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Sub-part
2.1033(c):

EQUIPMENT IDENTIFICATION

FCC ID: N6FC100059

NAMEPLATE DRAWING

ATTACHED, EXHIBIT 1.

LOCATION

AS PER LABEL DRAWING(S)

DATE OF REPORT

June 22, 1999

SUPERVISED BY:


Morton Flom, P. Eng.

THE APPLICANT HAS BEEN CAUTIONED AS TO THE FOLLOWING:

15.21 INFORMATION TO 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.

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Subpart 2.1033 (continued)

(c) (8): VOLTAGES & CURRENTS IN ALL ELEMENTS IN FINAL R. F. STAGE,
INCLUDING FINAL TRANSISTOR OR SOLID STATE DEVICE:

COLLECTOR CURRENT, A = per manual
COLLECTOR VOLTAGE, Vdc = per manual
SUPPLY VOLTAGE, Vac = 110

(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

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Sub-part

2.1033(c) (14):

TEST AND MEASUREMENT DATA

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

- ____ 21 - Domestic Public Fixed Radio Services
- ____ 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
- ____ 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 Radiobeacons (EPIRB'S)
- ____ 80 Subpart W - Global Maritime Distress and Safety System (GMDSS)
- ____ 80 Subpart X - Voluntary Radio Installations
- ____ 87 - Aviation Services
- 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)
- ____ 101 - Fixed Microwave Services

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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, 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 2.2.1TEST EQUIPMENT: As per attached pageMEASUREMENT PROCEDURE

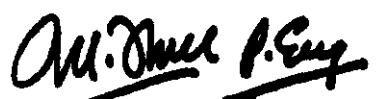
1. The EUT was connected to a resistive coaxial attenuator of normal load impedance, and the unmodulated output power was measured by means of an R. F. Power Meter.
2. Measurement accuracy is $\pm 3\%$.

MEASUREMENT RESULTS
(Worst case)

FREQUENCY OF CARRIER, MHZ = 150, 136, 174

<u>POWER SETTING</u>	<u>R. F. POWER, WATTS</u>
Low	5
High	60

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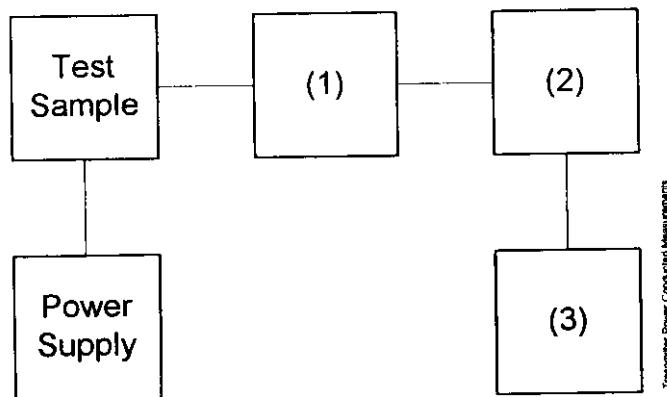

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TRANSMITTER POWER CONDUCTED MEASUREMENTS

TEST 1: R. F. POWER OUTPUT
 TEST 2: FREQUENCY STABILITY



Transmitter Power Conducted Measurements

Asset	Description	s/n
(1) COAXIAL ATTENUATOR		
i00122	Narda 766-10	7802
i00123	Narda 766-10	7802A
i00069	Bird 8329 (30 dB)	1006
x i00113	Sierra 661A-3D	1059
(2) POWER METERS		
i00014	HP 435A	1733A05836
x i00039	HP 436A	2709A26776
x i00020	HP 8901A POWER MODE	2105A01087
(3) FREQUENCY COUNTER		
i00042	HP 5383A	1628A00959
x i00019	HP 5334B	2704A00347
x i00020	HP 8901A FREQUENCY MODE	2105A01087

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NAME OF TEST: Unwanted Emissions (Transmitter Conducted)SPECIFICATION: 47 CFR 2.1051GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.13TEST EQUIPMENT: As per attached pageMEASUREMENT 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 = 150, 136, 174

SPECTRUM SEARCHED, GHz = 0 to 10 x F_c

MAXIMUM RESPONSE, Hz = 2820

ALL OTHER EMISSIONS = \geq 20 dB BELOW LIMIT

LIMIT(S), dBc

- (43+10xLOG P) = -50 (5 Watts)

- (50+10xLOG P) = -57 (5 Watts)

- (43+10xLOG P) = -60.8 (60 Watts)

- (50+10xLOG P) = -67.8 (60 Watts)

SUPERVISED BY:



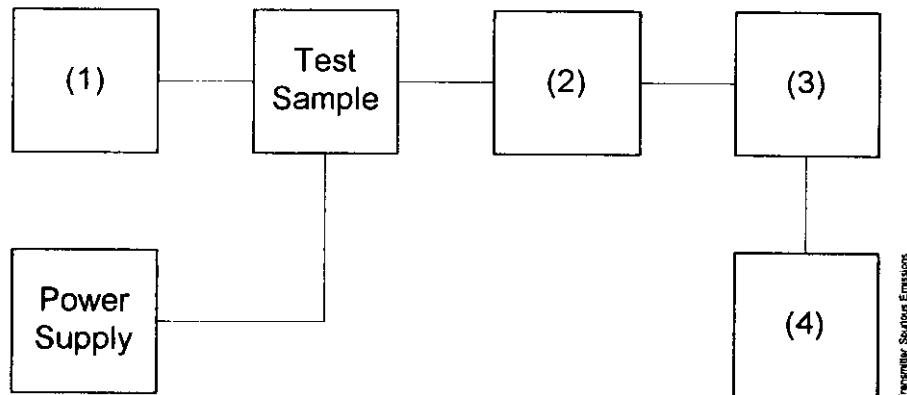
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TRANSMITTER SPURIOUS EMISSION

TEST A. OCCUPIED BANDWIDTH (IN-BAND SPURIOUS)
 TEST B. OUT-OF-BAND SPURIOUS



Asset	Description	s/n
(1) <u>AUDIO OSCILLATOR/GENERATOR</u>		
i00010	HP 204D	1105A04683
i00017	HP 8903A	2216A01753
<u>x</u> i00012	HP 3312A	1432A11250
(2) <u>COAXIAL ATTENUATOR</u>		
i00122	Narda 766-10	7802
i00123	Narda 766-10	7802A
<u>x</u> i00069	Bird 8329 (30 dB)	1006
<u>x</u> i00113	Sierra 661A-3D	1059
(3) <u>FILTERS; NOTCH, HP, LP, BP</u>		
<u>x</u> i00126	Eagle TNF-1	100-250
<u>x</u> i00125	Eagle TNF-1	50-60
<u>x</u> i00124	Eagle TNF-1	250-850
(4) <u>SPECTRUM ANALYZER</u>		
<u>x</u> i00048	HP 8566B	2511A01467
<u> </u> i00029	HP 8563E	3213A00104

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NAME OF TEST: Unwanted Emissions (Transmitter Conducted)
 g9960128: 1999-Jun-14 Mon 15:02:00
 STATE: 1:Low Power Digital

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
136.000000	272.012000	-36.5	-73.4	-23.5
150.000000	299.724000	-43.5	-80.4	-30.5
174.000000	348.297000	-44.1	-81	-31.1
136.000000	408.044000	-43.6	-80.5	-30.6
150.000000	450.372000	-44.1	-81	-31.1
174.000000	521.503000	-44.1	-81	-31.1
136.000000	543.721000	-44.1	-81	-31.1
150.000000	600.295000	-43.7	-80.6	-30.7
136.000000	679.969000	-44.3	-81.2	-31.3
174.000000	696.222000	-43.8	-80.7	-30.8
150.000000	750.027000	-42.4	-79.3	-29.4
136.000000	815.538000	-43.8	-80.7	-30.8
174.000000	870.067000	-44.3	-81.2	-31.3
150.000000	899.914000	-43.9	-80.8	-30.9
136.000000	952.065000	-43.1	-80	-30.1
174.000000	1043.944000	-43.7	-80.6	-30.7
150.000000	1050.218000	-44.1	-81	-31.1
136.000000	1087.503000	-43.1	-80	-30.1
150.000000	1199.513000	-43	-79.9	-30
174.000000	1217.586000	-43.9	-80.8	-30.9
136.000000	1224.344000	-43	-79.9	-30
150.000000	1350.106000	-43.1	-80	-30.1
136.000000	1360.321000	-43.4	-80.3	-30.4
174.000000	1392.284000	-41.4	-78.3	-28.4
136.000000	1496.183000	-42.9	-79.8	-29.9
150.000000	1499.751000	-43.3	-80.2	-30.3
174.000000	1565.711000	-43.5	-80.4	-30.5
136.000000	1631.694000	-44	-80.9	-31
150.000000	1649.683000	-44	-80.9	-31
174.000000	1739.988000	-42.8	-79.7	-29.8
136.000000	1768.258000	-42.8	-79.7	-29.8
150.000000	1799.722000	-43.2	-80.1	-30.2
136.000000	1904.281000	-42.7	-79.6	-29.7
174.000000	1914.448000	-42.1	-79	-29.1
150.000000	1949.566000	-43.1	-80	-30.1
136.000000	2039.522000	-43.6	-80.5	-30.6
174.000000	2087.668000	-43.2	-80.1	-30.2
150.000000	2099.960000	-42.8	-79.7	-29.8
150.000000	2249.650000	-42.8	-79.7	-29.8
174.000000	2261.688000	-42.6	-79.5	-29.6
174.000000	2435.940000	-43.1	-80	-30.1
174.000000	2609.972000	-44.4	-81.3	-31.4

