FEB 22 1999

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EXICOM TECHNOLOGIES (1996) LTD.

TRANSMITTERS: MODELS 2950-3, -4, -5

LIST OF DOCUMENTATION SUBMITTED WITH APPLICATIONS

1. NOTICE FOR INTERMEDIATE MANUAL:
(old 2802) New 2950
2. LIST OF ACTIVE DEVICES : 2950
3. CIRCUIT DIAGRAMS: 3 of 3

TECHNICAL MANUAL
CONDOR 2737

1. PART ONE: CONDOR STANDARD CONFIGURATION
2. PART 2 : SPECIFICATIONS
3. PART 3: SYSTEM OPERATION
4. PART 4: SYSTEM SETUP
5. PART 6: CONTROLLER TYPE 2737 (includes Circuit Descriptions, Schematics and., Block Diagram etc.)
6. PART 9: INTRODUCTION UHF Type 2950 (Includes Alignment & Block Diagram)
7. PART 10: VHF Duplexer descriptions
8. PART 12: MAIN POWER SUPPLY (includes Schematic)
9. PART 13: DC-DC Converter Type 2461 (includes Schematics)
10. PART 17: SYSTEM SETUP

EXICOM
INTERNATIONAL

Important Note

Exicom Technologies has recently designed new transmitter and receiver modules for its Condor radio link product. Specifically, the new 2950 transmitter module replaces the old 2802 module and the new 2940 receiver module replaces the old 2801 module.

The Condor Technical Manual is currently in the process of being updated by Exicom Technologies to include references to these new modules.

This version of the manual is an 'intermediate step' – it contains sections on the new 2950 and 2940 modules (appended to the front of the manual), but the main body still contains many references to the old 2802 and 2801 module. Therefore, wherever you read 2802 or 2801 in this manual, please make the following replacements:

	Old	*New*
Transmitter	2802	2950
Receiver	2801	2940

Thank you,

Exicom Technologies (1996) Ltd

Active Devices for UHF Transmitter Type 2950

Identifier	Manufacturer's Part Number	Description
D151, D152, D301, D401, D402	BAV70	General purpose diodes
D153, D651	BZX84C2V7	Voltage offset in 10V power supply shift regulators
D200	BB515	UHF varicap for VCO tuning
D201	BB515	UHF varicap audio modulation in VCO
D300, D505, D710	BAV99	General purpose diodes
D501, D502, D503, D652, D700, D703	BAV70	General purpose diodes
D602, D603	LED Red	Front panel indicators
D604, D606	5082-2800	SWR bridge RF detectors
Q151, Q402, Q601, Q602	BC847B	General purpose transistors
Q200	BFR93A	UHF oscillator in VCO tuning
Q301	DTA 144	Digital transistor
Q302	DTC144EC-A	Digital transistor
Q401	BC857B	General purpose transistors
Q501	BF994S	Gain control device in power block driver
Q502	2SK2973	Output stage of powerblock driver
Q651, Q701, Q702, Q703, Q704	BC847B	General purpose transistors
Q652, Q152	BD136	Series pass transistors for +10ps regulators
TCXO	TCXO	Temperature stable crystal oscillator reference
U101	TL074CD	Audio stage amplifiers
U151, U651	MC78L08ACD	8V regulators used as reference voltages
U152, U652	CA3140M	10V power supply regulator amplifier
U153	HA17805	5v regulator for uprocessor end phase lock loop IC
U302	AT89C2051-24SI	Microprocessor
U303,U304, U305	MM74HC165M	Shift registers for loading user settable parameters
U307	UMA1014T	Phase lock loop synthesizer
U308	TL071CD	Phase lock loop amplifier
U401	LT1054CS8	Voltage inverter for VCO negative supply
U601	M57704H	Output power block
U653	LM35DZ	Temperature monitor for power block protection
U701	MC14051BD	Analog Multiplexer for monitoring circuit
U702, U703	LM358M	Power control and SWR protection circuit amplifiers

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

a) TEST REPORT

b) Laboratory: (FCC: 31040/SIT) (Canada: IC 2044)
M. Flom Associates, Inc.
3356 N. San Marcos Place, Suite 107
Chandler, AZ 85224

c) Report Number: d9920033

d) Client:
Exicom Technologies (1996) Limited
Private Bag 50912
Porirua, Wellington New Zealand 6006

e) Identification: Type 2950-3
FCC ID: H4U2950-3
Description: UHF FM Transmitter

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

g) Report Date: February 17, 1999
EUT Received:

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.

