

KTL Test Report: 0R03307.1

Applicant: Daniels Electronics Ltd.
43 Erie Street
Victoria, BC
V8V 1P8

**Equipment Under Test:
(E.U.T.)** VT-3/140-SN & VT-3/160-SN
VHF Transmitter

In Accordance With: FCC Part 22 & 90

Tested By: KTL Ottawa Inc.
3325 River Road, R.R. 5
Ottawa, Ontario K1V 1H2

Authorized By:

R. Grant, Wireless Group Manager

Date:

Total Number of Pages: 30

Table of Contents

Section 1.	Summary of Test Results.....	3
Section 2.	General Equipment Specification	5
Section 3.	RF Power Output	6
Section 4.	Audio Frequency Response	7
Section 5.	Audio Low-Pass Filter Response.....	9
Section 6.	Modulation Limiting.....	11
Section 7.	Occupied Bandwidth.....	13
Section 8.	Spurious Emissions at Antenna Terminals.....	18
Section 9.	Field Strength of Spurious Emissions	19
Section 10.	Frequency Stability	21
Section 11.	Transient Frequency Behaviour	22
Section 12.	Test Equipment List	26
Section 13.	Test Diagrams	27

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Section 1. Summary of Test Results

General

All measurements are traceable to national standards.

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 22 and 90.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit



Equipment Code

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE.

See "Summary of Test Data".



NVLAP LAB CODE: 100351-0

KTL Ottawa Inc. authorizes the above named company to reproduce this report provided it is reproduced in its entirety and for use by the company's employees only.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. KTL Ottawa Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

This report applies only to the items tested.

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Summary Of Test Data

Name Of Test	Para. No.	Result
RF Power Output	2.1046	Complies
Audio Frequency Response	2.1047	Complies
Audio Low-Pass Filter Response	2.1047	Complies
Modulation Limiting	2.1047	Complies
Occupied Bandwidth	2.1049	Complies
Spurious Emissions at Antenna Terminals	2.1051	Complies
Field Strength of Spurious Emissions	2.1053	Complies
Frequency Stability	2.1055	Complies
Transient Frequency Behavior	——	Complies

.

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Section 2. General Equipment Specification

Manufacturer:	Daniels Electronics Inc.
Model No.:	VT-3/140-SN VT-3/160-SN
Date Received In Laboratory:	December 7, 2000
KTL Identification No.:	Item #1SN
RF Output Power:	8W
Frequency Range:	VT-3/140-SN = 132 – 150 MHz VT-3/160-SN = 150 – 174 MHz
Emission Designator:	11K0F3E
Channel Spacing:	12.5 kHz

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Section 3. RF Power Output

Para. No.: 2.1046

Test Performed By: Russell Grant	Date of Test: December 19, 2000
---	--

Minimum Standard: ± 1 dB

Test Results: Complies.

Measurement Data: 8W

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Section 4. Audio Frequency Response

Para. No.: 2.1047

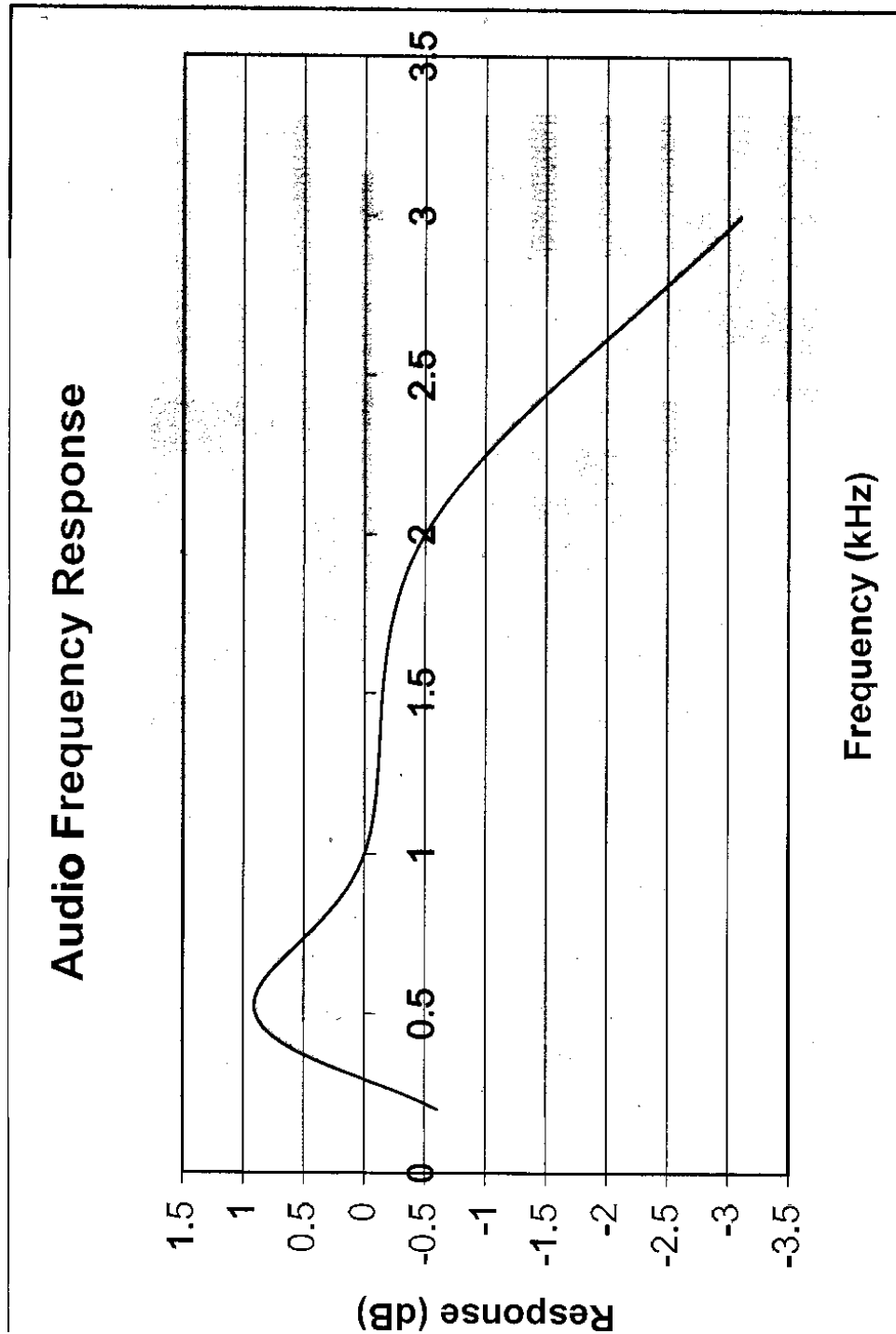
Test Performed By: Russell Grant	Date of Test: December 19, 2000
---	--

Minimum Standard: N/A

Test Results: Complies.

