



# Nemko

**Test Report:** 2W06693


**Applicant:** Daniels Electronics Ltd.  
43 Erie Street  
Victoria, B.C. V8V 1P8

**Equipment Under Test:  
(EUT)** UT-3/460-SWC800  
Paging Transmitter

**FCC ID:** H4JUT-3-460-S08

**In Accordance With:** **FCC Part 22,90**  
**Class II Permissive Change**

**Tested By:** Nemko Canada Inc.  
303 River Road, R.R. 5  
Ottawa, Ontario K1V 1H2



**Authorized By:** Kevin Carr, EMC Specialist

**Date:** 22 January 2003

**Total Number of Pages:** 30

*EQUIPMENT: UT-3/460-SWC800*  
*FCC ID:H4JUT-3-460-S08*

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**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..... 16**

**Section 9. Field Strength of Spurious Emissions ..... 18**

**Section 10. Frequency Stability.....21**

**Section 11. Transient Frequency Behaviour.....23**

**Section 12. Test Equipment List .....26**

**Section 13. Test Diagrams .....27**

EQUIPMENT: UT-3/460-SWC800  
FCC ID:H4JUT-3-460-S08

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## 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, 90.

New Submission

Production Unit

Class II Permissive Change

Pre-Production Unit

T	N	B
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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. NONE  
See " Summary of Test Data".



TESTED BY: \_\_\_\_\_ DATE: 22 January 2003  
Russell Grant

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This report applies only to the items tested.

*EQUIPMENT: UT-3/460-SWC800*  
*FCC ID:H4JUT-3-460-S08*

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**Summary Of Test Data**

<b>Name Of Test</b>	<b>Para. No.</b>	<b>Result</b>
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	90.214	Complies

This application is for a class II permissive change of this paging transmitter. It is approved under FCC I.D. H4JUT-3-460-S08 as an analog paging transmitter. This test reports contains test data to support digital paging operation as well as analog.

**Indoor**                      Temperature: 20°C  
   Humidity: 20 %

**Outdoor**                     Temperature: 5°C  
   Humidity: 20 %

*EQUIPMENT: UT-3/460-SWC800*  
*FCC ID:H4JUT-3-460-S08*

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**Section 2.           General Equipment Specification**

**Manufacturer:** Daniels Electronics  
**Model No.:** UT-3/460-SWC800  
**Serial No.:** 14441  
**Date Received In Laboratory:** Jan 6, 2003  
**Nemko Identification No.:** 1

**Radio Base Station Paging Transmitter**

**Primary Power** 13.8 VDC  
**Emission Designator (Analog Paging)** 16K0F3E  
**Emission Designator (Digital Paging)** 16K8F1D  
**Power Output** 8.0 Watts  
**Channel Spacing** 25 kHz  
**Frequency Range** 450-470 MHz

*EQUIPMENT: UT-3/460-SWC800*  
*FCC ID:H4JUT-3-460-S08*

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**Section 3. RF Power Output**

**Para. No.: 2.1046**

<b>Test Performed By:Russell Grant</b>	<b>Date of Test:Jan 10, 2003</b>
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**Minimum Standard:** 1 dB

**Test Results:** Complies

**Measurement Data:** 7.6 Watts

*EQUIPMENT: UT-3/460-SWC800*  
*FCC ID:H4JUT-3-460-S08*

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**Section 4. Audio Frequency Response**

**Para. No.: 2.1047**

<b>Test Performed By:Russell Grant</b>	<b>Date of Test:Jan 9, 2003</b>
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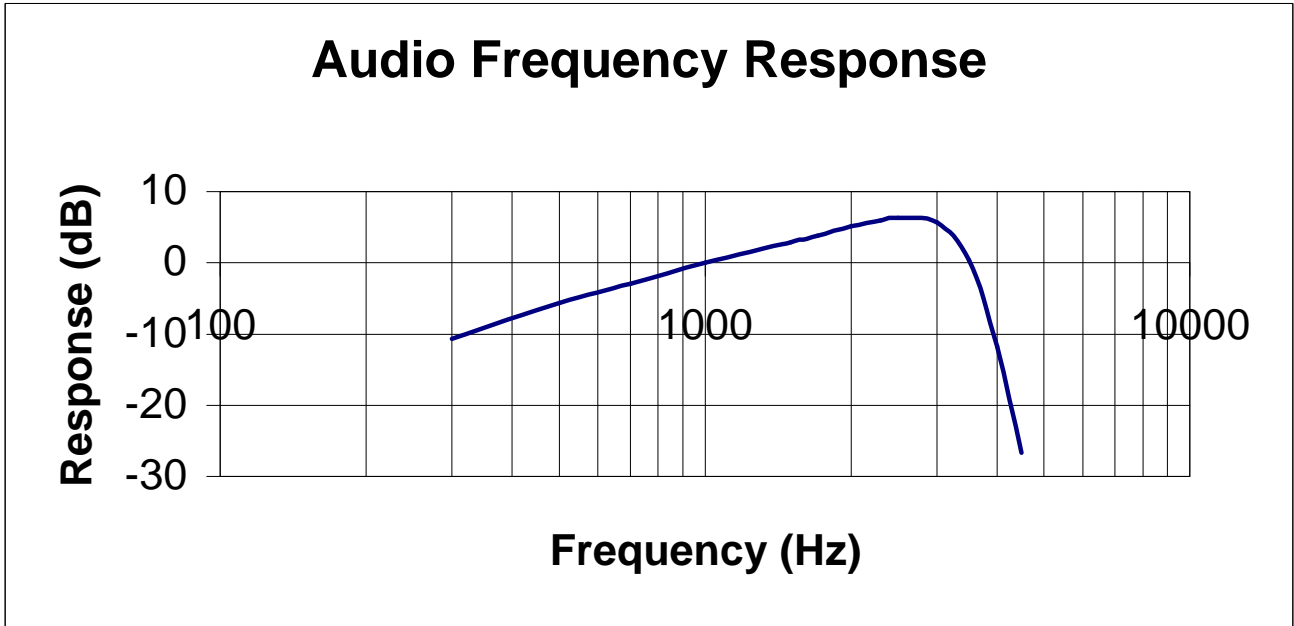
**Minimum Standard:** N/A

