



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

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

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

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	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 %

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

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

Section 3. RF Power Output

Para. No.: 2.1046

Test Performed By:Russell Grant	Date of Test:Jan 10, 2003
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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

Section 4. Audio Frequency Response

Para. No.: 2.1047

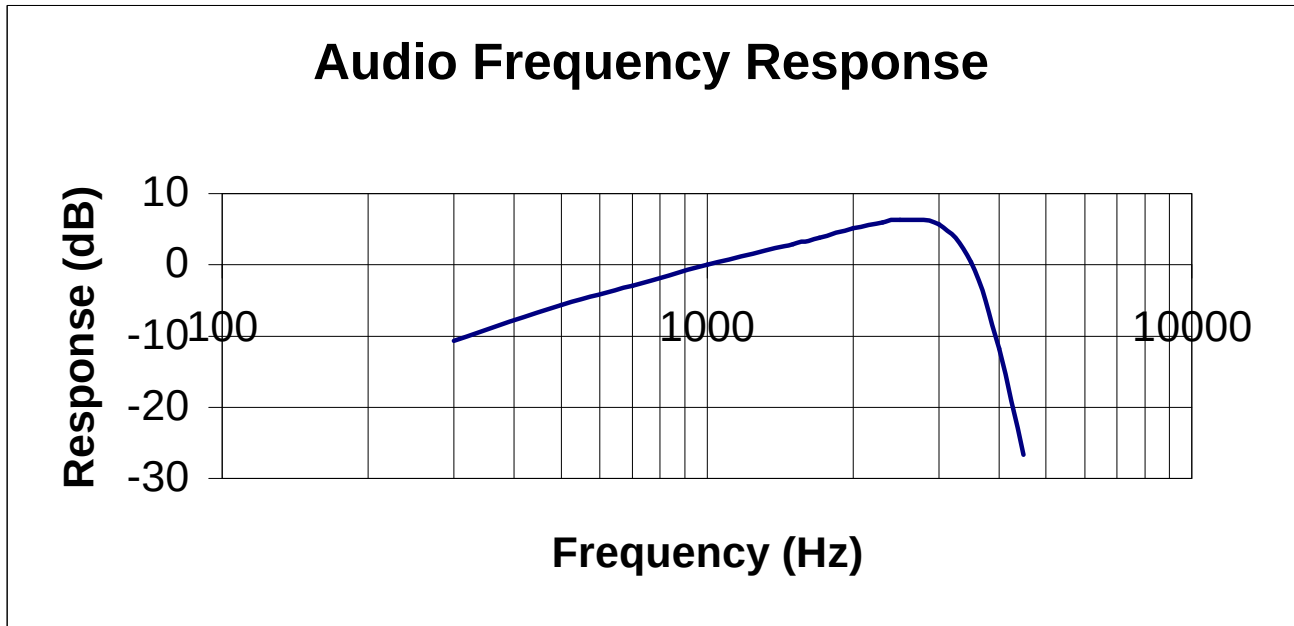
Test Performed By:Russell Grant	Date of Test:Jan 9, 2003
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Minimum Standard: N/A

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

Section 5. Audio Low-Pass Filter Response

Para. No.: 2.1047

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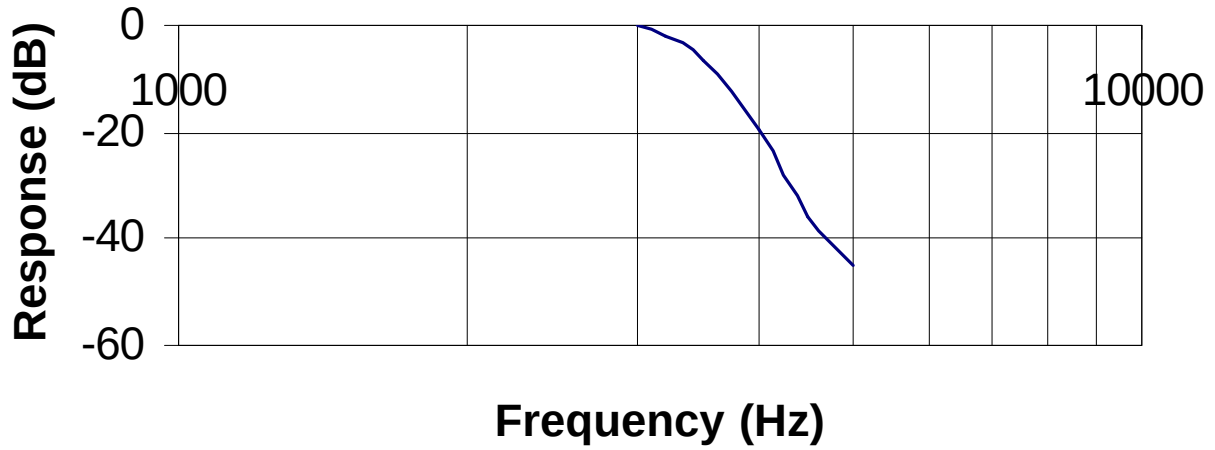
Minimum Standard: N/A