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LIST OF GENERAL INFORMATION REQUIRED FOR CERTIFICATION

IN ACCORDANCE WITH FCC RULES AND REGULATIONS,
VOLUME II, PART 2 AND TO

90

Sub-part 2.1033

(c)(1): NAME AND ADDRESS OF APPLICANT:

Exicom Technologies (1996) Limited
Private Bag 50912
Porirua, Wellington New Zealand 6006

MANUFACTURER:

Applicant

(c)(2): FCC ID: H4U2950-3

MODEL NO: Type 2950-3

(c)(3): INSTRUCTION MANUAL(S):

PLEASE SEE ATTACHED EXHIBITS

(c)(4): TYPE OF EMISSION: 11K0F3E, 16K0F3E

(c)(5): FREQUENCY RANGE, MHz: 403 to 430
406-406.1 is Blocked

(c)(6): POWER RATING, Watts: 1 to 10
___ Switchable x Variable ___ N/A

(c)(7): MAXIMUM POWER RATING, Watts: 500

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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, 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

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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
__x__ 90 - Private Land Mobile Radio Services
____ 94 - Private Operational-Fixed Microwave Service
____ 95 Subpart A - General Mobile Radio Service (GMRS)
____ 95 Subpart C - Radio Control (R/C) Radio Service
____ 95 Subpart D - Citizens Band (CB) Radio Service
____ 95 Subpart E - Family Radio Service
____ 95 Subpart F - Interactive Video and Data Service (IVDS)
____ 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, 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 R. F. Power Meter.

2. Measurement accuracy is ±3%.

MEASUREMENT RESULTS
(Worst case)

FREQUENCY OF CARRIER, MHz = 412.95

POWER SETTING	R. F. POWER, WATTS
Low	1
High	10

SUPERVISED BY:

Morton Flom, P. Eng.

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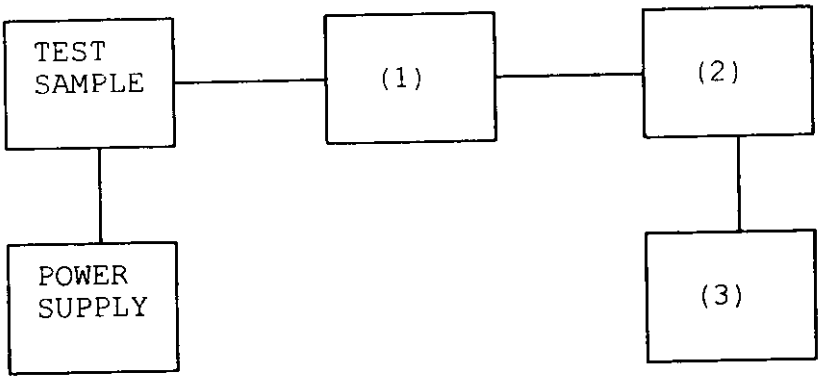
TRANSMITTER POWER CONDUCTED MEASUREMENTS

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



	Asset	Description	s/n
(1)		COAXIAL ATTENUATOR	
	i00122	Narda 766-10	7802
X	i00123	Narda 766-10	7802A
	i00069	Bird 8329 (30 dB)	1006
	i00113	Sierra 661A-3D	1059
(2)		POWER METERS	
	i00014	HP 435A	1733A05836
	i00039	HP 436A	2709A26776
X	i00020	HP 8901A POWER MODE	2105A01087
(3)		FREQUENCY COUNTER	
	i00042	HP 5383A	1628A00959
	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 2.1051

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 = 412.95

SPECTRUM SEARCHED, GHz = 0 to 10 x F_C

MAXIMUM RESPONSE, Hz = N/A

ALL OTHER EMISSIONS = ≥ 20 dB BELOW LIMIT

LIMIT(S), dBc

$-(43+10\times LOG\ P)$ = -43 (1 Watt)
$-(43+10\times LOG\ P)$ = -53 (10 Watts)
$-(50+10\times LOG\ P)$ = -50 (1 Watt)
$-(50+10\times LOG\ P)$ = -60 (10 Watts)

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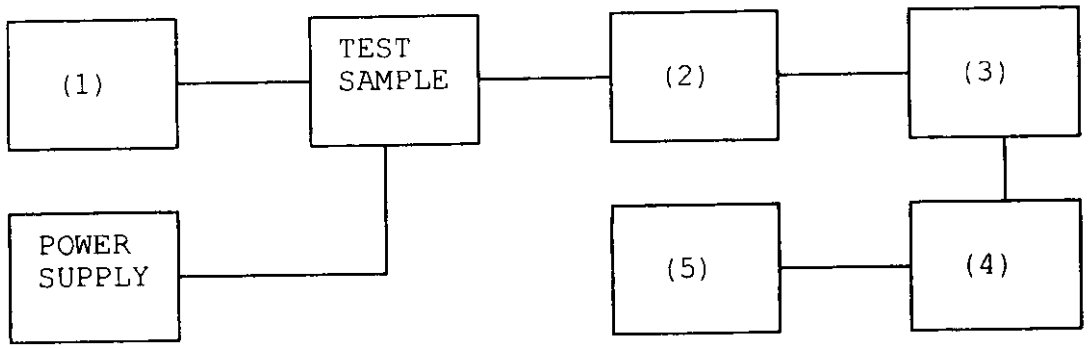
TRANSMITTER SPURIOUS EMISSION