Measurement Data: See attached graph.

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter



EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Section 5. Audio Low-Pass Filter Response

Para. No.: 2.1047

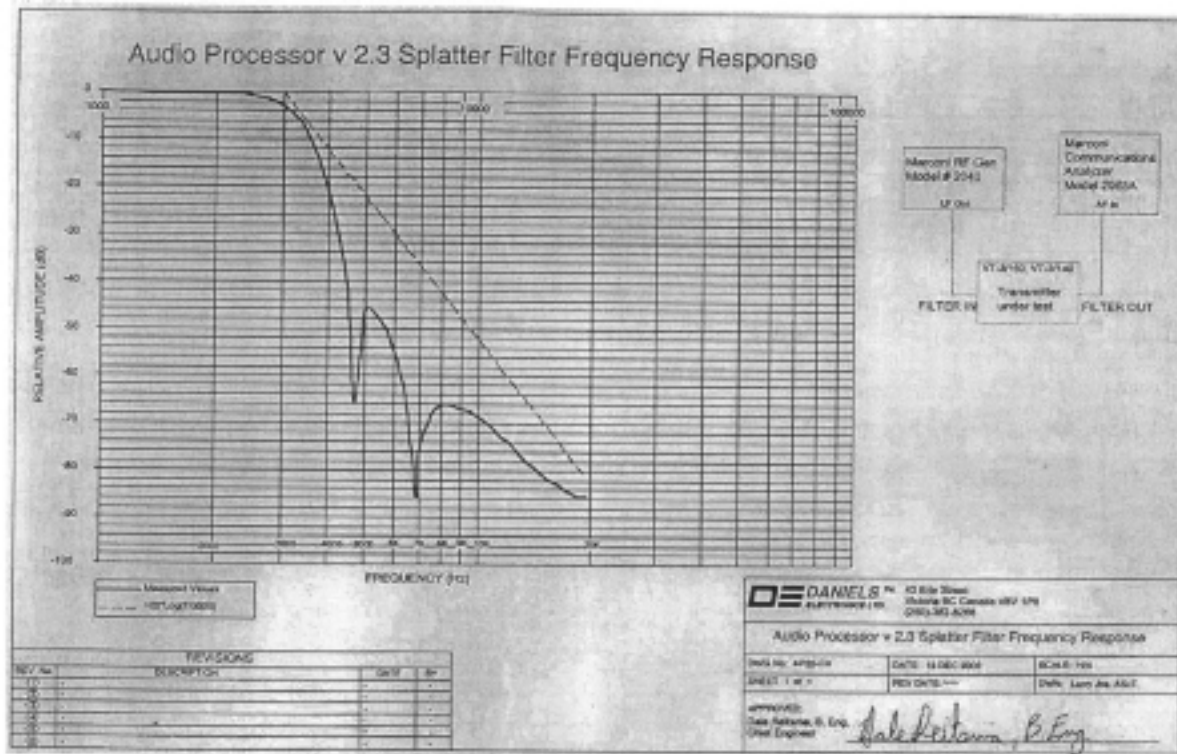
Test Performed By: Daniels Electronics Ltd.	Date of Test: December 12, 2000
--	--

Minimum Standard: N/A

Test Results: Complies.

Measurement Data: See attached graph.

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter



EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Section 6. Modulation Limiting

Para. No.: 2.1047

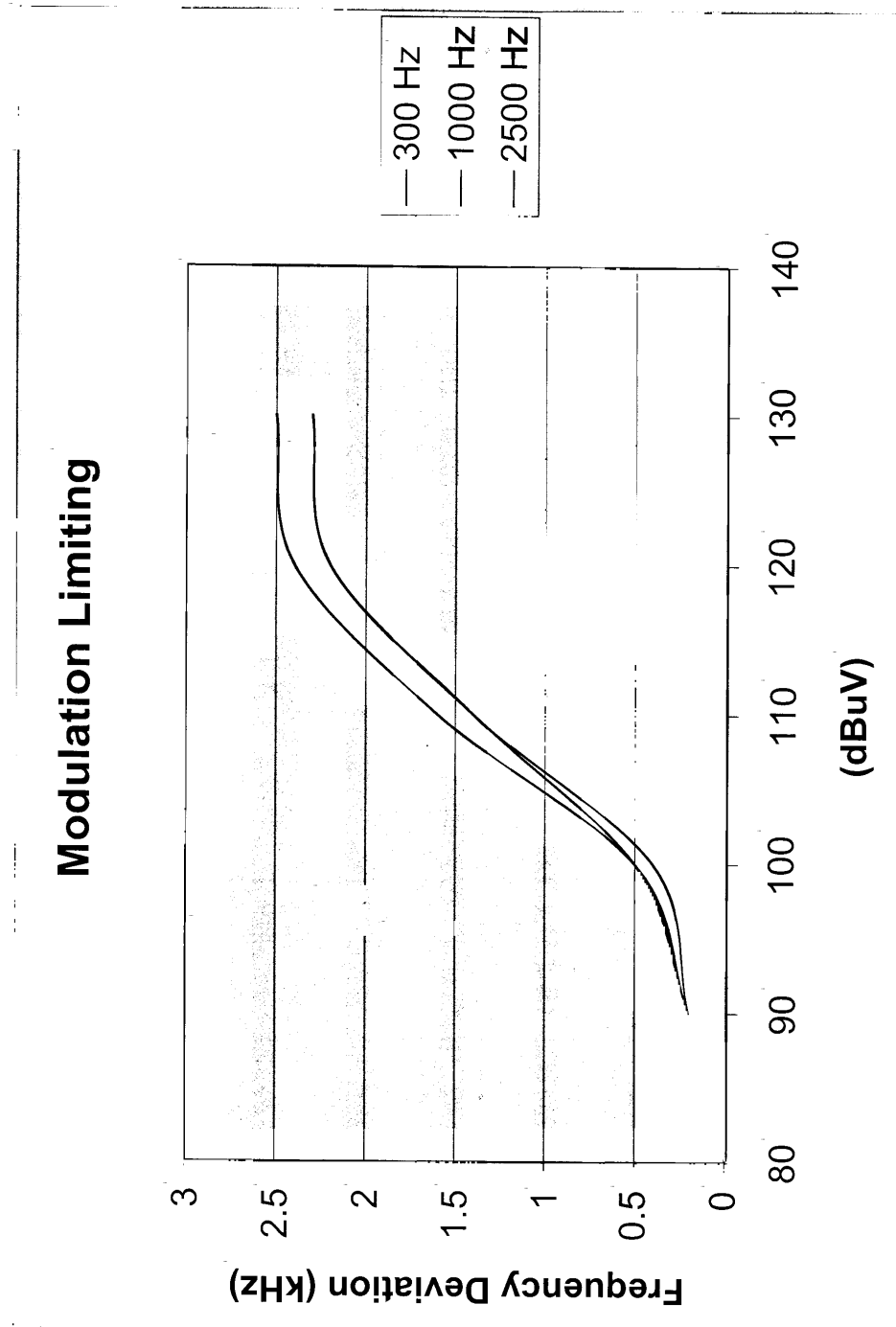
Test Performed By: Russell Grant	Date of Test: December 19, 2000
---	--