Test Results: Complies

Measurement Data: See attached graph.

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

Audio Low Pass Filter



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

Section 6. Modulation Limiting

Para. No.: 2.1047

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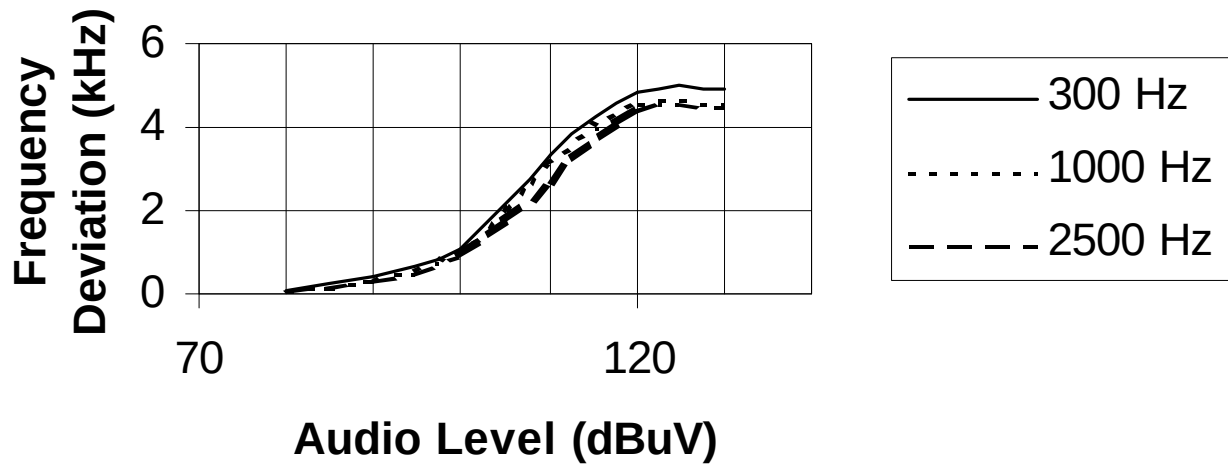
Minimum Standard: N/A

Test Results: Complies

Measurement Data: See attached graph.

