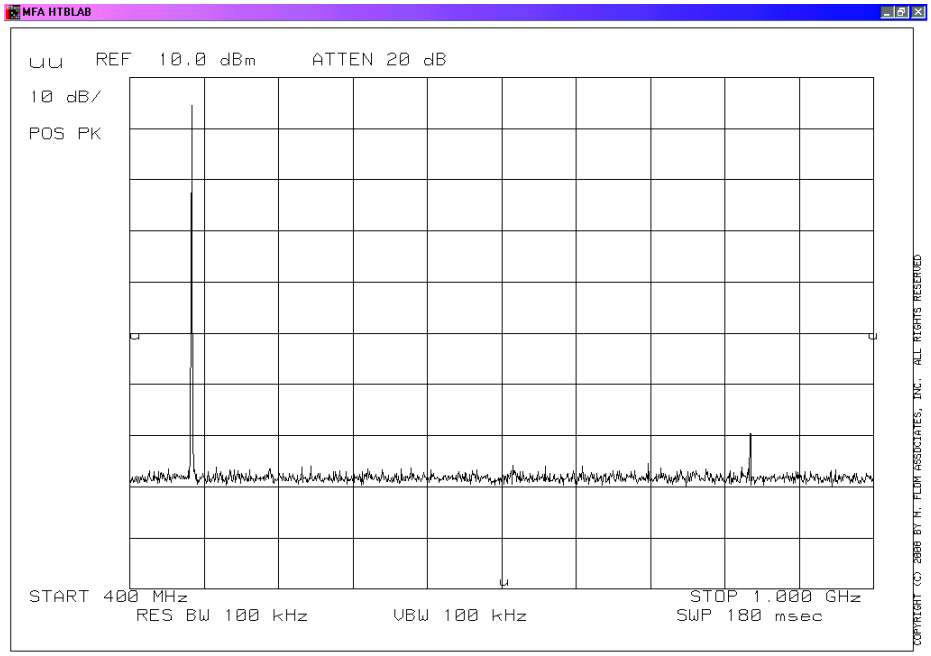
438 Panorama

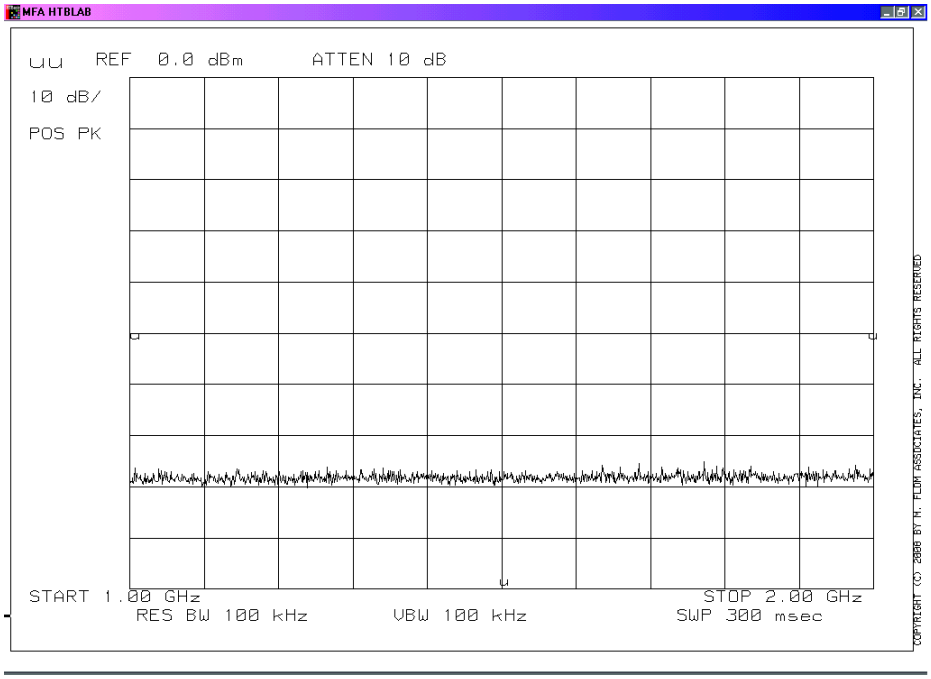


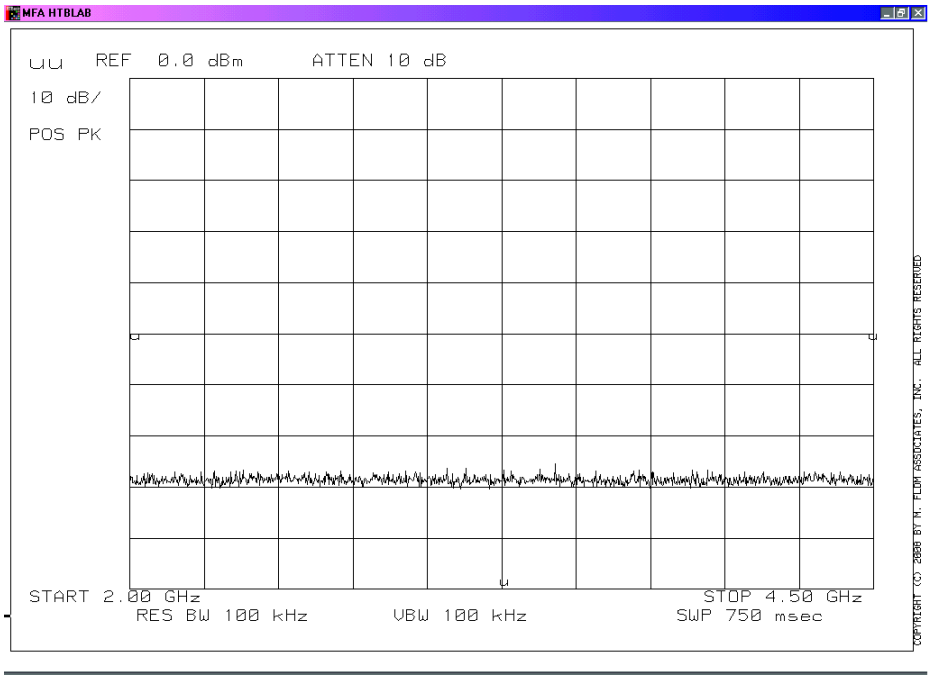



MFA HTBLAB
REF 10.2 dBm
ATTEN 10 dB
10 dB/
POS PK
OFFSET
30.2
dB
START 2.00 GHz
STOP 4.50 GHz
RES BW 100 kHz
VBW 100 kHz
SWP 750 msec
COPYRIGHT (C) 2000 BY H. FLOM ASSOCIATES, INC. ALL RIGHTS RESERVED

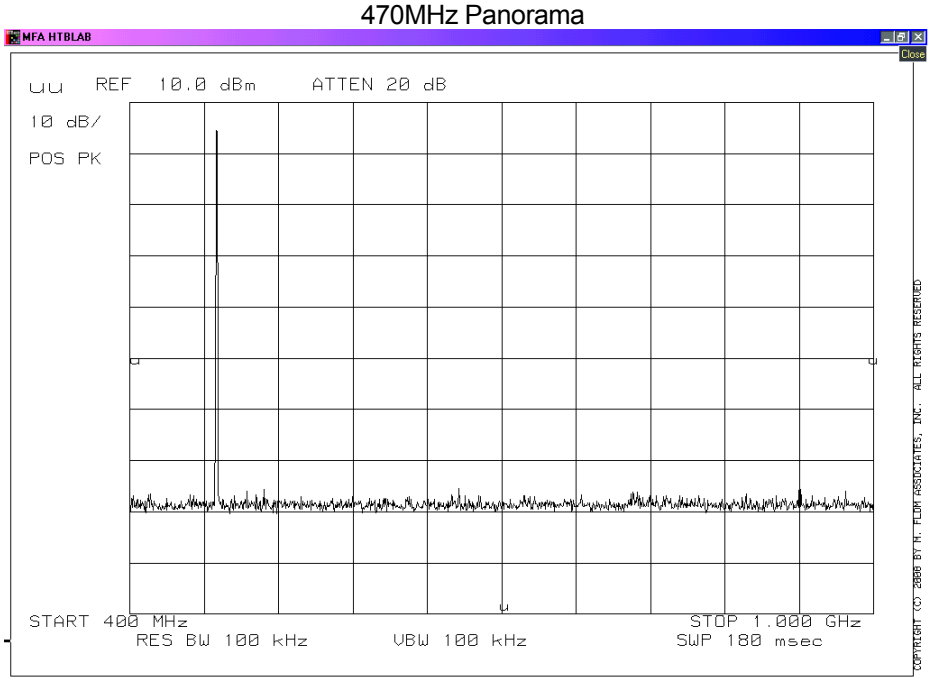
450MHz Panorama

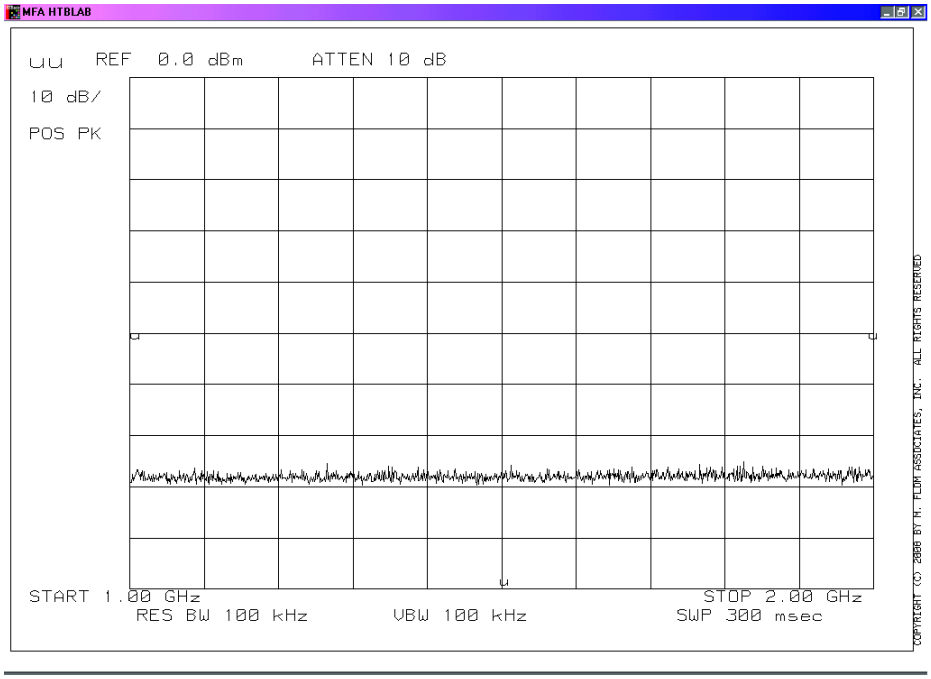


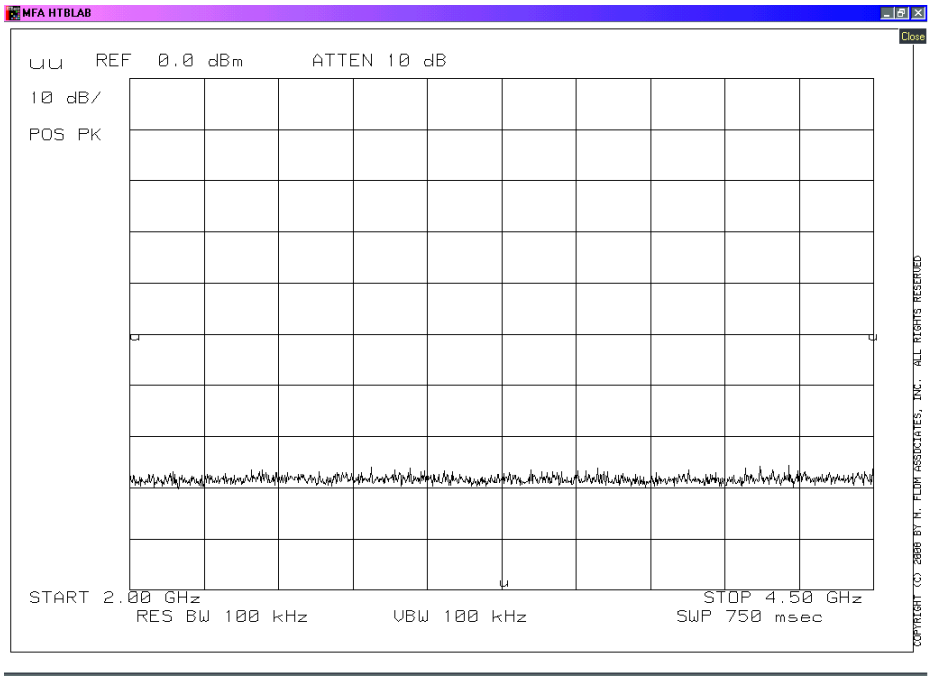



MFA HTBLAB
REF 0.0 dBm
ATTEN 10 dB
10 dB/
POS PK
START 2.00 GHz
STOP 4.50 GHz
RES BW 100 kHz
VBW 100 kHz
SWP 750 msec
COPYRIGHT (C) 2006 BY M. FLOM ASSOCIATES, INC. ALL RIGHTS RESERVED