**Test Results:** Complies

**Measurement Data:** See attached graph.

EQUIPMENT: UT-3/460-SWC800  
FCC ID:H4JUT-3-460-S08

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*EQUIPMENT: UT-3/460-SWC800*  
*FCC ID:H4JUT-3-460-S08*

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**Section 5. Audio Low-Pass Filter Response**

**Para. No.: 2.1047**

<b>Test Performed By: Russell Grant</b>	<b>Date of Test: Jan 14, 2003</b>
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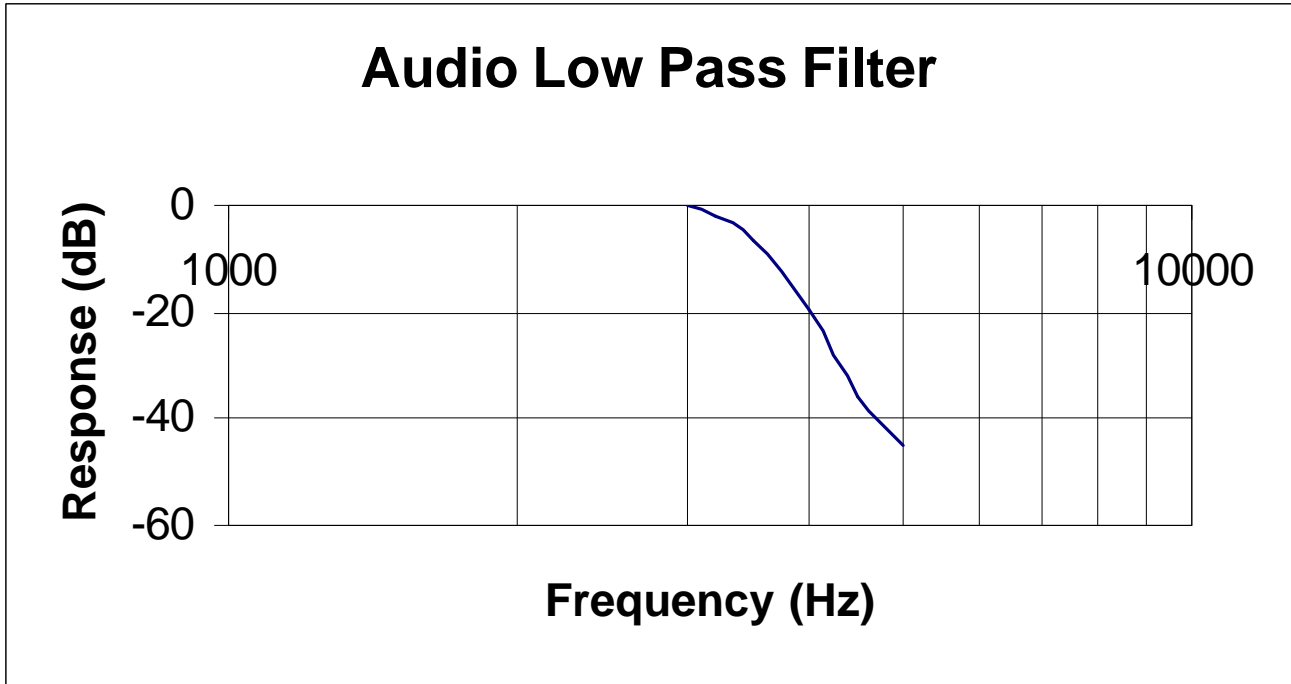
**Minimum Standard:** N/A

**Test Results:** Complies

**Measurement Data:** See attached graph.

EQUIPMENT: UT-3/460-SWC800  
FCC ID:H4JUT-3-460-S08

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*EQUIPMENT: UT-3/460-SWC800*  
*FCC ID:H4JUT-3-460-S08*

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**Section 6. Modulation Limiting**

**Para. No.: 2.1047**

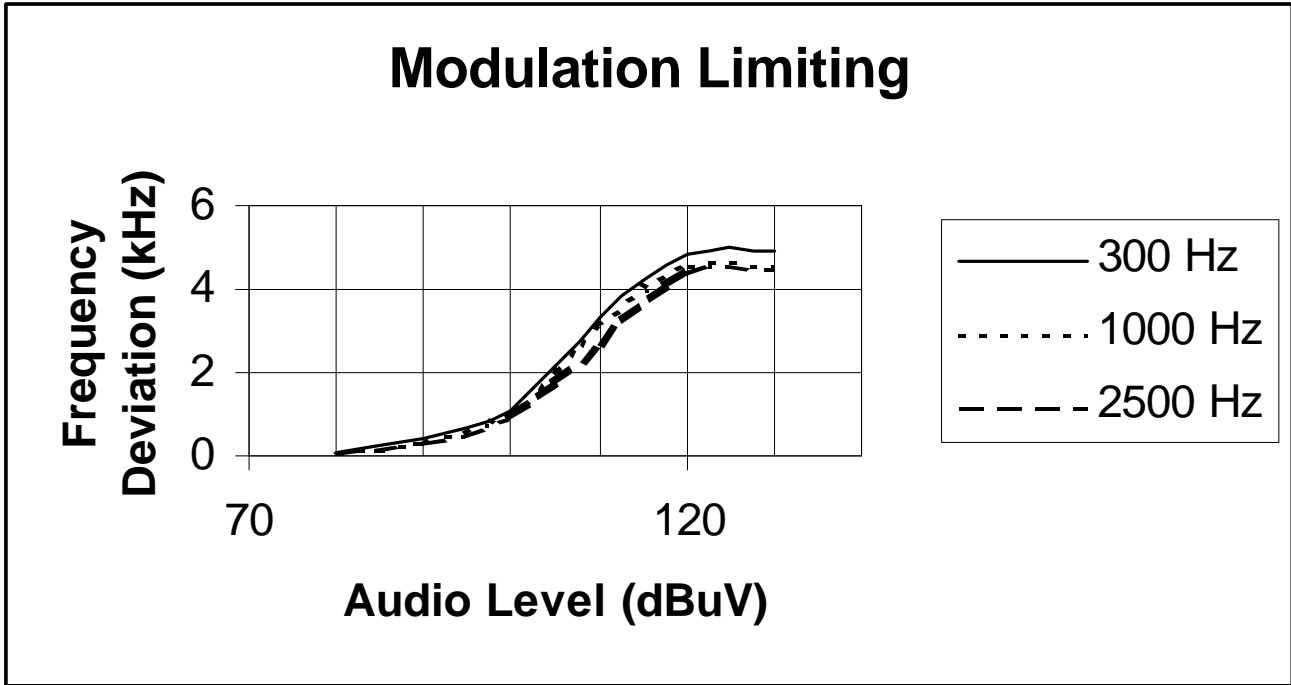
<b>Test Performed By:Russell Grant</b>	<b>Date of Test: Jan 9, 2003</b>
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**Minimum Standard:** N/A