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

Modulation Limiting



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

Section 7. Occupied Bandwidth

Para. No.: 2.1049

Test Performed By: Russell Grant	Date of Test: Jan 10, 2003
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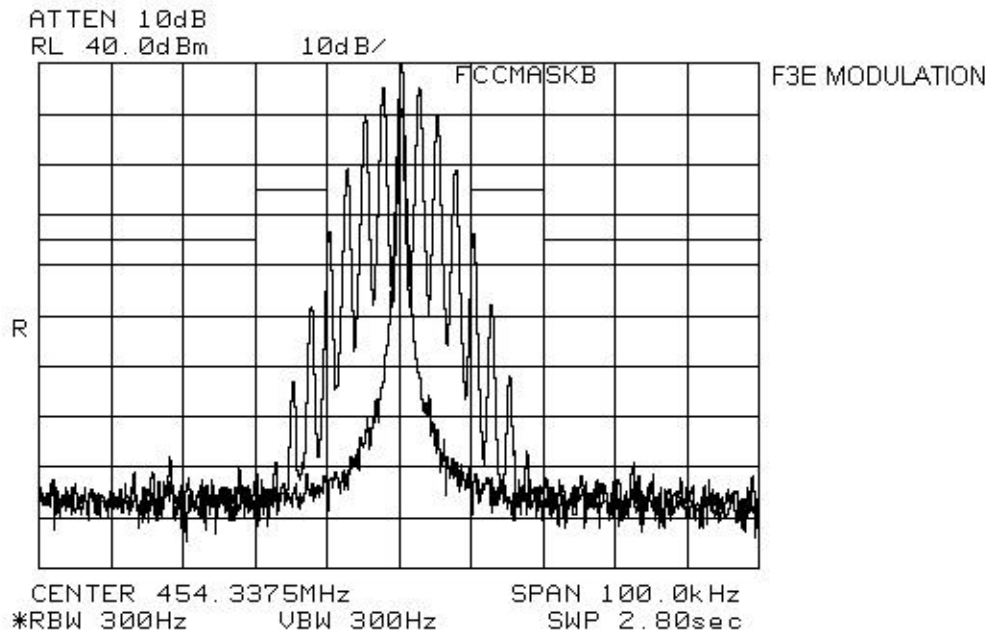
Minimum Standard: Mask B, G

Test Results: Complies

Measurement Data: See attached graphs.

