MFA M. Flom Associates, Inc. - Global Compliance Center
3356 North San Marcos Place, Suite 107, Chandler, Arizona 85225-7176
www.mflom.com general@mflom.com (480) 926-3100, FAX: 926-3598

Transmitter Certification

of

FCC ID: ALH35583110
Model: TKR-851-1

to

Federal Communications Commission

Rule Part(s) 22, 74, 90, 90.210, 95, Confidentiality

Date of report: January 14, 2004

On the Behalf of the Applicant:

Kenwood USA Corporation

At the Request of:

P.O. JB-F-006

Kenwood USA Corporation
Communications Division
3975 Johns Creek Court, Suite 300
Suwanee, GA 30024

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

Supervised by: Morton Flom, P. Eng.

List of Exhibits

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

Applicant: Kenwood USA Corporation

FCC ID: ALH35583110

By Applicant:

1. Letter of Authorization	x
2. Identification Drawings, 2.1033(c)(11)	
_X_ Label	
_X_ Location of Label	
_X_ Compliance Statement	
_X_ Location of Compliance Statement	
3. Photographs, 2.1033(c)(12)	x
4. Documentation: 2.1033(c)	
(3) User Manual	x
(9) Tune Up Info	x
(10) Schematic Diagram	x
(10) Circuit Description	x
Block Diagram	x
Parts List	x
Active Devices	x
5. Part 90.203(e) & (g) Attestation	x
6. Request for Confidentiality	x
7. MPE Report	x

By M.F.A. Inc.:

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.

Table of Contents

Required information per ISO/IEC Guide 25-1990, paragraph 13.2:

a) **Test Report**

b) Laboratory: M. Flom Associates, Inc.
(FCC: 31040/SIT) 3356 N. San Marcos Place, Suite 107
(Canada: IC 2044) Chandler, AZ 85225

c) Report Number: d0410016

d) Client: Kenwood USA Corporation
Communications Division
3975 Johns Creek Court, Suite 300
Suwanee, GA 30024

e) Identification: TKR-851-1
FCC ID: ALH35583110
EUT Description: UHF FM Repeater

f) EUT Condition: Not required unless specified in individual tests.

g) Report Date: January 14, 2004
EUT Received: December 18, 2003

h, j, k): As indicated in individual tests.

i) Sampling method: No sampling procedure used.

l) Uncertainty: In accordance with MFA internal quality manual.

m) Supervised by:

Morton Flom, P. Eng.

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.

List of General Information Required for Certification

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

22, 74, 90, 90.210, 95, Confidentiality

Sub-part 2.1033

(c)(1): **Name and Address of Applicant**:

Kenwood USA Corporation
Communications Division
3975 Johns Creek Court, Suite 300
Suwanee, GA 30024

Manufacturer:

Kenwood Electronics Technologies PTE Ltd.
1 Ang Mo Kio Street 63
Singapore 569110

(c)(2): **FCC ID**: ALH35583110

Model Number: TKR-851-1

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

Please see attached exhibits

(c)(4): **Type of Emission**: 16K0F3E, 11K0F3E
16K0F1D, 11K0F1D

(c)(5): **Frequency Range, MHz**: 450 to 480

(c)(6): **Power Rating, Watts**: 1 to 25

____ Switchable x Variable ____ N/A

FCC Grant Note: BC – The output power is continuously variable from the value listed in this entry to 5%-10% of the value listed.

(c)(7): **Maximum Power Rating, Watts**: 300

DUT Results: Passes x Fails _____

M. Flom Associates, Inc. is accredited by the American Association for Laboratory Association (A2LA) as shown in the scope below.

THE AMERICAN
ASSOCIATION
FOR LABORATORY
ACCREDITATION

ACCREDITED LABORATORY

A2LA has accredited

M. FLOM ASSOCIATES, INC.
Chandler, AZ

for technical competence in the field of

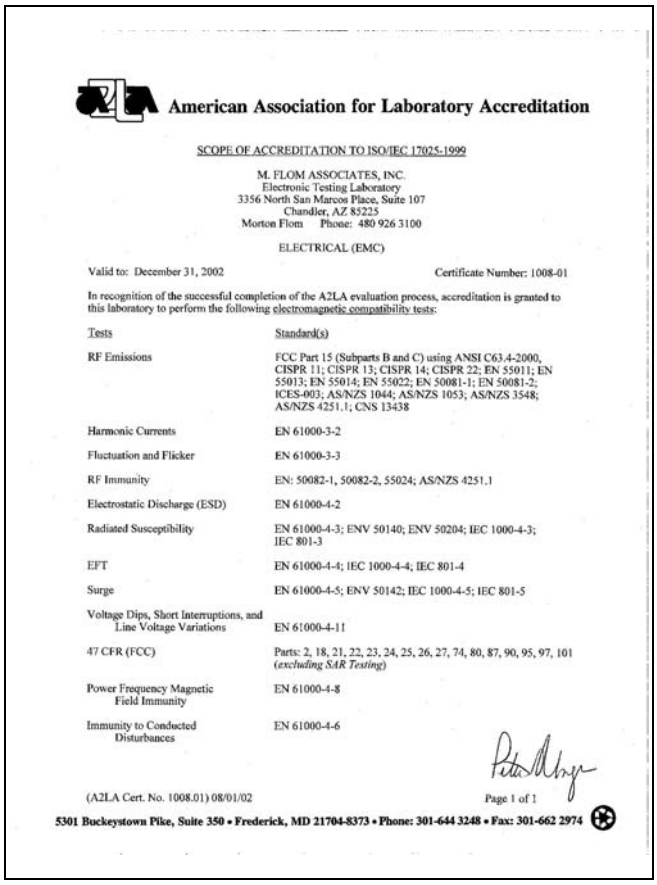
Electrical (EMC) Testing

The accreditation covers the specific tests and types of tests listed on the agreed scope of accreditation. This laboratory meets the requirements of ISO/IEC 17025 - 1999 "General Requirements for the Competence of Testing and Calibration Laboratories" and any additional program requirements in the identified field of testing. Testing and calibration laboratories that comply with this International Standard also operate in accordance with ISO 9001 or ISO 9002.

Presented this 2nd day of March, 2001.

President
For the Accreditation Council
Certificate Number 1008.01
Valid to December 31, 2002

For tests or types of tests to which this accreditation applies, please refer to the laboratory's Electrical (EMC) Scope of Accreditation



American Association for Laboratory Accreditation

SCOPE OF ACCREDITATION TO ISO/IEC 17025:1999

M. FLOM ASSOCIATES, INC.
Electronic Testing Laboratory
3356 North San Marcos Place, Suite 107
Chandler, AZ 85225
Morton Flom Phone: 480 926 3100

ELECTRICAL (EMC)

Valid to: December 31, 2002 Certificate Number: 1008-01

In recognition of the successful completion of the A2LA evaluation process, accreditation is granted to this laboratory to perform the following electromagnetic compatibility tests:

Tests	Standard(s)
RF Emissions	FCC Part 15 (Subparts B and C) using ANSI C63.4-2000, CISPR 11; CISPR 13; CISPR 14; CISPR 22; EN 55011; EN 55013; EN 55014; EN 55022; EN 50081-1; EN 50081-2; ICES-003; AS/NZS 1044; AS/NZS 1053; AS/NZS 3548; AS/NZS 4251.1; CNS 13438
Harmonic Currents	EN 61000-3-2
Fluctuation and Flicker	EN 61000-3-3
RF Immunity	EN: 50082-1, 50082-2, 55024; AS/NZS 4251.1
Electrostatic Discharge (ESD)	EN 61000-4-2
Radiated Susceptibility	EN 61000-4-3; ENV 50140; ENV 50204; IEC 1000-4-3; IEC 801-3
EFT	EN 61000-4-4; IEC 1000-4-4; IEC 801-4
Surge	EN 61000-4-5; ENV 50142; IEC 1000-4-5; IEC 801-5
Voltage Dips, Short Interruptions, and Line Voltage Variations	EN 61000-4-11
47 CFR (FCC)	Parts: 2, 18, 21, 22, 23, 24, 25, 26, 27, 74, 80, 87, 90, 95, 97, 101 *(excluding SAR Testing)*
Power Frequency Magnetic Field Immunity	EN 61000-4-8
Immunity to Conducted Disturbances	EN 61000-4-6

(A2LA Cert. No. 1008.01) 08/01/02 Page 1 of 1

5301 Buckeystown Pike, Suite 350 • Frederick, MD 21704-8373 • Phone: 301-644 3248 • Fax: 301-662 2974

"This laboratory is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this report have been determined in accordance with the laboratory's terms of accreditation unless stated otherwise in the report."

Should this report contain any data for tests for which we are not accredited, or which have been undertaken by a subcontractor that is not A2LA accredited, such data would not covered by this laboratory's A2LA accreditation.

Page Number 4 of 61.

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	=	8
Collector Voltage, Vdc	=	13.6
Supply Voltage, Vdc	=	13.6

(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

Page Number 5 of 61.

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:

____ 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
_X_ 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 C63.4-1992/2000 Draft, section 6.1.9, 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.

Prior to testing, the EUT was tuned up in accordance with the manufacturer's alignment procedures. All external gain controls were maintained at the position of maximum and/or optimum gain throughout the testing.

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

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Name of Test: Carrier Output Power (Conducted)

Specification: 47 CFR 2.1046(a)

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.1

Test Equipment: As per attached page

Measurement Procedure

1. 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.

2. Measurement accuracy is ±3%.

Measurement Results
(Worst case)

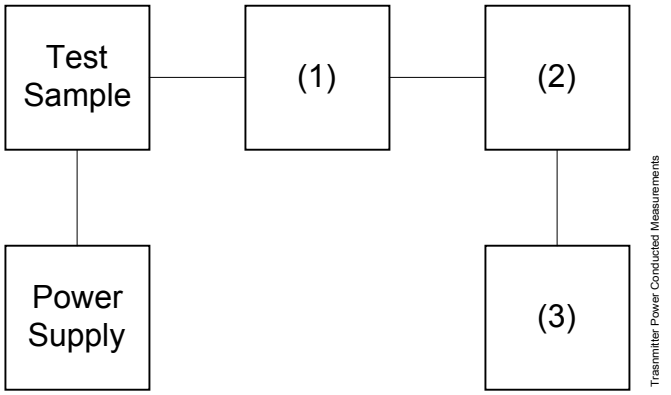
Frequency of Carrier, MHz = 465, 450, 480
Ambient Temperature = 23°C ± 3°C

Power Setting	RF Power, Watts
Low	1
High	25

Performed by: Daniel M. Dillon, Test Engineer

Transmitter Power Conducted Measurements

Test A. RF Power Output
Test B. Frequency Stability



	Asset	Description	s/n
(1)	**Coaxial Attenuator**		
X	i00231/2	PASTERNACK PE7021-30 (30 dB)	231 or 232
	i00122/3	NARDA 766 (10 dB)	7802 or 7802A
(2)	**Power Meters**		
X	i00020	HP 8901A Power Mode	2105A01087
(3)	**Frequency Counter**		
X	i00020	HP 8901A Frequency Mode	2105A01087

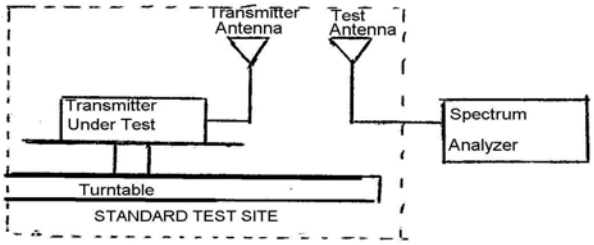
Page Number 9 of 61.

Name of Test: ERP Carrier Power (Radiated)

Specification: TIA/EIA 603A (Substitution Method)

2.2.17.1 Definition: The average radiated power of a licensed device is the equivalent power required, when delivered to a half-wave dipole or horn antenna, to produce at a distant point the same average received power as produced by the licensed device.

2.2.17.2 Method of Measurement:
a) Connect the equipment as illustrated. Place the transmitter to be tested on the turntable in the standard test site.



b) Raise and lower the test antenna from 1m to 6 m with the transmitter facing the antenna and record the highest received signal in dB as LVL.

c) Repeat step b) for seven additional readings at 45° interval positions of the turntable.

d) Replace the transmitter under test with a half-wave or horn vertically polarized antenna. The center of the antenna should be at the same location as the transmitter under test. Connect the antenna to a signal generator with a known output power and record the path loss in dB or LOSS.

e) Calculate the average radiated output power from the readings in step c) and d) by the following:

average radiated power = $10 \log_{10} \Sigma 10(LVL - LOSS)/10$ (dBm)

Results

	450 MHz		465 MHz		480 MHz	
	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db	LVL, dbm	Path Loss, db
0°	48.0	-2.4	47.7	-1	43.0	0.5
45°	47.7	-2.4	46.7	-1	43.9	0.5
90°	48.9	-2.4	47.2	-1	44.7	0.5
135°	48.2	-2.4	47.2	-1	43.4	0.5
180°	46.3	-2.4	46.7	-1	44.9	0.5
225°	48.6	-2.4	47.7	-1	43.6	0.5
270°	48.9	-2.4	47.9	-1	45.6	0.5
315°	46.8	-2.4	45.8	-1	42.1	0.5

	450 MHz	465 MHz	480 MHz
Av. Radiated Power:	45.53 dbm	46.11 dbm	44.4 dbm

Name of Test: Unwanted Emissions (Transmitter Conducted)

Specification: 47 CFR 2.1051

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.13

Test Equipment: As per attached page

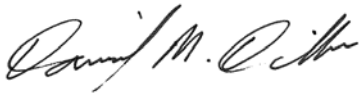
Measurement Procedure

1. The emissions were measured for the worst case as follows:
   (a): within a band of frequencies defined by the carrier frequency plus and minus one channel.
   (b): 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.