Minimum Standard: N/A

Test Results: Complies.

Measurement Data: See attached graph.

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter



EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Section 7. Occupied Bandwidth

Para. No.: 2.1049

Test Performed By: Russell Grant	Date of Test: December 19, 2000
---	--

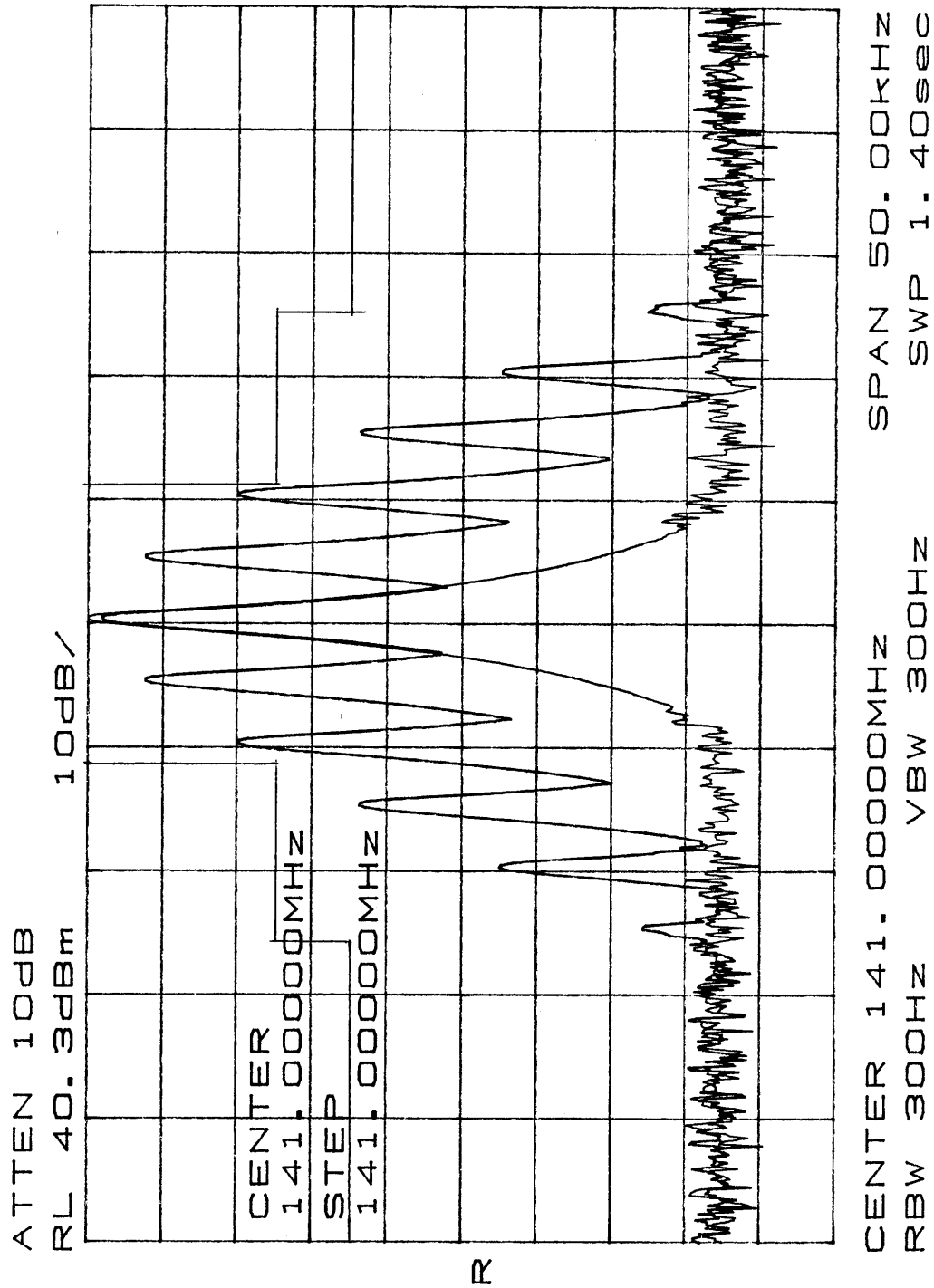
Minimum Standard: Mask D and 22.359(a) Mask

Test Results: Complies.