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



	Asset	Description	s/n
		(1) AUDIO OSCILLATOR/GENERATOR	
	i00010	HP 204D	1105A04683
X	i00017	HP 8903A	2216A01753
	i00012	HP 3312A	1432A11250
		(2) COAXIAL ATTENUATOR	
	i00122	Narda 766-10	7802
X	i00123	Narda 766-10	7802A
	i00069	Bird 8329 (30 dB)	1006
	i00113	Sierra 661A-3D	1059
		(3) FILTERS; NOTCH, HP, LP, BP	
	i00126	Eagle TNF-1	100-250
	i00125	Eagle TNF-1	50-60
X	i00124	Eagle TNF-1	250-850
		(4) SPECTRUM ANALYZER	
X	i00048	HP 8566B	2511A01467
	i00029	HP 8563E	3213A00104
		(5) SCOPE	
	i00058	HP 1741A	2251A09356
	i00030	HP 54502A	2927A00209
	i00071	Tektronix 935	1935-B011343

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NAME OF TEST: Unwanted Emissions (Transmitter Conducted)
G9920097: 1999-Feb-12 Fri 13:34:00
STATE: 1:Low Power

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
412.950000	825.669000	-53.6	-83.6	-40.6
412.950000	1238.815000	-53.2	-83.2	-40.2
412.950000	1651.957000	-52.3	-82.3	-39.3
412.950000	2064.747000	-50.7	-80.7	-37.7
412.950000	2477.330000	-50.2	-80.2	-37.2
412.950000	2890.734000	-54	-84	-41
412.950000	3303.910000	-54.4	-84.4	-41.4
412.950000	3716.883000	-54.7	-84.7	-41.7
412.950000	4129.459000	-54.6	-84.6	-41.6
412.950000	4542.105000	-54.5	-84.5	-41.5
412.950000	4954.904000	-54.5	-84.5	-41.5
412.950000	5367.858000	-53.6	-83.6	-40.6
412.950000	5781.077000	-54.5	-84.5	-41.5
412.950000	6193.846000	-49.3	-79.3	-36.3

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NAME OF TEST: Unwanted Emissions (Transmitter Conducted)
G9920096: 1999-Feb-12 Fri 13:28:00
STATE: 2:High Power

FREQUENCY TUNED, MHz	FREQUENCY EMISSION, MHz	LEVEL, dBm	LEVEL, dBc	MARGIN, dB
412.950000	825.890000	-34.2	-75.9	-21.2
412.950000	1238.867000	-39.2	-80.9	-26.2
412.950000	1651.802000	-40.3	-82	-27.3
412.950000	2064.771000	-36	-77.7	-23
412.950000	2477.717000	-37.7	-79.4	-24.7
412.950000	2890.963000	-41.7	-83.4	-28.7
412.950000	3303.212000	-41.7	-83.4	-28.7
412.950000	3716.572000	-34.4	-76.1	-21.4
412.950000	4129.234000	-41.4	-83.1	-28.4
412.950000	4542.045000	-41.8	-83.5	-28.8
412.950000	4955.768000	-42.3	-84	-29.3
412.950000	5368.072000	-42.1	-83.8	-29.1
412.950000	5781.396000	-42.2	-83.9	-29.2
412.950000	6193.754000	-36	-77.7	-23

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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 15.38, 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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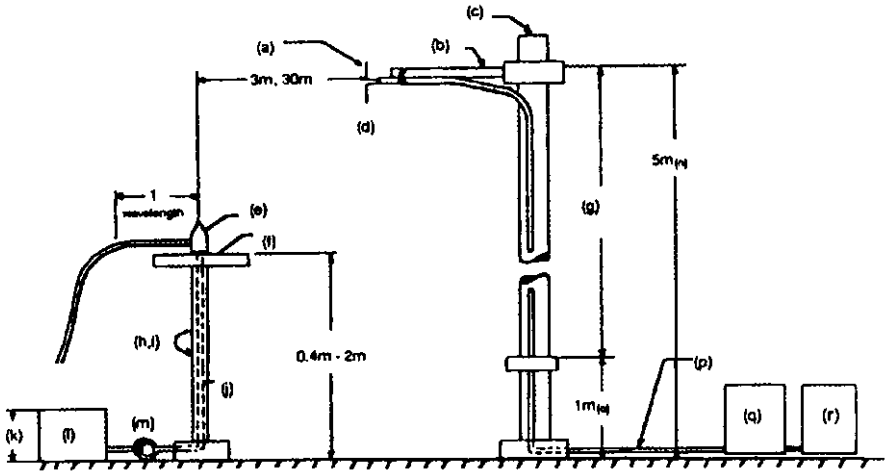
RADIATED TEST SETUP



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 (Per ANSI C63.4-1992, 10.1.4)	Last Cal
TRANSDUCER					
	i00065	EMCO 3109B 100Hz-50MHz	2336	12 mo.	
	i00033	Singer 94593-1 10kHz-32MHz	0219	12 mo.	
X	i00088	EMCO 3109-B 25MHz-300MHz	2336	12 mo.	Oct-98
X	i00089	Aprel 2001 200MHz-1GHz	001500	12 mo.	Oct-98
X	i00103	EMCO 3115 1GHz-18GHz	9208-3925	12 mo.	Oct-98
	i00085	EMCO 3116 10GHz-40GHz	2076	12 mo.	
AMPLIFIER					
	i00028	HP 8449A	2749A00121	12 mo.	Mar-98
SPECTRUM ANALYZER					
X	i00029	HP 8563E	3213A00104	12 mo.	Aug-98
	i00033	HP 85462A	3625A00357	12 mo.	Dec-98
	i00048	HP 8566B	2511AD1467	6 mo.	Dec-98