470MHz Panorama







Performed by: Michael Wyman

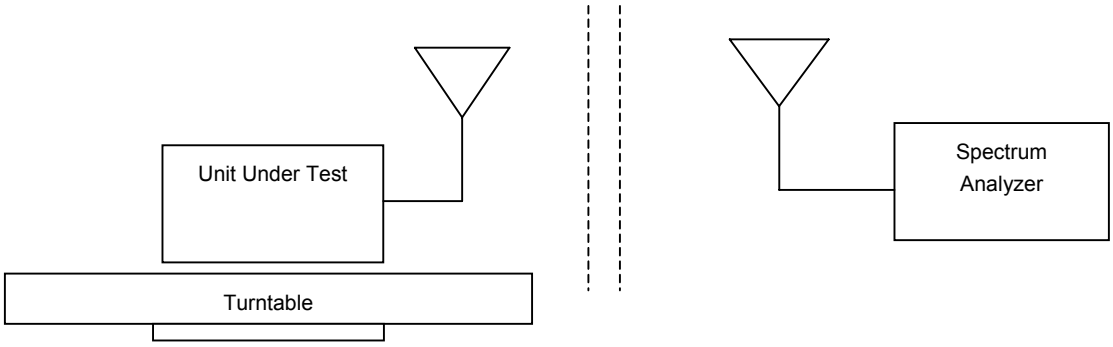
Name of Test: Field Strength of Spurious Radiation
Specification: 2.1053(a)
Test Equipment Utilized: I00049, i00037, i00039 i00042, i00048, i00103, i00091 **Test Date:** 09/12/08

Measurement Procedure

Definition:
Radiated spurious emissions are emissions from the equipment when transmitting into a non-radiating load on a frequency or frequencies which are outside an occupied band sufficient to ensure transmission of information of required quality for the class of communications desired.

Method of Measurement:

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 (22.917)
3) Sweep Speed ≤2000 Hz/second
4) Detector Mode = Mean or Average Power

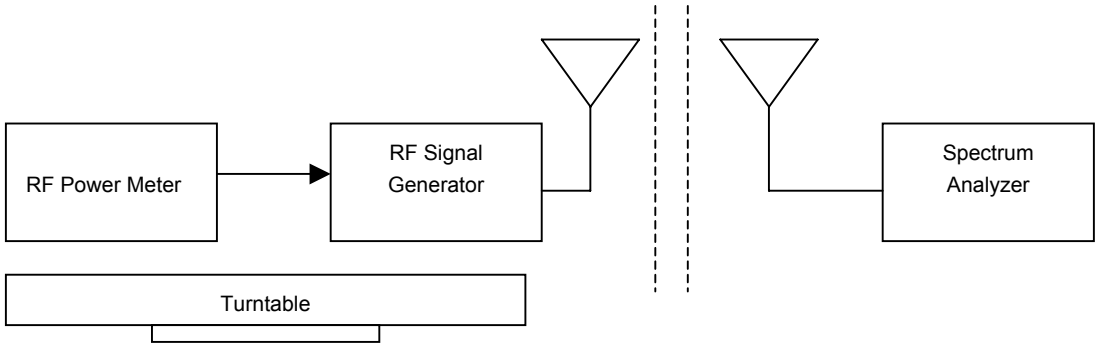
C) Place the transmitter to be tested on the turntable in the standard test site. The transmitter is transmitting into a non-radiating load that is placed on the turntable. The RF cable to this load should be of minimum length.

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 below.



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)

Sample Calculation: The Peak Power for the EUT is 35.9dBm
The ERP radiated power is taken from the OAT's site and includes the Antenna factor and cable correction to the Analyzer.
Power Radiated dBc = 35.9dBm – (-30.7) , --66.6
The Limit for Spurious Radiation per Part 2.1053 is >60dBc

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

Name of Test: Field Strength of Spurious Radiation

Measurement Results

Peak Power 37.0dBm

g0890030: 2008-Sep-15 Mon 10:50:00
STATE: 2:High Power Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	ERP, dBm	ERP, dBc
406.000000	812.000000	-57.1	-93.1
406.000000	1218.000000	-30.7	-66.6
406.000000	1624.000000	-30	-65.9

Harmonics were measured to the 10th harmonic. No harmonics were observed passed the 3rd harmonic. A notch filter was used to suppress the fundamental carrier.

Name of Test: Field Strength of Spurious Radiation

Measurement Results

Peak Power 36.8dBm

g0890031: 2008-Sep-15 Mon 12:53:00
STATE: 2:High Power Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	ERP, dBm	ERP, dBc
438.000000	875.945000	-53.6	-89.6
438.000000	1313.915000	-30.2	-66.0
438.000000	1751.885000	-28.5	-64.4

Harmonics were measured to the 10th harmonic. No harmonics were observed passed the 3rd harmonic. A notch filter was used to suppress the fundamental carrier.

Name of Test: Field Strength of Spurious Radiation

Measurement Results

Peak Power 36.9dBm

g0890032: 2008-Sep-15 Mon 12:57:00
STATE: 2:High Power Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	ERP, dBm	ERP, dBc
470.000000	939.970000	-27.69	-64.59
470.000000	1409.970000	-29.09	-66.09
470.000000	1879.970000	-26.79	-63.79

Harmonics were measured to the 10th harmonic. No harmonics were observed passed the 3rd harmonic. A notch filter was used to suppress the fundamental carrier.

There are no measurements taken at the IC frequencies as the Conducted Spurious graphs take the place of the Radiated data per IC RSS-119.

Performed by: Michael Wyman

Name of Test: Emission Masks (Occupied Bandwidth)
Specification: 2.1049(c)(1)
Test Equipment Utilized: i00049 **Test Date:** 09/16/08

Measurement Procedure

A) The EUT and test equipment were set up as shown below

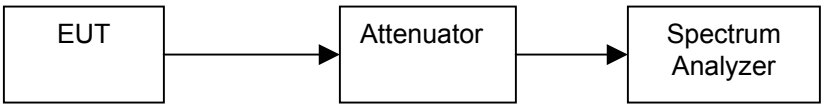
B) For EUTs supporting audio modulation, the audio signal generator was adjusted to the frequency of maximum response and with output level set for ±2.5/±1.25 kHz deviation (or 50% modulation). With level constant, the signal level was increased 16 dB.

C) For EUTs supporting digital modulation, the digital modulation mode was operated to its maximum extent.

D) The Occupied Bandwidth was measured with the Spectrum Analyzer controls set as shown on the test results.

Note: the Peak is displayed on each graph along with the mask response.

Transmitter Test Set-Up: Occupied Bandwidth



The following tables indicate the masks used to meet both FCC and IC requirements.

Emission Mask B

Displacement Frequency, f_d (% of the Authorized Bandwidth)	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
$50 \leq f_d \leq 100$	25	100
$100 < f_d \leq 250$	35	100
$f_d > 250$	$43 + 10 \log_{10}(P)$	

Emission Mask D

Displacement Frequency, f_d (kHz)	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
$5.625 < f_d \leq 12.5$	$7.27(f_d - 2.88)$	100
$f_d > 12.5$	whichever is the lesser attenuation; 70 or $50 + 10 \log_{10}(P)$	100

Emission Mask E

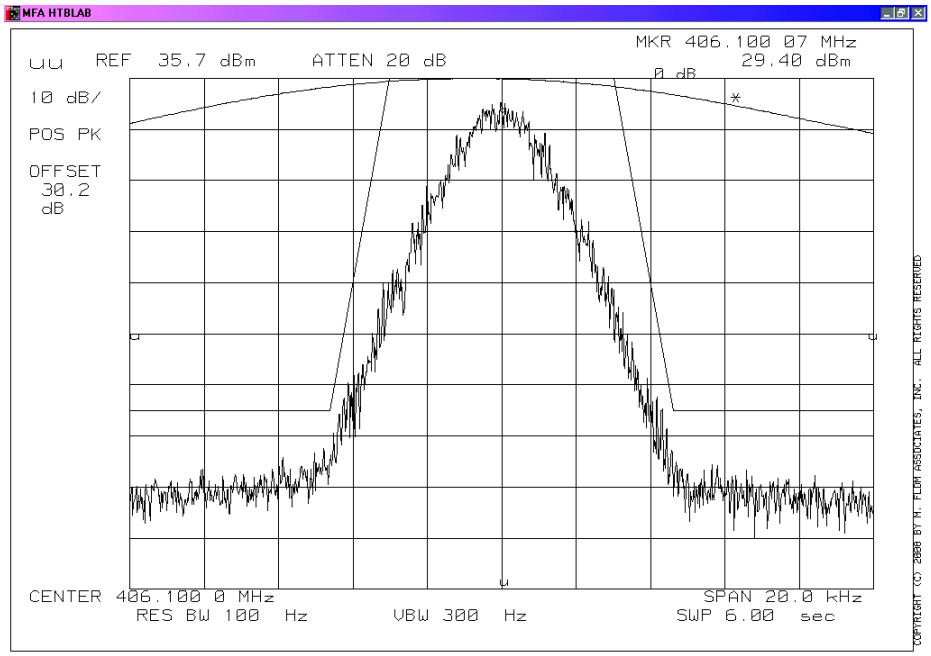
Displacement Frequency, f_d (kHz)	Minimum Attenuation (dB)	Resolution Bandwidth (Hz)
$3.0 < f_d \leq 4.6$	whichever is the lesser attenuation; 65 or $30 + 16.67(f_d - 3)$ or $55 + 10 \log_{10}(P)$	100