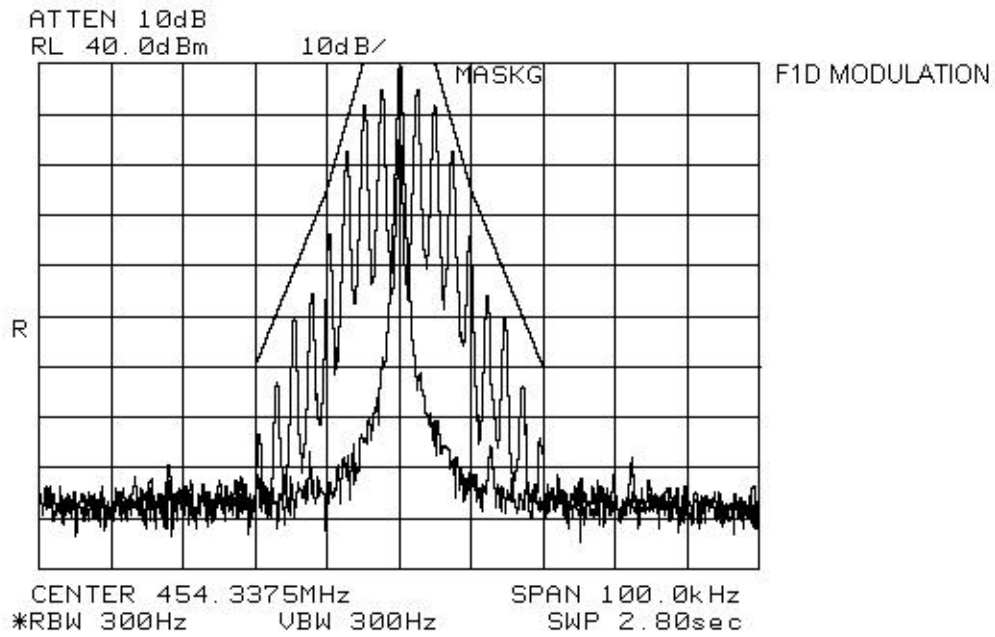
EQUIPMENT: UT-3/460-SWC800

FCC ID:H4JUT-3-460-S08



EQUIPMENT: UT-3/460-SWC800

FCC ID:H4JUT-3-460-S08



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

Section 8. Spurious Emissions at Antenna Terminals

Para. No.: 2.1051

Test Performed By: Russell Grant	Date of Test: Jan 10, 2003
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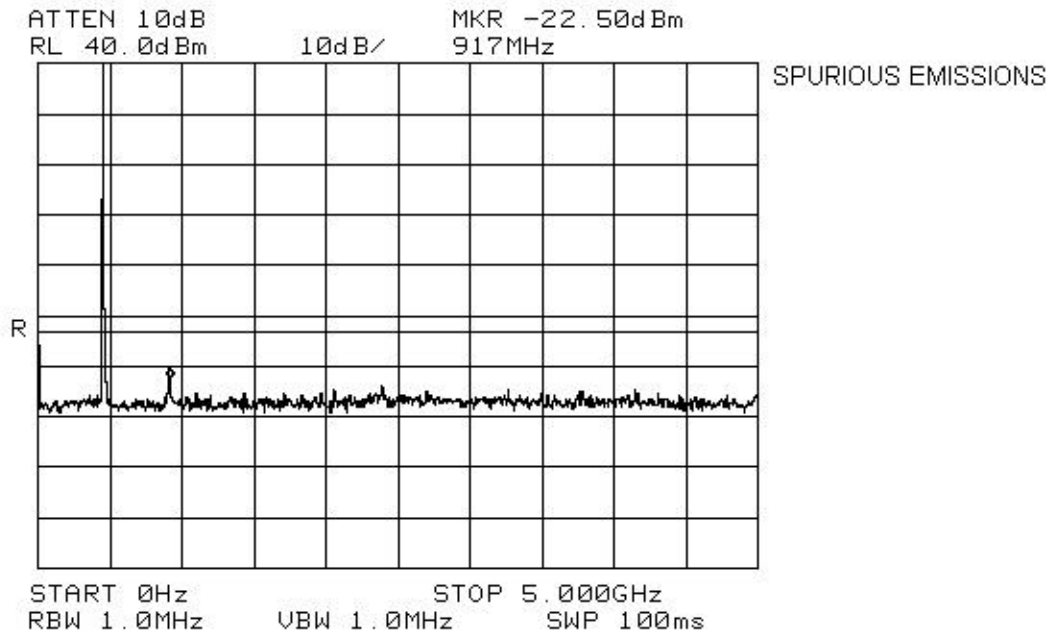
Minimum Standard: -13 dBm

Test Results: Complies