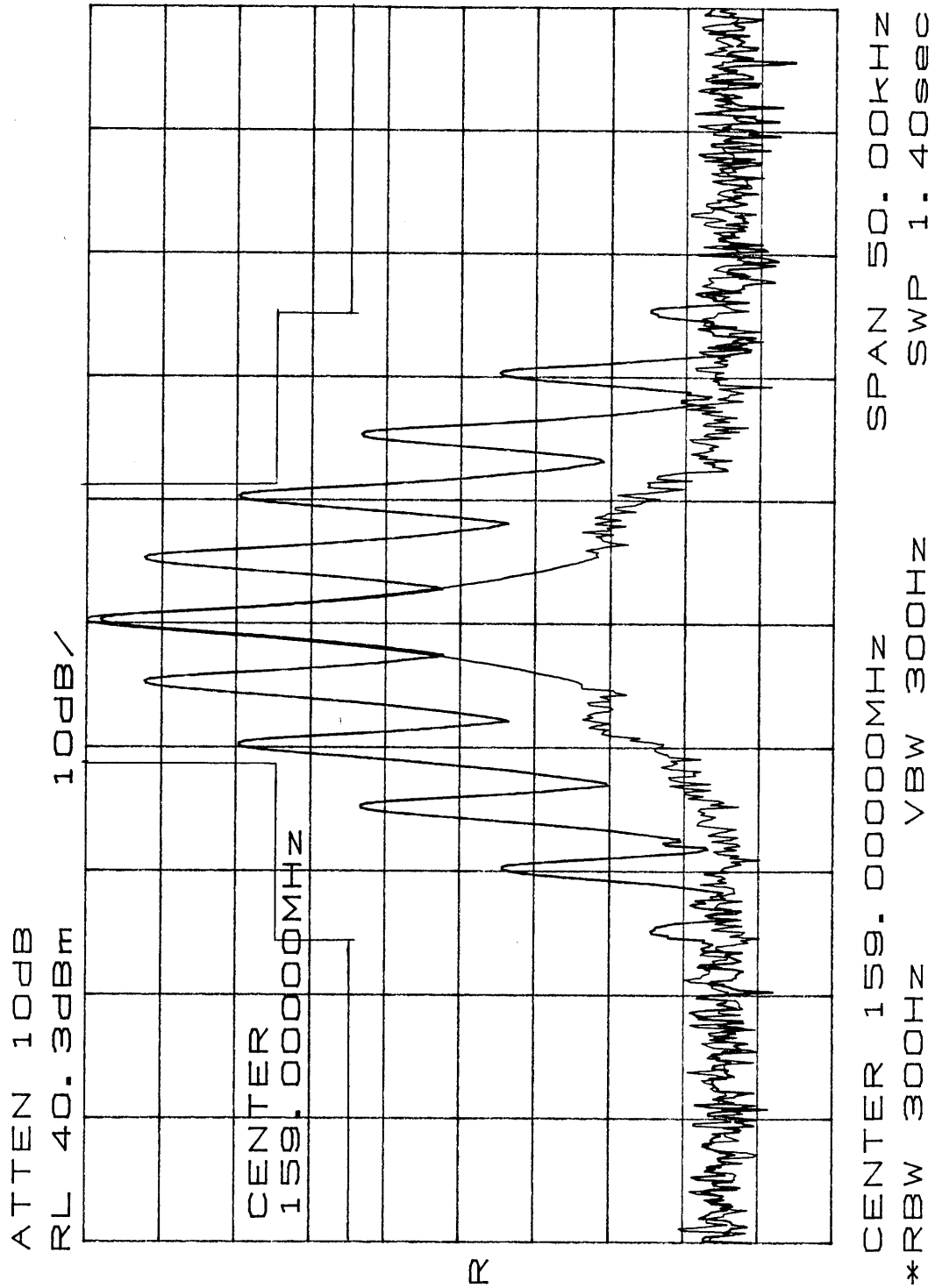
Measurement Data: See attached graphs.

Modulated 2500 Hz @ 16dB overdrive.

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter



EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter



ATTEN 10dB
RL 40 3dB

10dB/

CENTER 141.00000MHZ
STEP 141.00000MHZ

CENTER 141.00000MHZ
SPAN 50.000KHZ
RBW 300HZ
VBW 300HZ
SWP 1.40sec

R

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Section 8. Spurious Emissions at Antenna Terminals**Para. No.: 2.1051**

Test Performed By: Russell Grant	Date of Test: December 19, 2000
---	--

Minimum Standard: -20 dBm**Test Results:** Complies.**Measurement Data:****Tx 141 MHz, 8 W**

Frequency of Emissions (MHz)	Emission Level (dBm)
282	-37.7

Tx 159 MHz, 8 W

No emissions detected.

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Section 9. Field Strength of Spurious Emissions

Para. No.: 2.1053

Test Performed By: Russell Grant	Date of Test: December 19, 2000
---	--

Minimum Standard: -20 dBm

Test Results: Complies.

Measurement Data: The strongest emission is -67.6 dBm @ 3m at 318MHz.
This is 47.6 dB below the specification limit.

See attached table.

The spectrum was searched up to the 10th harmonic of the fundamental frequency of operation and all emissions within 20dB of the specification limit were measured and reported.

*EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter***Test Data - Field Strength of Spurious Emissions**

Test Distance (meters) : 3		Range: A Tower		Receiver: ESVP		RBW(kHz): 120		Detector: Peak	
Freq. (MHz)	Ant. *	Pol. (V/H)	RCVD Signal (dBμV)	Corr. Factor (dB)**	Amp. Gain (dB)***	Dist. Corr. (dB)	Field Strength (dBm)	Limit (dBm)	Margin (dB)
282.0	SSV	V	-9.9	-77.8			-87.7	-20.0	67.7
282.0	SSH	H	-4.2	-80.2			-84.4	-20.0	64.4
318.0	SSV	V	8.0	-77.4			-69.4	-20.0	49.4
318.0	SSH	H	11.0	-78.6			-67.6	-20.0	47.6
Notes: B/C = Biconical, B/L = Biconilog, L/P = Log-Periodic, H = Horn, D/P = Dipole * Re-Measured Using Dipole Antenna. () Denotes Failing Emission Level. (1) 120 kHz, Q-Peak, (2) 10 kHz, Peak, (3) 100 kHz RGW, 300 kHz VBW, Peak, (4) 300 kHz RBW, 1 MHz VBW, Peak, (5) 1 MHz RBW, 3 MHz VBW, Peak, (6) 1 MHz RBW, 10 Hz VBW, Peak N.D. = Not Detected									

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Section 10. Frequency Stability

Para. No.: 2.1055

Test Performed By: Russell Grant	Date of Test: December 19, 2000
---	--

Minimum Standard: 2.5 ppm

Test Results: Complies.