**Test Results:** Complies

**Measurement Data:** See attached graph.

EQUIPMENT: UT-3/460-SWC800  
FCC ID:H4JUT-3-460-S08



*EQUIPMENT: UT-3/460-SWC800*  
*FCC ID:H4JUT-3-460-S08*

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**Section 7. Occupied Bandwidth**

**Para. No.: 2.1049**

<b>Test Performed By: Russell Grant</b>	<b>Date of Test: Jan 10, 2003</b>
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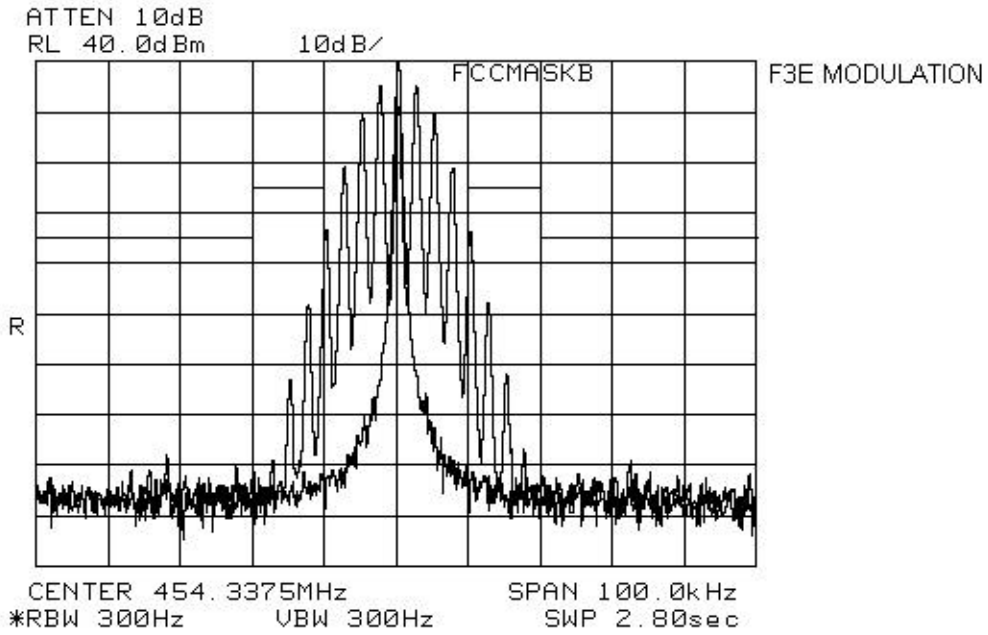
**Minimum Standard:** Mask B, G

**Test Results:** Complies

**Measurement Data:** See attached graphs.

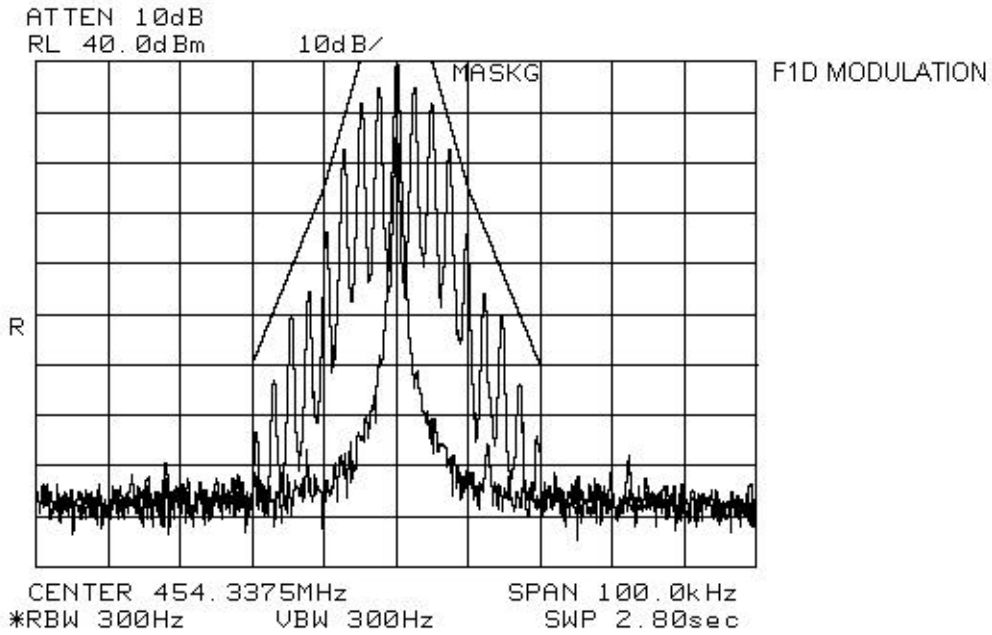
EQUIPMENT: UT-3/460-SWC800  
FCC ID:H4JUT-3-460-S08

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EQUIPMENT: UT-3/460-SWC800  
FCC ID:H4JUT-3-460-S08

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*EQUIPMENT: UT-3/460-SWC800*  
*FCC ID:H4JUT-3-460-S08*

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**Section 8. Spurious Emissions at Antenna Terminals**

**Para. No.: 2.1051**

<b>Test Performed By: Russell Grant</b>	<b>Date of Test: Jan 10, 2003</b>
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**Minimum Standard:** -13 dBm

**Test Results:** Complies

**Measurement Data:** See attached graph.





*EQUIPMENT: UT-3/460-SWC800*  
*FCC ID:H4JUT-3-460-S08*

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## **Section 9. Field Strength of Spurious Emissions**