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

3. Measurement Results: Attached for worst case

Frequency of carrier, MHz	=	465, 450, 480
Spectrum Searched, GHz	=	0 to 10 x F_C
Maximum Response, Hz	=	2820
All Other Emissions	=	≥ 20 dB Below Limit

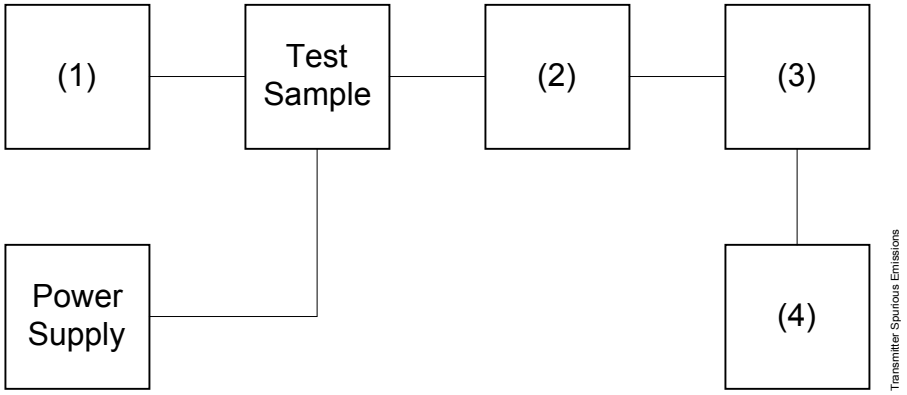


Performed by: Daniel M. Dillon, Test Engineer

Page Number 11 of 61.

Transmitter Spurious Emission

Test A. Occupied Bandwidth (In-Band Spurious)
Test B. Out-Of-Band Spurious



	Asset	Description	s/n
(1) **Audio Oscillator/Generator**			
X	i00017	HP 8903A Audio Analyzer	2216A01753
	i00002	HP 3336B Synthesizer / Level Gen.	1931A01465
(2) **Coaxial Attenuator**			
X	i00231/2	PASTERNACK PE7021-30 (30 dB)	231 or 232
	i0012/3	NARDA 766 (10 dB)	7802 or 7802A
(3) **Filters; Notch, HP, LP, BP**			
	i00126	Eagle TNF-1 Notch Filter	100-250
	i00125	Eagle TNF-1 Notch Filter	50-60
	i00124	Eagle TNF-1 Notch Filter	250-850
(4) **Spectrum Analyzer**			
X	i00048	HP 8566B Spectrum Analyzer	2511A01467
	i00029	HP 8563E Spectrum Analyzer	3213A00104

Name of Test: Unwanted Emissions (Transmitter Conducted)

Limit(s), dBc

-(43+10xLOG P) = -43 (1 Watt)
-(43+10xLOG P) = -57 (25 Watts)

g03c0053: 2003-Dec-30 Tue 12:41:00

State: 1:Low Power Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBm	Level, dBc
450.000000	74.083333	-40.8	-70
480.000000	133.341667	-40.8	-70
480.000000	326.375000	-40.8	-70
480.000000	383.525000	-40.3	-69.5
480.000000	399.750000	-39.8	-69
480.000000	426.008333	-40	-69.2
450.000000	473.900000	-40.5	-69.7
480.000000	554.375000	-40	-69.2
450.000000	554.833333	-40.8	-70
450.000000	600.341667	-40.6	-69.8
480.000000	615.008333	-40.1	-69.3
450.000000	670.966667	-40.8	-70
480.000000	678.666667	-40.8	-70
480.000000	717.666667	-40.6	-69.8
450.000000	728.758333	-40.1	-69.3
480.000000	787.466667	-40.5	-69.7
450.000000	793.241667	-40.5	-69.7
450.000000	798.416667	-40.1	-69.3
450.000000	799.750000	-40.6	-69.8
480.000000	833.616667	-40.6	-69.8
450.000000	842.508333	-40.8	-70
480.000000	858.408333	-40.6	-69.8
450.000000	900.004167	-40	-69.2
465.000000	930.004167	-40.5	-69.7
480.000000	960.003333	-41.5	-70.7
450.000000	966.658333	-40.6	-69.8
480.000000	1002.133333	-40.1	-69.3
450.000000	1019.775000	-40.5	-69.7
480.000000	1045.991667	-40.8	-70
450.000000	1046.266667	-40.5	-69.7
480.000000	1058.958333	-39.5	-68.7
480.000000	1074.633333	-40.8	-70
450.000000	1085.083333	-40.8	-70
480.000000	1134.441667	-39.6	-68.8
450.000000	1157.583333	-39.3	-68.5
480.000000	1193.241667	-40.3	-69.5
450.000000	1211.983333	-40.6	-69.8
480.000000	1237.741667	-40.5	-69.7
480.000000	1271.241667	-40.6	-69.8
480.000000	1311.341667	-40.6	-69.8
450.000000	1337.925000	-40.8	-70
450.000000	1350.021667	-41	-70.2
450.000000	1380.958333	-40.8	-70
465.000000	1395.032500	-50	-79.2

Name of Test: Unwanted Emissions (Transmitter Conducted)
g03c0053: 2003-Dec-30 Tue 12:41:00
State: 1:Low Power (Continued) Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBm	Level, dBc
480.000000	1397.000000	-40	-69.2
450.000000	1399.425000	-40.8	-70
480.000000	1408.133333	-40.6	-69.8
480.000000	1440.120000	-41.6	-70.8
480.000000	1530.866667	-40.3	-69.5
480.000000	1548.691667	-40.8	-70
450.000000	1657.125000	-40.8	-70
480.000000	1687.650000	-40.6	-69.8
480.000000	1697.500000	-40.8	-70
480.000000	1771.975000	-40.3	-69.5
450.000000	1776.191667	-40.1	-69.3
450.000000	1800.228333	-42	-71.2
450.000000	1819.225000	-40.5	-69.7
480.000000	1834.900000	-40.5	-69.7
465.000000	1860.055833	-50.2	-79.4
480.000000	1862.716667	-39.8	-69
480.000000	1899.700000	-40.8	-70
480.000000	1919.996667	-41.8	-71
450.000000	1930.316667	-40.6	-69.8
480.000000	1969.500000	-40.6	-69.8
450.000000	1979.216667	-40.6	-69.8
450.000000	2249.787500	-40.1	-69.3
465.000000	2325.068333	-50	-79.2
480.000000	2400.179167	-41.3	-70.5
450.000000	2700.185000	-41	-70.2
465.000000	2789.774167	-49	-78.2
480.000000	2880.109167	-39.8	-69
450.000000	3150.117500	-42.6	-71.8
465.000000	3255.005833	-49.7	-78.9
480.000000	3359.939167	-42.3	-71.5
450.000000	3600.018333	-41.8	-71
465.000000	3719.791667	-50	-79.2
480.000000	3840.076667	-42	-71.2
450.000000	4049.855833	-43.1	-72.3
465.000000	4185.204167	-51.2	-80.4
480.000000	4319.845833	-42	-71.2
450.000000	4499.831667	-43.5	-72.7
465.000000	4650.049167	-51.3	-80.5
480.000000	4800.015000	-42.6	-71.8
450.000000	4950.127500	-42.5	-71.7
465.000000	5114.951667	-51.7	-80.9
480.000000	5280.095833	-41.8	-71
450.000000	5399.959167	-42.6	-71.8
465.000000	5580.013333	-51.5	-80.7
480.000000	5759.855833	-43.1	-72.3
450.000000	5850.150833	-42.5	-71.7
465.000000	6044.864167	-51.3	-80.5

Name of Test: Unwanted Emissions (Transmitter Conducted)
g03c0053: 2003-Dec-30 Tue 12:41:00
State: 1:Low Power (Continued) Ambient Temperature: 23°C ± 3°C

480.000000	6239.996667	-42.3	-71.5
450.000000	6300.138333	-43.8	-73
465.000000	6509.938333	-50.2	-79.4
480.000000	6720.164167	-41.6	-70.8
450.000000	6750.188333	-40.5	-69.7
465.000000	6974.994167	-49.7	-78.9
480.000000	7200.244167	-40.5	-69.7

Performed by: Daniel M. Dillon, Test Engineer

Name of Test: Unwanted Emissions (Transmitter Conducted)

Limit(s), dBc: -(43+10xLOG P) = -43 (1 Watt)

-(43+10xLOG P) = -57 (25 Watts)

g0410034: 2004-Jan-06 Tue 08:36:00

State: 2:High Power Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	Level, dBm	Level, dBc	Margin, dB
450.000000	900.006500	-28.5	-75.5	-15.5
465.000000	930.011500	-29	-76	-16
480.000000	959.896000	-32.2	-79.2	-19.2
450.000000	1349.988500	-31.3	-78.3	-18.3
465.000000	1395.045000	-30.7	-77.7	-17.7
480.000000	1439.997000	-30.2	-77.2	-17.2
450.000000	1799.865000	-29.8	-76.8	-16.8
465.000000	1859.995000	-30.8	-77.8	-17.8
480.000000	1920.116500	-30.4	-77.4	-17.4
450.000000	2249.783000	-30.9	-77.9	-17.9
465.000000	2324.936500	-29.6	-76.6	-16.6
480.000000	2400.223000	-28	-75	-15
450.000000	2699.786500	-32.1	-79.1	-19.1
465.000000	2789.829000	-31.7	-78.7	-18.7
480.000000	2880.079500	-32.7	-79.7	-19.7
450.000000	3149.803500	-33.1	-80.1	-20.1
465.000000	3254.797000	-32.6	-79.6	-19.6
480.000000	3359.754500	-33.2	-80.2	-20.2
450.000000	3600.203500	-32.7	-79.7	-19.7
465.000000	3719.795000	-33.6	-80.6	-20.6
480.000000	3839.760000	-33.6	-80.6	-20.6
450.000000	4049.760500	-32.7	-79.7	-19.7
465.000000	4185.127500	-33.4	-80.4	-20.4
480.000000	4319.894500	-32.8	-79.8	-19.8
450.000000	4499.904500	-32.5	-79.5	-19.5
465.000000	4650.152500	-32.2	-79.2	-19.2
480.000000	4799.882500	-33.3	-80.3	-20.3
450.000000	4950.201000	-33.2	-80.2	-20.2
465.000000	5114.968000	-32.3	-79.3	-19.3
480.000000	5279.790000	-31.8	-78.8	-18.8
450.000000	5399.931500	-33.4	-80.4	-20.4
465.000000	5579.853000	-32.6	-79.6	-19.6
480.000000	5760.085000	-32.4	-79.4	-19.4
450.000000	5849.787500	-25.2	-72.2	-12.2
465.000000	6045.055000	-25.7	-72.7	-12.7
480.000000	6240.148500	-25.3	-72.3	-12.3
450.000000	6299.903000	-26.3	-73.3	-13.3
465.000000	6509.899500	-25.7	-72.7	-12.7
480.000000	6719.758500	-25.9	-72.9	-12.9
450.000000	6750.149500	-24.2	-71.2	-11.2
465.000000	6975.005500	-25.1	-72.1	-12.1
480.000000	7200.159500	-25.2	-72.2	-12.2

Performed by: Daniel M. Dillon, Test Engineer

Name of Test: Field Strength of Spurious Radiation

Specification: 47 CFR 2.1053(a)

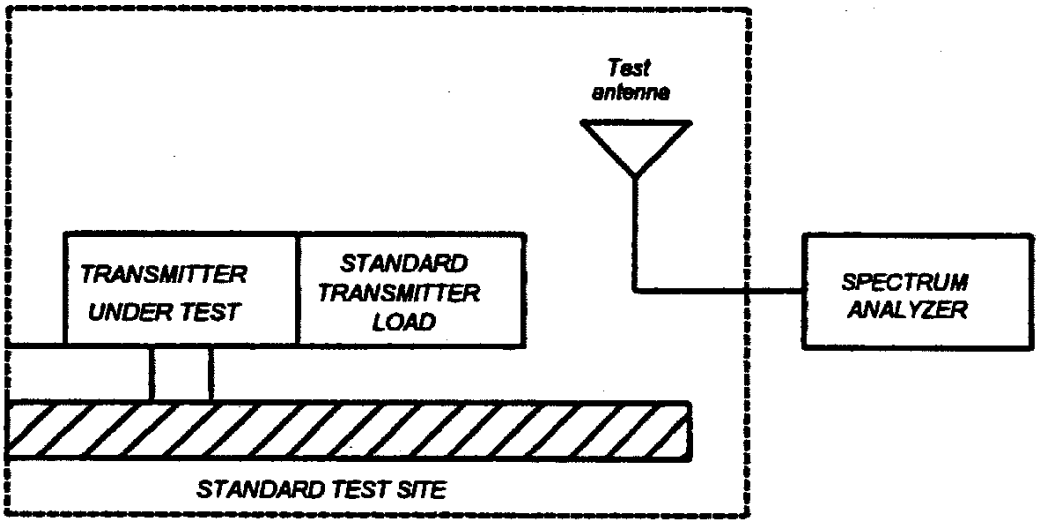
Guide: ANSI/TIA/EIA-603-1992/2001, Paragraph 1.2.12 and Table 16, 47 CFR 22.917

Measurement Procedure

1.2.12.1 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.

1.2.12.2 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 which is placed on the turntable. The RF cable to this load should be of minimum length.