Measurement Data: The maximum frequency drift is 55 Hz. This is 0.39 ppm.

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Measurement Data

Test Condition	Frequency (MHz)	Frequency Drift (Hz)
85% STV	141.000055	55
STV	141.000055	55
115% STV	141.000055	55
-30	141.000017	17
-20	141.000014	14
-10	141.000012	12
0	141.000015	15
10	141.000018	18
30	141.000055	55
40	141.000053	53
50	141.000043	43
55	141.000028	28

Test Condition	Frequency (MHz)	Frequency Drift (Hz)
85% STV	158.999993	-7
STV	158.999993	-7
115% STV	158.999993	-7
-30	159.000013	13
-20	159.000005	5
-10	158.999996	-4
0	158.999988	-12
10	158.999982	-18
30	158.999995	-5
40	159.000000	0
50	159.000001	1
55	158.999998	-2

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Section 11. Transient Frequency Behaviour

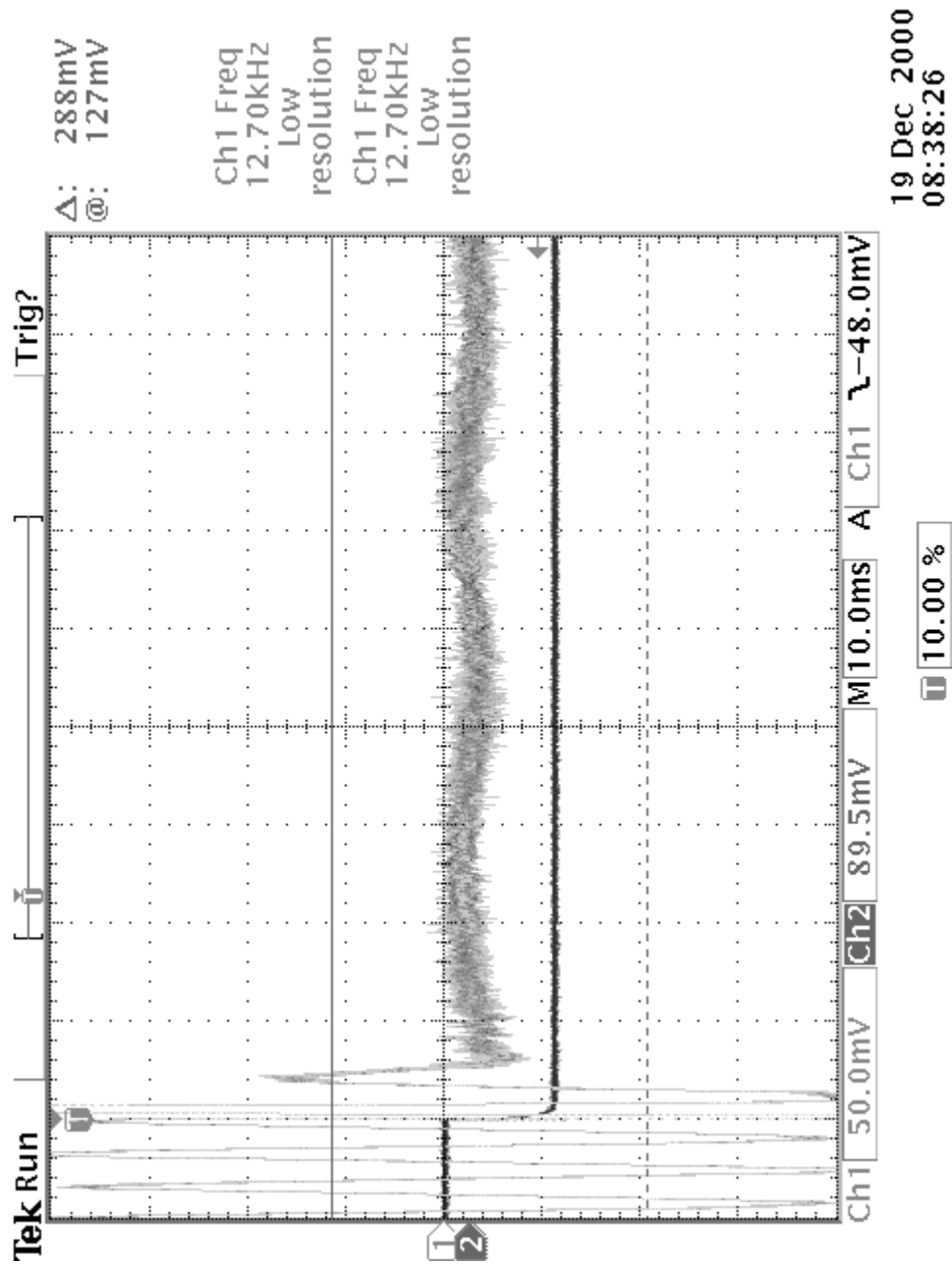
Para. No.: N/A

Test Performed By: Russell Grant	Date of Test: December 19, 2000
---	--

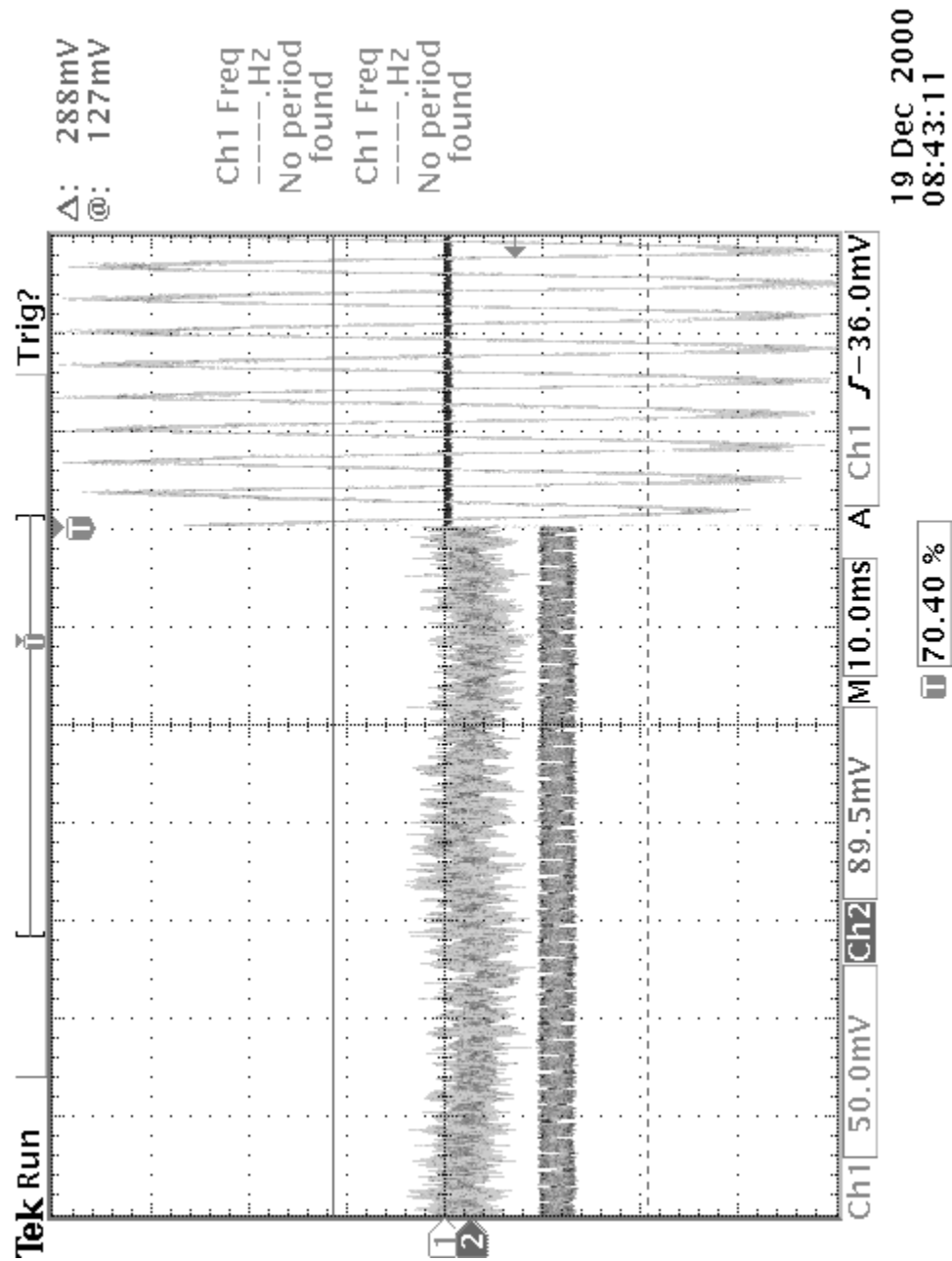
Test Results: Complies.

Measurement Data: See attached graphs.

EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter



EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter



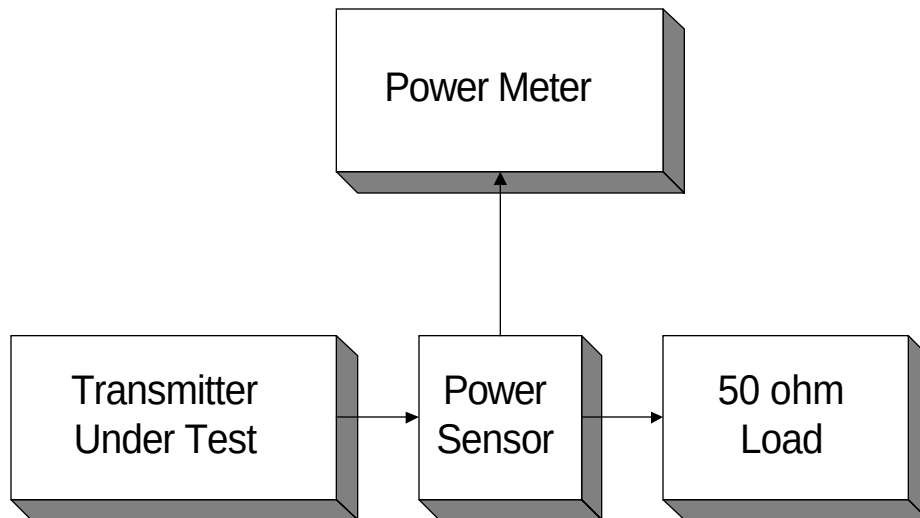
*EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter***Section 12. Test Equipment List**

CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL	LAST CAL.	NEXT CAL.
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981	June 16/00	June 16/01
1 Year	Radio Communications	Rohde & Schwarz	CMTA 54	840343/013	Dec. 14/99	Dec. 14/00
1 Year	Climate Chamber	Thermotron	SM-16C	15649-S	COU	COU
	Power Supply	Astron	VS-50M	8405071	NCR	NCR
1 Year	Attenuator	Narda	768-10	9709	Oct. 8/99	Oct. 8/00
1 Year	Attenuator	Narda	769-20	4153	Oct. 1/99	Oct. 1/00
1 Year	Attenuator	Narda	776B-20	FA001400	Oct. 15/99	Oct. 15/00
1 Year	Attenuator	Narda	776B-20	FA001401	Oct. 15/99	Oct. 15/00
2 Year	RF Millivoltmeter	Rohde & Schwarz	URV5	FA000420	Oct. 6/99	Oct. 6/01
2 Year	Power Sensor	Rohde & Schwarz	URV5-Z5	FA000419	Oct. 6/99	Oct. 6/01
1 Year	Receiver	Rohde & Schwarz	ESVP	892661/014	April 5/00	April 5/01
1 Year	Horn Antenna	EMCO #2	3115	4336	Nov. 11/99	Nov. 11/00
1 Year	Log Periodic Antenna 1	EMCO	LPA-25	1141	Aug. 4/99	Aug. 4/00
1 Year	Dipole Antenna Set	EMCO #2	3121C	FA001349	June 27/00	June 27/01
1Year	Frequency Counter	Hewlett Packard	HP5350A	2444A00135	May 7/00	Nov. 7/00