**Para. No.: 2.1053**

<b>Test Performed By: Russell Grant</b>	<b>Date of Test: Jan 6, 2003</b>
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**Minimum Standard:** -13 dBm

**Test Results:** Complies

**Measurement Data:** See attached tabulated data.

EQUIPMENT: UT-3/460-SWC800  
 FCC ID:H4JUT-3-460-S08

Radiated Disturbance Test Data:

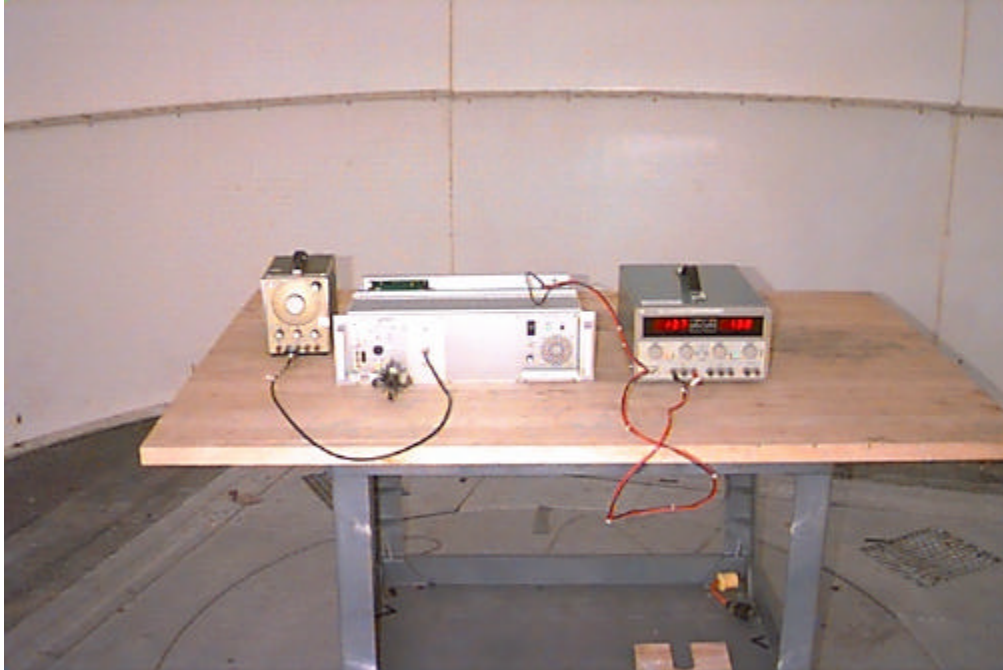
Test Date: 6 Jan 2003										
Engineer's Name: Russel Grant										
Temperature (C°): 5						Humidity %: 20				
<b>Tested as per (Table Top/Floor Standing):</b>										
Test Distance (meters): Table Top						Range: A				
Emissions within 20 dB of the limit have been recorded. Pre-scan data can be found at the back of this section										
Freq. (MHz)	Ant.	Pol. V/H	RCVD Signal (dBµV)	Sig. Sub. Factor (dB)	Cable Loss (dB)	Rad. Power (dBm)	Limit (dBm)	Margin (dB)	Detector	Amp.
908.675	ED4	V	-8.0	-67.6	4.0	-71.6	-13.0	58.6	Peak	None
908.675	ED4	H	-8.0	-73.6	4.0	-77.6	-13.0	64.6	Peak	None
1363.0125	Horn 1	V	40.8	-120.8	2.9	-77.1	-13.0	64.1	Peak	1-2GHz
1363.0125	Horn 1	H	40.0	-121.3	2.9	-78.4	-13.0	65.4	Peak	1-2GHz
1817.35	Horn 1	V	49.2	-119.1	3.8	-66.1	-13.0	53.1	Peak	1-2GHz
1817.35	Horn 1	H	45.3	-119.7	3.8	-70.6	-13.0	57.6	Peak	1-2GHz
2271.6875	Horn 1	V	45.3	-128.4	4.6	-78.5	-13.0	65.5	Peak	2-4GHz
2271.6875	Horn 1	H	46.2	-129.3	4.6	-78.5	-13.0	65.5	Peak	2-4GHz
2726.025	Horn 1	V	46.2	-127.5	5.5	-75.9	-13.0	62.9	Peak	2-4GHz
2726.025	Horn 1	H	44.2	-128.9	5.5	-79.3	-13.0	66.3	Peak	2-4GHz
3180.3625	Horn 1	V	47.5	-125.7	6.7	-71.5	-13.0	58.5	Peak	2-4GHz
3180.3625	Horn 1	H	43.0	-126.5	6.7	-76.9	-13.0	63.9	Peak	2-4GHz
3634.7	Horn 1	V	42.5	-125.0	5.9	-76.5	-13.0	63.5	Peak	2-4GHz
3634.7	Horn 1	H	42.3	-126.6	5.9	-78.4	-13.0	65.4	Peak	2-4GHz
4089.0375	Horn 1	V	37.3	-119.7	6.9	-75.5	-13.0	62.5	Peak	4-8GHz
4089.0375	Horn 1	H	35.2	-119.5	6.9	-77.4	-13.0	64.4	Peak	4-8GHz
Note 1: Antenna Legend: BC = Biconical, BL = Bilog, LP = Log-Periodic, Horn = Horn, ED = EMCO Dipole										
Note 2: Detector Legend: Q-Peak = 120 kHz RBW, Average = 1.0 MHz RBW										
Notes:										

*EQUIPMENT: UT-3/460-SWC800*

*FCC ID:H4JUT-3-460-S08*

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**OATS Set-up Photo**



*EQUIPMENT: UT-3/460-SWC800*  
*FCC ID:H4JUT-3-460-S08*

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**Section 10.      Frequency Stability**

**Para. No.: 2.1055**

<b>Test Performed By: Russell Grant</b>	<b>Date of Test: Jan 6, 2003</b>
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**Minimum Standard:**      2.5 ppm

**Test Results:**              Complies

**Measurement Data:**      See attached tabulated data.

*EQUIPMENT: UT-3/460-SWC800*  
*FCC ID:H4JUT-3-460-S08*

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Standard Test Frequency (MHz):		454.3375	
Standard Test Voltage (STV): 13.8 VDC			
Temperature	Measured Frequency	Frequency Drift	
(C)	(MHZ)	(Hz)	ppm
-30	454.337540	40	0.0880
-20	454.337539	39	0.0858
-10	454.337537	37	0.0814
0	454.337535	35	0.0770
10	454.337527	27	0.0594
20	454.337513	13	0.0286
30	454.337519	19	0.0418
40	454.337508	8	0.0176
50	454.337507	7	0.0154

No change in frequency due to  $\pm 15\%$  change in power supply voltage at 20°C.