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NAME OF TEST: Unwanted Emissions (Transmitter Conducted)
 g9960130: 1999-Jun-14 Mon 15:20:00
 STATE: 1:High Power Digital

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
136.000000	271.997000	-35.8	-72.7	-15.8
150.000000	300.236000	-43.6	-80.5	-23.6
174.000000	347.914000	-42.8	-79.7	-22.8
136.000000	408.467000	-43.9	-80.8	-23.9
150.000000	449.578000	-44.1	-81	-24.1
174.000000	521.639000	-44.4	-81.3	-24.4
136.000000	544.471000	-43.3	-80.2	-23.3
150.000000	600.223000	-44.2	-81.1	-24.2
136.000000	679.580000	-43.9	-80.8	-23.9
174.000000	696.028000	-42.7	-79.6	-22.7
150.000000	749.780000	-43.5	-80.4	-23.5
136.000000	815.980000	-43.3	-80.2	-23.3
174.000000	869.600000	-43.7	-80.6	-23.7
150.000000	899.812000	-43.1	-80	-23.1
136.000000	952.104000	-43.4	-80.3	-23.4
174.000000	1043.546000	-44	-80.9	-24
150.000000	1050.450000	-43.6	-80.5	-23.6
136.000000	1087.899000	-42.9	-79.8	-22.9
150.000000	1200.412000	-43.9	-80.8	-23.9
174.000000	1218.382000	-43.4	-80.3	-23.4
136.000000	1223.641000	-43.3	-80.2	-23.3
150.000000	1350.283000	-43.7	-80.6	-23.7
136.000000	1360.161000	-43.4	-80.3	-23.4
174.000000	1392.439000	-43.3	-80.2	-23.3
136.000000	1496.104000	-43.3	-80.2	-23.3
150.000000	1500.151000	-43.7	-80.6	-23.7
174.000000	1565.917000	-42.7	-79.6	-22.7
136.000000	1632.095000	-42.3	-79.2	-22.3
150.000000	1650.237000	-42.9	-79.8	-22.9
174.000000	1740.161000	-42.9	-79.8	-22.9
136.000000	1768.021000	-43.3	-80.2	-23.3
150.000000	1800.371000	-42.7	-79.6	-22.7
136.000000	1903.880000	-42.6	-79.5	-22.6
174.000000	1913.983000	-43.2	-80.1	-23.2
150.000000	1949.565000	-43.4	-80.3	-23.4
136.000000	2039.657000	-42.8	-79.7	-22.8
174.000000	2087.880000	-42.6	-79.5	-22.6
150.000000	2099.774000	-43.1	-80	-23.1
150.000000	2250.207000	-43.1	-80	-23.1
174.000000	2262.432000	-42.8	-79.7	-22.8
174.000000	2435.549000	-41.6	-78.5	-21.6
174.000000	2610.096000	-43.4	-80.3	-23.4

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NAME OF TEST: Unwanted Emissions (Transmitter Conducted)
 99960127: 1999-Jun-14 Mon 14:49:00
 STATE: 2:Low Power Analog

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
136.000000	272.009000	-32.5	-80.3	-19.5
150.000000	300.165000	-34.3	-82.1	-21.3
174.000000	348.476000	-34.1	-81.9	-21.1
136.000000	407.563000	-34.3	-82.1	-21.3
150.000000	450.146000	-34.9	-82.7	-21.9
174.000000	521.957000	-34.6	-82.4	-21.6
136.000000	543.864000	-33.7	-81.5	-20.7
150.000000	600.084000	-33.5	-81.3	-20.5
136.000000	679.711000	-33.8	-81.6	-20.8
174.000000	695.585000	-32.7	-80.5	-19.7
150.000000	750.026000	-34.4	-82.2	-21.4
136.000000	815.634000	-33.9	-81.7	-20.9
174.000000	870.131000	-35.1	-82.9	-22.1
150.000000	900.314000	-34	-81.8	-21
136.000000	952.330000	-34.4	-82.2	-21.4
174.000000	1044.230000	-33.6	-81.4	-20.6
150.000000	1050.382000	-34.1	-81.9	-21.1
136.000000	1087.783000	-34.4	-82.2	-21.4
150.000000	1199.825000	-33.8	-81.6	-20.8
174.000000	1218.103000	-33.5	-81.3	-20.5
136.000000	1223.856000	-33.9	-81.7	-20.9
150.000000	1350.039000	-34.6	-82.4	-21.6
136.000000	1359.741000	-33.5	-81.3	-20.5
174.000000	1391.727000	-33.7	-81.5	-20.7
136.000000	1496.004000	-34.1	-81.9	-21.1
150.000000	1500.019000	-34	-81.8	-21
174.000000	1565.501000	-33.7	-81.5	-20.7
136.000000	1632.019000	-33	-80.8	-20
150.000000	1649.896000	-33.9	-81.7	-20.9
174.000000	1739.919000	-33.4	-81.2	-20.4
136.000000	1767.681000	-33.9	-81.7	-20.9
150.000000	1800.283000	-34.5	-82.3	-21.5
136.000000	1904.042000	-33	-80.8	-20
174.000000	1913.647000	-32.6	-80.4	-19.6
150.000000	1950.323000	-31.7	-79.5	-18.7
136.000000	2040.426000	-33.3	-81.1	-20.3
174.000000	2088.246000	-33.3	-81.1	-20.3
150.000000	2099.967000	-32.3	-80.1	-19.3
150.000000	2250.470000	-32.5	-80.3	-19.5
174.000000	2262.050000	-32.4	-80.2	-19.4
174.000000	2435.583000	-32.2	-80	-19.2
174.000000	2609.935000	-34.8	-82.6	-21.8

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NAME OF TEST: Unwanted Emissions (Transmitter Conducted)
 g9960129: 1999-Jun-14 Mon 15:12:00
 STATE: 2:High Power Analog

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
136.000000	272.006000	-31.2	-79	-11.2
150.000000	299.862000	-34.6	-82.4	-14.6
174.000000	347.698000	-34.4	-82.2	-14.4
136.000000	408.018000	-34.2	-82	-14.2
150.000000	449.709000	-33.9	-81.7	-13.9
174.000000	521.889000	-34.2	-82	-14.2
136.000000	544.031000	-34.2	-82	-14.2
150.000000	599.610000	-34	-81.8	-14
136.000000	680.038000	-34.3	-82.1	-14.3
174.000000	695.552000	-34.5	-82.3	-14.5
150.000000	749.536000	-34.3	-82.1	-14.3
136.000000	816.264000	-33.4	-81.2	-13.4
174.000000	869.808000	-34.3	-82.1	-14.3
150.000000	900.452000	-33.9	-81.7	-13.9
136.000000	951.888000	-34.1	-81.9	-14.1
174.000000	1043.595000	-34.1	-81.9	-14.1
150.000000	1049.908000	-34	-81.8	-14
136.000000	1088.491000	-32.9	-80.7	-12.9
150.000000	1200.343000	-33.7	-81.5	-13.7
174.000000	1218.095000	-34	-81.8	-14
136.000000	1223.688000	-32.8	-80.6	-12.8
150.000000	1349.944000	-32	-79.8	-12
136.000000	1359.560000	-33.5	-81.3	-13.5
174.000000	1391.635000	-33.6	-81.4	-13.6
136.000000	1496.487000	-34.2	-82	-14.2
150.000000	1500.023000	-33.8	-81.6	-13.8
174.000000	1565.714000	-31.7	-79.5	-11.7
136.000000	1632.137000	-33.3	-81.1	-13.3
150.000000	1650.242000	-33.7	-81.5	-13.7
174.000000	1740.206000	-33.4	-81.2	-13.4
136.000000	1768.018000	-33.3	-81.1	-13.3
150.000000	1799.663000	-32.9	-80.7	-12.9
136.000000	1903.514000	-33.2	-81	-13.2
174.000000	1913.900000	-34	-81.8	-14
150.000000	1949.879000	-32.4	-80.2	-12.4
136.000000	2039.915000	-33.6	-81.4	-13.6
174.000000	2088.409000	-33.1	-80.9	-13.1
150.000000	2100.240000	-32.6	-80.4	-12.6
150.000000	2249.642000	-32.6	-80.4	-12.6
174.000000	2262.354000	-33.6	-81.4	-13.6
174.000000	2436.244000	-31.4	-79.2	-11.4
174.000000	2609.910000	-34.4	-82.2	-14.4

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NAME OF TEST: Field Strength of Spurious Radiation

SPECIFICATION: 47 CFR 2.1053(a)

GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.12

TEST EQUIPMENT: As per attached page

MEASUREMENT PROCEDURE

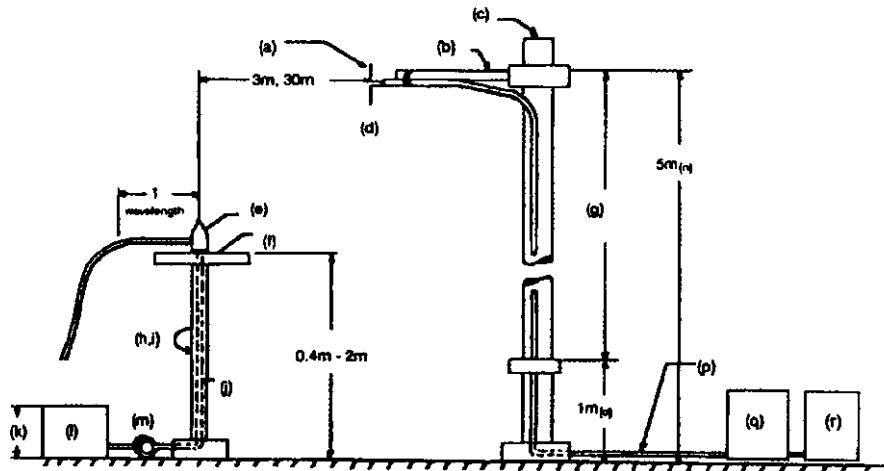
1. A description of the measurement facilities was filed with the FCC and was found to be in compliance with the requirements of Section 2.948, by letter from the FCC dated March 3, 1997, FILE 31040/SIT. All pertinent changes will be reported to the Commission by up-date prior to March 2000.
2. At first, in order to locate all spurious frequencies and approximate amplitudes, and to determine proper equipment functioning, the test sample was set up at a distance of three meters from the test instrument. Valid spurious signals were determined by switching the power on and off.
3. In the field, the test sample was placed on a wooden turntable above ground at three (or thirty) meters away from the search antenna. Excess power leads were coiled near the power supply.

The cables were oriented in order to obtain the maximum response. At each emission frequency, the turntable was rotated and the search antennas were raised and lowered vertically.

4. The emission was observed with both a vertically polarized and a horizontally polarized search antenna and the worst case was used.
6. The field strength of each emission within 20 dB of the limit was recorded and corrected with the appropriate cable and transducer factors.
7. The worst case for all channels is shown.
8. Measurement results: ATTACHED FOR WORST CASE

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RADIATED TEST SETUP

NOTES:

- (a) Search Antenna - Rotatable on boom
- (b) Non-metallic boom
- (c) Non-metallic mast
- (d) Adjustable horizontally
- (e) Equipment Under Test
- (f) Turntable
- (g) Boom adjustable in height.
- (h) External control cables routed horizontally at least one wavelength.
- (i) Rotatable
- (j) Cables routed through hollow turntable center
- (k) 30 cm or less
- (l) External power source
- (m) 10 cm diameter coil of excess cable
- (n) 25 cm (V), 1 m-7 m (V, H)
- (o) 25 cm from bottom end of 'V', 1m normally
- (p) Calibrated Cable at least 10m in length
- (q) Amplifier (optional)
- (r) Spectrum Analyzer

Asset	Description	s/n	Cycle	Last Cal
-------	-------------	-----	-------	----------

Per ANSI C63.4-1992, 10.1.4

TRANSDUCER

100065	EMCO 3109B 100Hz-50MHz	2336	12 mo.
100033	Singer 94593-1 10kHz-32MHz	0219	12 mo.
x 100088	EMCO 3109-B 25MHz-300MHz	2336	12 mo. Oct-98
x 100089	Aprel 2001 200MHz-1GHz	001500	12 mo. Oct-98
x 100103	EMCO 3115 1GHz-18GHz	9208-3925	12 mo. Oct-98
100085	EMCO 3116 10GHz-40GHz	2076	12 mo.

AMPLIFIER

100028	HP 8449A	2749A00121	12 mo.	Mar-99
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SPECTRUM ANALYZER

100029	HP 8563E	3213A00104	12 mo.	Aug-98
x 100033	HP 85462A	3625A00357	12 mo.	Dec-98
100048	HP 8566B	2511AD1467	6 mo.	Dec-98

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NAME OF TEST:

Field Strength of Spurious Radiation

ALL OTHER EMISSIONS = \geq 20 dB BELOW LIMIT

EMISSION, MHz/HARMONIC	SPURIOUS LEVEL, dBc	
	Low	High
Digital 2nd to 10 th	<-70	<-70
Analog 2nd to 10 th	<-75	<-75
2nd to 10 th	<-	<-
2nd to 10 th	<-	<-

SUPERVISED BY:

MFA p9960005, d9960027


 Morton Flom, P. Eng.

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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

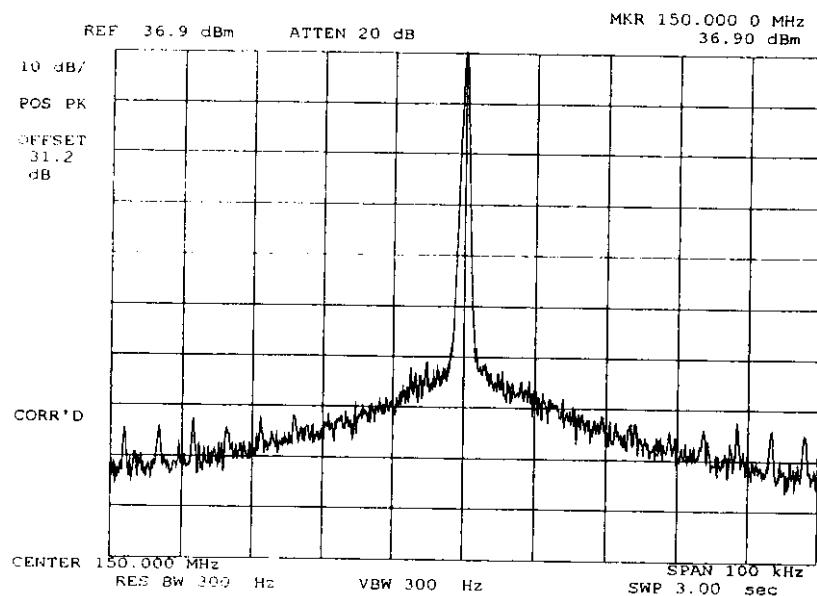
MEASUREMENT PROCEDURE

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 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)
g9960115; 1999-Jun-14 Mon 13:34:00
STATE: 1:Low Power



POWER: LOW
MODULATION: NONE

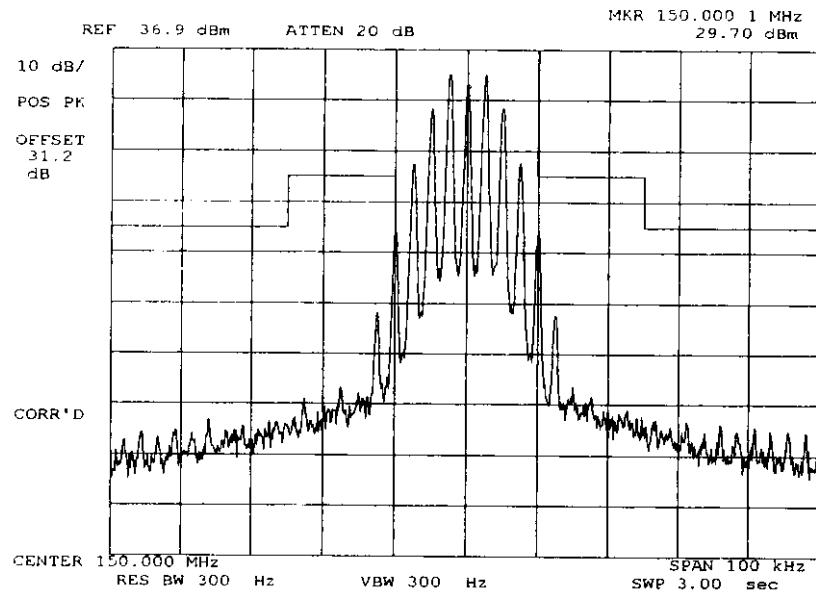
SUPERVISED BY:


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NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960119: 1999-Jun-14 Mon 13:58:00
 STATE: 1:Low Power



POWER:
 MODULATION:

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

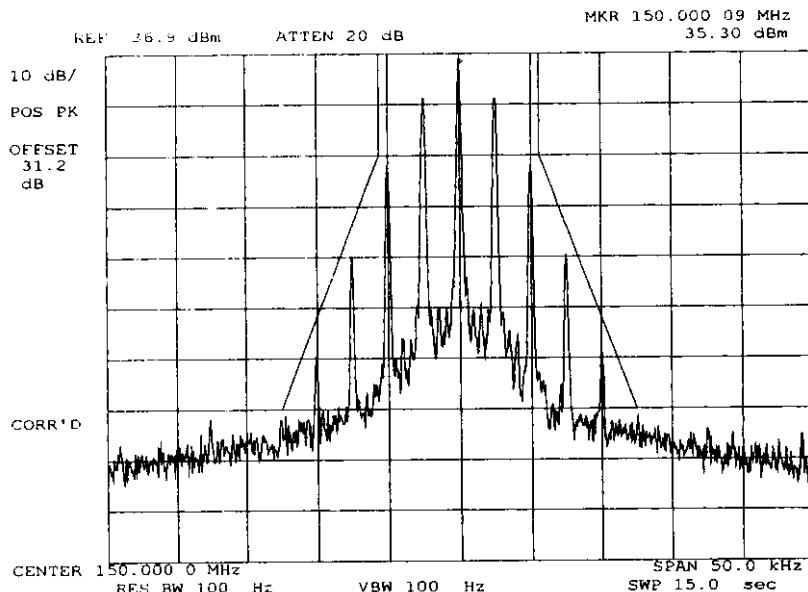
SUPERVISED BY:

M. Flom P. Eng.
 Morton Flom, P. Eng.

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NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960121: 1999-Jun-14 Mon 14:03:00
 STATE: 1:Low Power



POWER:
 MODULATION:

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

SUPERVISED BY:

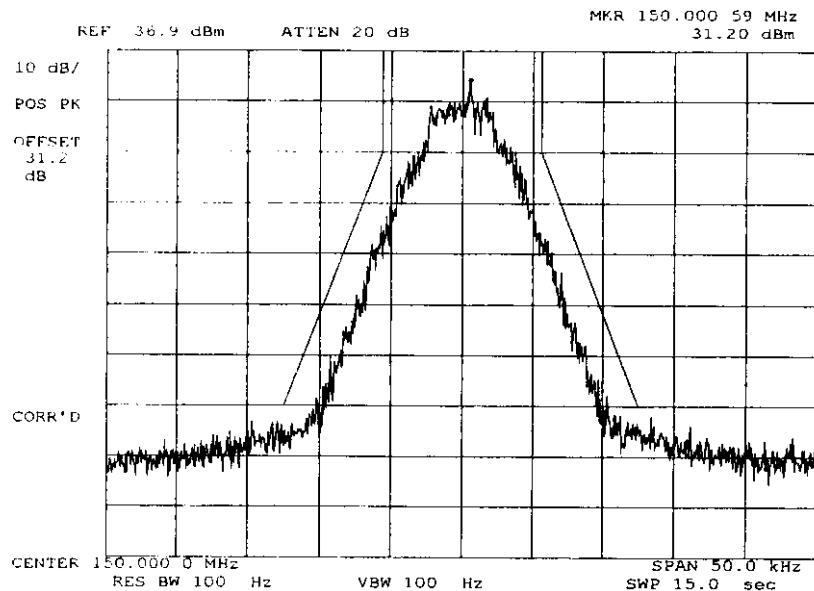


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NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960143: 1999-Jun-16 Wed 15:56:00
 STATE: 1:Low Power



POWER:
 MODULATION:

LOW
 APCO PROJECT 25 DIGITIZED
 VOICE
 MASK: D, VHF/UHF 12.5kHz BW

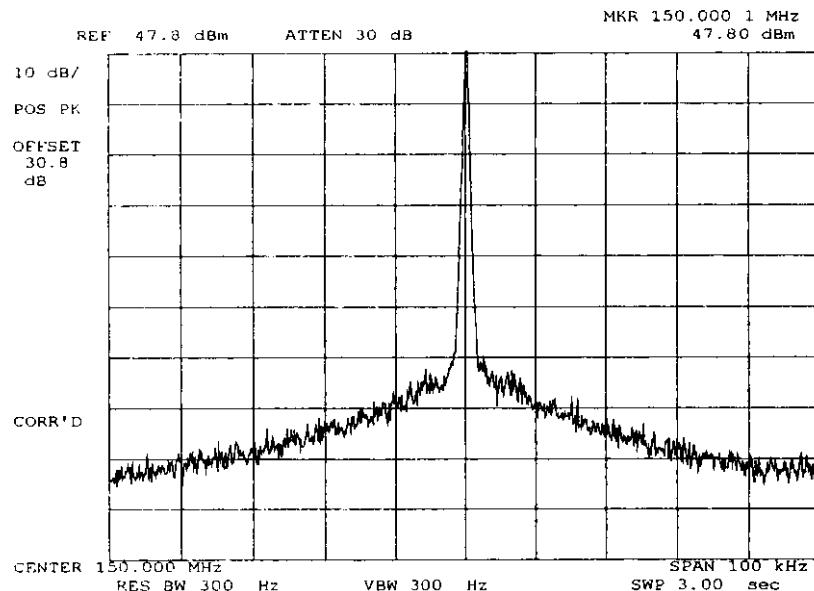
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NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960117: 1999-Jun-14 Mon 13:55:00
 STATE: 2:High Power



POWER: HIGH
 MODULATION: NONE

SUPERVISED BY:

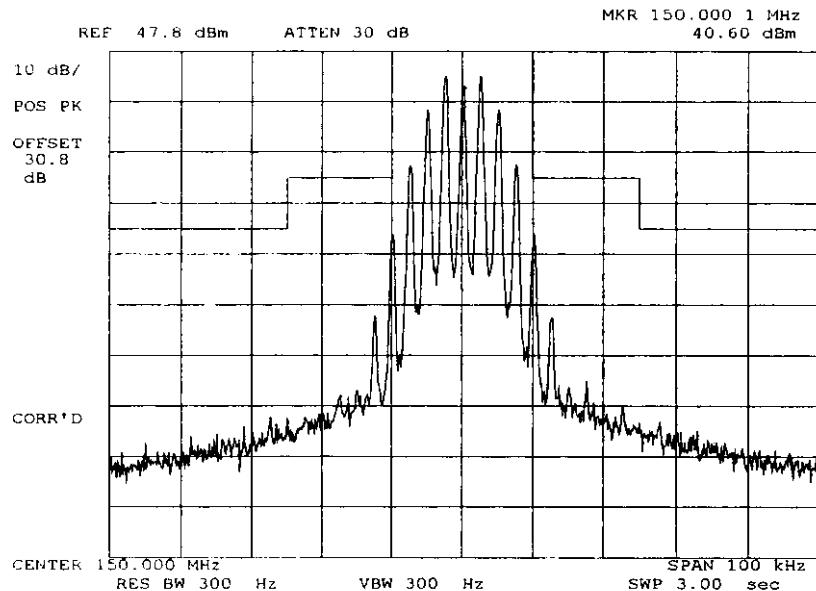


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NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960118: 1999-Jun-14 Mon 13:57:00
 STATE: 2:High Power



POWER:
 MODULATION:

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

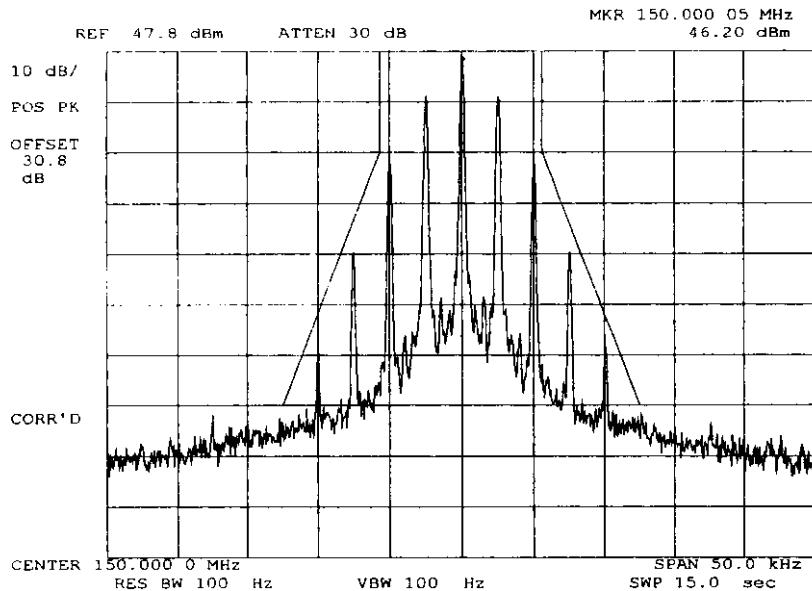
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NAME OF TEST: Emission Masks (Occupied Bandwidth)
g9960120: 1999-Jun-14 Mon 14:01:00
STATE: 2:High Power



POWER:
MODULATION:

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

SUPERVISED BY:

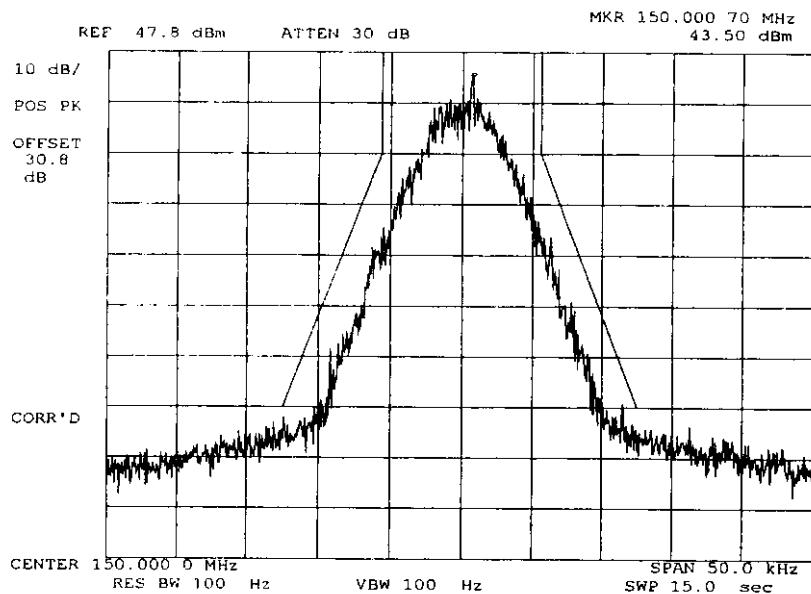


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NAME OF TEST: Emission Masks (Occupied Bandwidth)
 g9960141: 1999-Jun-16 Wed 15:33:00
 STATE: 2:High Power



POWER:
 MODULATION:

HIGH
 APCO PROJECT 25 DIGITIZED
 VOICE
 MASK: D, VHF/UHF 12.5kHz BW

SUPERVISED BY:

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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

1. The EUT was setup as shown on the attached page, following TIA/EIA-603 steps a, b, and c as a guide.
2. The transmitter was turned on.
3. 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 as step f.
4. The transmitter was turned off.
5. 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 f, as measured at the output of the combiner. This level was then fixed for the remainder of the test and is recorded at step h.
6. 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).
7. 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 as step l.
8. 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.