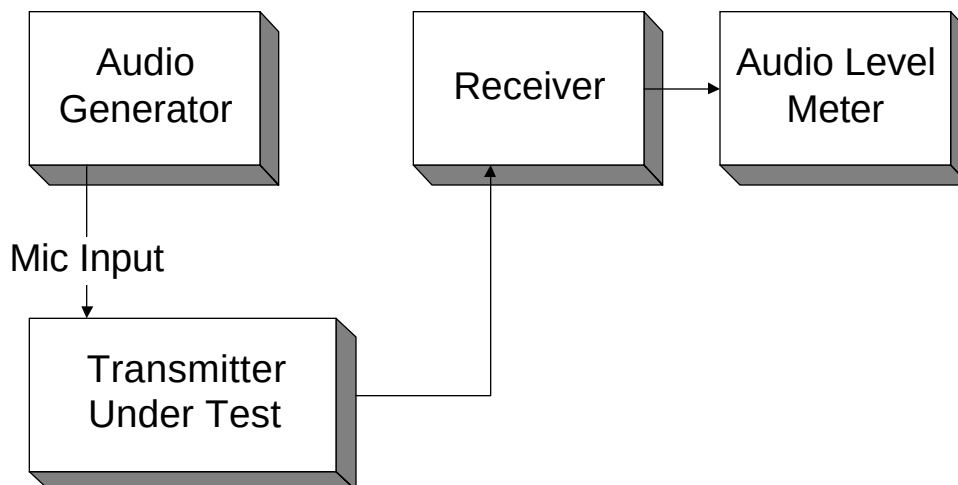
NA: Not Applicable
NCR: No Cal Required
COU: CAL On Use

Section 13. Test Diagrams

Para. No. 2.1046 - R.F. Power Output

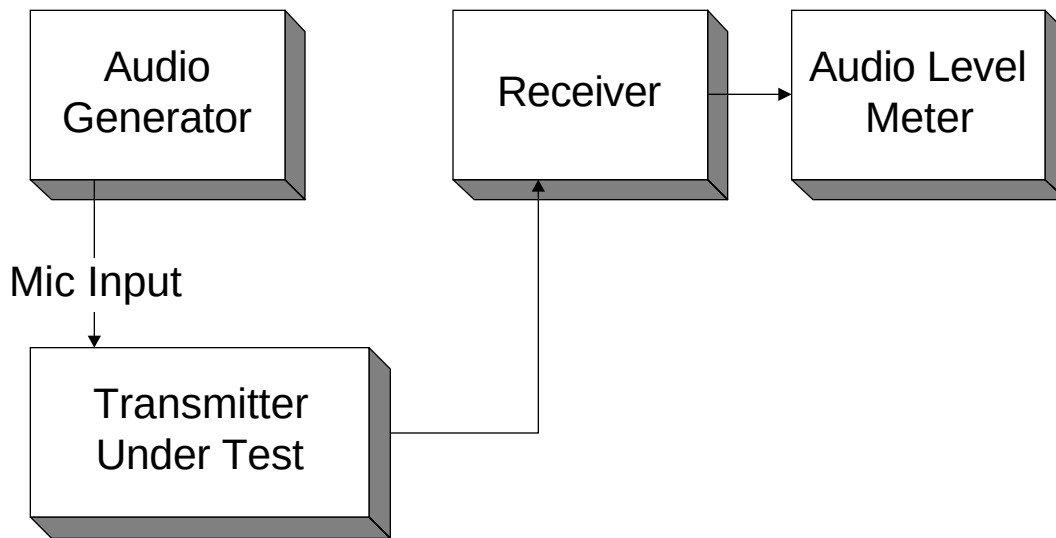


Para. No. 2.2.1047 - Audio Frequency Response

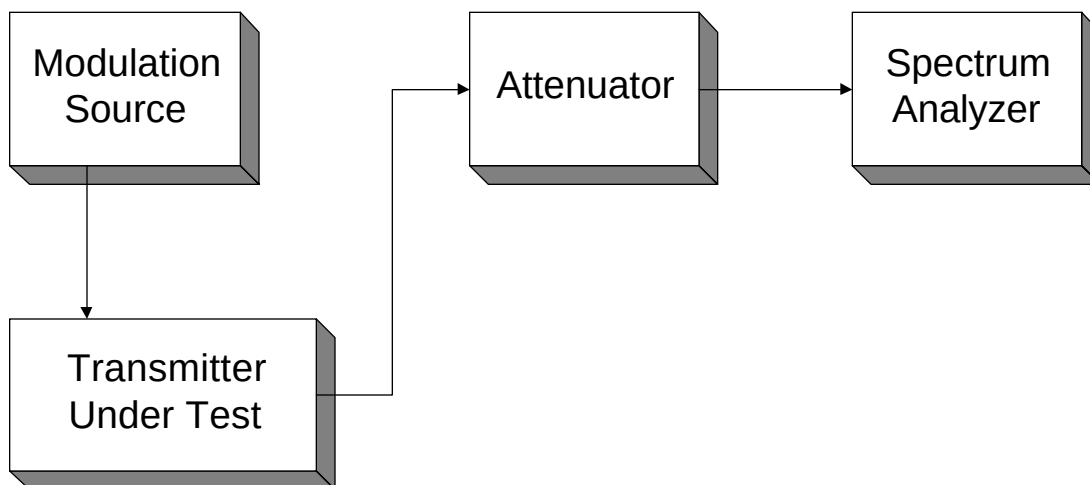


EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Para. No. 2.1047 - Modulation Limiting