Measurement Results

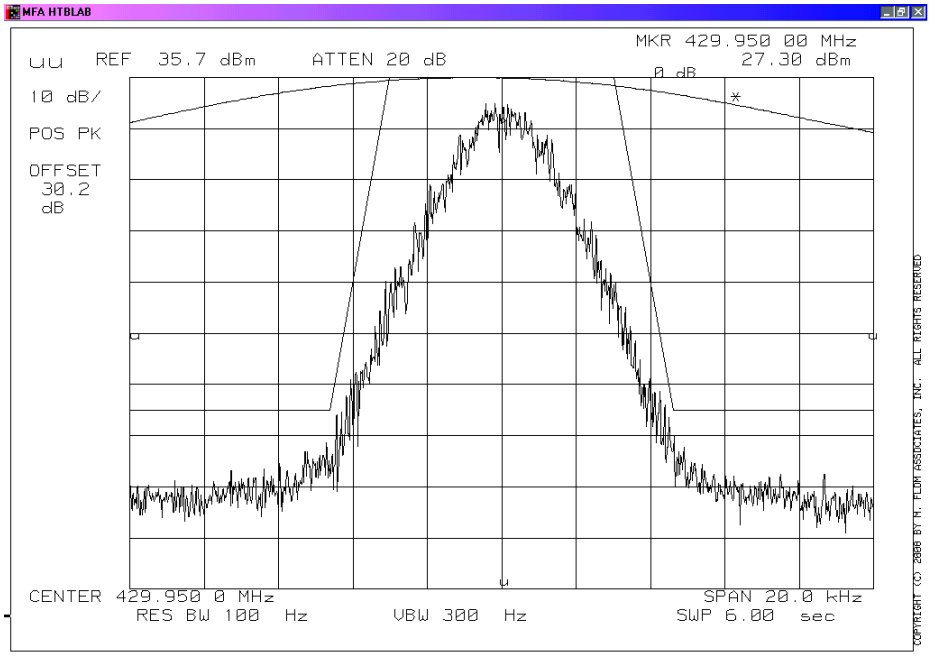
State: Hi Power

Ambient Temperature: 23°C ± 3°C

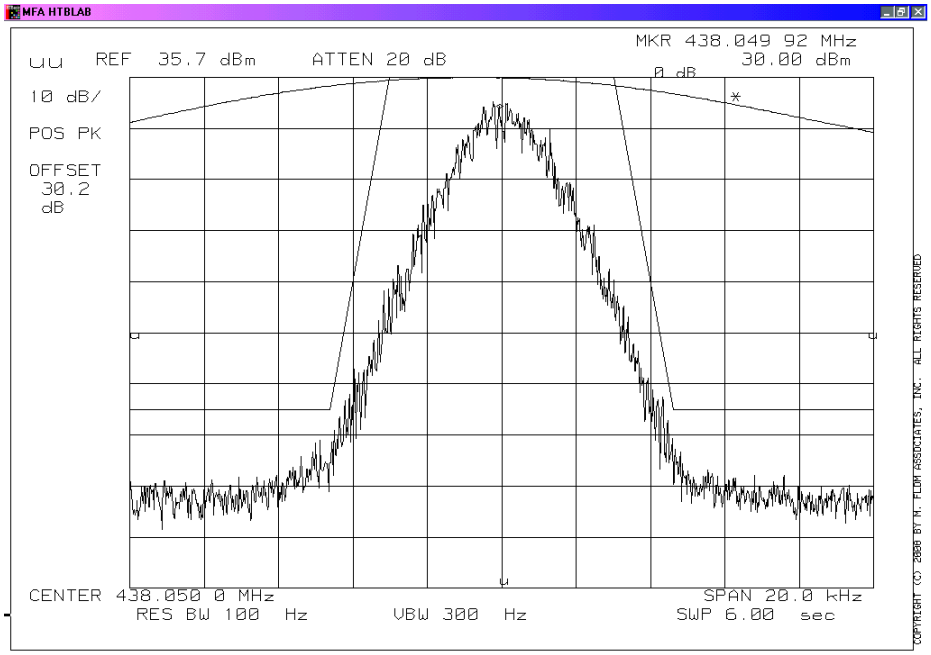
406MHz 6KHz Bandwidth



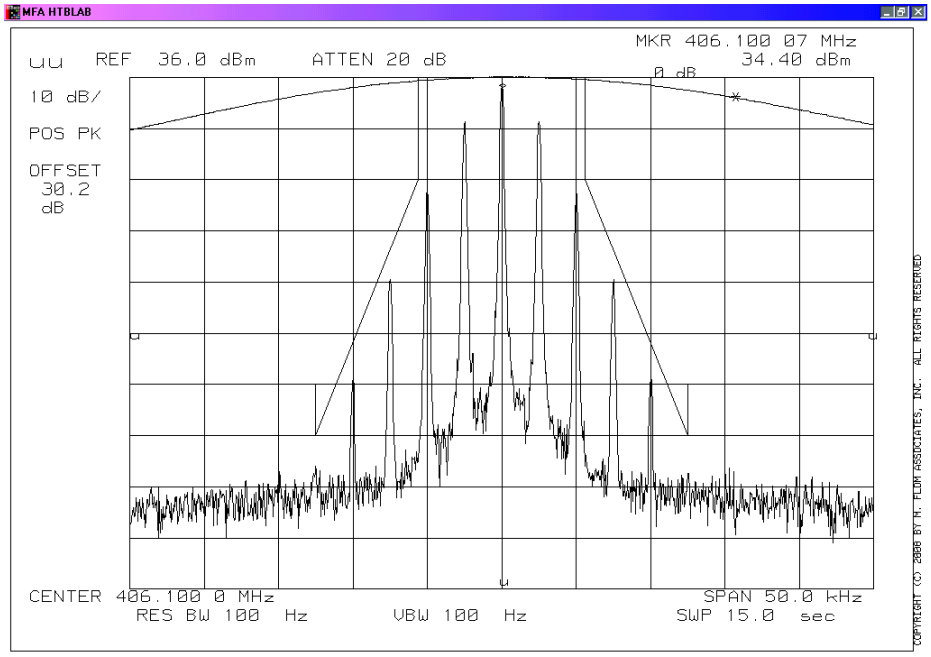
430MHz 6KHz Bandwidth



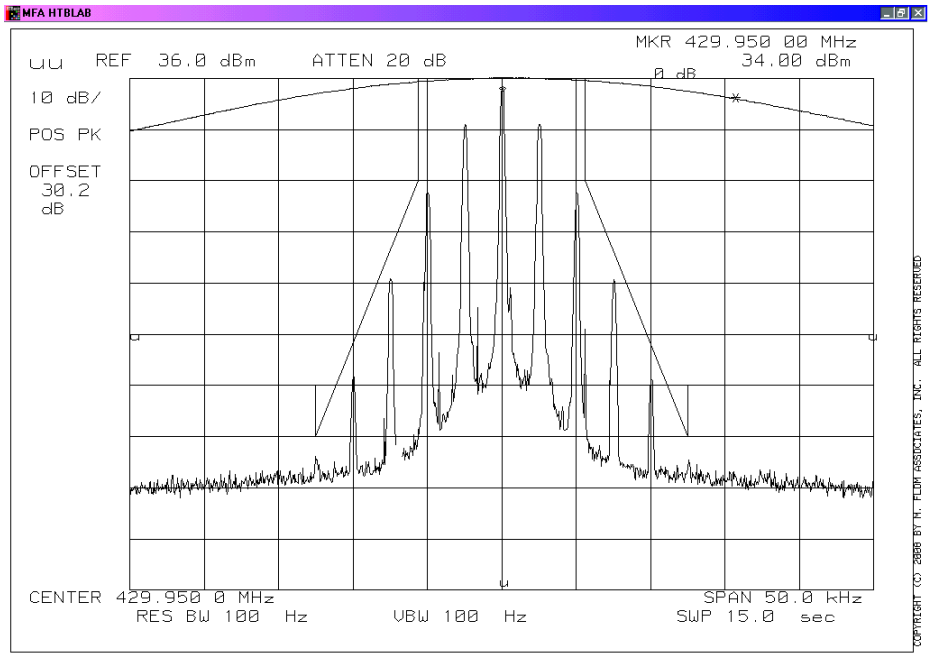
438MHz 6KHz Bandwidth



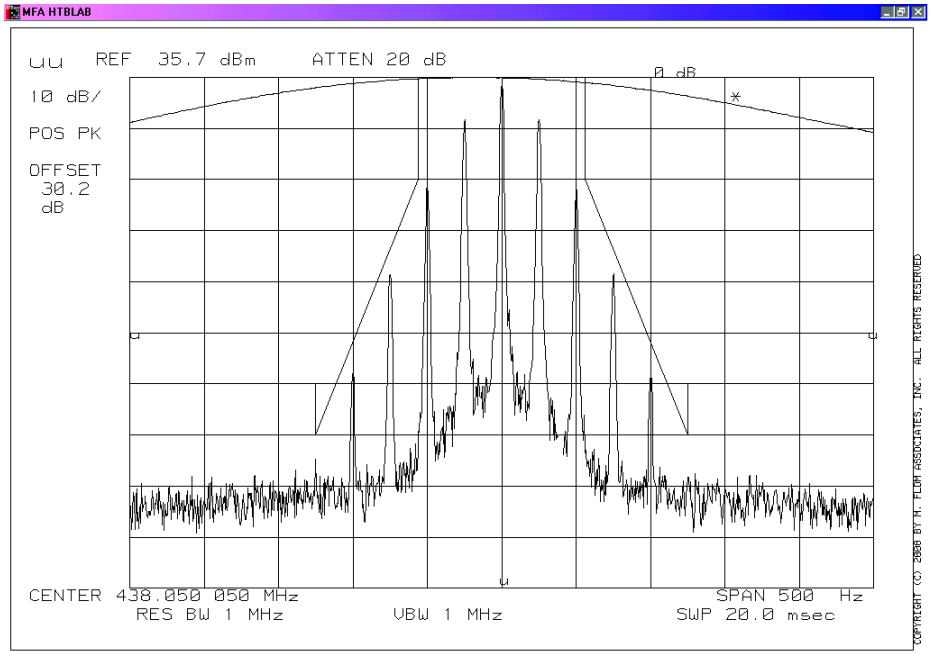
406MHz 12.5Khz Bandwidth



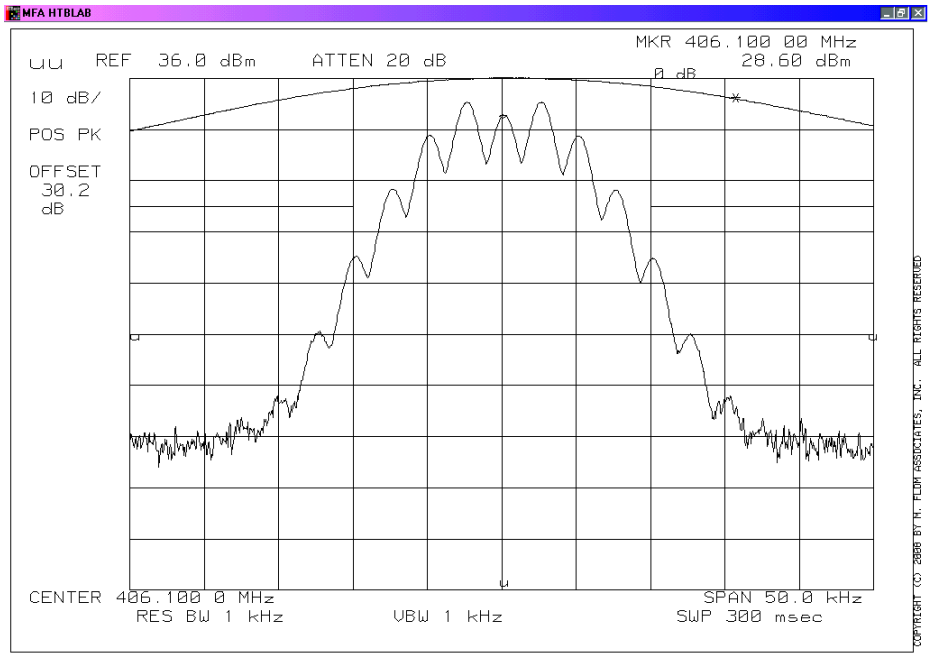
430MHZ 12.5KHz Bandwidth



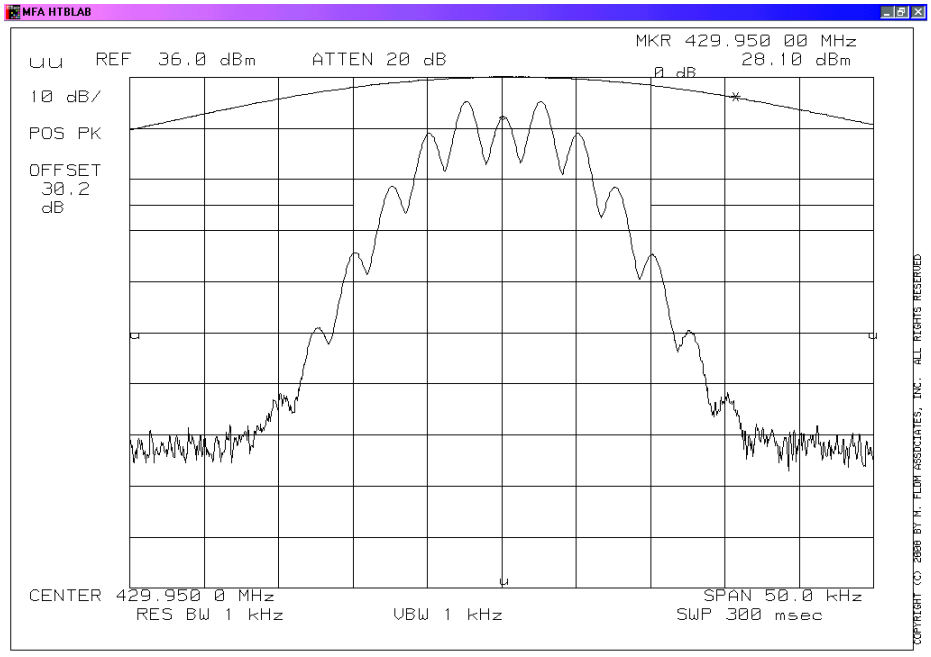
438MHz 12.5KHz Bandwidth



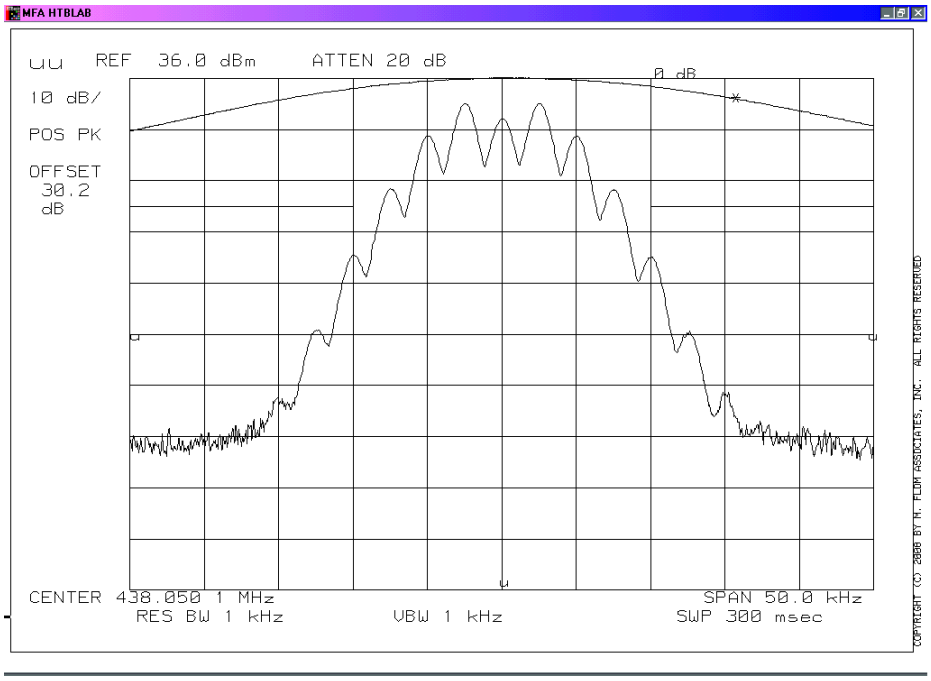
406MHz 25KHz Bandwidth



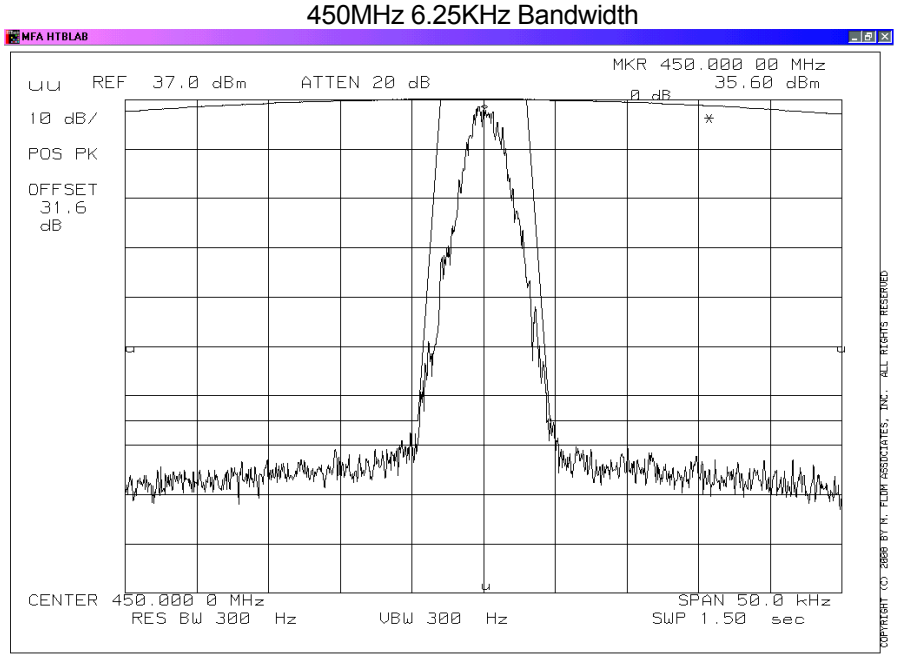
430MHz 25KHz Bandwidth



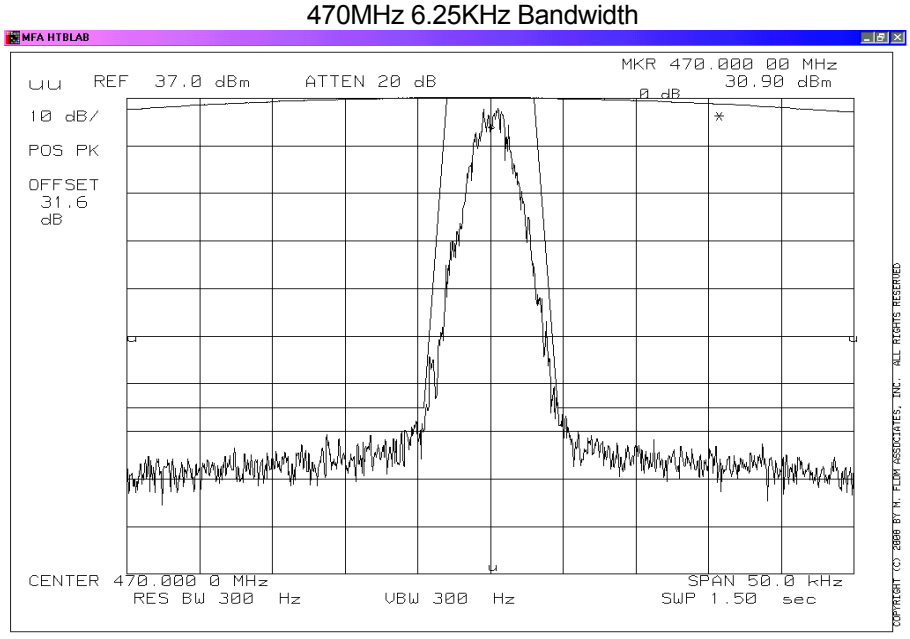
438MHz 25KHz Bandwidth



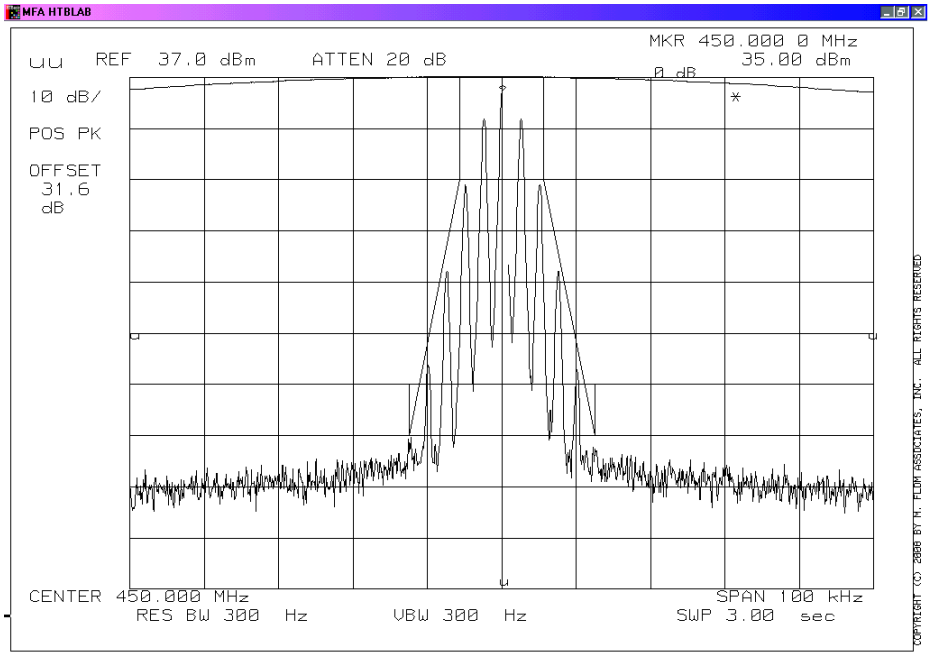
450MHz 6.25KHz Bandwidth



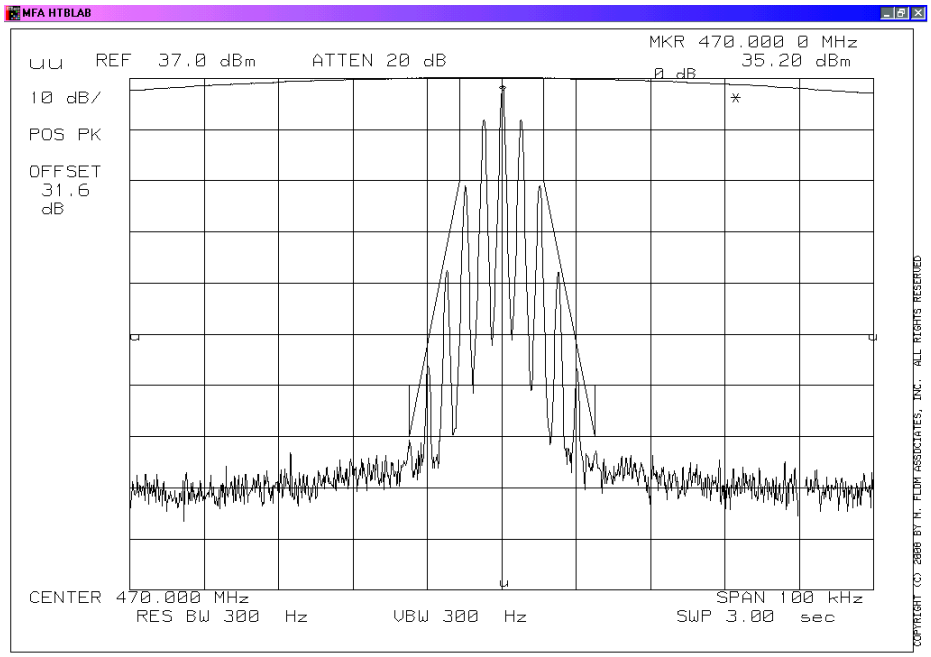
470MHz 6.25KHz Bandwidth



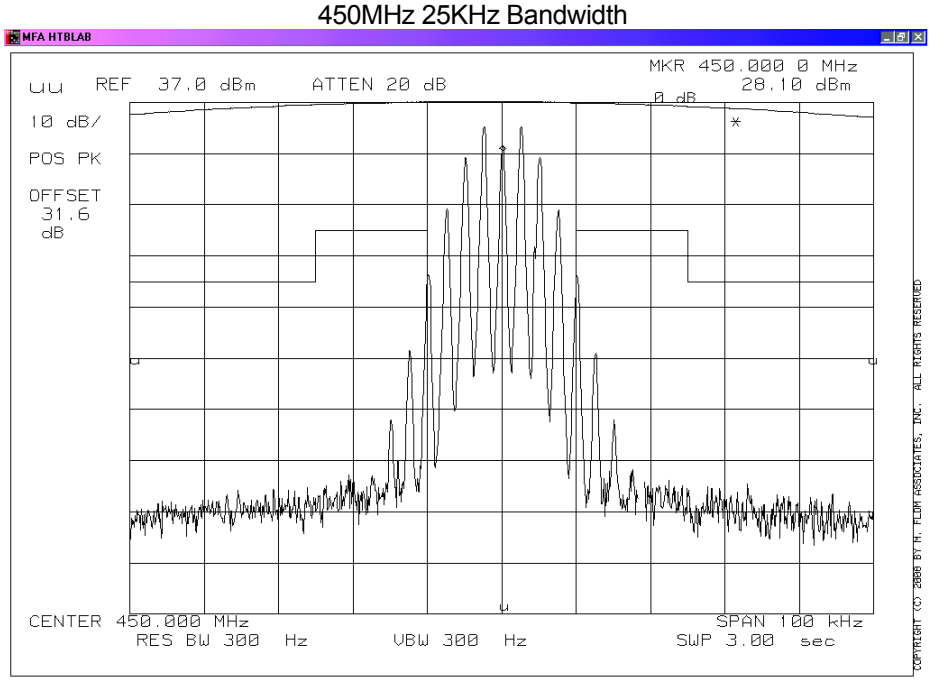
450MHz 12.5KHz Bandwidth



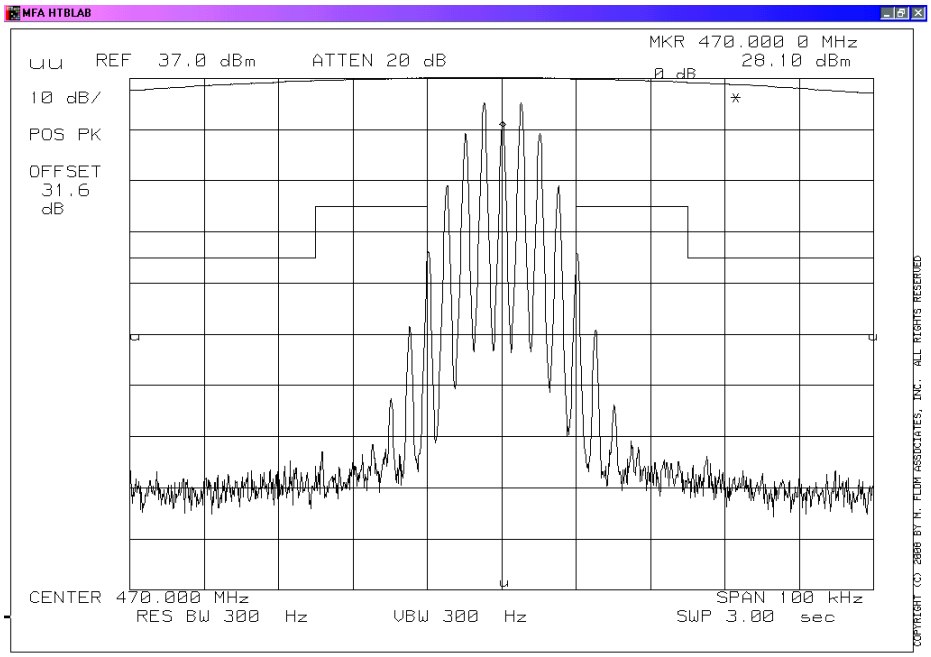
470MHz 12.5KHz Bandwidth



450MHz 25KHz Bandwidth