LEVELS MEASURED:

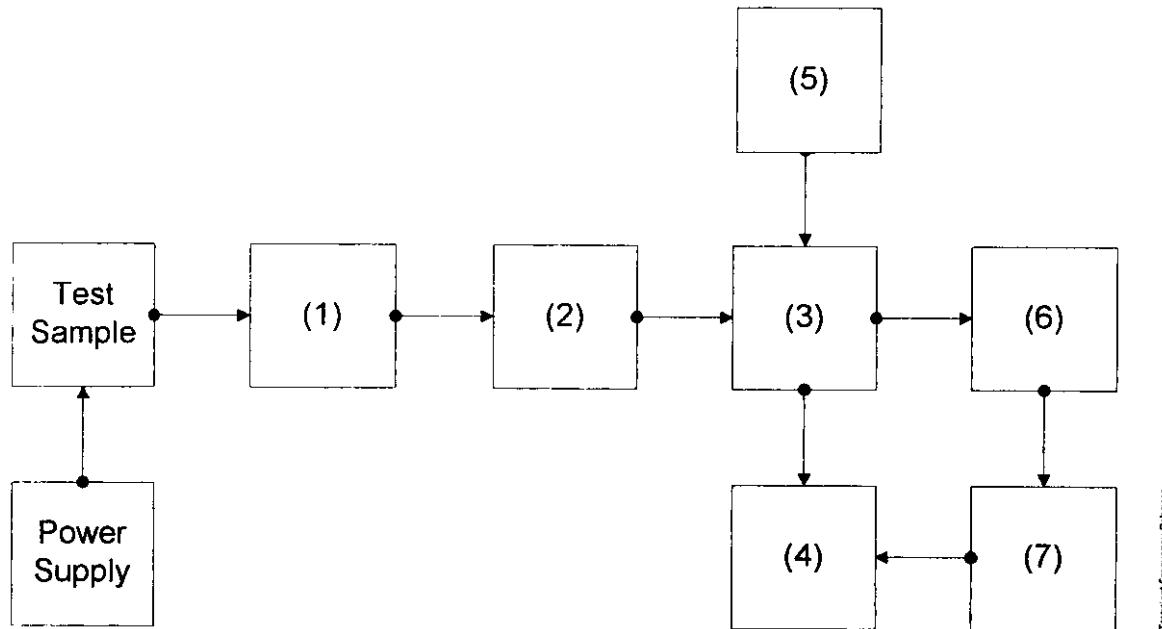
step f, dBm	= -12.9
step h, dBm	= -34.3
step l, dBm	= 15.7

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TRANSIENT FREQUENCY BEHAVIOR

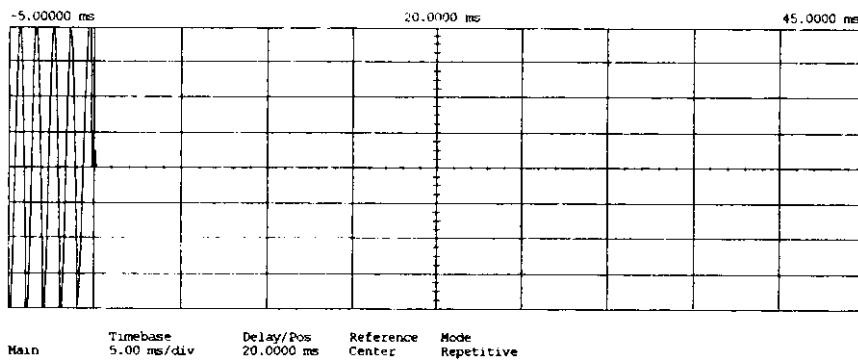
Transient Frequency Behavior

Asset	Description	s/n
(1) ATTENUATOR	(Removed after 1st step)	
x i00112	Philco 30 dB	989
(2) ATTENUATOR		
x i00112	Philco 30 dB	989
— i00172	Bird 30 dB	989
x i00122	Narda 10 dB	7802
— i00123	Narda 10 dB	7802A
— i00110	Kay Variable	145-387
(3) COMBINER		
x i00154	4 x 25 Ω COMBINER	154
(4) CRYSTAL DETECTOR		
x i00159	HP 8470B	1822A10054
(5) RF SIGNAL GENERATOR		
— i00018	HP 8656A	2228A03472
— i00031	HP 8656A	2402A06180
x i00067	HP 8920A	3345U01242
(6) MODULATION ANALYZER		
x i00020	HP 8901A	2105A01087
(7) SCOPE		
x i00030	HP 54502A	2927A00209

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NAME OF TEST: Transient Frequency Behavior
 g9960136: 1999-Jun-14 Mon 16:27:00
 STATE: 0:General



25

-25

Main	Timebase	Delay/Pos	Reference	Mode
	5.00 ms/div	20.0000 ms	Center	Repetitive
Channel 1	Sensitivity	Offset	Probe	Coupling
	275 mV/div	0.00000 V	1.000 :1	dc (1M ohm)

Trigger mode : Edge
 On Negative Edge Of Chan2
 Trigger Level
 Chan2 = -12.500 mV (noise reject ON)
 Holdoff = 40.000 ns

POWER:
 MODULATION:
 DESCRIPTION:

n/a
 Ref Gen=25 kHz Deviation
 CARRIER ON TIME

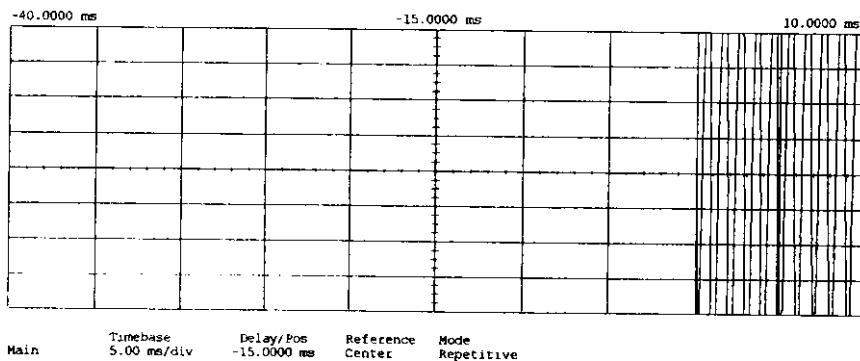
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NAME OF TEST: Transient Frequency Behavior
 g9960137: 1999-Jun-14 Mon 16:41:00
 STATE: 0:General



25

-25

Main	Timebase 5.00 ms/div	Delay/Pos -15.0000 ms	Reference Center	Mode Repetitive
Channel 1	Sensitivity 275 mV/div	Offset 0.00000 V	Probe 1.000 :1	Coupling dc (1M ohm)

Trigger mode : Edge
 On Positive Edge Of Chan2
 Trigger Level
 Chan2 = -1.50000 V (noise reject OFF)
 Holdoff = 40.000 ns

POWER:
 MODULATION:
 DESCRIPTION:

n/a
 Ref Gen=25 kHz Deviation
 CARRIER OFF TIME

SUPERVISED BY:

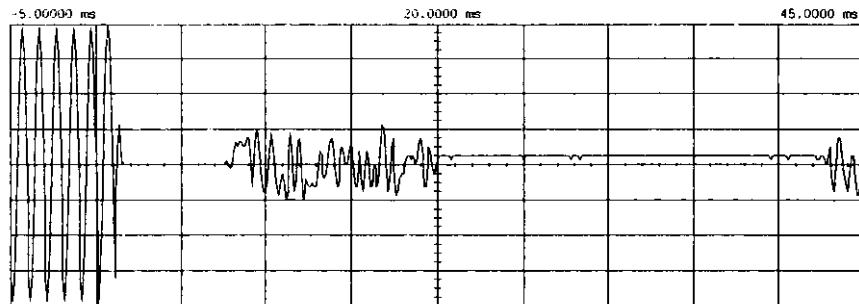


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NAME OF TEST: Transient Frequency Behavior
 g9960131: 1999-Jun-14 Mon 15:56:00
 STATE: 0:General