*EQUIPMENT: UT-3/460-SWC800*  
*FCC ID:H4JUT-3-460-S08*

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## **Section 11.      Transient Frequency Behaviour**

**Para. No.:** N/A

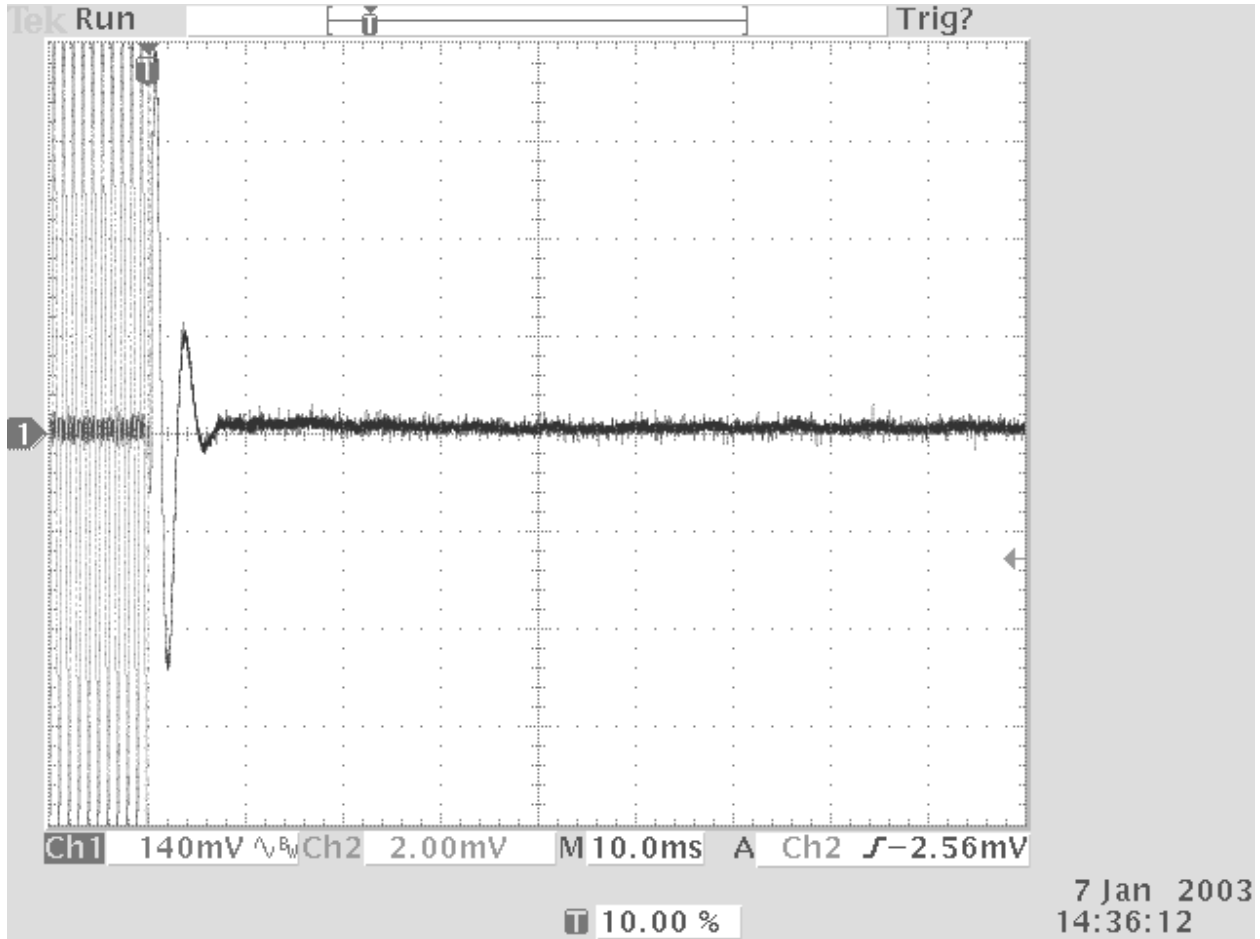
<b>Test Performed By: Russell Grant</b>	<b>Date of Test: Jan 7, 2003</b>
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**Minimum Standard:**            90.214 (25kHz channel spacing)