Measurement Data: See attached graph.

EQUIPMENT: UT-3/460-SWC800

FCC ID:H4JUT-3-460-S08



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

Section 9. Field Strength of Spurious Emissions

Para. No.: 2.1053

Test Performed By: Russell Grant	Date of Test: Jan 6, 2003
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Minimum Standard: -13 dBm

Test Results: Complies

Measurement Data: See attached tabulated data.

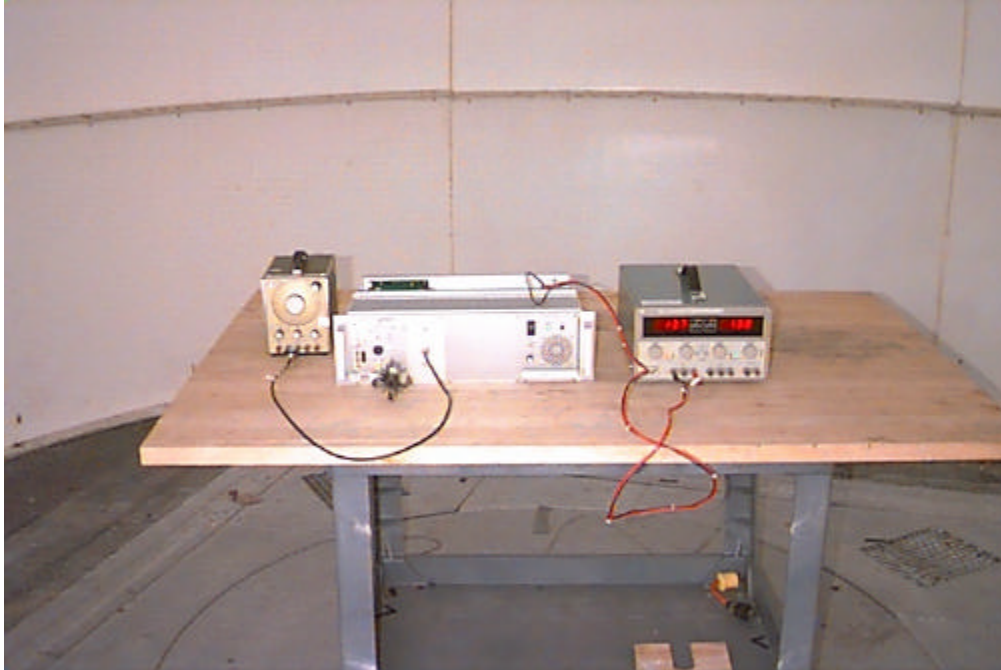
EQUIPMENT: UT-3/460-SWC800
FCC ID:H4JUT-3-460-S08