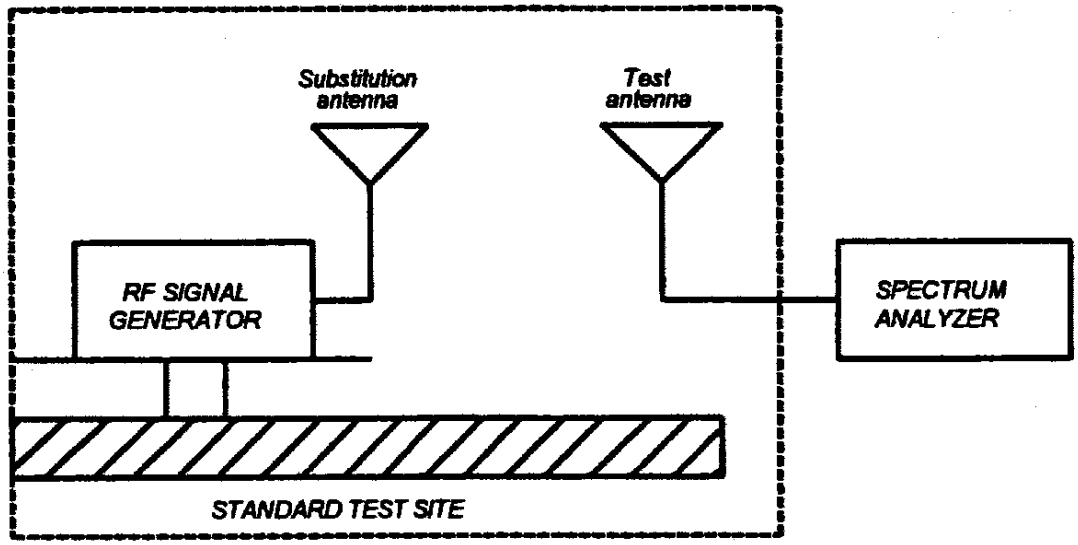


Name of Test: Field Strength of Spurious Radiation (Cont.)

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.

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Name of Test: Field Strength of Spurious Radiation (Cont.)

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 Equipment:

	Asset	Description	s/n	Cycle	Last Cal
Transducer					
	i00088	EMCO 3109-B 25MHz-300MHz	2336	12 mo.	Sep-03
X	i00089	Aprel 2001 200MHz-1GHz	001500	12 mo.	Sep-03
X	i00103	EMCO 3115 1GHz-18GHz	9208-3925	12 mo.	Jan-03
Amplifier					
X	i00028	HP 8449A	2749A00121	12 mo.	May-03
Spectrum Analyzer					
X	i00029	HP 8563E	3213A00104	12 mo.	May-03
X	i00033	HP 85462A	3625A00357	12 mo.	Aug-03
Substitution Generator					
X	i00067	HP 8920A Communication TS	3345U01242	12 mo.	Oct-03
	i00207	HP 8753D Network Analyzer	3410A08514	12 mo.	Jul-03

Microphone, Antenna Port, and Cabling

Microphone	Yes	Cable Length	1.0	Meters	
Antenna Port Terminated	Yes	Load	N/A	Antenna Gain	0 dBd
All Ports Terminated by Load	Yes	Peripheral	N/A		

Name of Test: Field Strength of Spurious Radiation
g03c0028: 2003-Dec-22 Mon 10:08:00
STATE: 2:High Power Ambient Temperature: 23°C ± 3°C

Frequency Tuned, MHz	Frequency Emission, MHz	ERP, dBm	ERP, dBc
450.000000	900.010000	-26.9	≤ -60.8
465.000000	930.006000	-19	≤ -60.8
480.000000	960.010000	-27.9	≤ -60.8
450.000000	1350.010000	-25.1	≤ -60.8
465.000000	1395.006000	-28	≤ -60.8
480.000000	1440.010000	-26.2	≤ -60.8
450.000000	1800.005000	-40	≤ -60.8
465.000000	1860.019000	-33.1	≤ -60.8
480.000000	1920.008000	-26.5	≤ -60.8
450.000000	2250.002500	-32.6	≤ -60.8
465.000000	2325.006000	-29.7	≤ -60.8
480.000000	2400.008000	-34.4	≤ -60.8
450.000000	2700.010000	-25.1	≤ -60.8
465.000000	2790.011000	-23.4	≤ -60.8
480.000000	2880.008000	-24.4	≤ -60.8
450.000000	3149.988333	-22.5	≤ -60.8
465.000000	3254.988333	-35	≤ -60.8
480.000000	3359.990000	-37.9	≤ -60.8
450.000000	3599.998333	-32.9	≤ -60.8
465.000000	3719.996667	-32.4	≤ -60.8
480.000000	3839.993333	-33.7	≤ -60.8
450.000000	4049.996667	-34.7	≤ -60.8
465.000000	4185.001667	-30.9	≤ -60.8
480.000000	4320.000000	-34.1	≤ -60.8
450.000000	4500.005000	-33	≤ -60.8
0.000000	4650.005000	-35.4	≤ -60.8
480.000000	4800.000000	-34.5	≤ -60.8

Performed by: Daniel M. Dillon, Test Engineer

Name of Test: Emission Masks (Occupied Bandwidth)

Specification: 47 CFR 2.1049(c)(1)

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.11

Test Equipment: As per previous page

Measurement Procedure

1. The EUT and test equipment were set up as shown on the following page, with the Spectrum Analyzer connected.

2. 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.

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

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

5. Measurement Results: Attached

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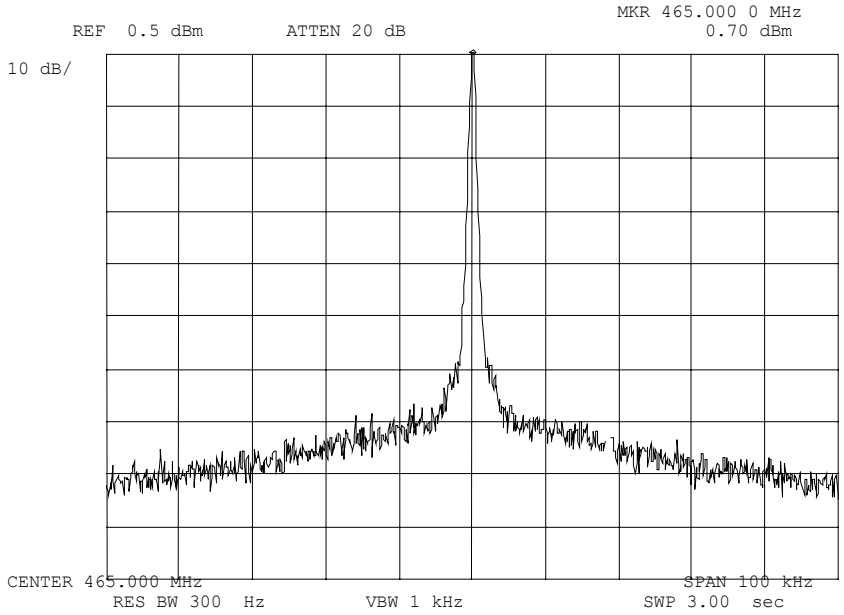
Name of Test: Emission Masks (Occupied Bandwidth)
g03c0032: 2003-Dec-24 Wed 10:29:00
State: 1:Low Power Ambient Temperature: 23°C ± 3°C



Power: LOW
Modulation: NONE

Performed by: Daniel M. Dillon, Test Engineer

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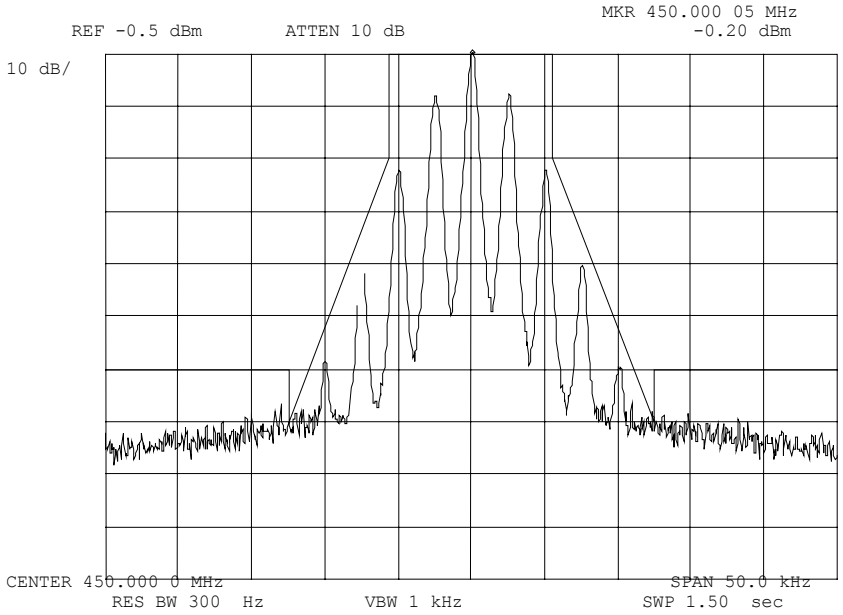
Name of Test: Emission Masks (Occupied Bandwidth)
g03c0036: 2003-Dec-24 Wed 10:44:00
State: 1:Low Power Ambient Temperature: 23°C ± 3°C



Power: LOW
Modulation: VOICE: 2500 Hz SINE WAVE
MASK: D, VHF/UHF 12.5kHz BW

Performed by: Daniel M. Dillon, Test Engineer

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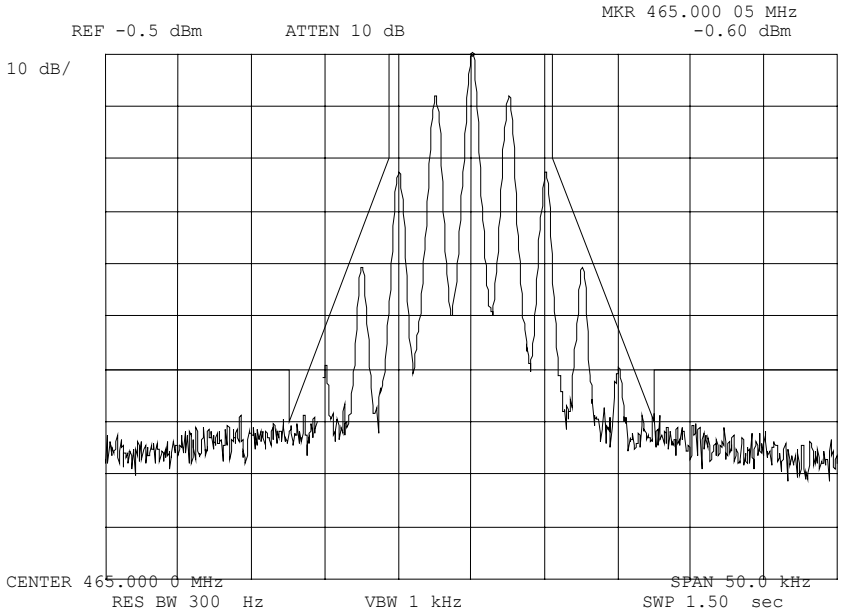
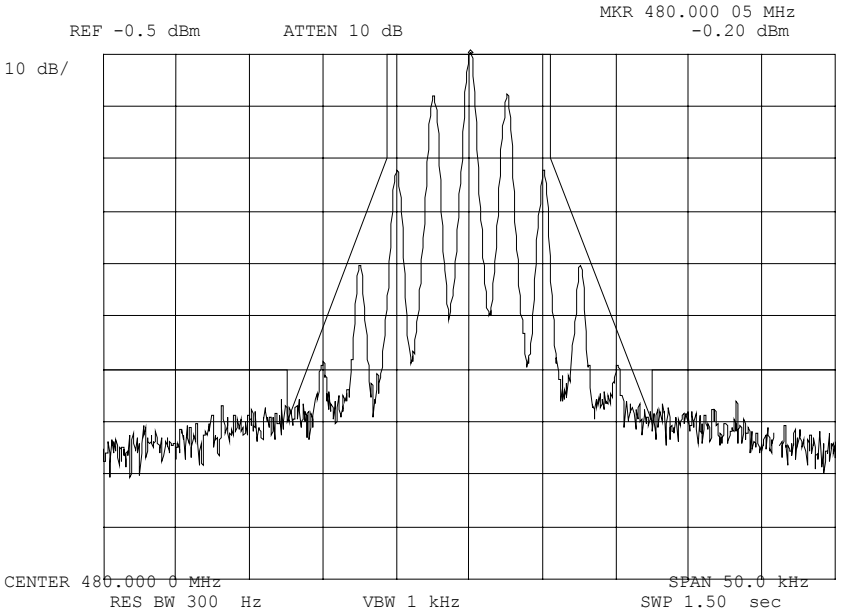
Name of Test: Emission Masks (Occupied Bandwidth)
g03c0037: 2003-Dec-24 Wed 10:45:00
State: 1:Low Power Ambient Temperature: 23°C ± 3°C