12.5

-12.5

Main Timebase 5.00 ms/div Delay/Pos 20.0000 ms Reference Center Mode Repetitive
 Channel 1 Sensitivity 312 mV/div Offset 0.00000 V Probe 1.000 :1 Coupling dc (1M ohm)

Trigger mode : Edge
 On Negative Edge Of Chan2
 Trigger Level
 Chan2 = -4.000 mV (noise reject ON)
 Holdoff = 40.000 ns

POWER:
 MODULATION:
 DESCRIPTION:

n/a
 Ref Gen=12.5 kHz Deviation
 CARRIER ON TIME

SUPERVISED BY:

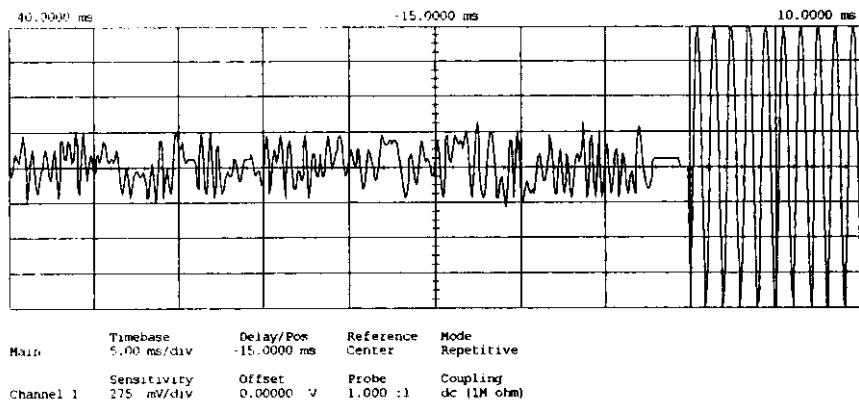


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NAME OF TEST: Transient Frequency Behavior
 g9960132: 1999-Jun-14 Mon 16:06:00
 STATE: 0:General



POWER:
 MODULATION:
 DESCRIPTION:

n/a
 Ref Gen=12.5 kHz Deviation
 CARRIER OFF TIME

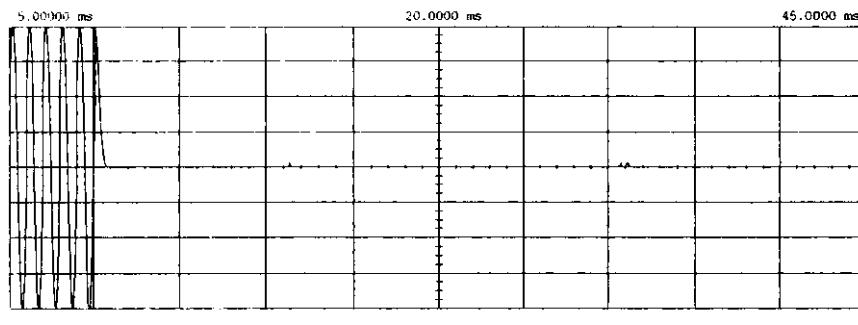
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NAME OF TEST: Transient Frequency Behavior
 g9960133: 1999-Jun-14 Mon 16:09:00
 STATE: 0:General



12.5

-12.5

Main	Timebase	Delay/Pos	Reference	Mode
	5.00 ms/div	20.0000 ms	Center	Repetitive
Channel 1	Sensitivity	Offset	Probe	Coupling
	275 mV/div	0.00000 V	1.000 :1	dc (1M ohm)

Trigger mode : Edge
 On Negative Edge Of Chan2
 Trigger Level
 Chan2 = -3.000 mV (noise reject ON)
 Holdoff = 40.000 ns

POWER:
 MODULATION:
 DESCRIPTION:

n/a
 Ref Gen=12.5 kHz Deviation
 CARRIER ON TIME

SUPERVISED BY:



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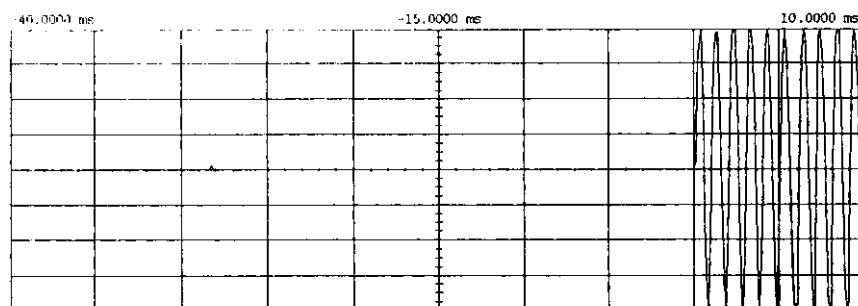
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NAME OF TEST: Transient Frequency Behavior

g9960134: 1999-Jun-14 Mon 16:21:00

STATE: 0:General



12.5

-12.5

Main	Timebase	Delay/Pos	Reference	Mode
	5.00 ms/div	-15.0000 ms	Center	Repetitive
Channel 1	Sensitivity 275 mV/div	Offset 0.00000 V	Probe 1.000 :1	Coupling dc (1M ohm)

Trigger Mode : Edge
 On Positive Edge Of Chan2
 Trigger Level
 Chan2 = -1.56000 V (noise reject ON)
 Holdoff = 40.000 ns

POWER:
 MODULATION:
 DESCRIPTION:

n/a
 Ref Gen=12.5 kHz Deviation
 CARRIER OFF TIME

SUPERVISED BY:

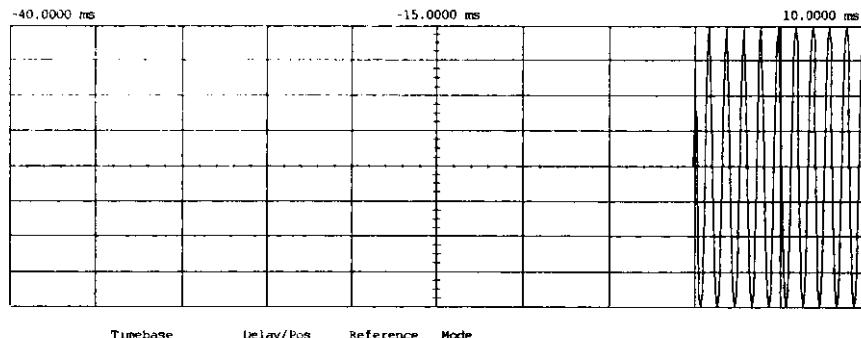


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NAME OF TEST: Transient Frequency Behavior
 g9960135: 1999-Jun-14 Mon 16:22:00
 STATE: 0:General



12.5

-12.5

Main	Timebase	Delay/Pos	Reference	Mode
	5.00 ms/div	-15.0000 ms	Center	Repetitive
Channel 1	Sensitivity	Offset	Probe	Coupling
	275 mV/div	0.00000 V	1.000 :1	dc (1M ohm)

Trigger mode : Edge
 On Positive Edge Of Chanz
 Trigger level
 Chanz = 1.5000 V (inrise level)
 Holdoff = 40.000 ns

POWER:
 MODULATION:
 DESCRIPTION:

n/a
 Ref Gen=12.5 kHz Deviation
 CARRIER OFF TIME

SUPERVISED BY:



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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

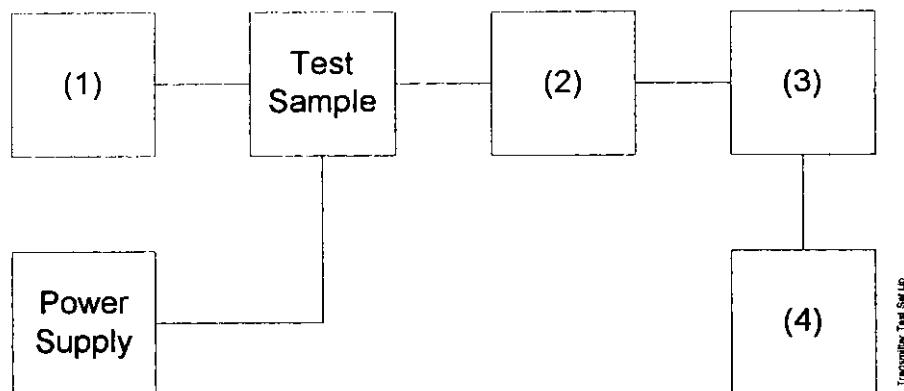
1. The EUT and test equipment were set up such that the audio input was connected at the input to the modulation limiter, and the modulated stage.
2. The audio output was connected at the output to the modulated stage.
3. MEASUREMENT RESULTS: ATTACHED

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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