Radiated Disturbance Test Data:

Test Date: 6 Jan 2003										
Engineer's Name: Russel Grant										
Temperature (C°): 5							Humidity %: 20			
Tested as per (Table Top/Floor Standing):										
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

OATS Set-up Photo



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

Section 10. Frequency Stability

Para. No.: 2.1055

Test Performed By: Russell Grant	Date of Test: Jan 6, 2003
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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

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

Section 11. Transient Frequency Behaviour

Para. No.: N/A

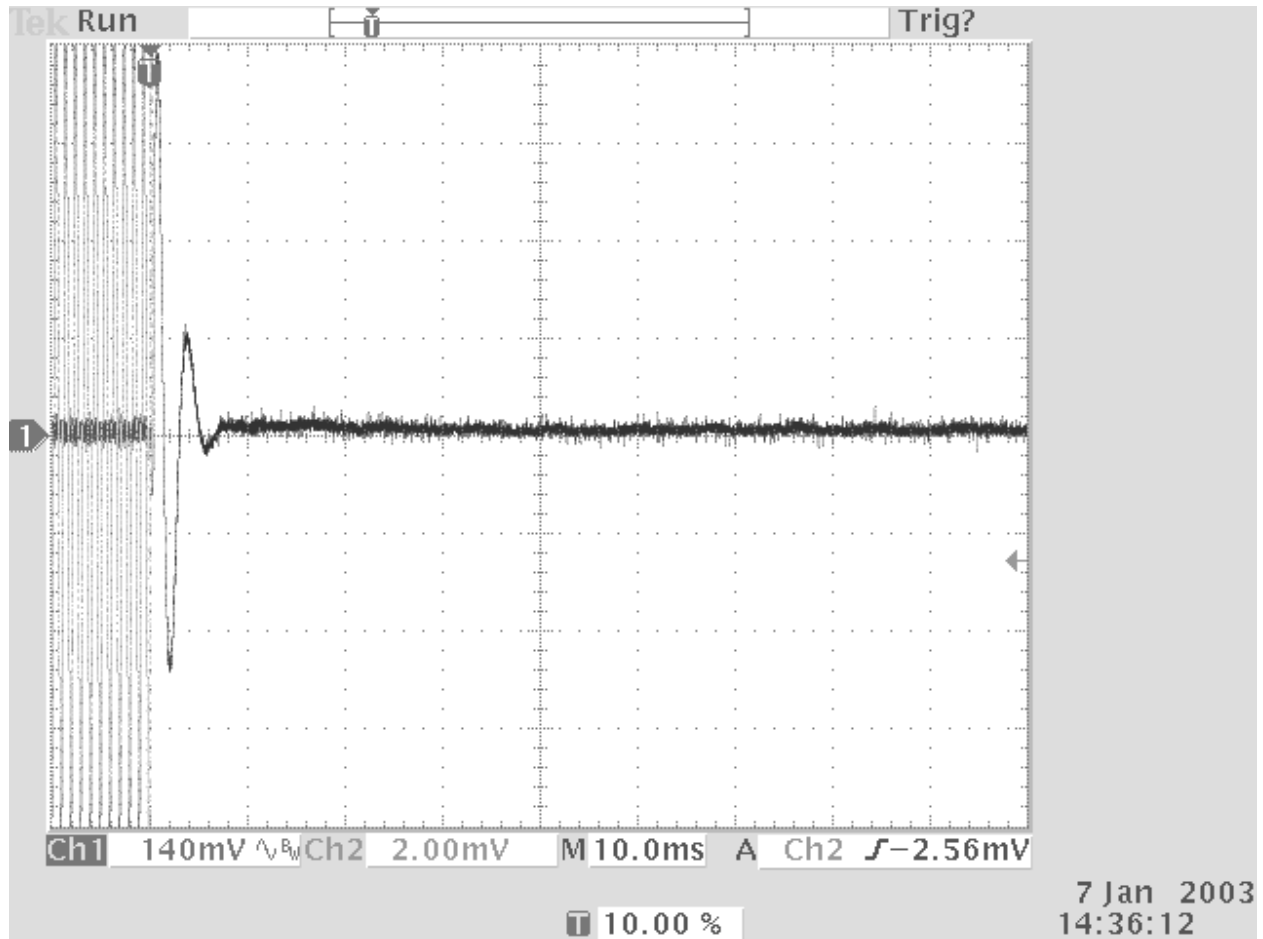
Test Performed By: Russell Grant	Date of Test: Jan 7, 2003
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Minimum Standard: 90.214 (25kHz channel spacing)