470MHz 25KHz Bandwidth



Michael D Wyman

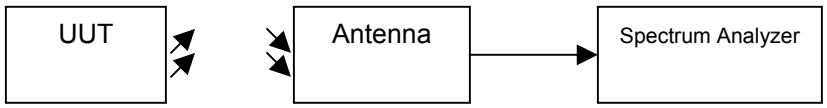
Performed by: Michael Wyman

Name of Test: Radiated Emissions
Specification: 15.109
Spec. Limit: See Table
Test Equipment Utilized i00049, i00088, i00089 **Test Date: 09/080/8**

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 1 GHz 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
34.345000	15.7	13.5	29.2	40.0	-10.8
142.295000	14.6	15.5	30.1	43.0	-12.9
258.704000	15.1	17.1	32.2	46.0	-13.8
474.846000	15.2	19.8	35.0	46.0	-11.1
653.605000	15.9	22.9	38.8	46.0	-7.2
950.584000	14.7	27.8	42.5	46.0	-3.5

Performed by: Michael Wyman

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

Name of Test: Transient Frequency Behavior
Specification: 90.214
Test Equipment Utilized: I00324, i003321, i00159, i00318, i00266 **Test Date:** 09/08/08

Measurement Procedure

A) The EUT was setup as shown on the attached page, following TIA-603 steps a, b, and c as a *guide*.

B) The transmitter was turned on.