Power: LOW
Modulation: VOICE: 2500 Hz SINE WAVE
MASK: D, VHF/UHF 12.5kHz BW

Performed by: Daniel M. Dillon, Test Engineer

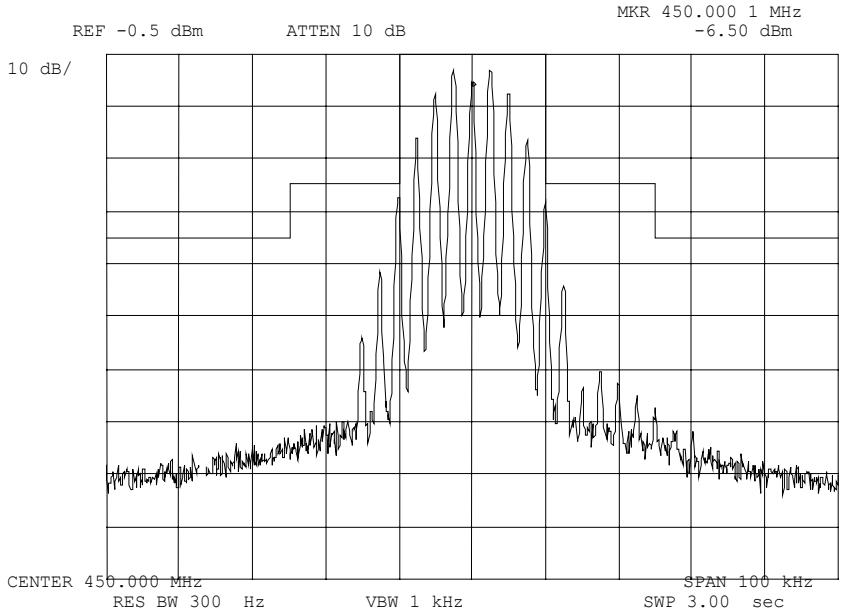
Name of Test: Emission Masks (Occupied Bandwidth)
g03c0038: 2003-Dec-24 Wed 10:45:00
State: 1:Low Power Ambient Temperature: 23°C ± 3°C



Power: LOW
Modulation: VOICE: 2500 Hz SINE WAVE
MASK: D, VHF/UHF 12.5kHz BW

Performed by: Daniel M. Dillon, Test Engineer

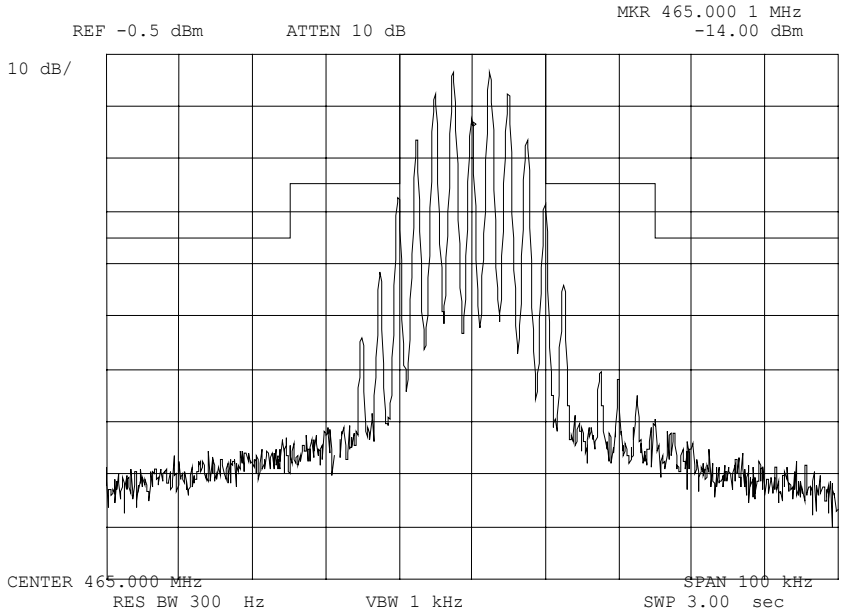
Name of Test: Emission Masks (Occupied Bandwidth)
g03c0042: 2003-Dec-24 Wed 11:08:00
State: 1:Low Power Ambient Temperature: 23°C ± 3°C



Power: LOW
Modulation: VOICE: 2500 Hz SINE WAVE
MASK: B, VHF/UHF 25kHz, w/LPF

Performed by: Daniel M. Dillon, Test Engineer

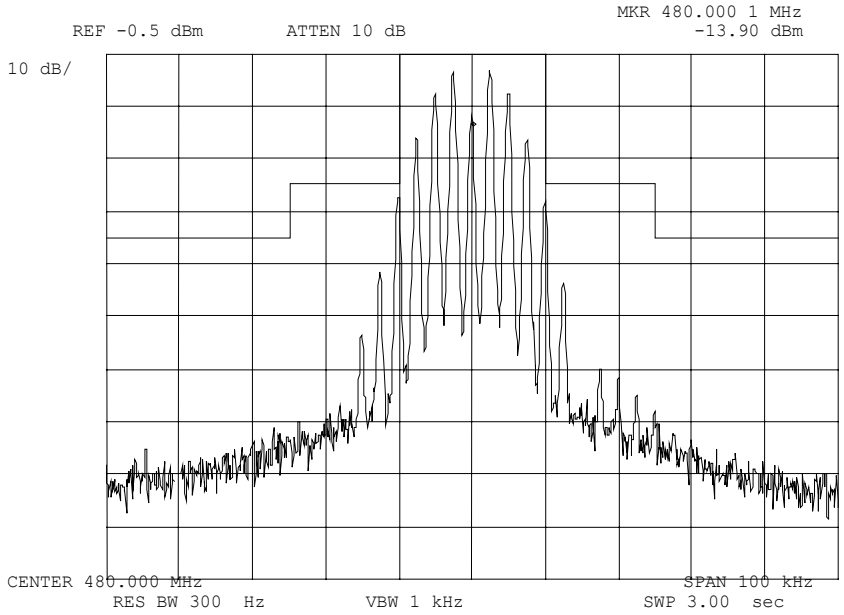
Name of Test: Emission Masks (Occupied Bandwidth)
g03c0043: 2003-Dec-24 Wed 11:09:00
State: 1:Low Power Ambient Temperature: 23°C ± 3°C



Power: LOW
Modulation: VOICE: 2500 Hz SINE WAVE
MASK: B, VHF/UHF 25kHz, w/LPF

Performed by: Daniel M. Dillon, Test Engineer

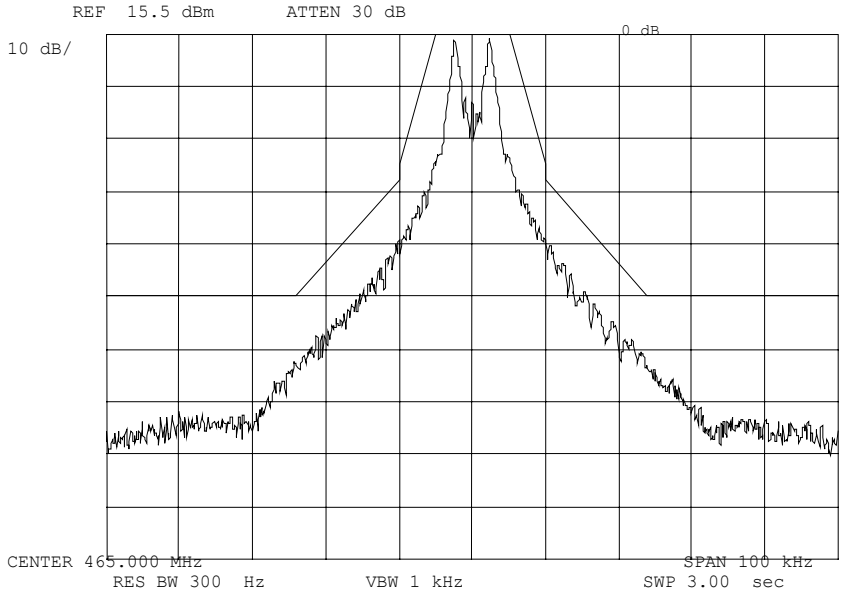
Name of Test: Emission Masks (Occupied Bandwidth)
g03c0044: 2003-Dec-24 Wed 11:09:00
State: 1:Low Power Ambient Temperature: 23°C ± 3°C



Power: LOW
Modulation: VOICE: 2500 Hz SINE WAVE
MASK: B, VHF/UHF 25kHz, w/LPF

Performed by: Daniel M. Dillon, Test Engineer

Name of Test: Emission Masks (Occupied Bandwidth)
g0410058: 2004-Jan-16 Fri 10:46:00
State: 1:Low Power Ambient Temperature: 23°C ± 3°C



Power: LOW
Modulation: 19.2KBPS @5V PP
MASK: C, VHF/UHF 25kHz, no LPF

Performed by: Daniel M. Dillon, Test Engineer

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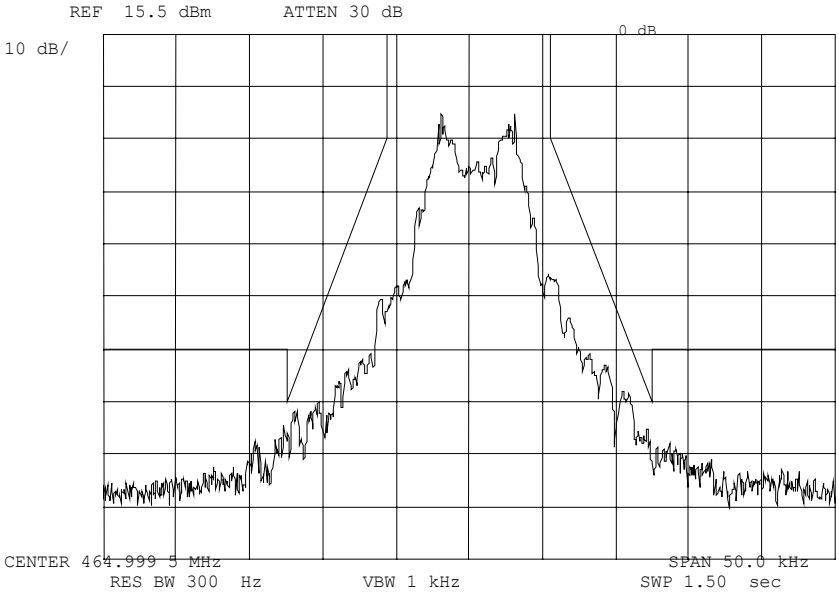
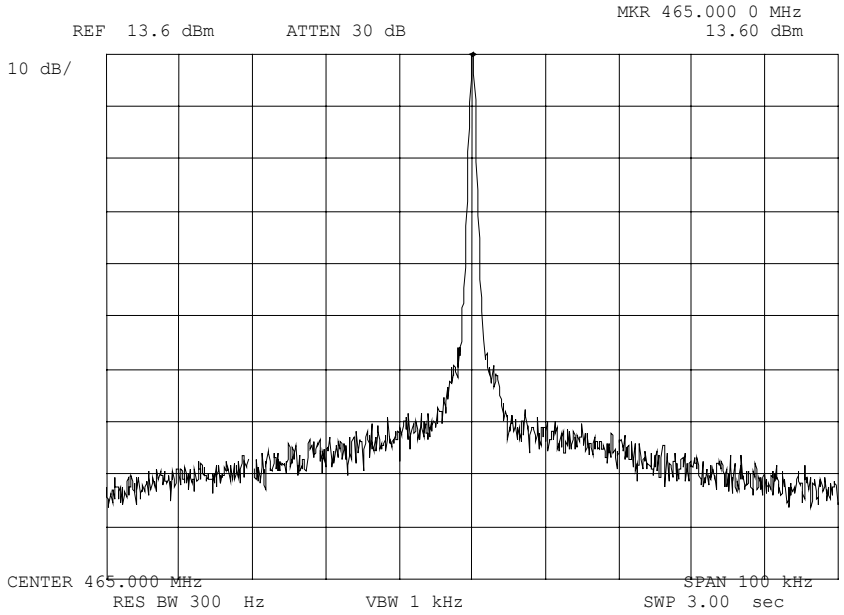
Name of Test: Emission Masks (Occupied Bandwidth)
g0410065: 2004-Jan-16 Fri 12:28:00
State: 1:Low Power Ambient Temperature: 23°C ± 3°C



Power: LOW
Modulation: 9.6KBPS @5V VPP
MASK: D, VHF/UHF 12.5kHz BW

Performed by: Daniel M. Dillon, Test Engineer

Name of Test: Emission Masks (Occupied Bandwidth)
g03c0031: 2003-Dec-24 Wed 10:27:00
State: 2:High Power Ambient Temperature: 23°C ± 3°C



Power: HIGH
Modulation: NONE

Performed by: Daniel M. Dillon, Test Engineer

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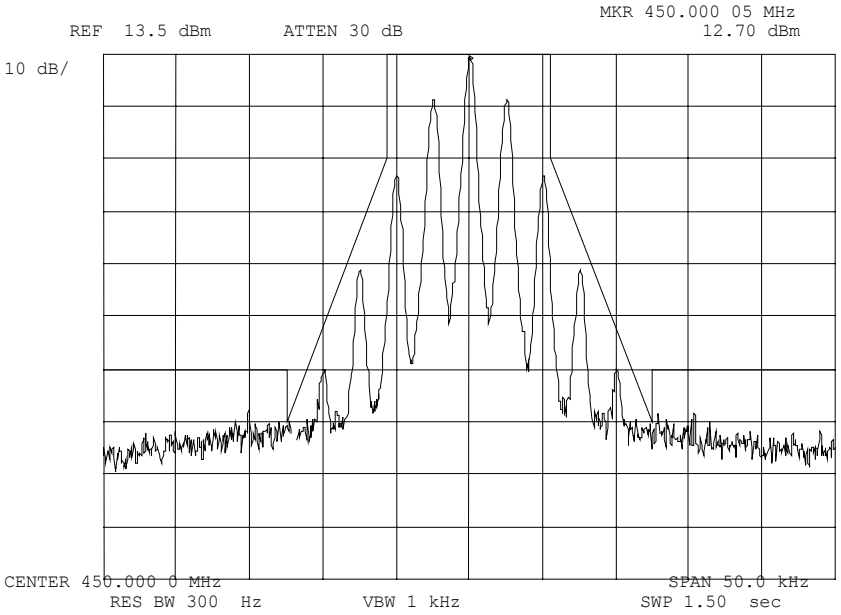
Name of Test: Emission Masks (Occupied Bandwidth)
g03c0039: 2003-Dec-24 Wed 11:05:00
State: 2:High Power Ambient Temperature: 23°C ± 3°C