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NAME OF TEST: Field Strength of Spurious Radiation

ALL OTHER EMISSIONS = ≥ 20 dB BELOW LIMIT

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

SUPERVISED BY: 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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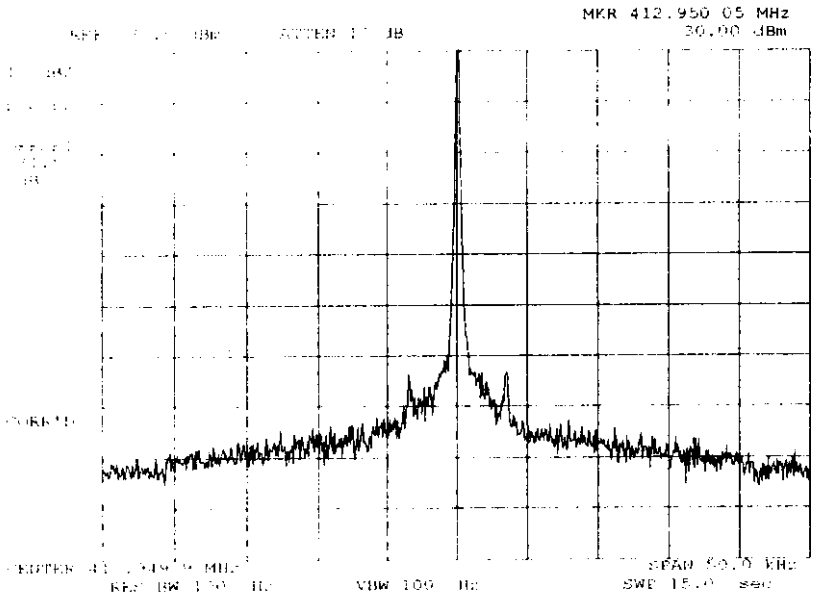
NAME OF TEST: Emission Masks (Occupied Bandwidth)
G9920089: 1999-Feb-12 Fri 10:17:00
STATE: 1:Low Power



POWER: LOW
MODULATION: NONE

SUPERVISED BY: Morton Flom, P. Eng.

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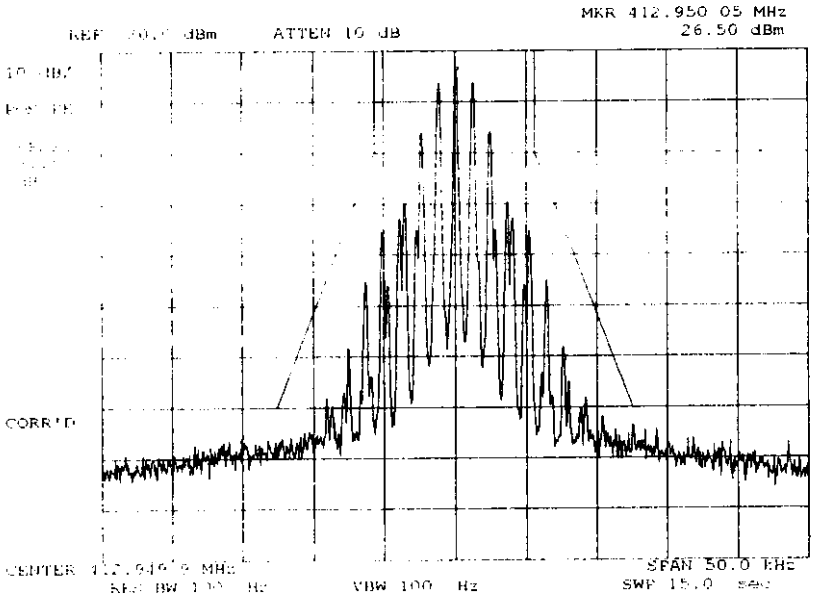
NAME OF TEST: Emission Masks (Occupied Bandwidth)
G9920090: 1999-Feb-12 Fri 10:25:00
STATE: 1:Low Power



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

SUPERVISED BY: Morton Flom, P. Eng.