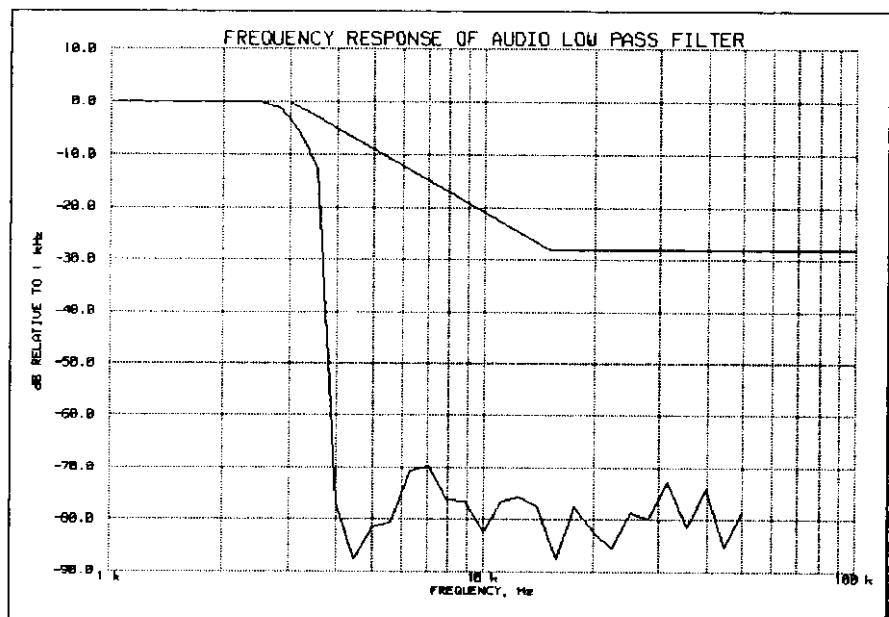


Asset	Description	s/n
(1) <u>Audio Oscillator</u>		
<u>i00010</u>	HP 204D	1105A04683
<u>x i00017</u>	HP 8903A	2216A01753
<u>x i00118</u>	HP 33120A	US36002064
(2) <u>COAXIAL ATTENUATOR</u>		
<u>i00122</u>	NARDA 766-10	7802
<u>i00123</u>	NARDA 766-10	7802A
<u>x i00113</u>	SIERRA 661A-3D	1059
<u>i00069</u>	BIRD 8329 (30 dB)	10066
(3) <u>MODULATION ANALYZER</u>		
<u>x i00020</u>	HP 8901A	2105A01087
(4) <u>AUDIO ANALYZER</u>		
<u>x i00017</u>	HP 8903A	2216A01753

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NAME OF TEST: Audio Low Pass Filter (Voice Input)
g9960045: 1999-Jun-14 Mon 09:50:00
STATE: 0:General



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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

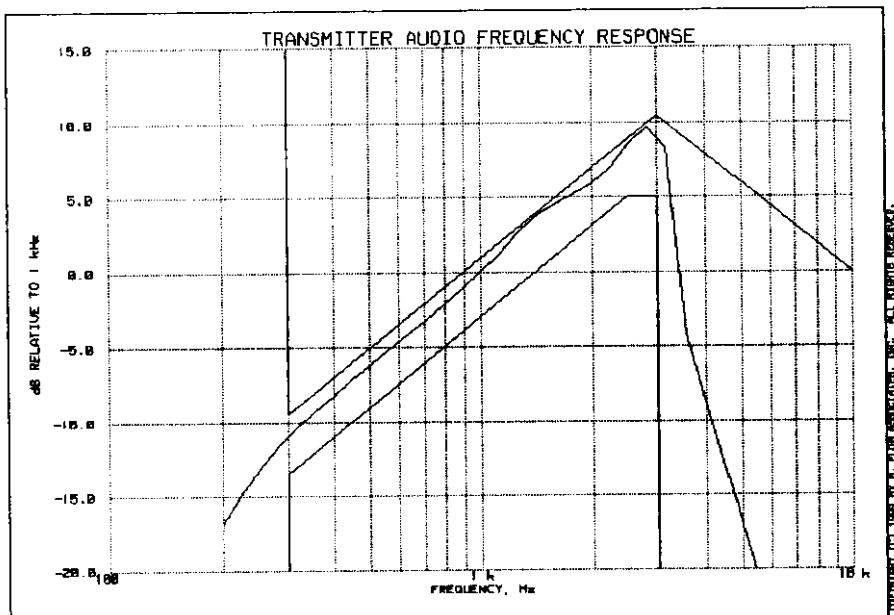
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NAME OF TEST: Audio Frequency Response

g9960047: 1999-Jun-14 Mon 10:01:00

STATE: 0:General

Additional points:

FREQUENCY, Hz	LEVEL, dB
300	-10.99
20000	-34.46
30000	-34.50
50000	-34.54

SUPERVISED BY:

Morton Flom, P. Eng.

PAGE NO. 41 of 48.
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

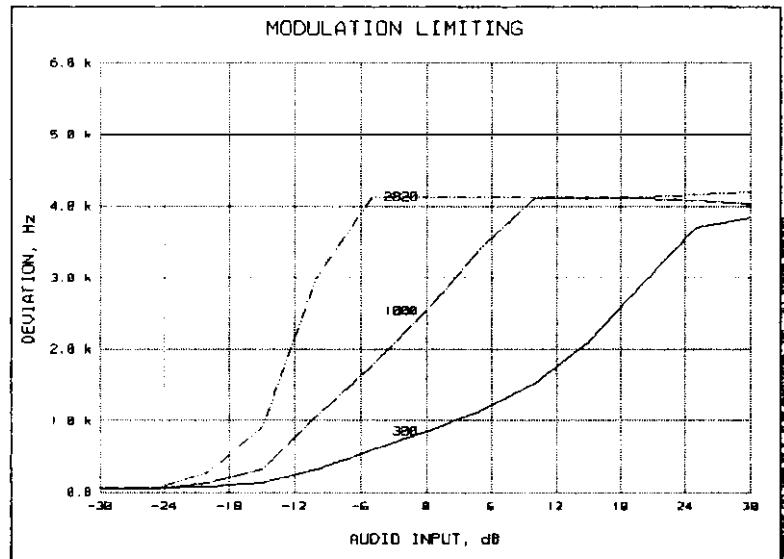
1. The signal generator was connected to the input of the EUT as for "Frequency Response of the Modulating Circuit."
2. The modulation response was measured for each of three frequencies (one of which was the frequency of maximum response), and the input voltage was varied and was observed on an HP 8901A 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

PAGE NO.

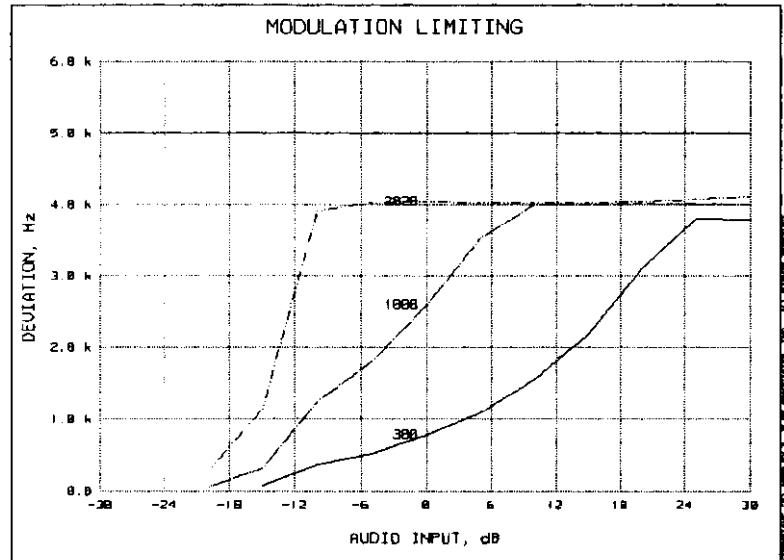
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NAME OF TEST: Modulation Limiting
 g9960048: 1999-Jun-14 Mon 10:12:00
 STATE: 0:General

Positive
 Peaks:



Negative
 Peaks:



SUPERVISED BY:

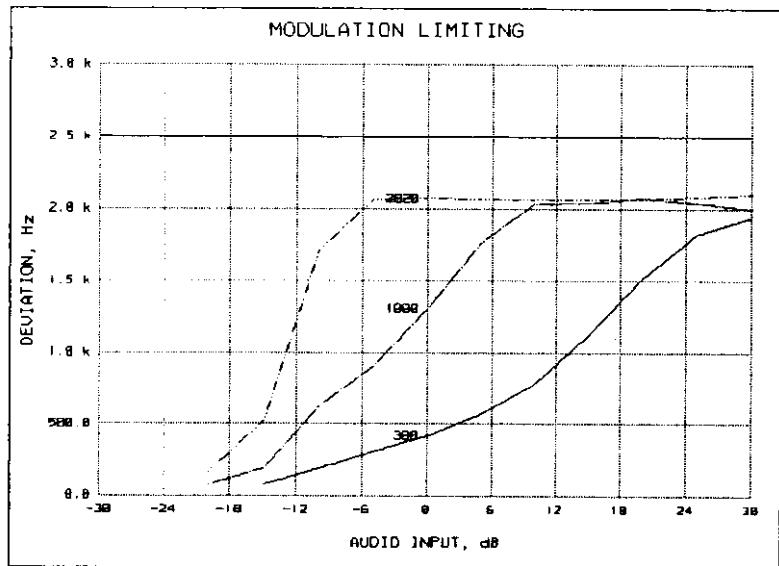
M. Flom, P. Eng.
 Morton Flom, P. Eng.