Power: HIGH
Modulation: VOICE: 2500 Hz SINE WAVE
MASK: D, VHF/UHF 12.5kHz BW

Performed by: Daniel M. Dillon, Test Engineer

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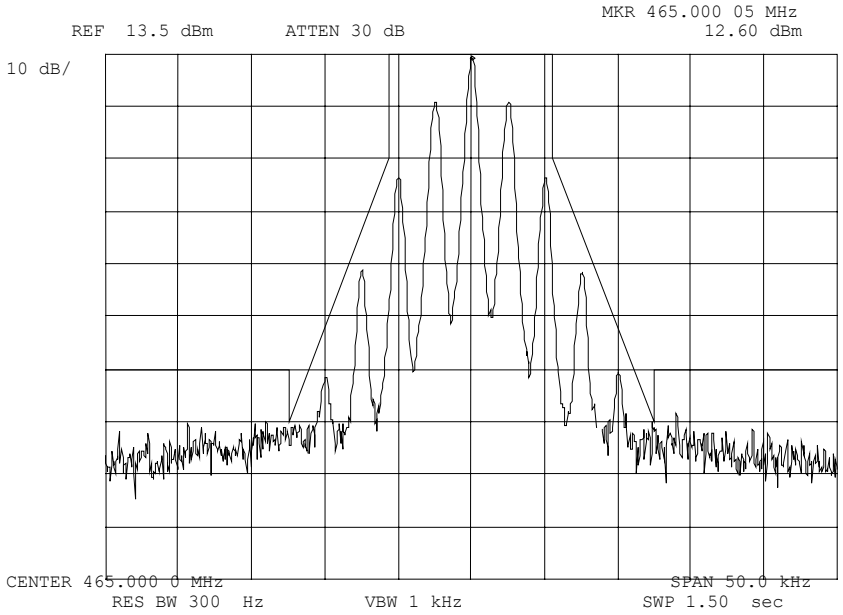
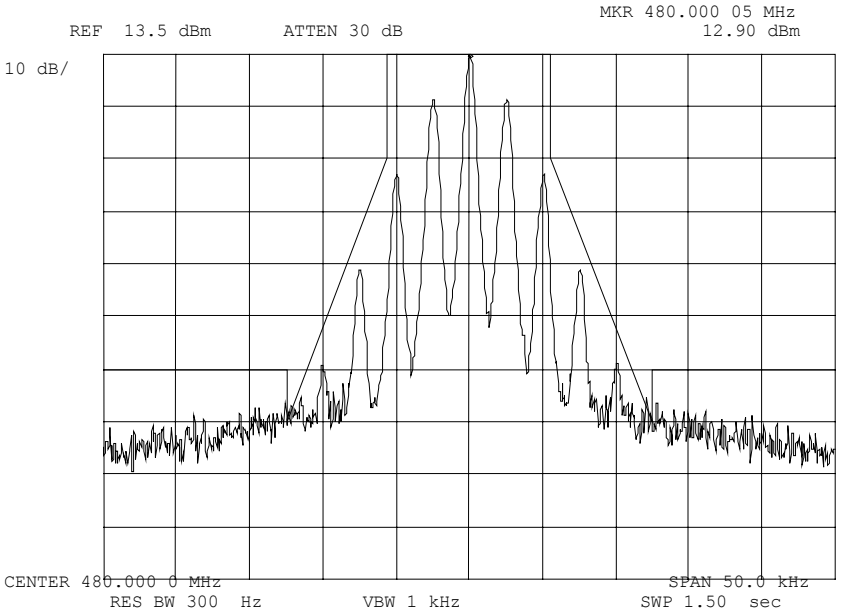
Name of Test: Emission Masks (Occupied Bandwidth)
g03c0040: 2003-Dec-24 Wed 11:05:00
State: 2:High Power Ambient Temperature: 23°C ± 3°C



Power: HIGH
Modulation: VOICE: 2500 Hz SINE WAVE
MASK: D, VHF/UHF 12.5kHz BW

Performed by: Daniel M. Dillon, Test Engineer

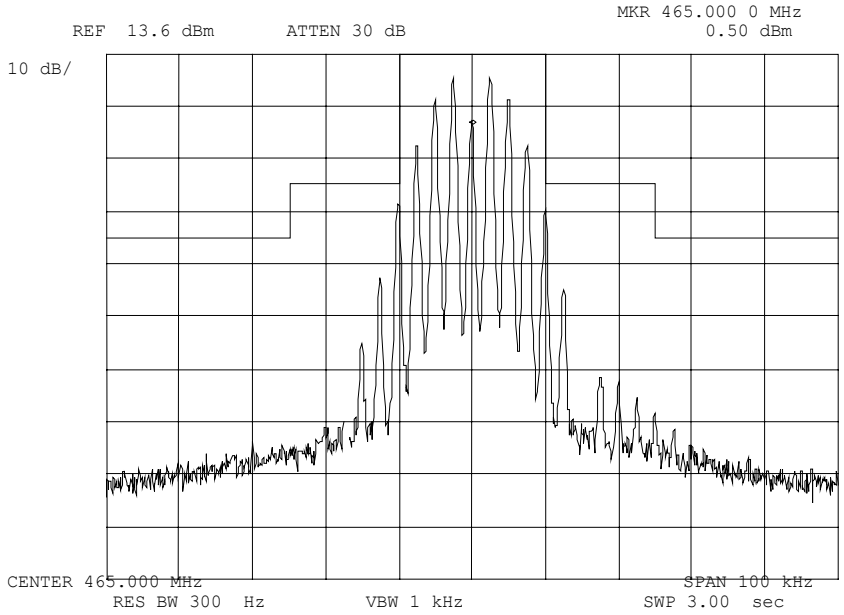
Name of Test: Emission Masks (Occupied Bandwidth)
g03c0041: 2003-Dec-24 Wed 11:06:00
State: 2:High Power Ambient Temperature: 23°C ± 3°C



Power: HIGH
Modulation: VOICE: 2500 Hz SINE WAVE
MASK: D, VHF/UHF 12.5kHz BW

Performed by: Daniel M. Dillon, Test Engineer

Name of Test: Emission Masks (Occupied Bandwidth)
g03c0033: 2003-Dec-24 Wed 10:38:00
State: 2:High Power Ambient Temperature: 23°C ± 3°C



Power: HIGH
Modulation: VOICE: 2500 Hz SINE WAVE
MASK: B, VHF/UHF 25kHz, w/LPF

Performed by: Daniel M. Dillon, Test Engineer

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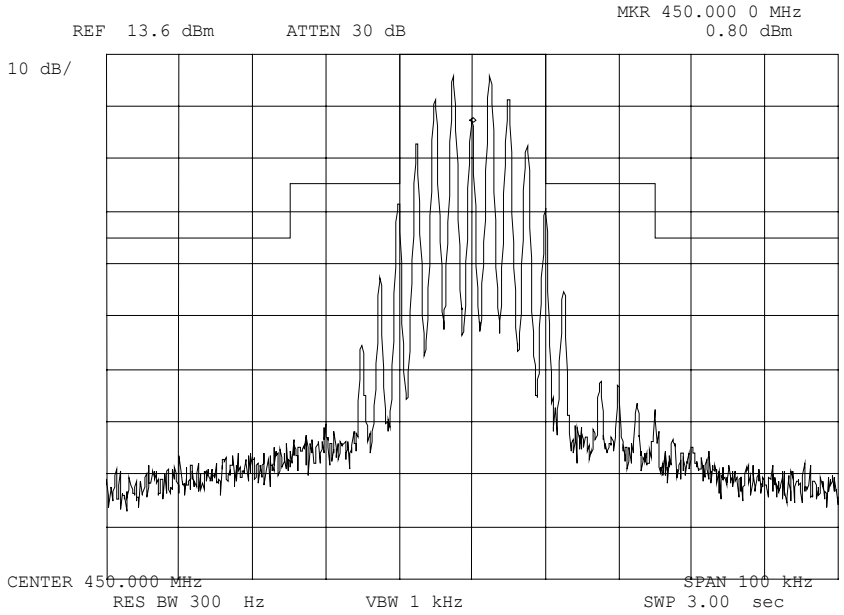
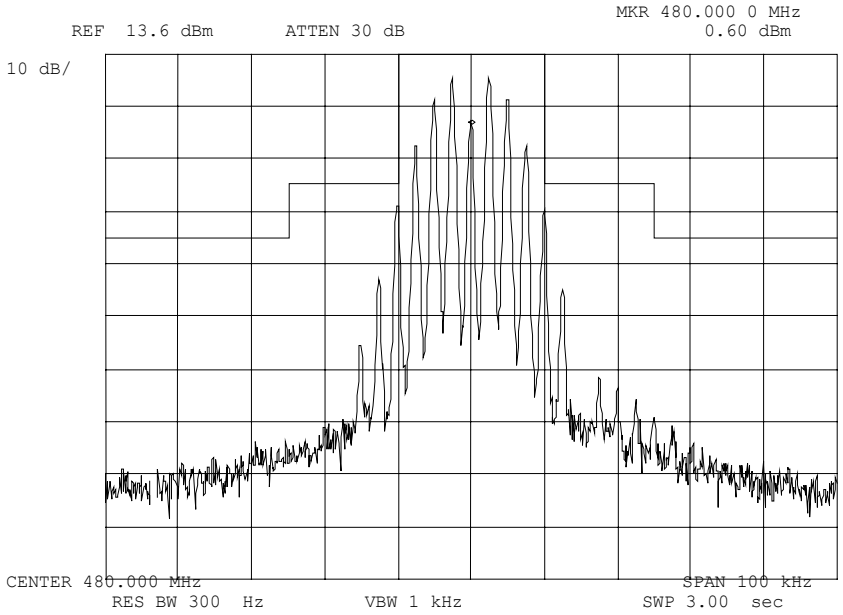
Name of Test: Emission Masks (Occupied Bandwidth)
g03c0034: 2003-Dec-24 Wed 10:39:00
State: 2:High Power Ambient Temperature: 23°C ± 3°C



Power: HIGH
Modulation: VOICE: 2500 Hz SINE WAVE
MASK: B, VHF/UHF 25kHz, w/LPF

Performed by: Daniel M. Dillon, Test Engineer

Name of Test: Emission Masks (Occupied Bandwidth)
g03c0035: 2003-Dec-24 Wed 10:39:00
State: 2:High Power Ambient Temperature: 23°C ± 3°C



Power: HIGH
Modulation: VOICE: 2500 Hz SINE WAVE
MASK: B, VHF/UHF 25kHz, w/LPF

Performed by: Daniel M. Dillon, Test Engineer

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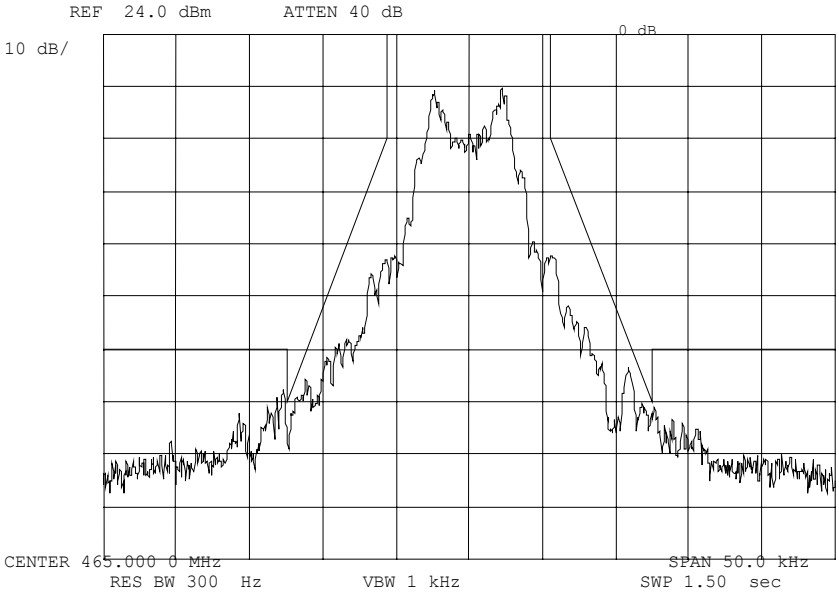
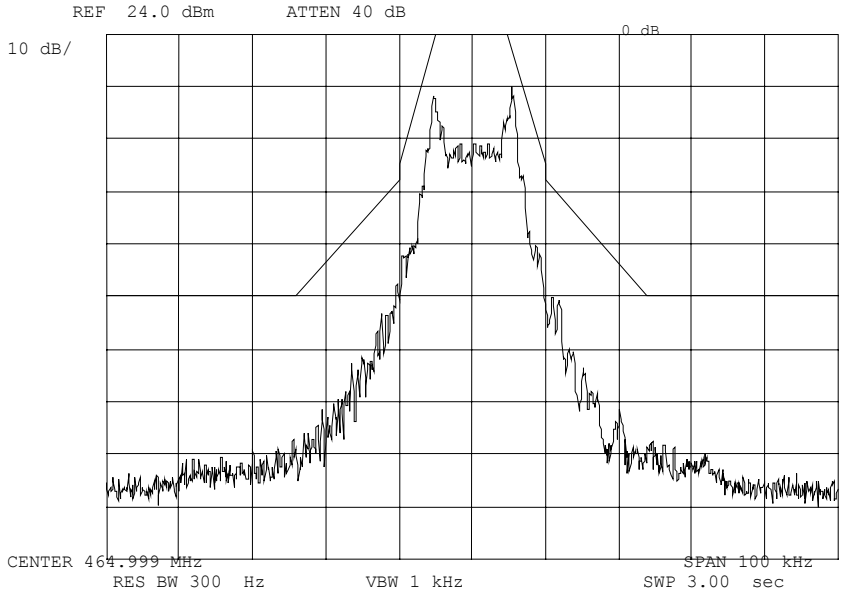
Name of Test: Emission Masks (Occupied Bandwidth)
g0410062: 2004-Jan-16 Fri 12:06:00
State: 2:High Power Ambient Temperature: 23°C ± 3°C



Power: HIGH
Modulation: 9.6KBPS @5V PP
MASK: D, VHF/UHF 12.5kHz BW

Performed by: Daniel M. Dillon, Test Engineer

Name of Test: Emission Masks (Occupied Bandwidth)
g0410064: 2004-Jan-16 Fri 12:27:00
State: 2:High Power Ambient Temperature: 23°C ± 3°C



Power: HIGH
Modulation: 19.2KBPS @5V VPP
MASK: C, VHF/UHF 25kHz, no LPF

Performed by: Daniel M. Dillon, Test Engineer

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Name of Test: Transient Frequency Behavior
Specification: 47 CFR 90.214
Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.19

Test Equipment: As per attached page

Measurement Procedure

A) The EUT was setup as shown on the attached page, following TIA/EIA-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.