**Test Results:**                    Complies

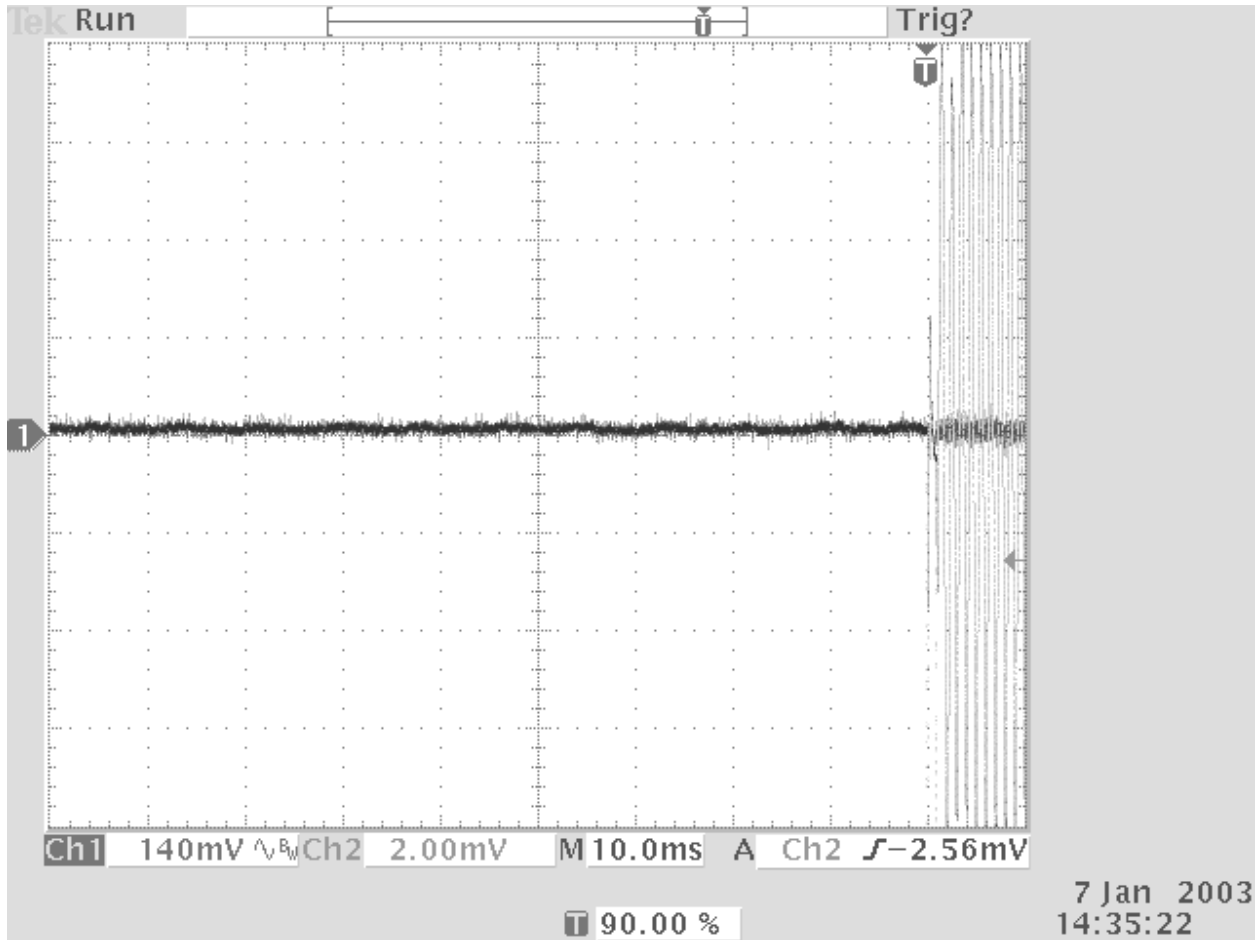
**Measurement Data:**            **See attached graphs.**

EQUIPMENT: UT-3/460-SWC800  
FCC ID:H4JUT-3-460-S08





EQUIPMENT: UT-3/460-SWC800  
FCC ID:H4JUT-3-460-S08



EQUIPMENT: UT-3/460-SWC800  
 FCC ID:H4JUT-3-460-S08

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**Section 12. Test Equipment List**

**RADIO TEST EQUIPMENT LIST**

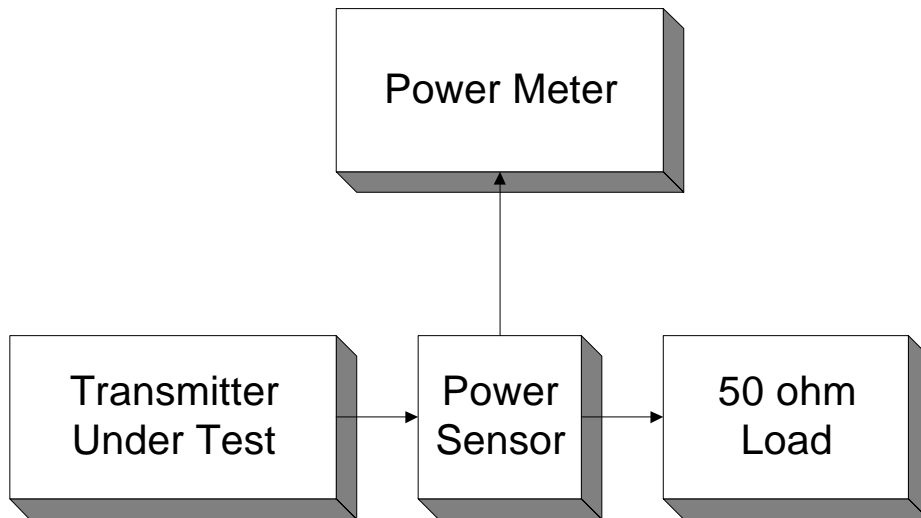
CAL CYCLE	EQUIPMENT	MANUFACTURER	MODEL	SERIAL
1 Year	Spectrum Analyzer	Hewlett Packard	8565E	FA000981
1 Year	Radio Communications	Rohde & Schwarz	CMTA 54	840343/013
1 Year	Climate Chamber	Thermotron	SM-16C	15649-S
	Power Supply	Astron	VS-50M	8405071
1 Year	Attenuator	Narda	768-20	9507
1 Year	Attenuator	Narda	769-20	4153
3 Year	RF Millivoltmeter	Rohde & Schwarz	URV5	FA001570
3 Year	Insertion Unit	Rohde & Schwarz	URV5-Z4	FA000905
1 Year	Receiver	Rohde & Schwarz	ESVP	892661/014
1 Year	Horn Antenna	EMCO #2	3115	4336
1 Year	Horn Antenna	EMCO #1	3115	3132
1 Year	Dipole Antenna Set	EMCO #2	3121C	FA001349
1 Year	50 ohm Combiner Pad	Mini Circuits	ZFC-3-4	922603
3 Year	Signal Generator	Rohde & Schwarz	SM1Q03	DE22004
1Year	Frequency Counter	Hewlett Packard	HP5350A	2444A00135
1 Year	RF AMP	JCA	2-4 GHz	FA001496
1 Year	RF AMP	JCA	1-2 GHz	FA001498
1 Year	RF AMP	JCA	4-8 GHz	FA001497