C) Sufficient attenuation was provided so that the transmitter carrier level measured at the output of the combiner was 40 dB below the maximum input level of the test receiver. This level was recorded.

D) The transmitter was turned off.

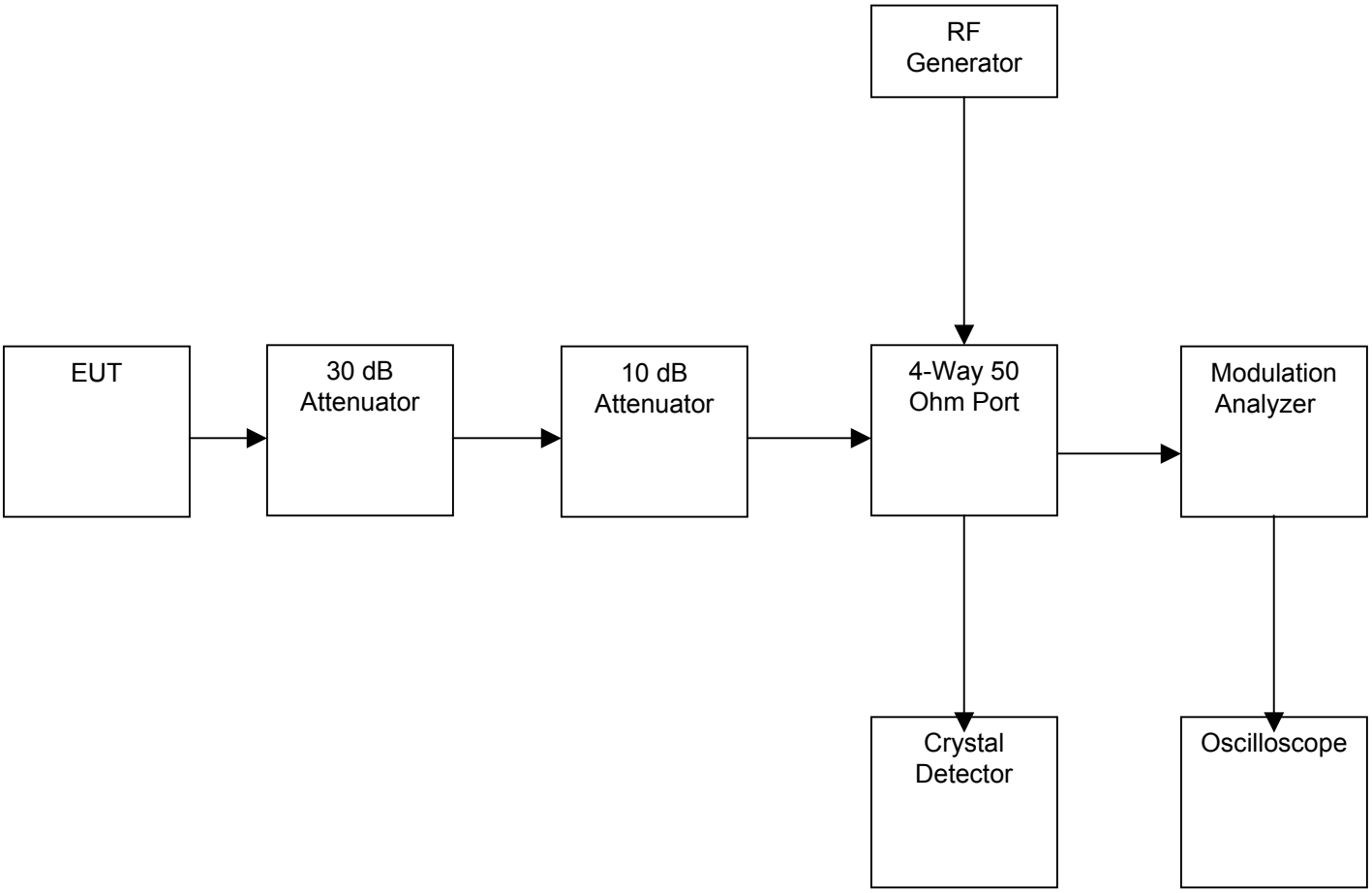
E) An RF signal generator (1) modulated with a 1 kHz tone at either 25, 12.5, or 6.25 kHz deviation, and set to the same frequency as the assigned transmitter frequency, (2) was adjusted to a level -20 dB below the level recorded for step C) above, measured at the output of the combiner. This level was then fixed for the remainder of the test.

F) The oscilloscope was setup using TIA-603 steps j and k as a guide, and to either 10 ms/div (UHF) or 5 ms/div (VHF).

G) The 30 dB attenuator was removed, the transmitter was turned on, and the level of the carrier at the output of the combiner was recorded.

H) The carrier on-time as referenced in TIA-603 steps m, n, and o was captured and plotted. The carrier off-time as referenced in TIA-603 steps p, q, r, and s was captured and plotted.