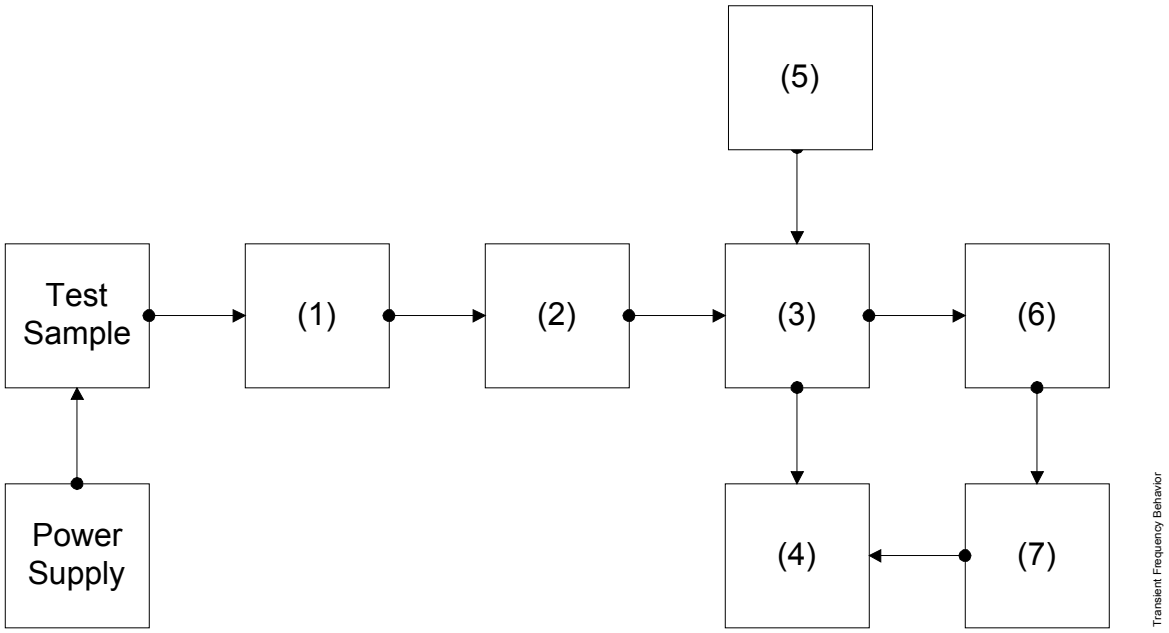
E) An RF signal generator (1) modulated with a 1 kHz tone at either 25, 12.5, or 6.25 kHz deviation, and set to the same frequency as the assigned transmitter frequency, (2) was adjusted to a level -20 dB below the level recorded for step C) above, measured at the output of the combiner. This level was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

F) The oscilloscope was setup using TIA/EIA-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/EIA-603 steps m, n, and o was captured and plotted. The carrier off-time as referenced in TIA/EIA-603 steps p, q, r, and s was captured and plotted.

Transient Frequency Behavior



	Asset	Description	s/n
(1) **Attenuator** (Removed after 1st step)			
X	i00231/2	PASTERNACK PE7021-30 (30 dB)	231 or 232
(2) **Attenuator**			
X	i00231/2	PASTERNACK PE7021-30 (30 dB)	231 or 232
	i00122/3	NARDA 766 (10 dB)	7802 or 7802A
(3) **Combiner**			
X	i00154	4 x 25 Ω Combiner	154
(4) **Crystal Decoder**			
X	i00159	HP 8470B Crystal Detector	1822A10054
(5) **RF Signal Generator**			
X	i00067	HP 8920A Communication TS	3345U01242
(6) **Modulation Analyzer**			
X	i00020	HP 8901A Modulation Meter	2105A01087
(7) **Oscilloscope**			
X	i00030	HP 54502A Digital Oscilloscope	2927A00209

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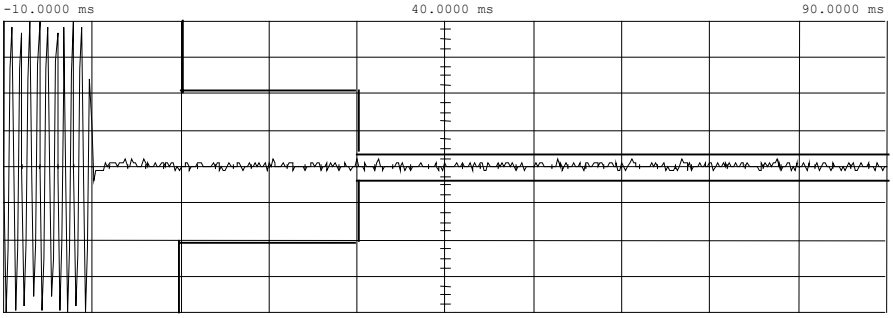
Name of Test: Transient Frequency Behavior
g03c0045: 2003-Dec-29 Mon 11:35:00
State: 0:General Ambient Temperature: 23°C ± 3°C



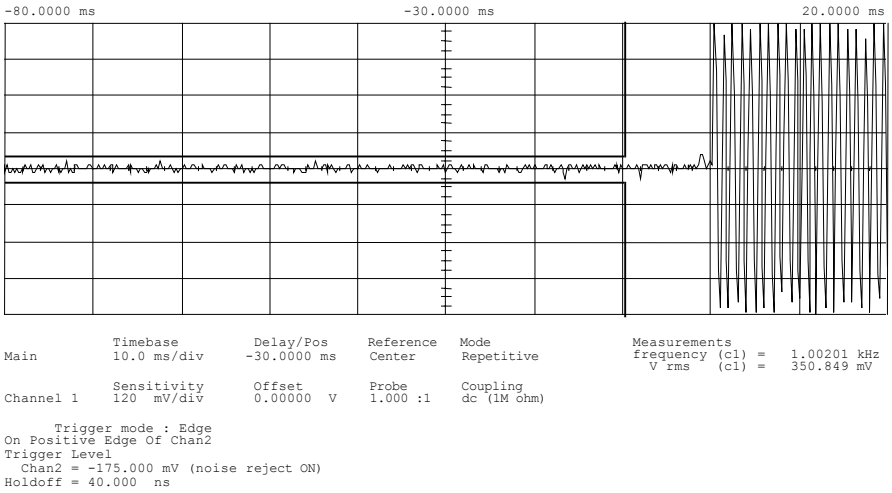
	Timebase	Delay/Pos	Reference	Mode	Measurements	
Main	10.0 ms/div	40.0000 ms	Center	Repetitive	frequency (c1) =	1.00200 kHz
					V rms (c1) =	333.252 mV
	Sensitivity	Offset	Probe	Coupling		
Channel 1	120 mV/div	0.00000 V	1.000 :1	dc (1M ohm)		

Trigger mode : Edge
On Negative Edge Of Chan2
Trigger Level
Chan2 = -50.000 mV (noise reject ON)
Holdoff = 40.000 ns

Power: n/a
Modulation: Ref Gen=25 kHz Deviation
Description: CARRIER ON TIME

Performed by: Daniel M. Dillon, Test Engineer

Name of Test: Transient Frequency Behavior
g03c0046: 2003-Dec-29 Mon 11:37:00
State: 0:General Ambient Temperature: 23°C ± 3°C



Power: n/a
Modulation: Ref Gen=25 kHz Deviation
Description: CARRIER OFF TIME

Performed by: Daniel M. Dillon, Test Engineer

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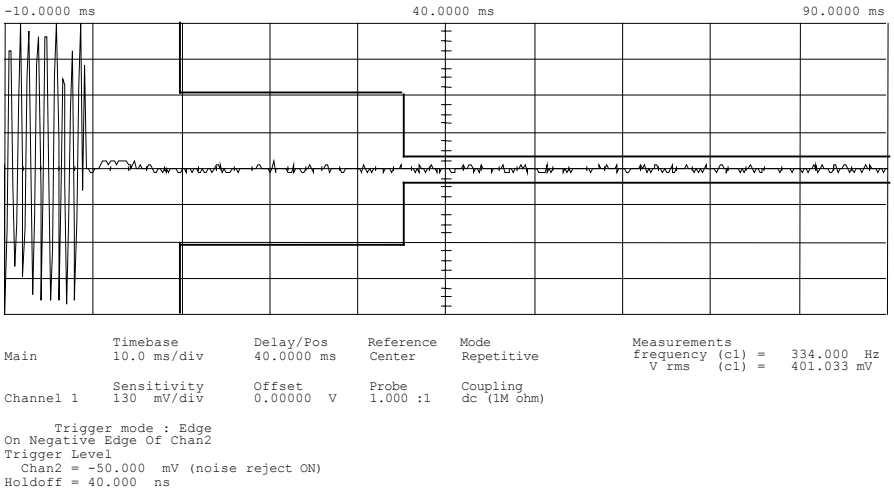
Name of Test: Transient Frequency Behavior
g03c0047: 2003-Dec-29 Mon 11:59:00
State: 0:General Ambient Temperature: 23°C ± 3°C



Power: n/a
Modulation: Ref Gen=12.5 kHz Deviation
Description: CARRIER ON TIME

Performed by: Daniel M. Dillon, Test Engineer

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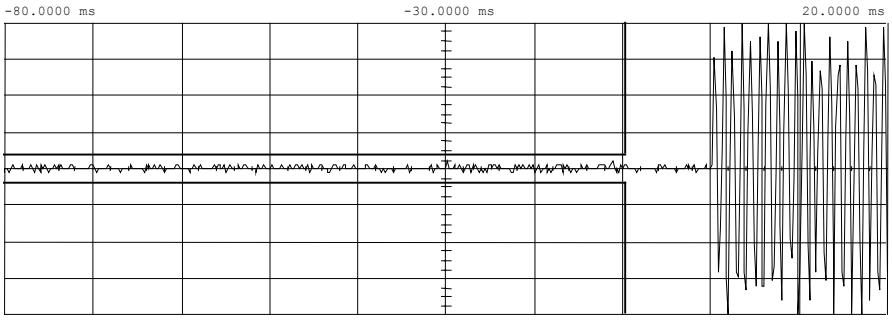
Name of Test: Transient Frequency Behavior
g03c0048: 2003-Dec-29 Mon 11:59:00
State: 0:General Ambient Temperature: 23°C ± 3°C



	Timebase	Delay/Pos	Reference	Mode	Measurements
Main	10.0 ms/div	-30.0000 ms	Center	Repetitive	frequency (c1) = 500.999 Hz
					V rms (c1) = 401.033 mV
	Sensitivity	Offset	Probe	Coupling	
Channel 1	130 mV/div	0.00000 V	1.000 :1	dc (1M ohm)	

Trigger mode : Edge
On Positive Edge Of Chan2
Trigger Level
Chan2 = -50.000 mV (noise reject ON)
Holdoff = 40.000 ns

Power: n/a
Modulation: Ref Gen=12.5 kHz Deviation
Description: CARRIER OFF TIME

Performed by: Daniel M. Dillon, Test Engineer

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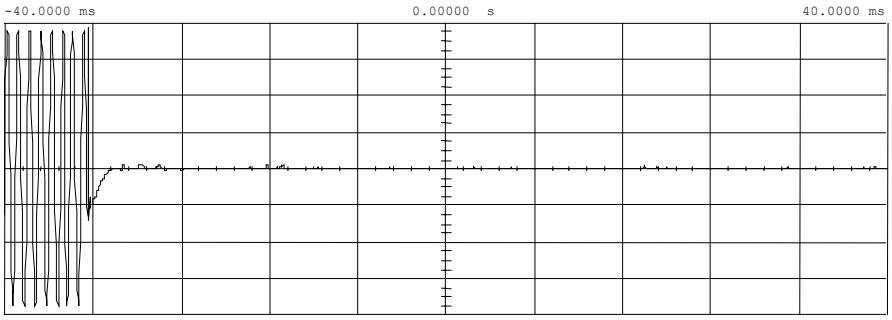
Name of Test: Transient Frequency Behavior
g0410069: 2004-Jan-19 Mon 15:07:00
State: 0:General Ambient Temperature: 23°C ± 3°C