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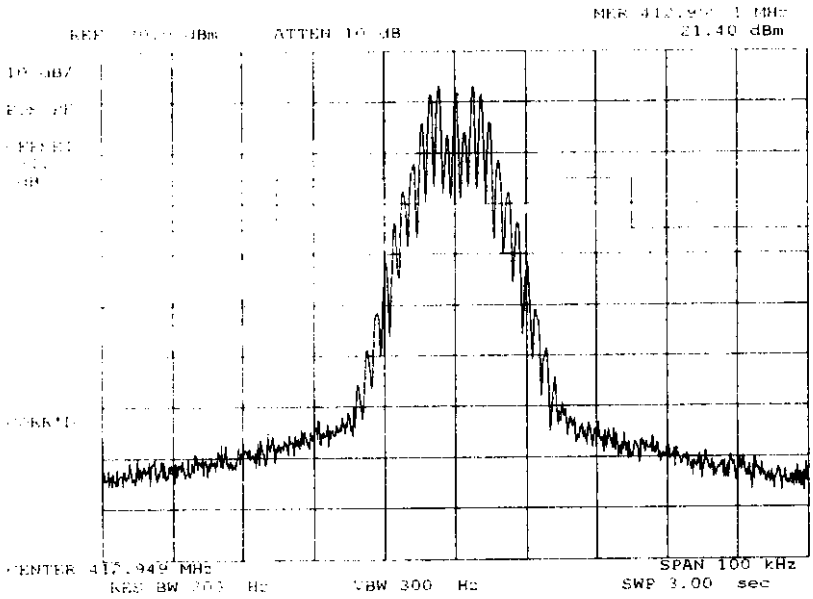
NAME OF TEST: Emission Masks (Occupied Bandwidth)
G9920094: 1999-Feb-12 Fri 10:46:00
STATE: 1:Low Power



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

SUPERVISED BY: Morton Flom, P. Eng.

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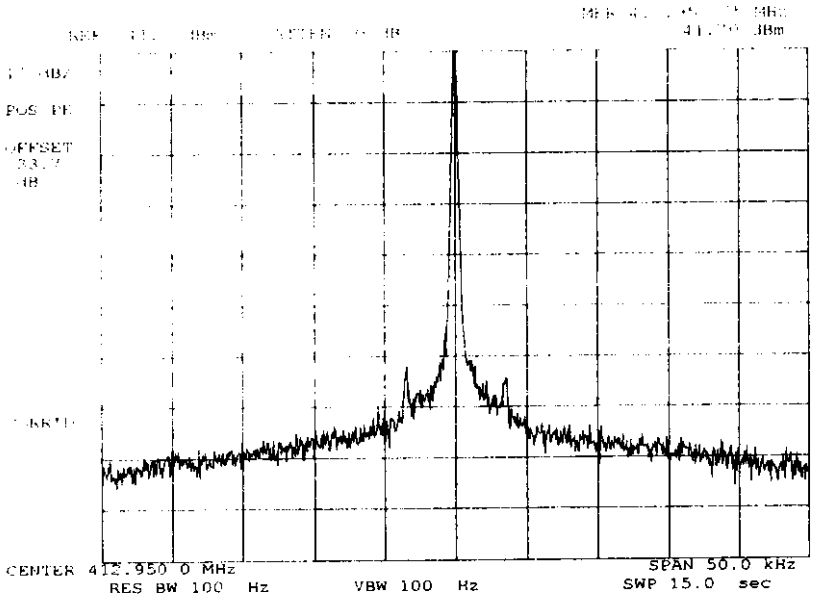
NAME OF TEST: Emission Masks (Occupied Bandwidth)
G9920088: 1999-Feb-12 Fri 10:13:00
STATE: 2:High Power



POWER: HIGH
MODULATION: NONE

SUPERVISED BY: Morton Flom, P. Eng.

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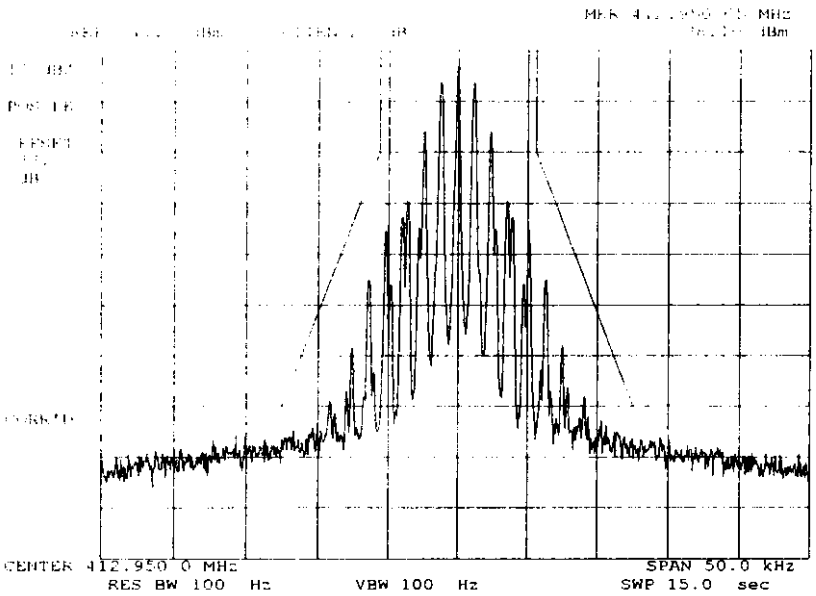
NAME OF TEST: Emission Masks (Occupied Bandwidth)
G9920091: 1999-Feb-12 Fri 10:27:00
STATE: 2:High Power



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

SUPERVISED BY: Morton Flom, P. Eng.