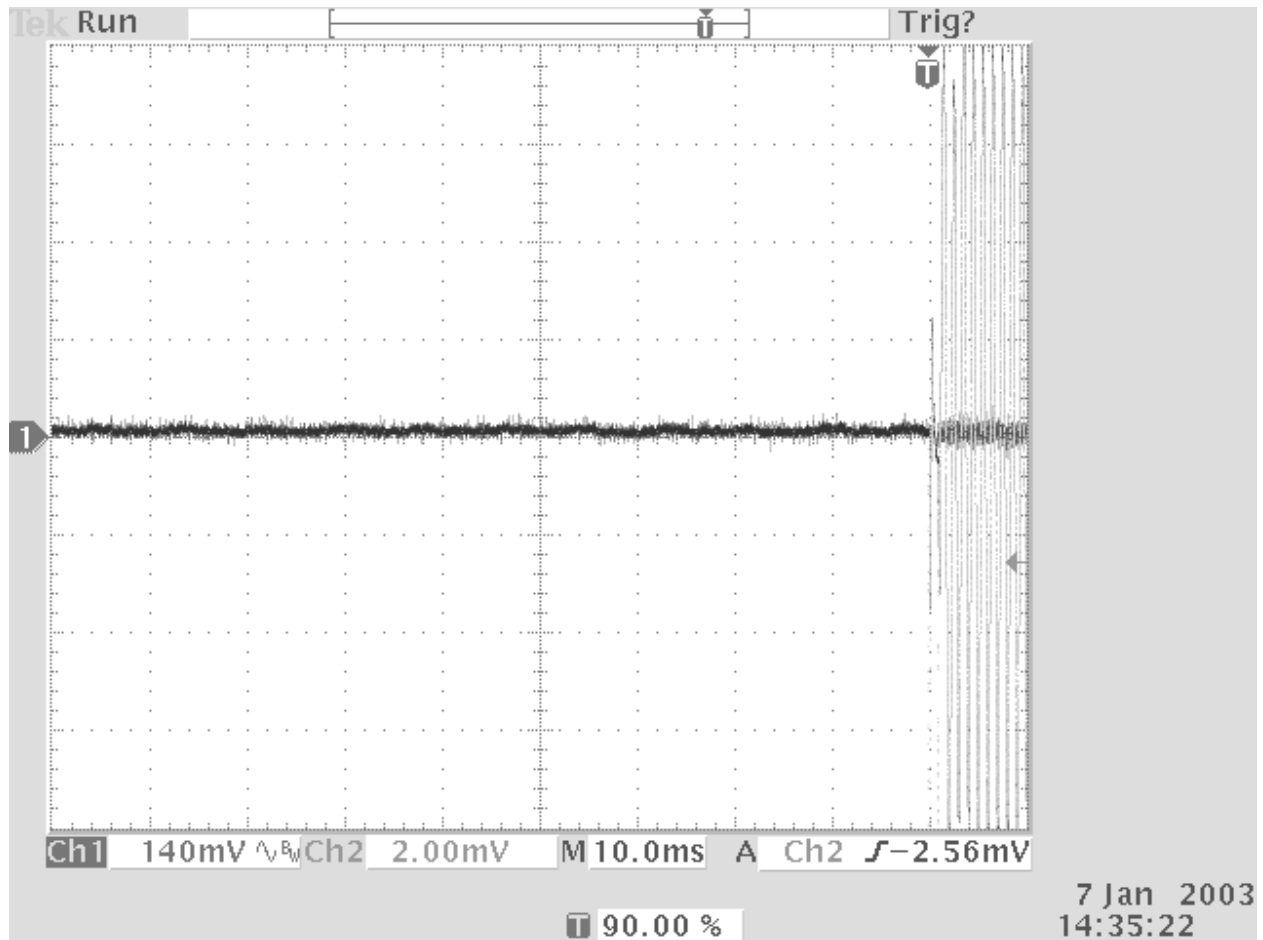
Test Results: Complies

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

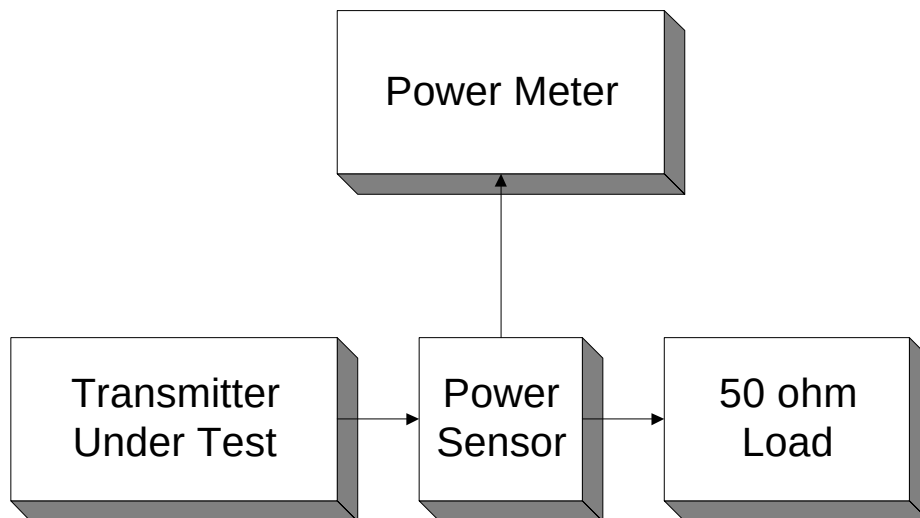
Section 12. Test Equipment List**RADIO TEST EQUIPMENT LIST**

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

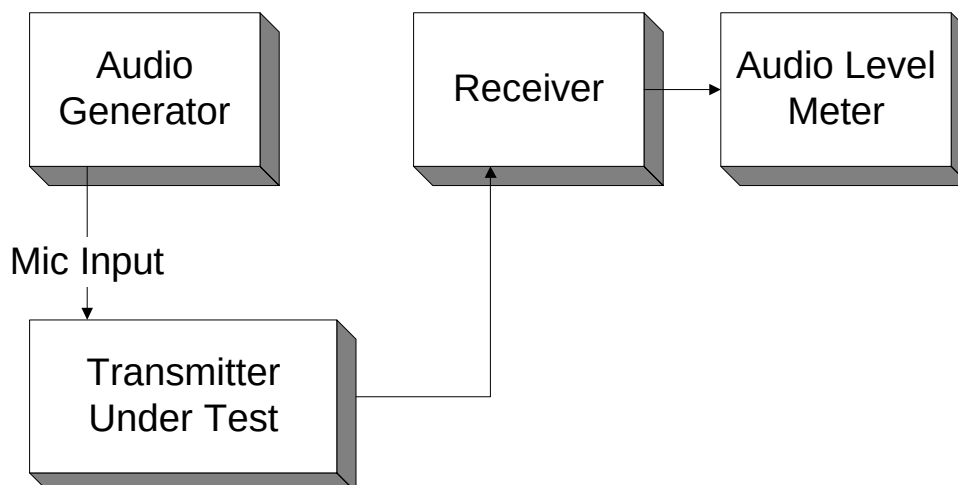
EQUIPMENT: UT-3/460-SWC800
FCC ID:H4JUT-3-460-S08