	Timebase	Delay/Pos	Reference	Mode
Main	8.00 ms/div	-40.0000 ms	Left	Realtime (EXTENDED)

	Sensitivity	Offset	Probe	Coupling
Channel 1	75.0 mV/div	5.000 mV	1.000 :1	dc (1M ohm)

Trigger mode : Edge
On Negative Edge Of Chan2
Trigger Level
Chan2 = -325.000 mV (noise reject ON)
Holdoff = 40.000 ns

Power: n/a
Modulation: Ref Gen=25 kHz Deviation
Description: CARRIER ON TIME

Performed by: Daniel M. Dillon, Test Engineer

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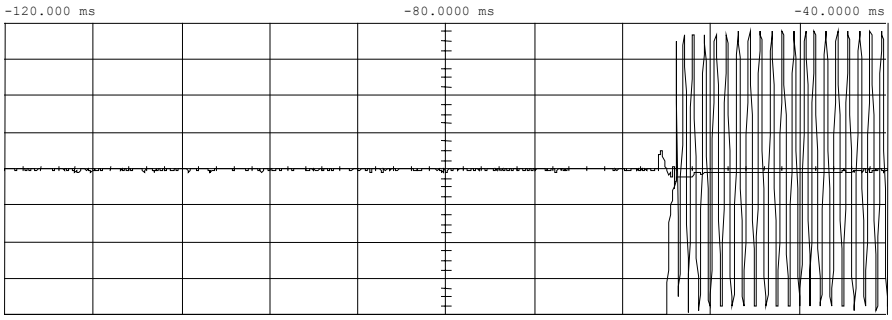
Name of Test: Transient Frequency Behavior
g0410066: 2004-Jan-19 Mon 15:01:00
State: 0:General Ambient Temperature: 23°C ± 3°C



	Timebase	Delay/Pos	Reference	Mode
Main	8.00 ms/div	-80.0000 ms	Center	Realtime (EXTENDED)

	Sensitivity	Offset	Probe	Coupling
Channel 1	75.0 mV/div	10.200 mV	1.000 :1	dc (1M ohm)
Channel 2	20.0 mV/div	0.00000 V	1.000 :1	dc BW lim (1M ohm)

Trigger mode : Edge
On Positive Edge Of Chan2
Trigger Level
Chan2 = -50.000 mV (noise reject ON)
Holdoff = 40.000 ns

Power: n/a
Modulation: Ref Gen=25 kHz Deviation
Description: CARRIER OFF TIME

Performed by: Daniel M. Dillon, Test Engineer

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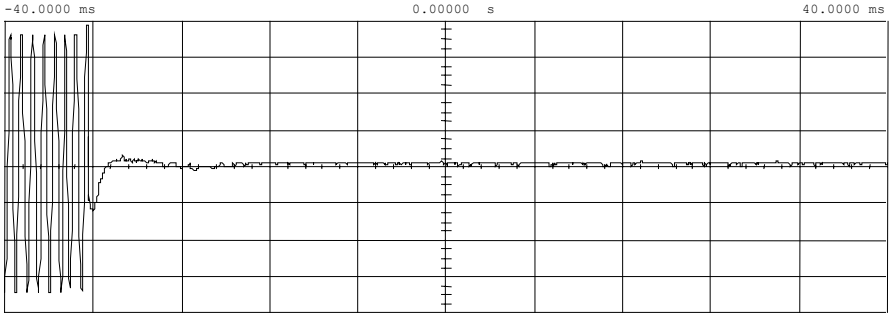
Name of Test: Transient Frequency Behavior
g0410068: 2004-Jan-19 Mon 15:06:00
State: 0:General Ambient Temperature: 23°C ± 3°C



	Timebase	Delay/Pos	Reference	Mode
Main	8.00 ms/div	-40.0000 ms	Left	Realtime (EXTENDED)
	Sensitivity	**Offset**	**Probe**	**Coupling**
Channel 1	40.0 mV/div	5.000 mV	1.000 :1	dc (1M ohm)

Trigger mode : Edge
On Negative Edge Of Chan2
Trigger Level
Chan2 = -325.000 mV (noise reject ON)
Holdoff = 40.000 ns

Power: n/a
Modulation: Ref Gen=12.5 kHz Deviation
Description: CARRIER ON TIME

Performed by: Daniel M. Dillon, Test Engineer

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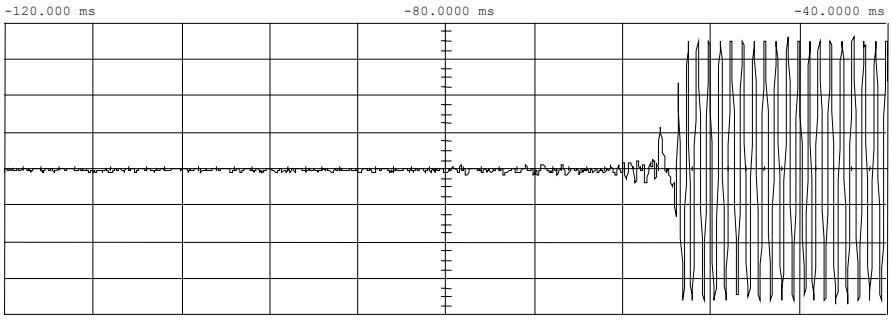
Name of Test: Transient Frequency Behavior
g0410067: 2004-Jan-19 Mon 15:03:00
State: 0:General Ambient Temperature: 23°C ± 3°C



	Timebase	Delay/Pos	Reference	Mode
Main	8.00 ms/div	-80.0000 ms	Center	Realtime (EXTENDED)

	Sensitivity	Offset	Probe	Coupling
Channel 1	40.0 mV/div	10.200 mV	1.000 :1	dc (1M ohm)

Trigger mode : Edge
On Positive Edge Of Chan2
Trigger Level
Chan2 = -50.000 mV (noise reject ON)
Holdoff = 40.000 ns

Power: n/a
Modulation: Ref Gen=12.5 kHz Deviation
Description: CARRIER OFF TIME

Performed by: Daniel M. Dillon, Test Engineer

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

Specification: 47 CFR 2.1047(a)

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.15

Test Equipment: As per attached page

Measurement Procedure

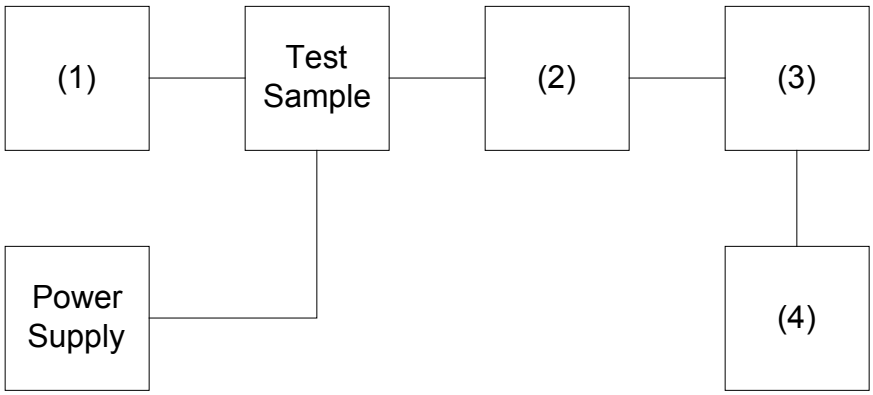
1. The EUT and test equipment were set up such that the audio input was connected at the input to the modulation limiter, and the modulated stage.

2. The audio output was connected at the output to the modulated stage.

3. Measurement Results: Attached

Transmitter Test Set-Up

Test A. Modulation Capability/Distortion
Test B. Audio Frequency Response
Test C. Hum and Noise Level
Test D. Response of Low Pass Filter
Test E. Modulation Limiting



Transmitter Test Set Up

	Asset	Description	s/n
(1) **Audio Oscillator**			
X	i00002	HP 3336B Synthesizer / Level Gen.	1931A01465
(2) **Coaxial Attenuator**			
	i00122/3	NARDA 766 (10dB)10	7802 or 7802A
X	i00231/2	PASTERNACK PE7021-30 (30 dB)	231 or 232
(3) **Modulation Analyzer**			
X	i00020	HP 8901A Modulation Meter	2105A01087
(4) **Audio Analyzer**			
X	i00001	HP 3586B Selective Level Meter	1928A01360

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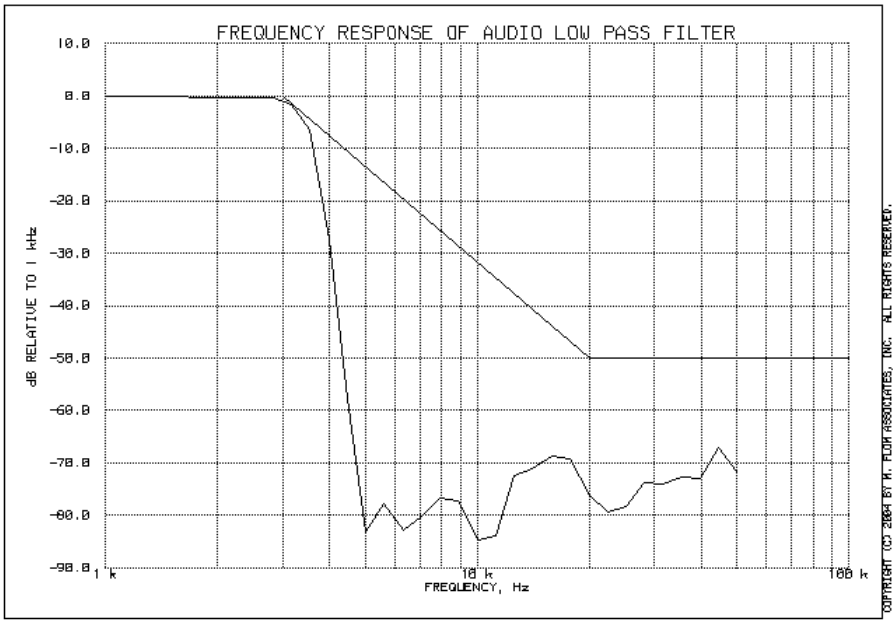
Name of Test: Audio Low Pass Filter (Voice Input)
g03c0147: 2003-Dec-29 Mon 14:35:00
State: 0:General Ambient Temperature: 23°C ± 3°C



Performed by: Daniel M. Dillon, Test Engineer

Name of Test: Audio Frequency Response

Specification: 47 CFR 2.1047(a)

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.6

Test Equipment: As per previous page

Measurement Procedure

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

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

3. The audio signal input was adjusted to obtain 20% modulation at 1 kHz, and this point was taken as the 0 dB reference level.

4. With input levels held constant and below limiting at all frequencies, the audio signal generator was varied from 100 Hz to 50 kHz.

5. The response in dB relative to 1 kHz was then measured, using the HP 8901A Modulation Analyzer.

6. Measurement Results: Attached

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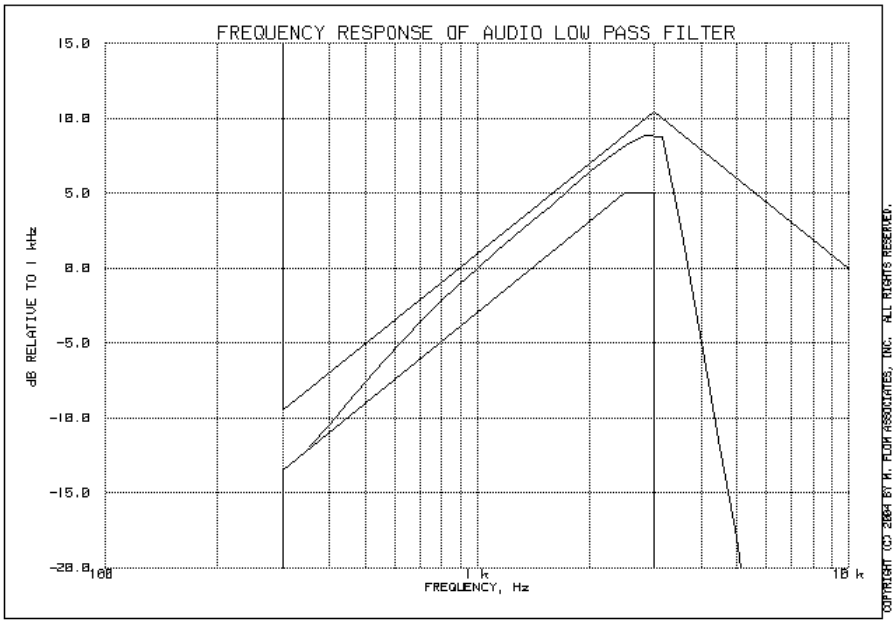
Name of Test: Audio Frequency Response
g03c0146: 2003-Dec-29 Mon 14:31:00
State: 0:General Ambient Temperature: 23°C ± 3°C



Frequency of Maximum Audio Response, Hz = 2820

Additional points:

Frequency, Hz	Level, dB
300	-14.41
20000	-22.41
30000	-22.45
50000	-22.50

Performed by: Daniel M. Dillon, Test Engineer

Name of Test: Modulation Limiting

Specification: 47 CFR 2.1047(b)

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.3

Test Equipment: As per previous page

Measurement Procedure

1. The signal generator was connected to the input of the EUT as for "Frequency Response of the Modulating Circuit."

2. 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.

3. The input level was varied from 30% modulation (±1.5 kHz deviation) to at least 20 dB higher than the saturation point.