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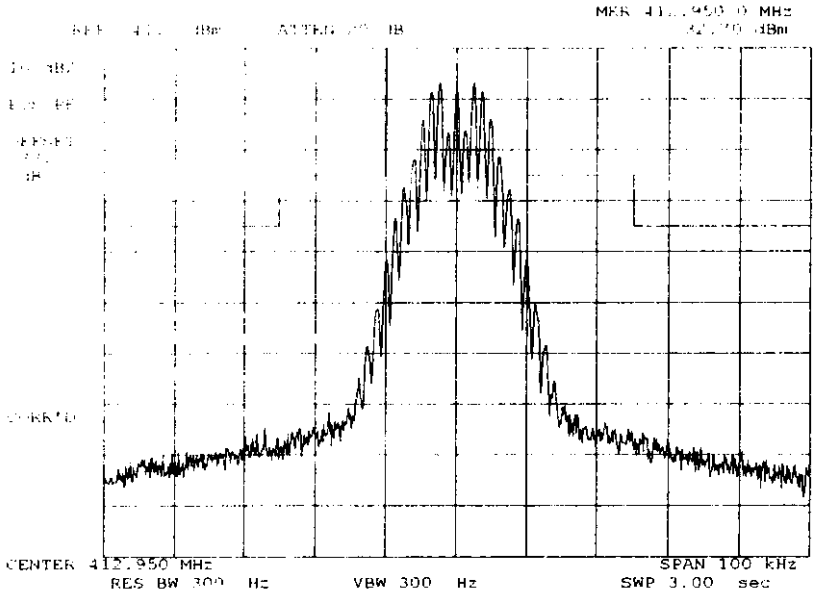
NAME OF TEST: Emission Masks (Occupied Bandwidth)
G9920095: 1999-Feb-12 Fri 10:47:00
STATE: 2:High Power



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

SUPERVISED BY: Morton Flom, P. Eng.

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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	=	-13.7
step h, dBm	=	-30.8
step l, dBm	=	20.1

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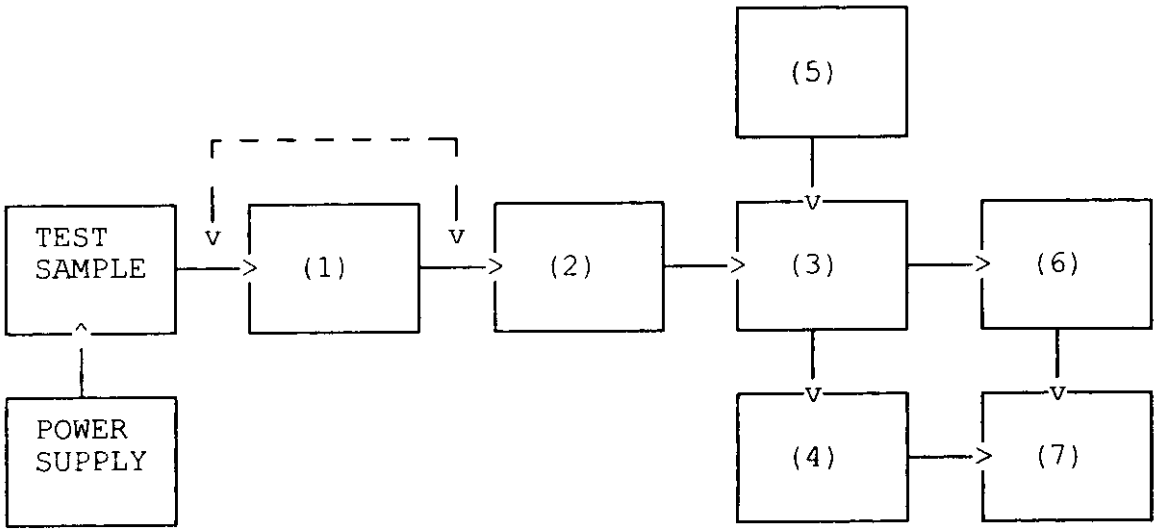
TRANSIENT FREQUENCY BEHAVIOR



	Asset	Description	s/n
(1)		ATTENUATOR (Removed after 1st step)	
X	i00112	Philco 30 dB	989
(2)		ATTENUATOR	
	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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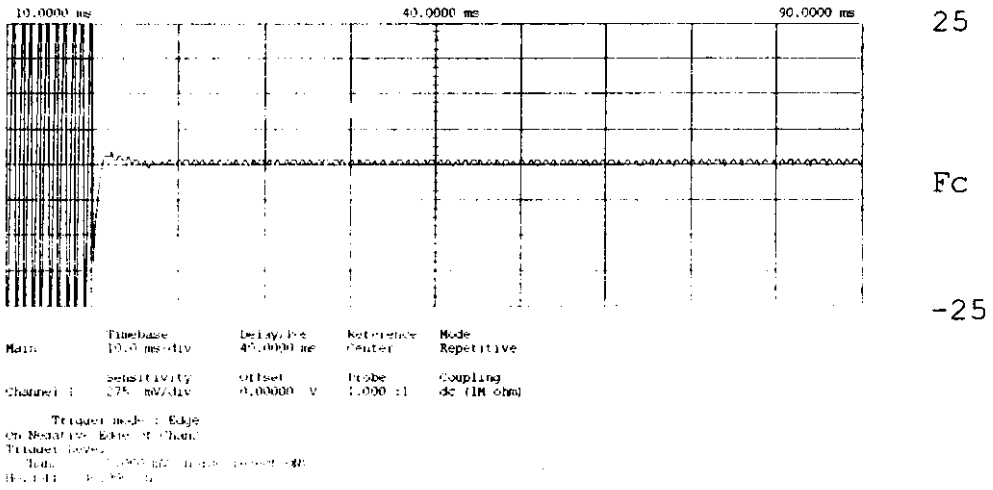
NAME OF TEST: Transient Frequency Behavior
G9920098: 1999-Feb-12 Fri 14:36:00
STATE: 0:General