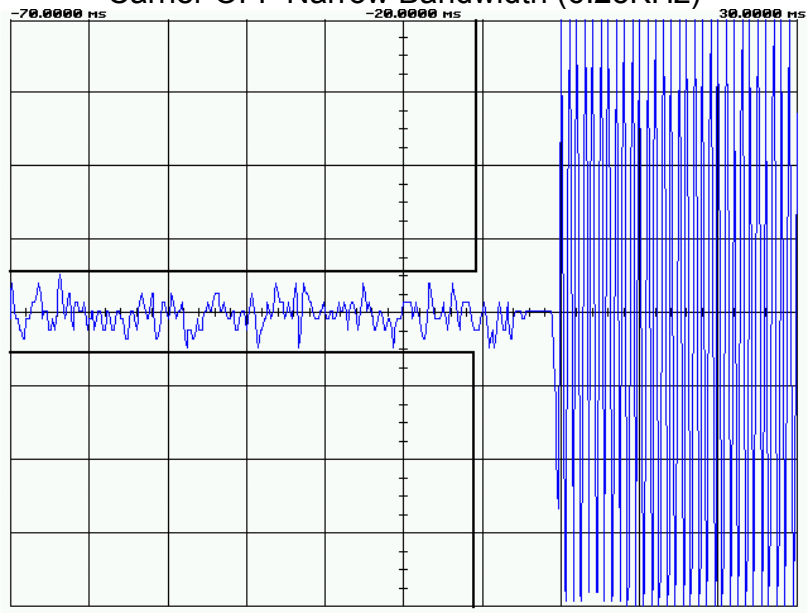
Transmitter Set-Up



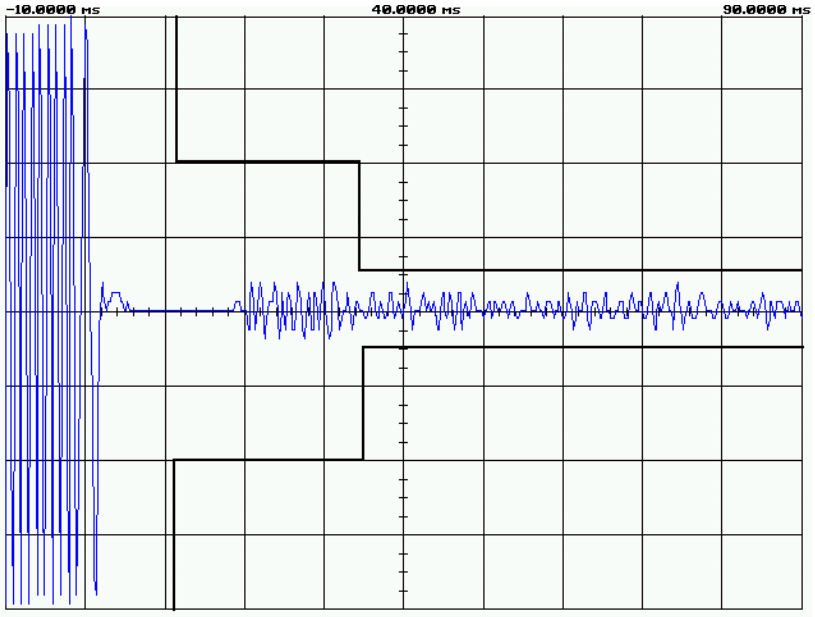
Transmitter Set-Up

Name of Test: Transient Frequency Behavior

Carrier OFF Narrow Bandwidth (6.25KHz)



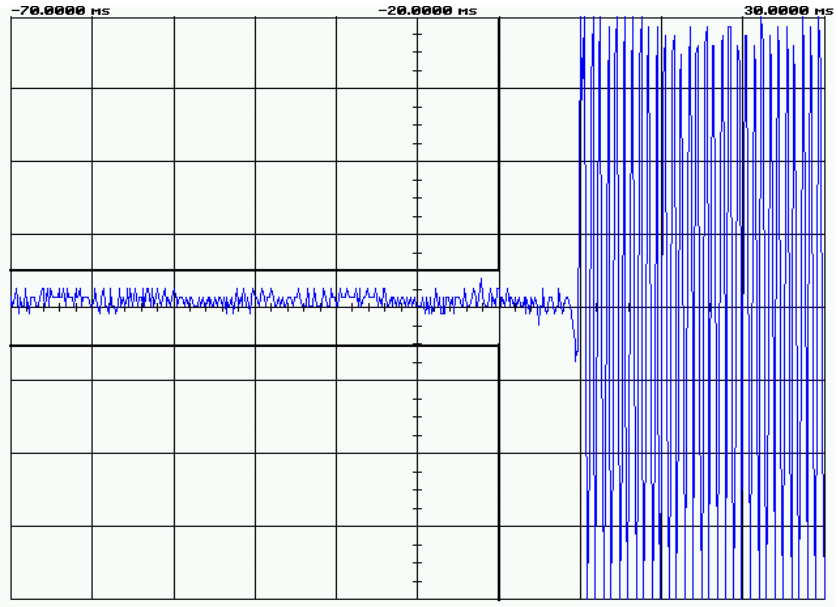
Carrier ON Narrow Bandwidth



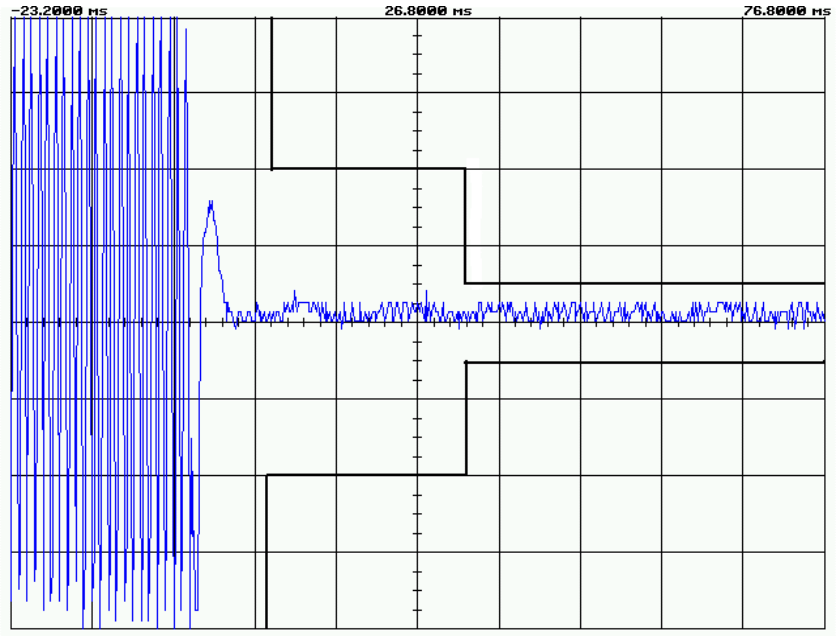
Transmitter Set-Up

Name of Test: Transient Frequency Behavior

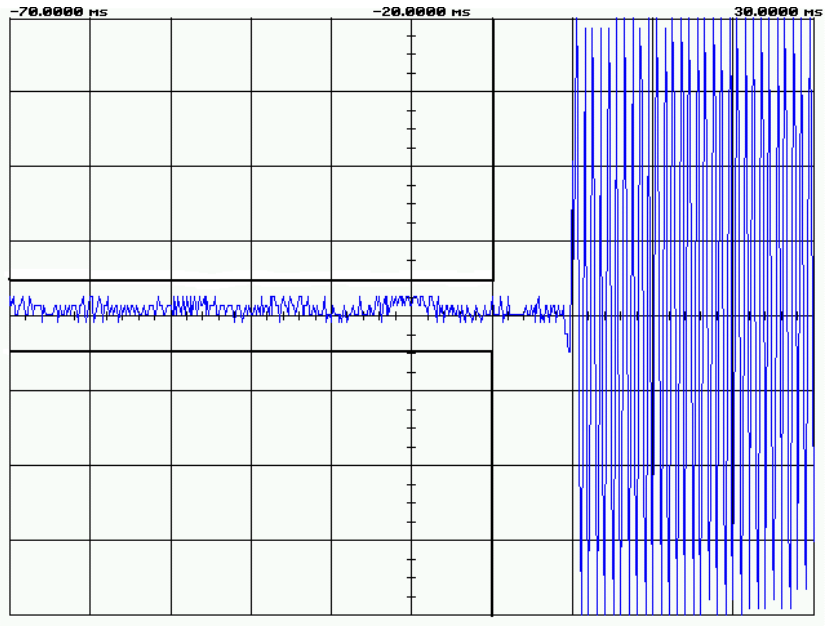
Carrier OFF Narrow Bandwidth (12.5KHz)



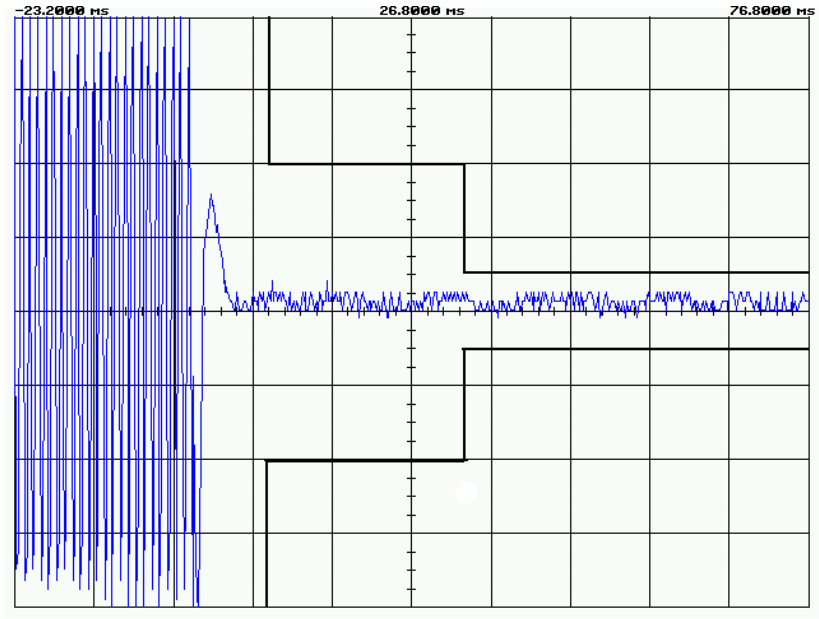
Carrier ON Narrow Bandwidth



Carrier OFF Wide Bandwidth (25.0KHz)



Carrier ON Wide Bandwidth



Performed by: Michael Wyman

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

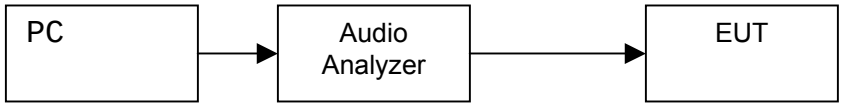
Name of Test: Audio Low Pass Filter (Voice Input)
Specification: 2.1047(a)
Test Equipment Utilized: I000324 **Test Date:** 09/08/08

Measurement Procedure

A) The EUT 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.

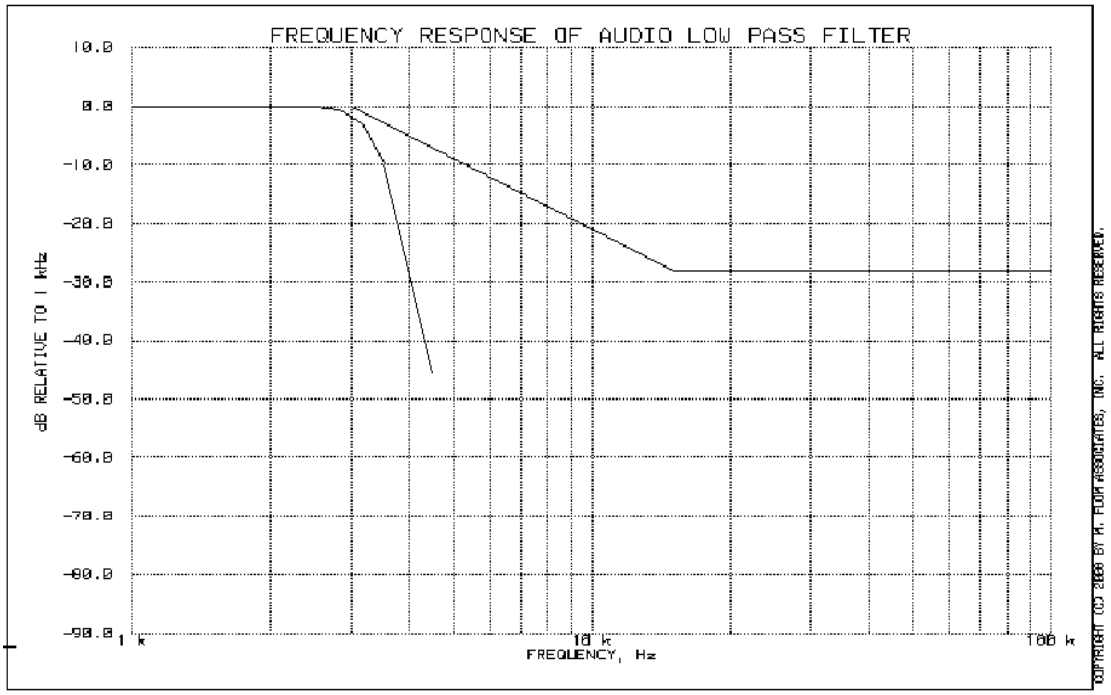
Transmitter Test Set-Up: Response of Low Pass Filter



Name of Test: Audio Low Pass Filter (Voice Input)

Measurement Results

g0890011: 2008-Sep-10 Wed 09:55:00
State: 0:General Ambient Temperature: 23°C ± 3°C



R

Performed by: Michael Wyman

Name of Test: Audio Frequency Response
Specification: 2.1047(a)
Test Equipment Utilized: I00324 **Test Date:** 09/08/08

Measurement Procedure

A) The EUT and test equipment were set up as shown below.