PAGE NO.

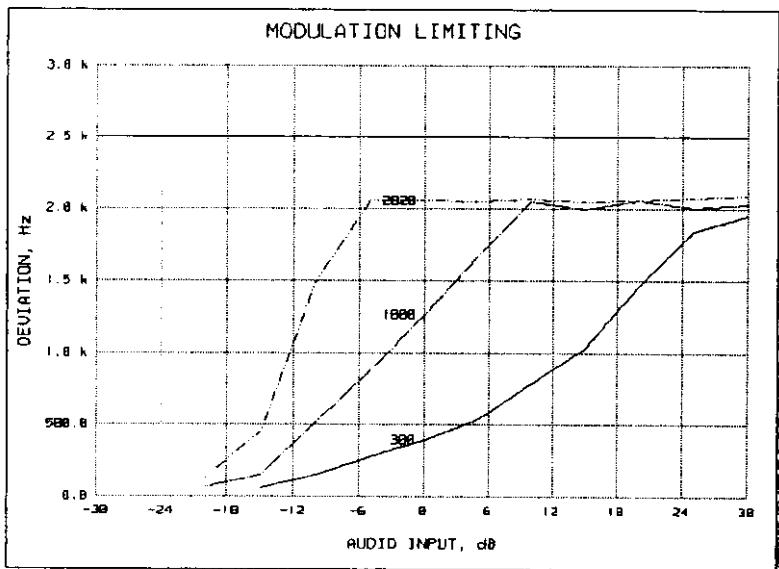
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NAME OF TEST: Modulation Limiting
 g9960049: 1999-Jun-14 Mon 10:15:00
 STATE: 0:General

Positive
 Peaks:



Negative
 Peaks:



SUPERVISED BY:


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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

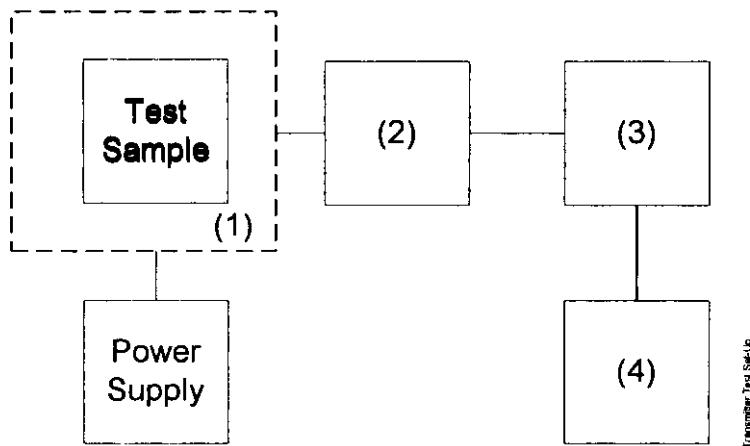
1. The EUT and test equipment were set up as shown on the following page.
2. With all power removed, the temperature was decreased to -30°C and permitted to stabilize for three hours. Power was applied and the maximum change in frequency was noted within one minute.
3. With power OFF, the temperature 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

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TRANSMITTER TEST SET-UP

TEST A. OPERATIONAL STABILITY
 TEST B. CARRIER FREQUENCY STABILITY
 TEST C. OPERATIONAL PERFORMANCE STABILITY
 TEST D. HUMIDITY
 TEST E. VIBRATION
 TEST F. ENVIRONMENTAL TEMPERATURE
 TEST G. FREQUENCY STABILITY: TEMPERATURE VARIATION
 TEST H. FREQUENCY STABILITY: VOLTAGE VARIATION



Asset	Description	s/n
(1)	TEMPERATURE, HUMIDITY, VIBRATION	
x	i00027 Tenny Temp. Chamber	9083-765-234
—	i00 Weber Humidity Chamber	
—	i00 L.A.B. RVH 18-100	
(2)	COAXIAL ATTENUATOR	
—	i00122 NARDA 766-10	7802
—	i00123 NARDA 766-10	7802A
x	i00113 SIERRA 661A-3D	1059
—	i00069 BIRD 8329 (30 dB)	10066
(3)	R.F. POWER	
—	i00014 HP 435A POWER METER	1733A05839
x	i00039 HP 436A POWER METER	2709A26776
x	i00020 HP 8901A POWER MODE	2105A01087
(4)	FREQUENCY COUNTER	
—	i00042 HP 5383A	1628A00959
x	i00019 HP 5334B	2704A00347
x	i00020 HP 8901A	2105A01087

(1)	TEMPERATURE, HUMIDITY, VIBRATION	
x	i00027 Tenny Temp. Chamber	9083-765-234
—	i00 Weber Humidity Chamber	
—	i00 L.A.B. RVH 18-100	

(2)	COAXIAL ATTENUATOR	
—	i00122 NARDA 766-10	7802
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—	i00014 HP 435A POWER METER	1733A05839
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(4)	FREQUENCY COUNTER	
—	i00042 HP 5383A	1628A00959
x	i00019 HP 5334B	2704A00347
x	i00020 HP 8901A	2105A01087

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NAME OF TEST: Frequency Stability (Temperature Variation)

<u>TEMPERATURE</u>	<u>ERROR</u>
-30	-9 Hz
-20	-9 Hz
-10	-9 Hz
0	-8 Hz
10	-8 Hz
20	-8 Hz
30	-6 Hz
40	-6 Hz
50	-6 Hz
60	-6 Hz

SUPERVISED BY:


Morton Flom, P. Eng.

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NAME OF TEST: Frequency Stability (Voltage Variation)
SPECIFICATION: 47 CFR 2.1055(b)(1)
GUIDE: ANSI/TIA/EIA-603-1992, Paragraph 2.2.2
TEST EQUIPMENT: As per previous page

MEASUREMENT PROCEDURE

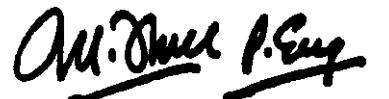
1. The EUT was placed in a temperature chamber at $25\pm5^{\circ}\text{C}$ and connected as for "Frequency Stability - Temperature Variation" test.
2. The power supply voltage to the EUT was varied from 85% to 115% of the nominal value measured at the input to the EUT.
3. The variation in frequency was measured for the worst case.

RESULTS: Frequency Stability (Voltage Variation)
g9960114: 1999-Jun-14 Mon 11:28:08
STATE: 0:General

LIMIT, ppm = 2.5
 LIMIT, Hz = 375
 BATTERY END POINT (Voltage) = 10.8

% of STV	Voltage	Frequency, MHz	Change, Hz	Change, ppm
85	12.75	150.000001	0	0.006
100	15	150.000001	0	0.006
115	17.25	150.000002	0	0.012

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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	= (2 x M) + (2 x D x K)
	= 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	= (2 x M) + (2 x D x K)
	= 11.0

MODULATION = 16K0F1E

NECESSARY BANDWIDTH:

NECESSARY BANDWIDTH (B _N), kHz	= 16.0
(measured at the 99.75% power bandwidth)	

MODULATION = 11K0F1E

NECESSARY BANDWIDTH:

NECESSARY BANDWIDTH (B _N), kHz	= 11.0
(measured at the 99.75% power bandwidth)	

SUPERVISED BY:


Morton Flom, P. Eng.

TESTIMONIAL
AND
STATEMENT OF CERTIFICATION

THIS IS TO CERTIFY THAT:

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.

STATEMENT OF QUALIFICATIONS

EDUCATION:

1. B. ENG. in ENGINEERING PHYSICS, 1949, McGill University, Montreal, Canada.
2. Post Graduate Studies, McGill University & Sir George Williams University, Montreal.

PROFESSIONAL AFFILIATIONS:

1. ARIZONA SOCIETY OF PROFESSIONAL ENGINEERS (NSPE), #026 031 821.
2. ORDER OF ENGINEERS (QUEBEC) 1949. #45 34.
3. ASSOCIATION OF PROFESSIONAL ENGINEERS, GEOPHYSICISTS & GEOLOGISTS OF ALBERTA #5916.
4. REGISTERED ENGINEERING CONSULTANT - INDUSTRY CANADA, Certification & Engineering Bureau.
5. IEEE, Lifetime member no. 041/204 (Member since 1947).

EXPERIENCE:

1. Research/Development/Senior Project Engineer. R.C.A. LIMITED (4 years).
2. Owner/Chief Engineer of Electronics. Design/Manufacturing & Cable TV Companies (10 years)
3. CONSULTING ENGINEER (over 25 years).



MORTON FLOM, P. Eng.



Quality
Endorsed
Company

Certificate of Registration

ADI LIMITED - SYSTEMS GROUP TELECOMMUNICATIONS

ACN 008 842 761

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424 Lane Cove Road NORTH RYDE NSW 2113 AUSTRALIA

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installation and servicing

Certified Date: 2 December 1994

Issue Date: 10 June 1997

Issue No.: 2

Licence No.: QEC0314

A handwritten signature in black ink, appearing to read 'Malcolm Cameron'.

Malcolm Cameron
General Manager, Certification Development Division

A handwritten signature in black ink, appearing to read 'Steve Fletcher'.

Authorised Local Signatory, QAS



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