EQUIPMENT: UT-3/460-SWC800  
FCC ID:H4JUT-3-460-S08

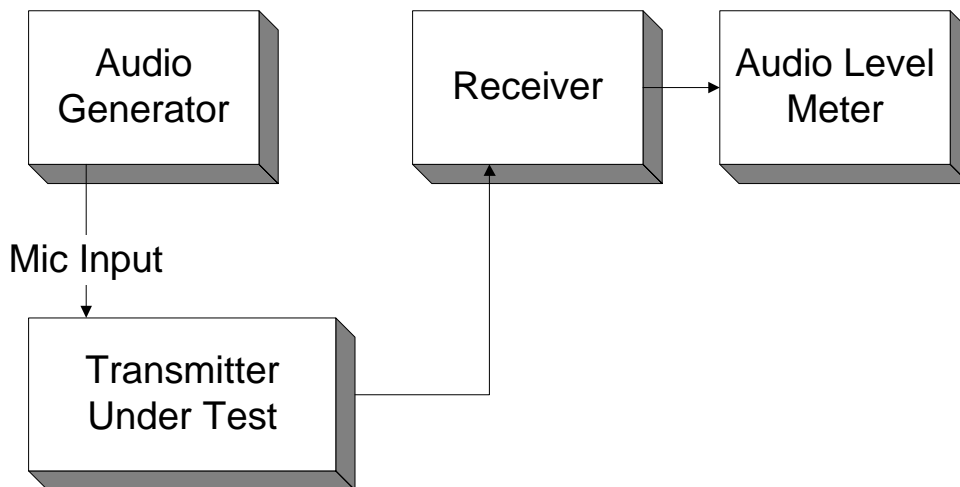
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### Section 13. Test Diagrams

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



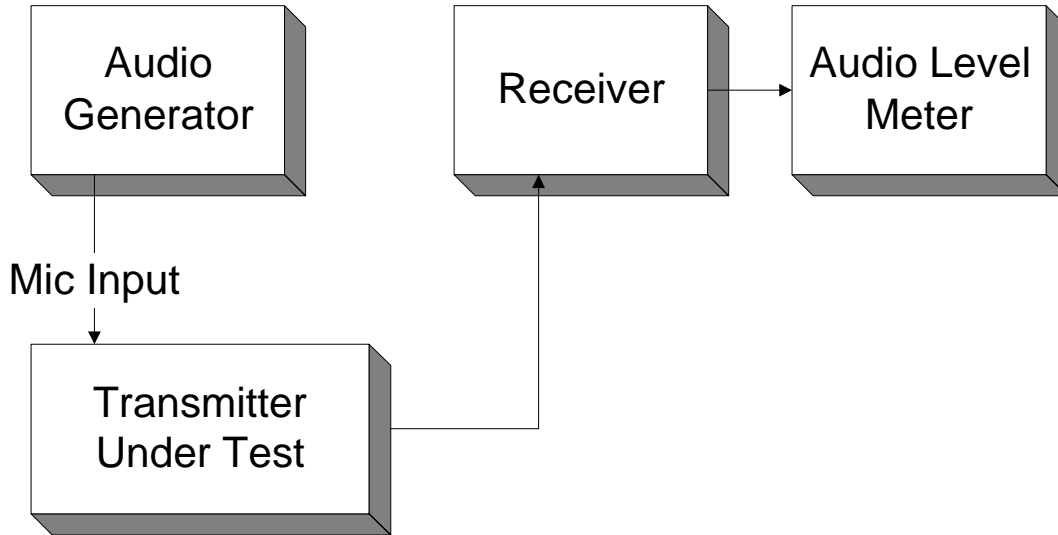
#### Para. No. 2.2.1047 - Audio Frequency Response



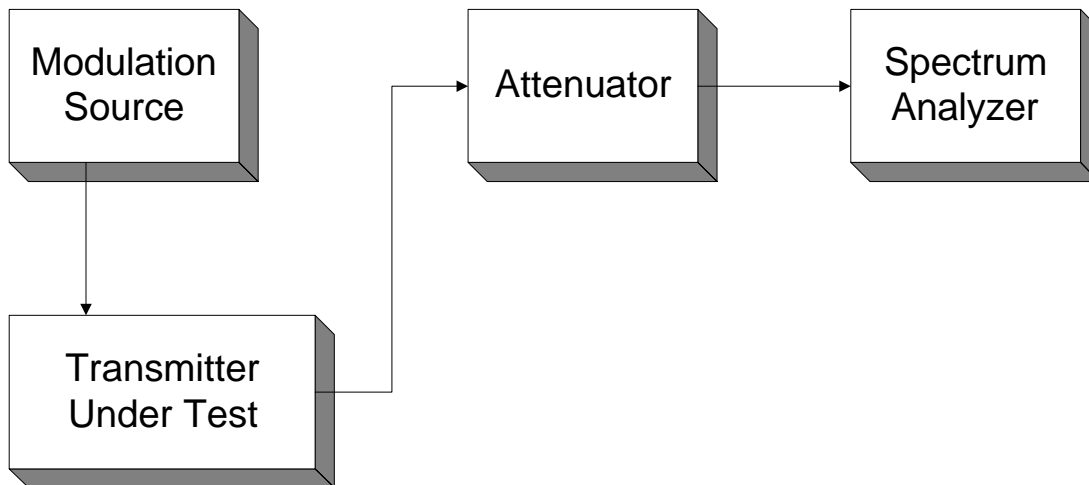
EQUIPMENT: UT-3/460-SWC800  
FCC ID:H4JUT-3-460-S08

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**Para. No. 2.1047 - Modulation Limiting**



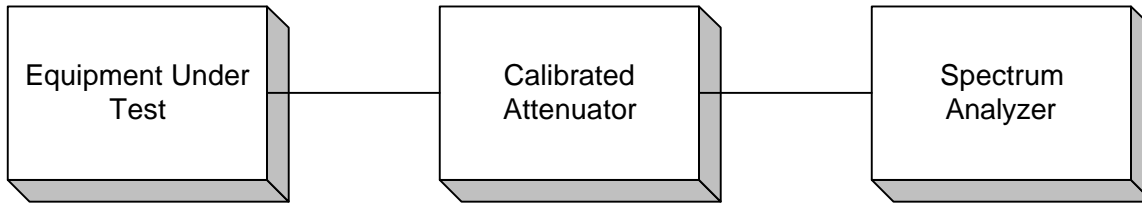
**Para. No. 2.1049 - Occupied Bandwidth**