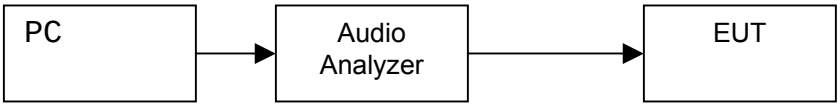
B) The audio signal generator was connected to the audio input circuit/microphone of the EUT.

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.

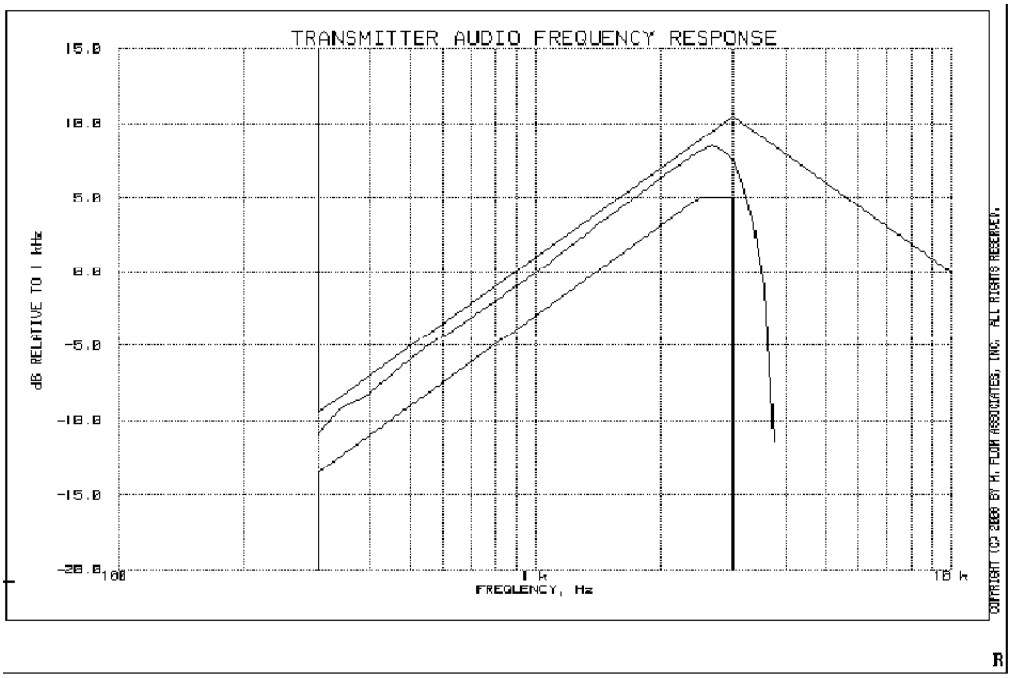
Transmitter Test Set-Up: Audio Frequency Response



Measurement Results

g0890011: 2008-Sep-10 Wed 09:55:00
State: 0:General

Ambient Temperature: 23°C ± 3°C



Frequency of Maximum Audio Response, Hz = 2500

Performed by: Michael Wyman

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Chandler, Arizona 85225-7176
(866) 311-3268 phone, (480) 926-3598 fax

Name of Test: Modulation Limiting
Specification: 2.1047(b)
I00324, i00321 **Test Date:** 09/08/08

Measurement Procedure

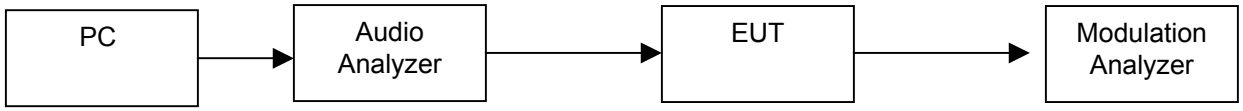
A) The signal generator was connected to the input of the EUT as shown below.

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.

Transmitter Test Set-Up: Modulation Limiting

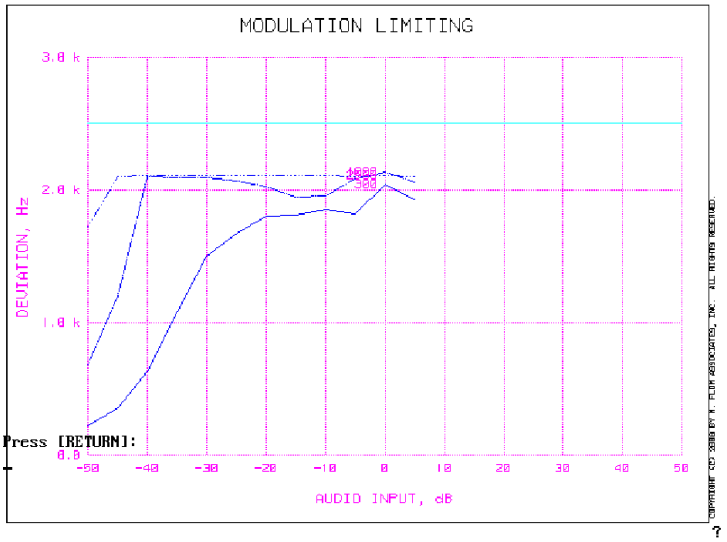


Measurement Results

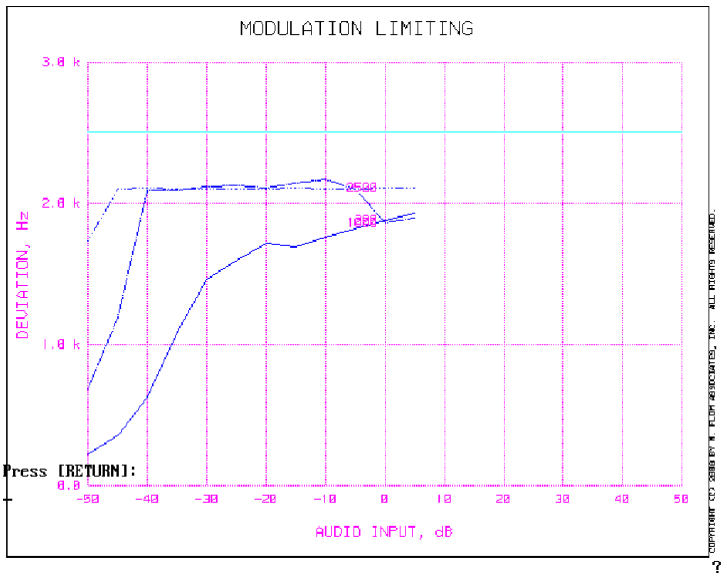
g0890011: 2008-Sep-10 Wed 09:55:00
State: 0:General

Ambient Temperature: 23°C ± 3°C

Positive
Peaks: 2.5KHz
6.25KHz



Negative
Peaks: 2.5KHz
6.25KHz

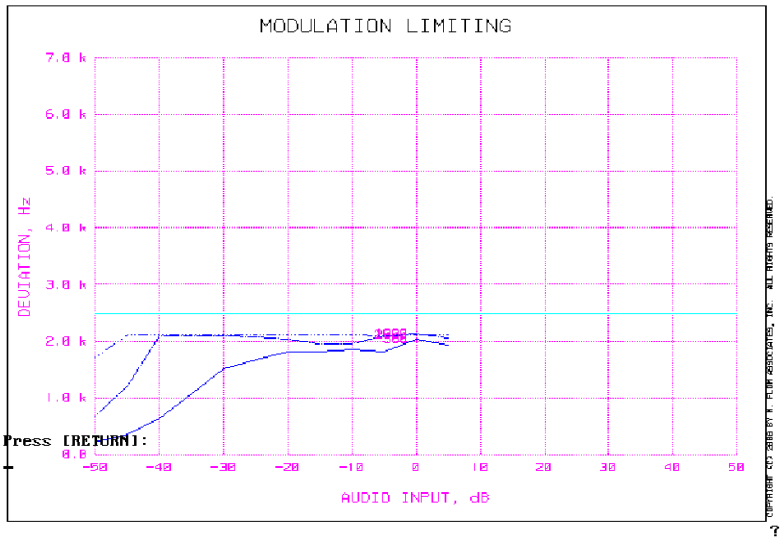


Measurement Results

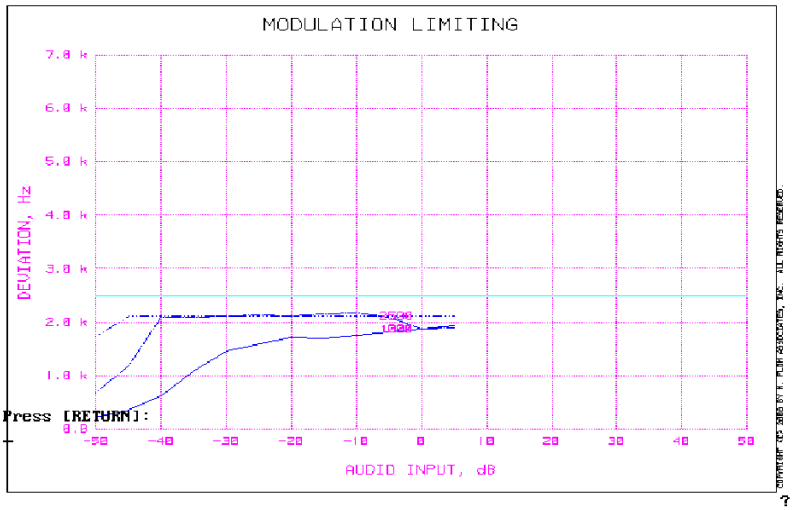
g0890011: 2008-Sep-10 Wed 09:55:00
State: 0:General