POWER:	n/a
MODULATION:	Ref Gen=25 kHz Deviation
DESCRIPTION:	CARRIER ON TIME

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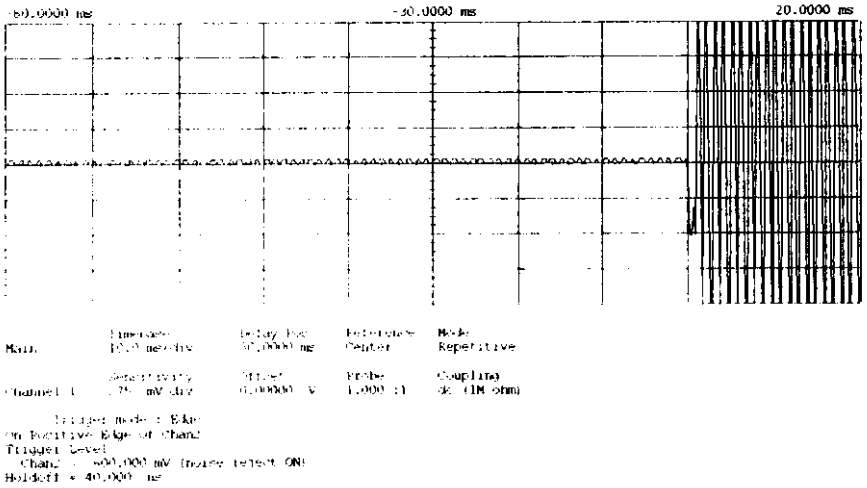
NAME OF TEST: Transient Frequency Behavior
G9920099: 1999-Feb-12 Fri 14:37:00
STATE: 0:General

0



25

Fc

-25

POWER: n/a
MODULATION: Ref Gen=25 kHz Deviation
DESCRIPTION: CARRIER OFF TIME

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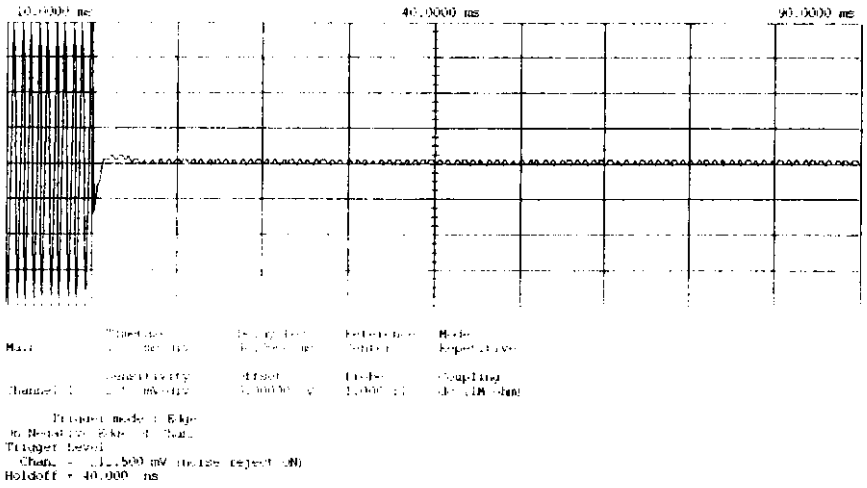
NAME OF TEST: Transient Frequency Behavior
G9920100: 1999-Feb-12 Fri 14:38:00
STATE: 0:General



POWER: n/a
MODULATION: Ref Gen=12.5 kHz Deviation
DESCRIPTION: CARRIER ON TIME

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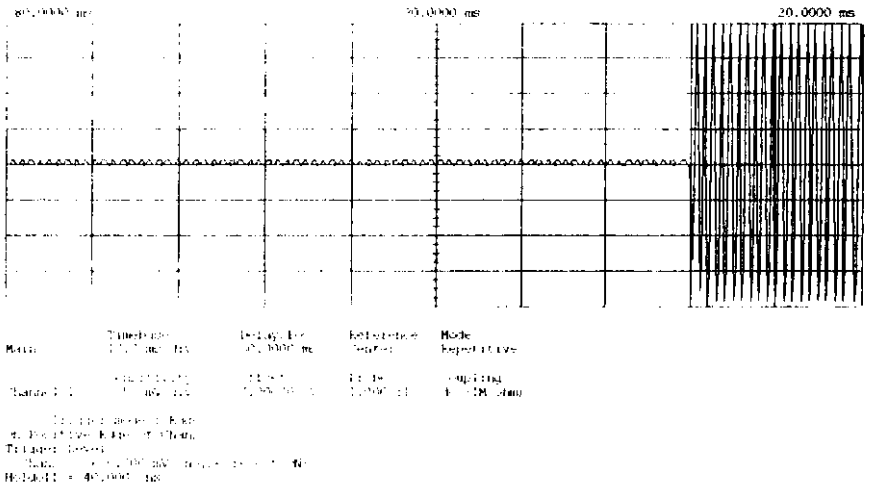
NAME OF TEST: Transient Frequency Behavior
G9920101: 1999-Feb-12 Fri 14:41:00
STATE: 0:General