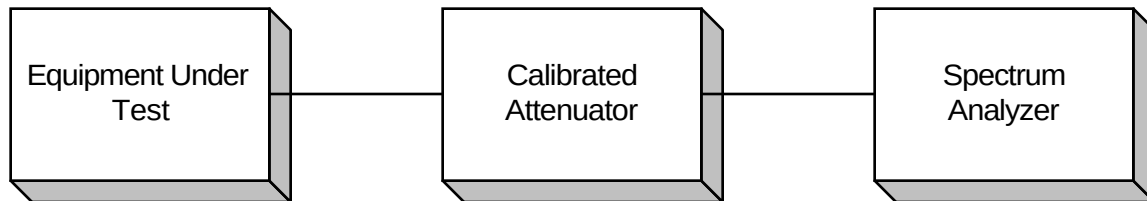


Para. No. 2.1049 - Occupied Bandwidth

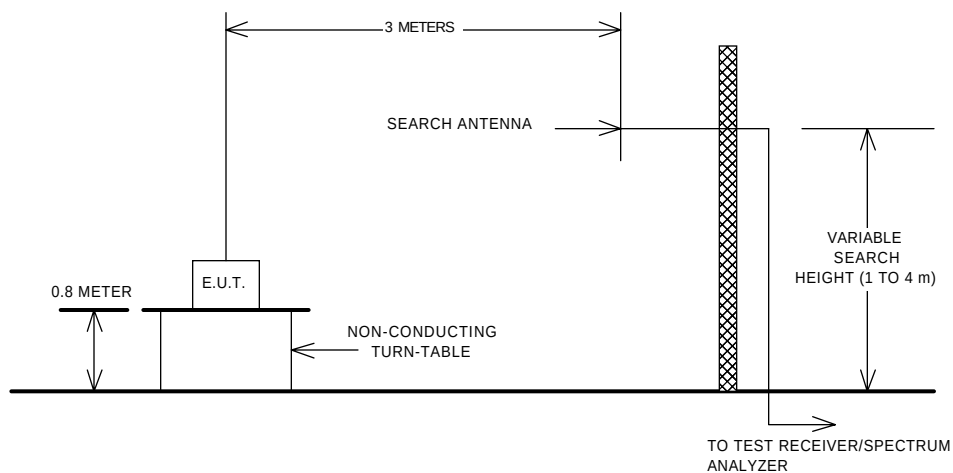


EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

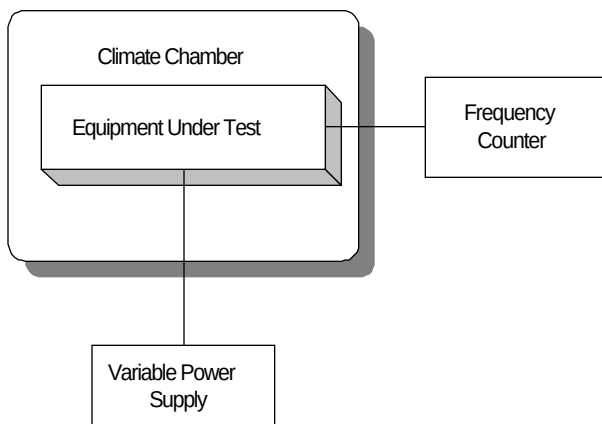
Para. No. 2.1051 - Spurious Emissions at Antenna Terminals



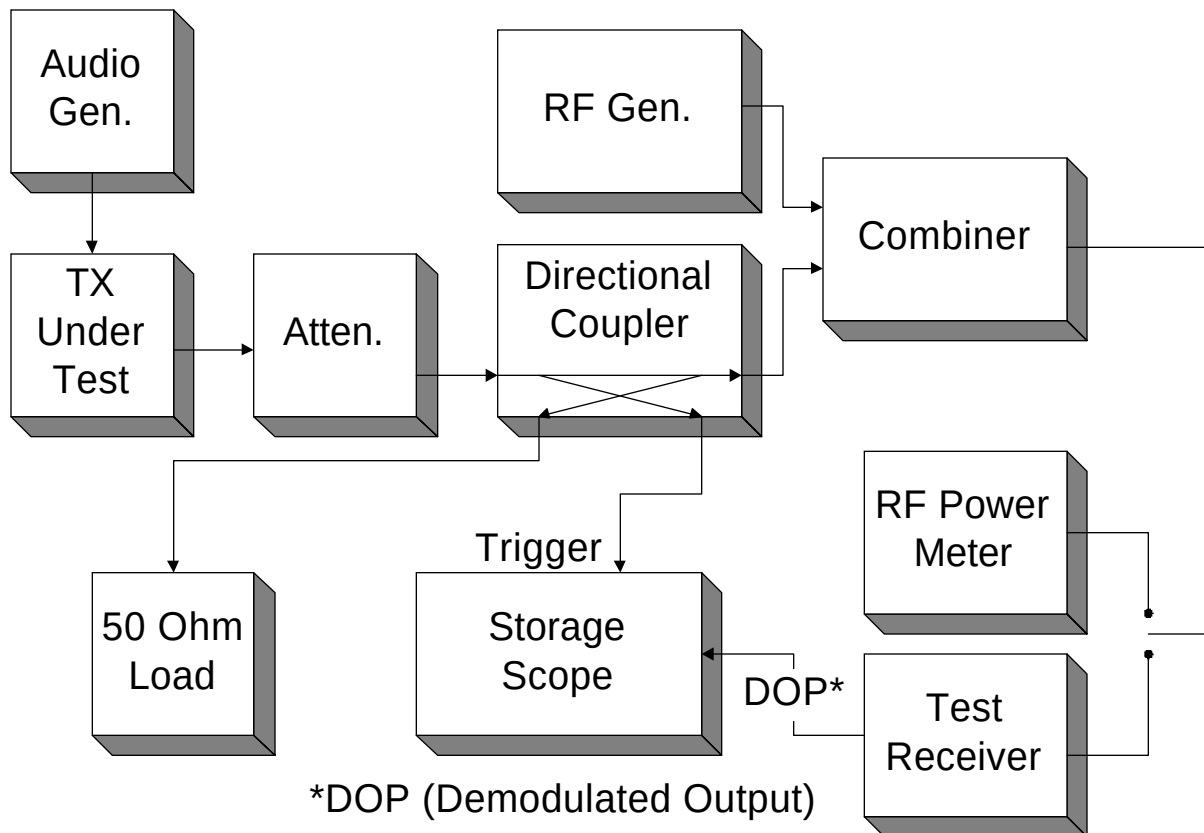
Para. No. 2.1053 - Field Strength of Spurious Radiation



Para. No. 2.1055 - Frequency Stability



EQUIPMENT: VT-3/140-SN & VT-3/160-SN VHF Transmitter

Transient Frequency Behaviour**Voice**

This measurement was made using measurement procedure TIA/EIA Land Mobile FM or PM Communications Equipment Measurement and Performance Standards TIA/EIA-603 February 1993 Telecommunications Industry Association (American National Standard ANSI/TIA/EIA-603-1992 Approved: October 27, 1992) Para. no. 2.2 Methods of Measurement for Transmitters Para. no. 2.2.19 Transient Frequency Behaviour (page no. 83).

Data

This measurement was made using measurement procedure TIA/EIA Digital C4FM/CQPSK Transceiver Measurement Methods TSB102.CAAA Para. no. 2.2.17 Transient Frequency Behaviour (page no. 74).