Ambient Temperature: 23°C ± 3°C

Positive
Peaks: 2.5KHz
12.5KHz



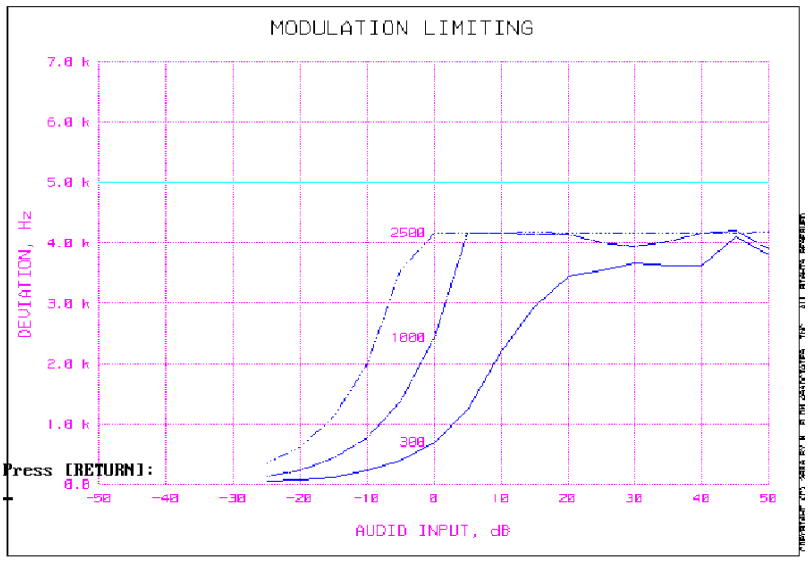
Negative
Peaks: 2.5KHz
12.5KHz



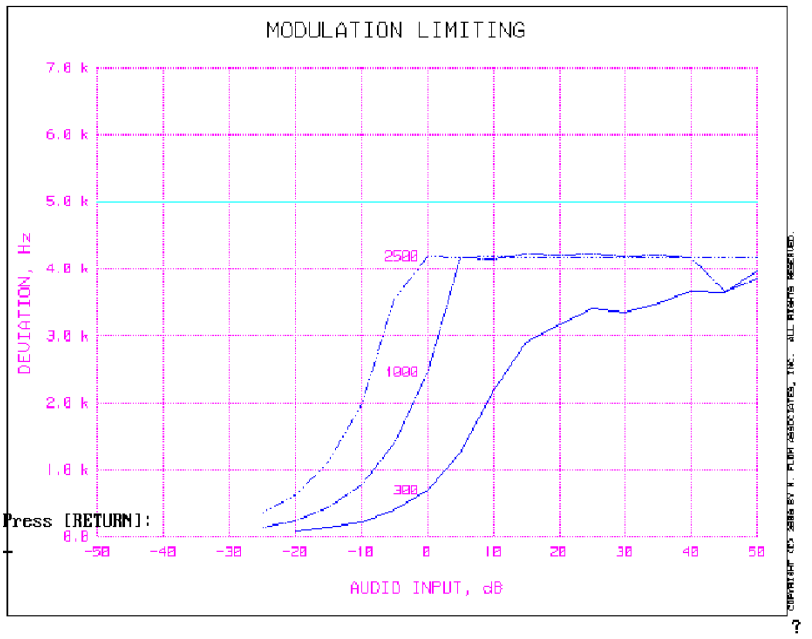
g0890011: 2008-Sep-10 Wed 09:55:00
State: 0:General

Ambient Temperature: 23°C ± 3°C

Positive
Peaks: 5KHz
25.0KHz



Negative
Peaks: 5KHz
25.0KHz



Name of Test: Frequency Stability (Temperature Variation)
Specification: 2.1055(a)(1)
Test Equipment Utilized: I00019 **Test Date:** 09/15/08

Measurement Procedure

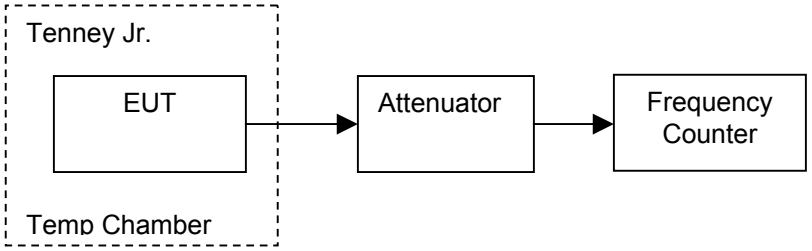
A) The EUT and test equipment were set up as shown on the following page.

B) With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.

C) With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.

D) The temperature tests were performed for the worst case.

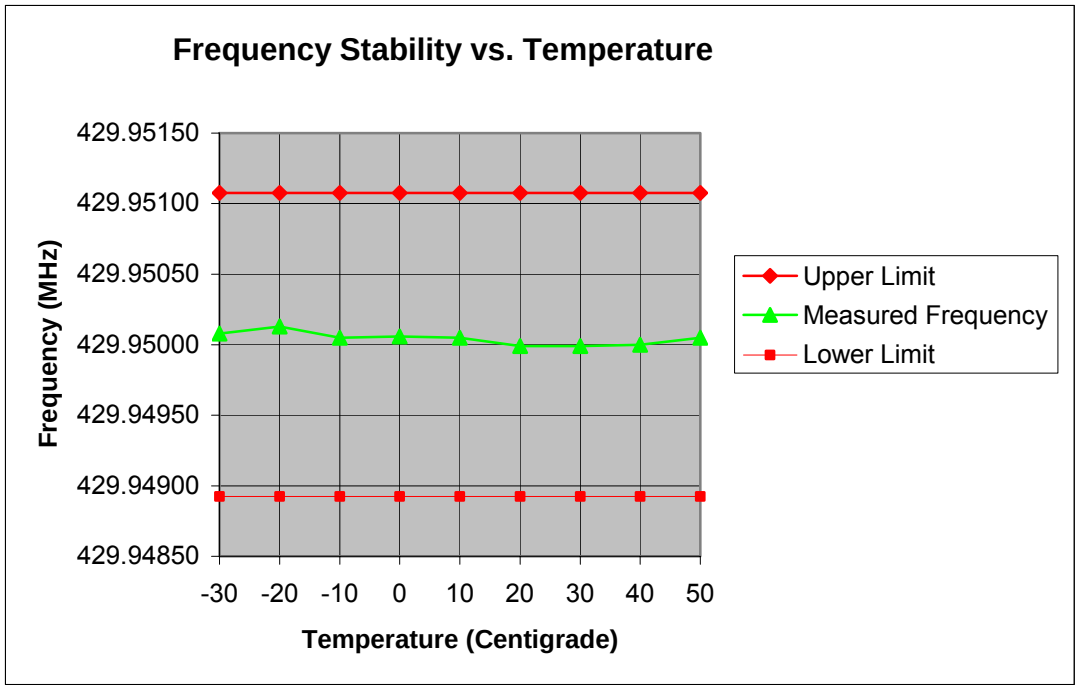
Transmitter Test Set-Up: Temperature Variation



Measurement Results

g0890012: 2008-Sep-10 Wed 10:03:00
State: 0:General

Ambient Temperature: 23°C ± 3°C



Performed by: Michael Wyman

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Name of Test: Frequency Stability (Voltage Variation)
Specification: 2.1055(b)(1)
Test Equipment Utilized: i00019, i00319, i00005 **Test Date:** 09/16/08

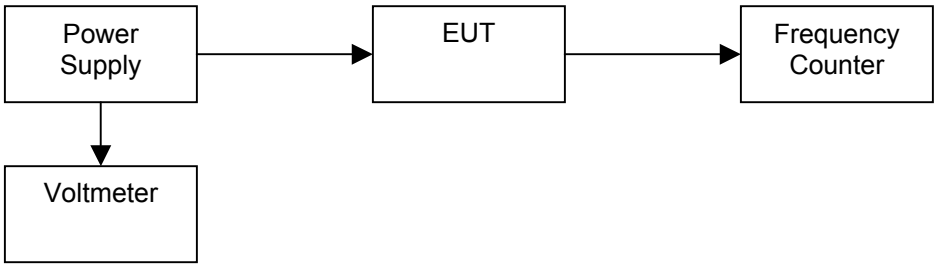
Measurement Procedure

A) The EUT was placed in a temperature chamber (if required) at 25±5°C and connected as shown below.

B) The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.

C) The variation in frequency was measured for the worst case.

Transmitter Test Set-Up: Voltage Variation



Measurement Results

g0890012: 2008-Sep-10 Wed 10:03:00
State: 0:General Ambient Temperature: 23°C ± 3°C

Limit, ppm	=	0.5ppm
Limit, Hz	=	215Hz +/- 107Hz
Battery End Point (Voltage)	=	6.83Vdc

% of STV	Voltage	Frequency, MHz	Change, Hz	Change, ppm
115	8.63	429.95000	0	<1ppm
100	7.50	429.95000	0	<1ppm
85	6.38	429.95000	0	<1ppm

Performed by: Michael Wyman

Name of Test: Necessary Bandwidth and Emission Bandwidth
Specification: 2.202(g)

Modulation = FM

Necessary Bandwidth Calculation:		16K0F3E	11K0F3E
Maximum Modulation (M), kHz	=	3.0	3.0
Maximum Deviation (D), kHz	=	5.0	2.5
Constant Factor (K)	=	1	1
Necessary Bandwidth (B_N), kHz	=	16.0	11.0

Bn = 2M + 2DK

Necessary Bandwidth Calculation:		8K10F1E, 8K10F1D
Digital Information Rate, bps	=	9600bps
Peak Frequency Deviation, KHz	=	3.111
Signaling States	=	4
Numerical Factor K	=	1
Necessary Bandwidth (B_N), kHz	=	8.10

Bn = 2M + 2DK

Necessary Bandwidth Calculation:	8K30F1D, 8K30F1E, 8K30F7W
Digital information rate, bps	9600
Peak frequency deviation, KHz	3.391
Signaling states	4
Numerical factor	1
Necessary bandwidth (B_N), KHz	8.30

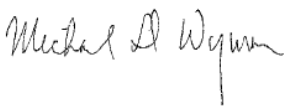
Bn =$R/(\log_2 S)$ + 2DK

Necessary Bandwidth Calculation:	
Digital information rate, bps	4800
Peak frequency deviation, KHz	1.550
Signaling states	4
Numerical factor	516
Necessary bandwidth (B_N), KHz	4.0

Bn =$R/(\log_2 S)$ + 2DK

Necessary Bandwidth Calculation:		
Maximum Modulation (M), kHz	=	0.8
Maximum Deviation (D), kHz	=	1.2
Constant Factor (K)	=	1
Necessary Bandwidth (B_N), kHz	=	4.0

Bn = 2M + 2DK



Performed by: Michael Wyman

Test Equipment Utilized

Description	MFG	Model Number	FTL Asset Number	Last Cal Date	Cal Due Date
RF Pre-Amplifier	HP	8449	i00028	1/23/07	1/23/09
Spectrum Analyzer	HP	8563E	i00029	3/9/07	3/9/08
Spectrum Analyzer	HP	8566B	i00049	8/18/07	8/18/08
Bi Con Antenna	EMCO	3109B	i00088	10/15/07	10/15/09
Log Periodic Antenna	Aprel	2001	i00089	10/22/07	10/22/09
Monopole Antenna	Ailtech	DM-105A-T1,T2, T3	i00037, 39 i00042, 48	Verified	Verified
Horn Antenna	EMCO	3115	i00103	9/5/06	9/5/08
Horn Antenna	Aprel	3115	I00091	NCR	NCR
Power Meter	HP	E4418B	i00228	9/6/07	9/6/08
Power sensor	HP	8481A	i00317	9/6/07	9/6/08
Spectrum Analyzer	HP	8566B	i00329	5/05/08	5/05/09
Voltmeter	Fluke	87III	i00319	11/05/07	11/05/08
Temperature Chamber	Tenney	Tenney Jr.	i00027	9/25/07	9/25/08
Audio Analyzer	HP	8903A	i00324	9/14/07	9/14/08
Modulation Analyzer	HP	8901A	i00321	9/17/07	9/17/08
Frequency Counter	HP	5334A	i00019	11/20/07	11/20/08
Power Supply	HP	6286A	i00005	NCR	NCR
Signal Generator	R&S	SMT-03	i00266	NCR	NCR
Digitizing Oscilloscope	HP	50402	i00318	10/17/07	10/17/08
Crystal Detector	HP	8472B	i00159	NCR	NCR

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