4. Measurements were performed for both negative and positive modulation and the respective results were recorded.

5. Measurement Results: Attached

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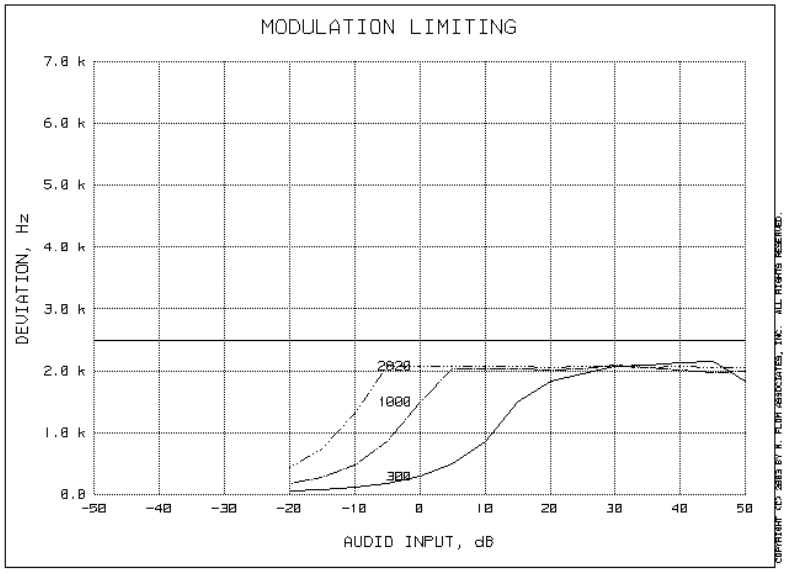
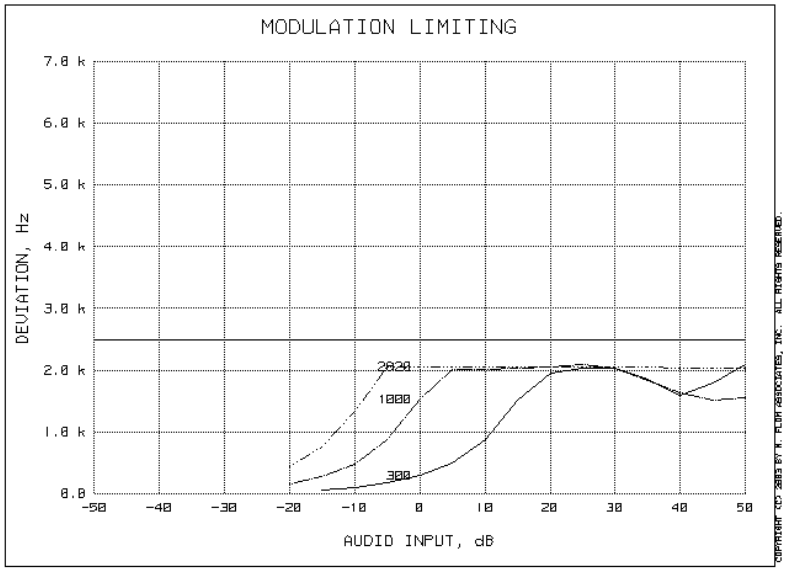
Name of Test: Modulation Limiting
g03c0151: 2003-Dec-29 Mon 14:53:00
State: 0:General Ambient Temperature: 23°C ± 3°C

Positive Peaks:



Negative Peaks:



Performed by: Daniel M. Dillon, Test Engineer

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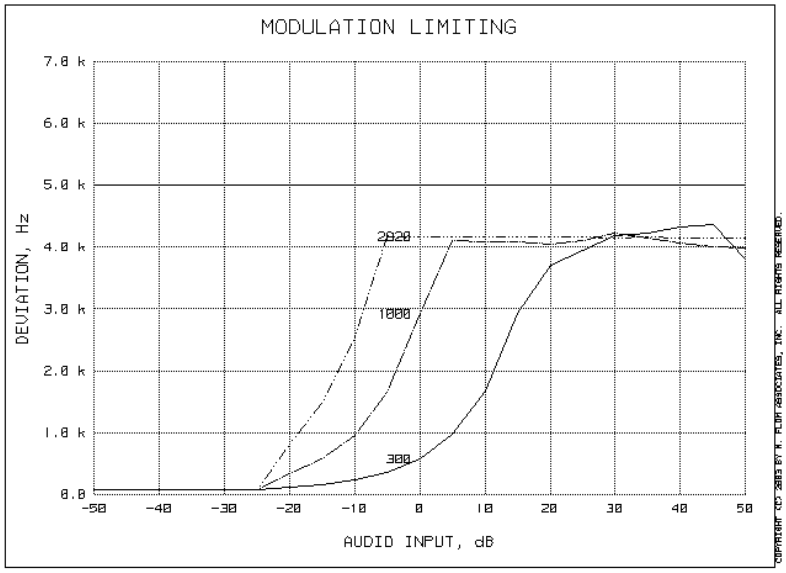
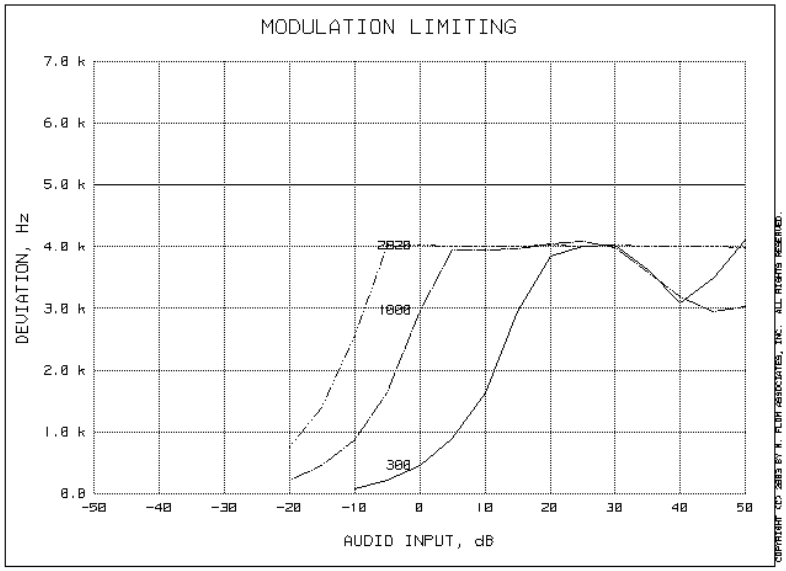
Name of Test: Modulation Limiting
g03c0152: 2003-Dec-29 Mon 14:57:00
State: 0:General Ambient Temperature: 23°C ± 3°C

Positive Peaks:



Negative Peaks:



Performed by: Daniel M. Dillon, Test Engineer

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Name of Test: Frequency Stability (Temperature Variation)

Specification: 47 CFR 2.1055(a)(1)

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2

Test Conditions: As Indicated

Test Equipment: As per previous page

Measurement Procedure

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

2. 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.

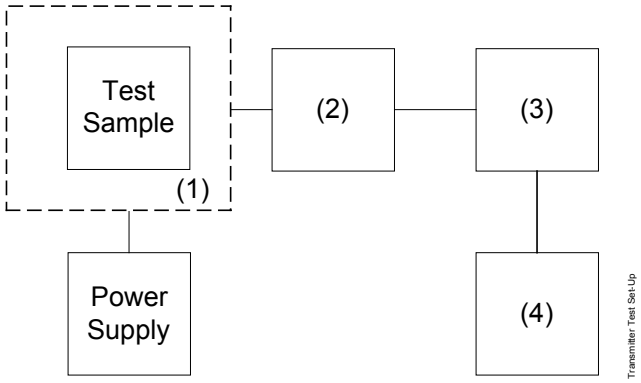
3. With power OFF, the temperature was raised in 10°C steps. The sample was permitted to stabilize at each step for at least one-half hour. Power was applied and the maximum frequency change was noted within one minute.

4. The temperature tests were performed for the worst case.

5. Measurement Results: Attached

Transmitter Test Set-Up

Frequency Stability: Temperature Variation
Frequency Stability: Voltage Variation



	Asset	Description	s/n
(1) **Temperature, Humidity, Vibration**			
X	i00027	Tenney Temp. Chamber	9083-765-234
(2) **Coaxial Attenuator**			
X	i00231/2	PASTERNACK PE7021-30 (30 dB)	231 or 232
	i00122/3	NARDA 766 (10 dB)	7802 or 7802A
(3) **RF Power**			
X	i00067	HP 8920A Communications TS	3345U01242
(4) **Frequency Counter**			
X	i00067	HP 8920A Communications TS	3345U01242

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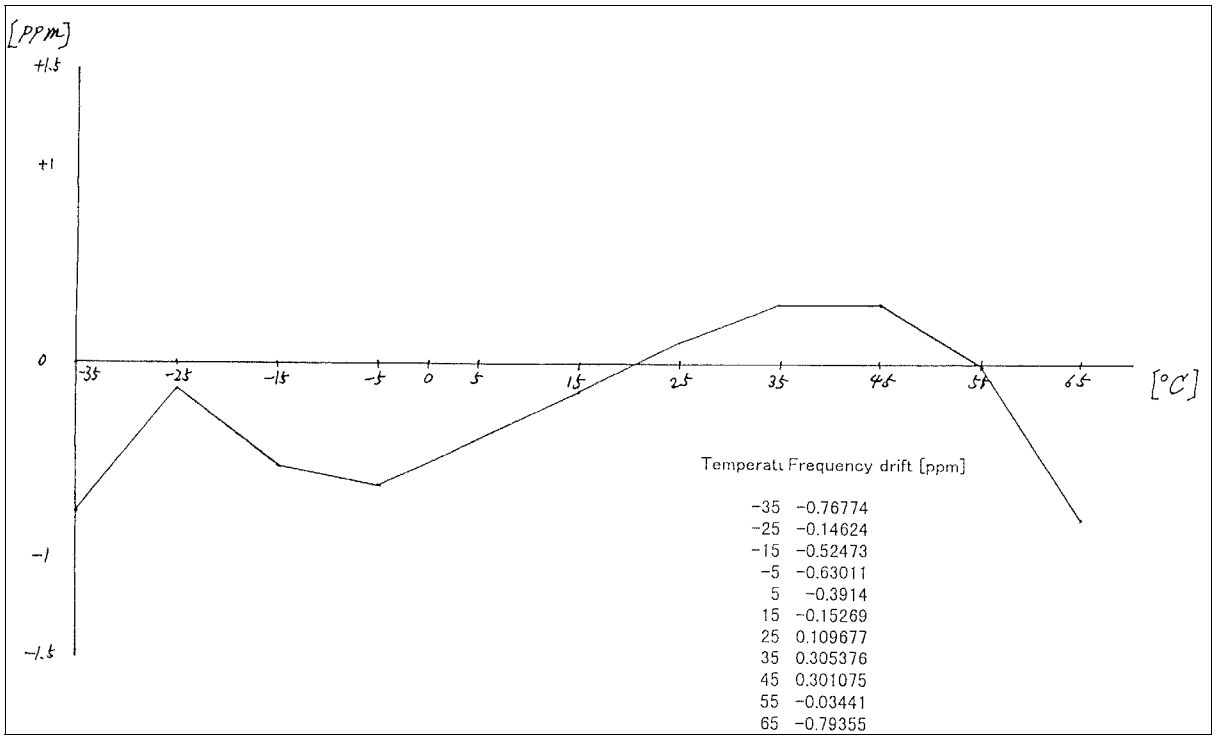
Name of Test: Frequency Stability (Temperature Variation)



Temperature [°C]	Frequency drift [ppm]
-35	-0.76774
-25	-0.14624
-15	-0.52473
-5	-0.63011
5	-0.3914
15	-0.15269
25	0.109677
35	0.305376
45	0.301075
55	-0.03441
65	-0.79355

*Data supplied by Applicant.

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Name of Test: Frequency Stability (Voltage Variation)

Specification: 47 CFR 2.1055(d)(1)

Guide: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2

Test Equipment: As per previous page

Measurement Procedure

1. The EUT was placed in a temperature chamber at 25±5°C and connected as for "Frequency Stability - Temperature Variation" test.

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

3. The variation in frequency was measured for the worst case.

Results: Frequency Stability (Voltage Variation)

g03c0049: 2003-Dec-29 Mon 12:46:00
State: 0:General Ambient Temperature: 23°C ± 3°C

Limit, ppm	=	5
Limit, Hz	=	2325
Battery End Point (Voltage)	=	8.5

% of STV	Voltage	Frequency, MHz	Change, Hz	Change, ppm
85	11.73	464.999970	-30	-0.06
100	13.8	465.000000	0	0.00
115	15.87	465.000000	0	0.00
62	8.5	465.000030	30	0.06

Performed by: Daniel M. Dillon, Test Engineer

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Name of Test: Necessary Bandwidth and Emission Bandwidth

Specification: 47 CFR 2.202(g)

Modulation = 16K0F3E

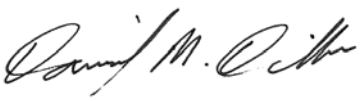
Necessary Bandwidth Calculation:

Maximum Modulation (M), kHz	=	3
Maximum Deviation (D), kHz	=	5
Constant Factor (K)	=	1
Necessary Bandwidth (B_N), kHz	=	(2xM)+(2xDxK)
	=	16.0

Modulation = 11K0F3E

Necessary Bandwidth Calculation:

Maximum Modulation (M), kHz	=	3
Maximum Deviation (D), kHz	=	2.5
Constant Factor (K)	=	1
Necessary Bandwidth (B_N), kHz	=	(2xM)+(2xDxK)
	=	11.0



Performed by: Daniel M. Dillon, Test Engineer

END OF TEST REPORT

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: Morton Flom, P. Eng.