0



12.5

Fc

-12.5

POWER: n/a
MODULATION: Ref Gen=12.5 kHz Deviation
DESCRIPTION: CARRIER OFF TIME

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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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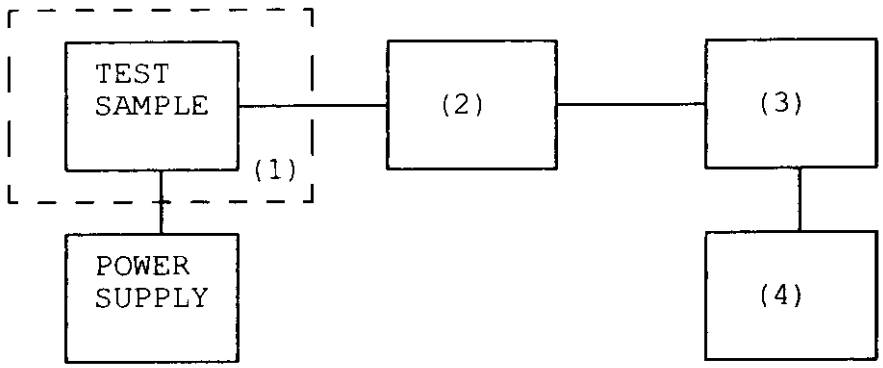
TRANSMITTER TEST SET-UP

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
X	i00123	NARDA 766-10	7802A
___	i00113	SIERRA 661A-3D	1059
___	i00069	BIRD 8329 (30 dB)	10066
(3)		R.F. POWER	
___	i00014	HP 435A POWER METER	1733A05839
___	i00039	HP 436A POWER METER	2709A26776
X	i00020	HP 8901A POWER MODE	2105A01087
(4)		FREQUENCY COUNTER	
___	i00042	HP 5383A	1628A00959
___	i00019	HP 5334B	2704A00347
X	i00020	HP 8901A	2105A01087

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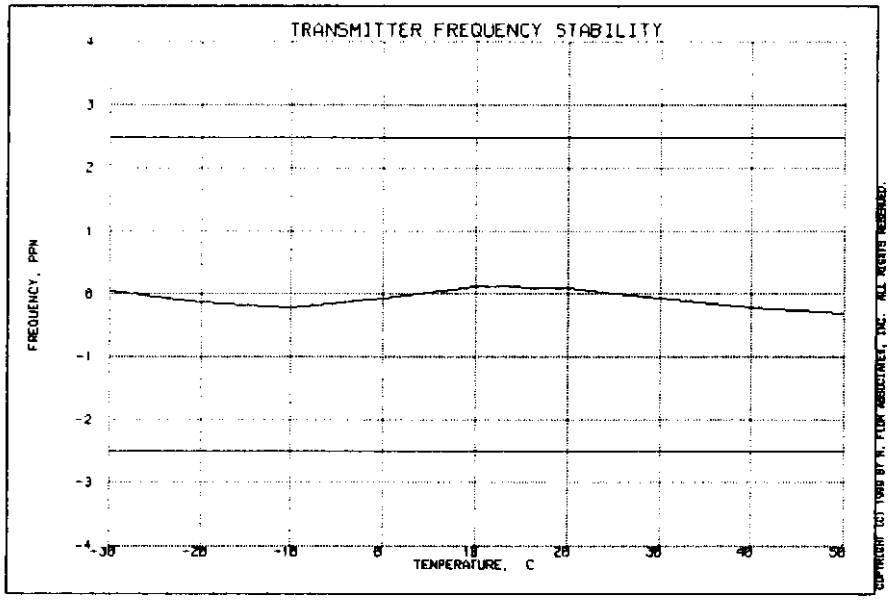
NAME OF TEST: Frequency Stability (Temperature Variation)
G9910183: 1999-Jan-29 Fri 12:13:00
STATE: 0:General



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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±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)
G9920087: 1999-Feb-12 Fri 09:57:11
STATE: 0:General

LIMIT, ppm = 1.5
LIMIT, Hz = 619
BATTERY END POINT (Voltage) = 10.2

% of STV	Voltage	Frequency, MHz	Change, Hz	Change, ppm
85	11.56	412.950000	0	0.00
100	13.6	412.950000	0	0.00
115	15.64	412.950020	20	0.05
75	10.2	412.950030	30	0.07

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NAME OF TEST: Necessary Bandwidth and Emission Bandwidth

SPECIFICATION: 47 CFR 2.202(g)

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 = 16K0F3E

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)
	= 16.0

M. Flom P. Eng

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