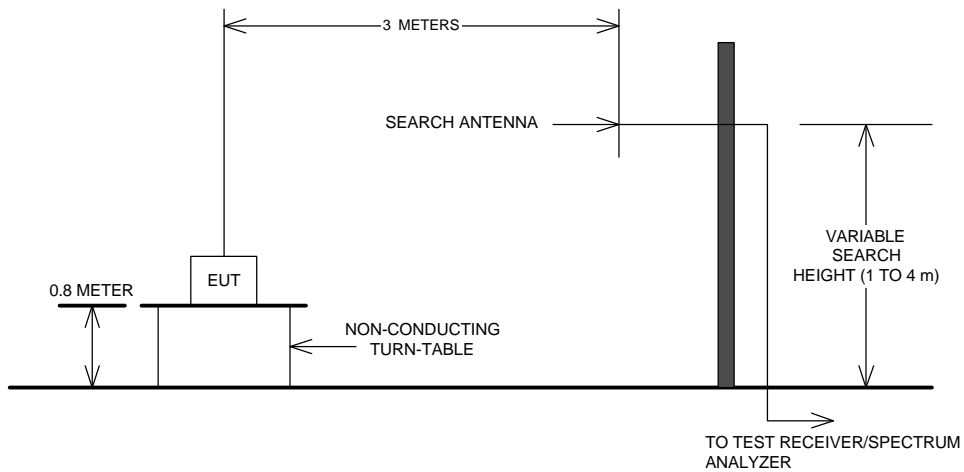
EQUIPMENT: UT-3/460-SWC800  
FCC ID:H4JUT-3-460-S08

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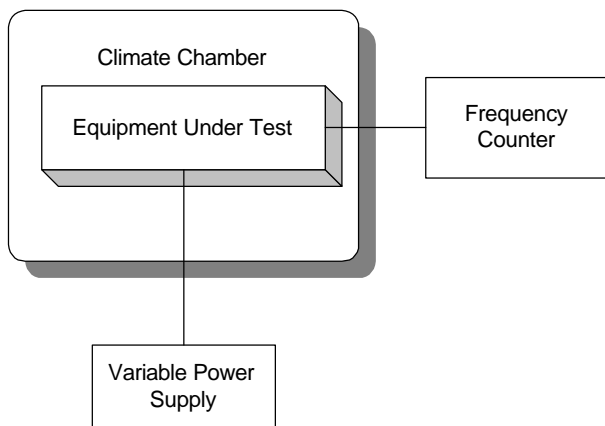
**Para. No. 2.1051 - Spurious Emissions at Antenna Terminals**



**Para. No. 2.1053 - Field Strength of Spurious Radiation**

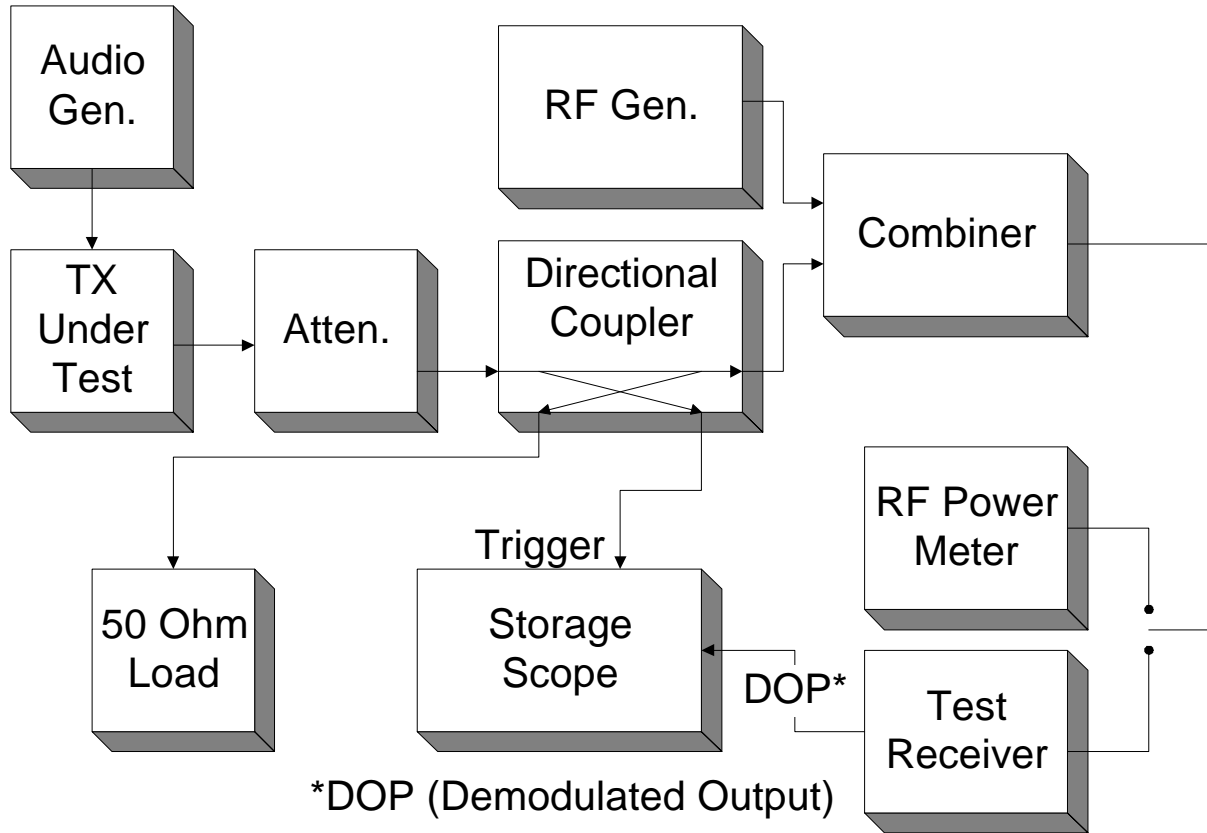


**Para. No. 2.1055 - Frequency Stability**



EQUIPMENT: UT-3/460-SWC800  
 FCC ID:H4JUT-3-460-S08

**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).