Section 13. Test Diagrams

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

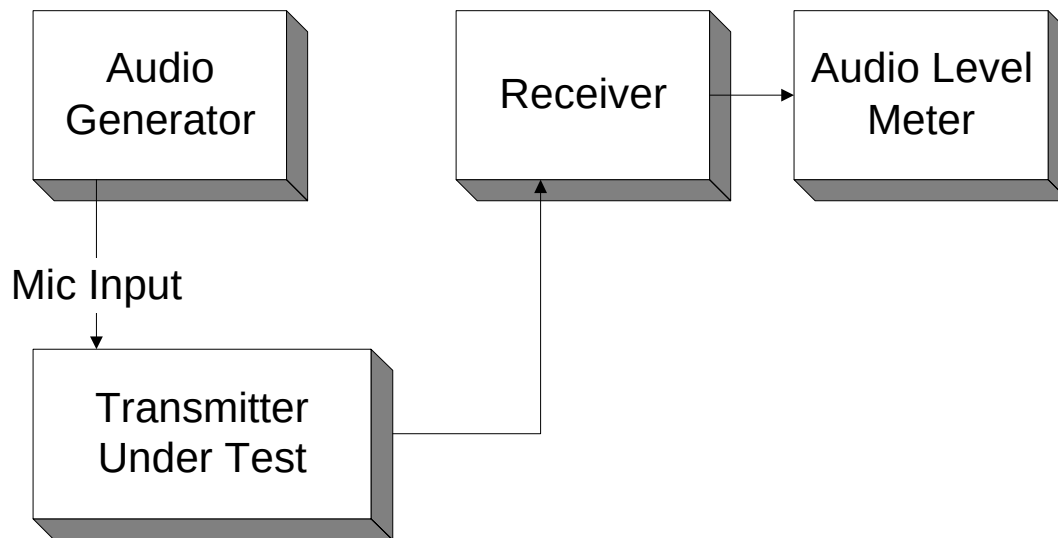


Para. No. 2.2.1047 - Audio Frequency Response

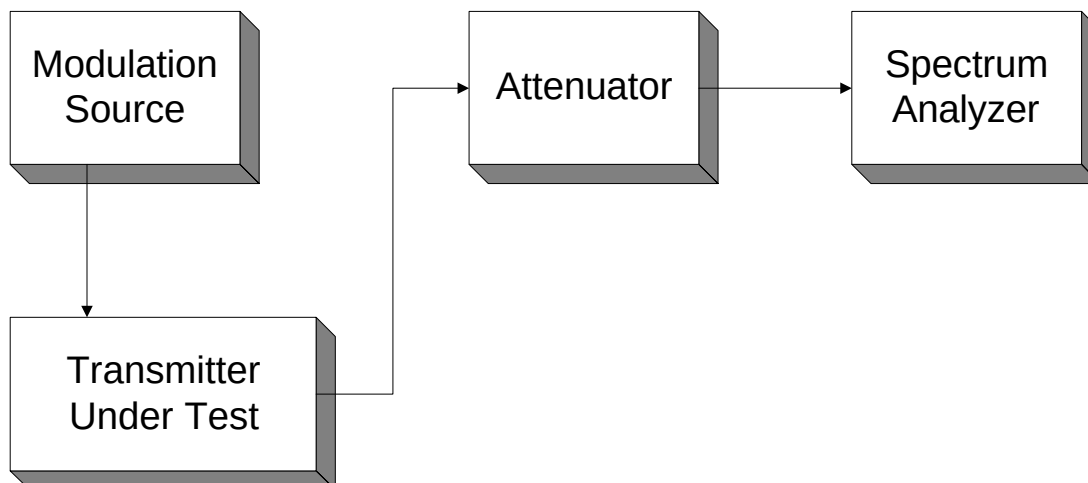


EQUIPMENT: UT-3/460-SWC800
FCC ID:H4JUT-3-460-S08

Para. No. 2.1047 - Modulation Limiting

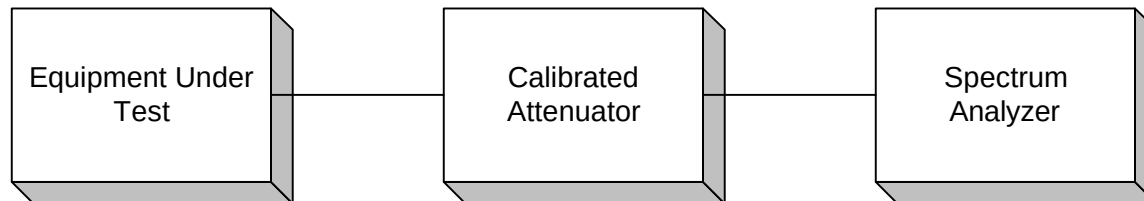


Para. No. 2.1049 - Occupied Bandwidth

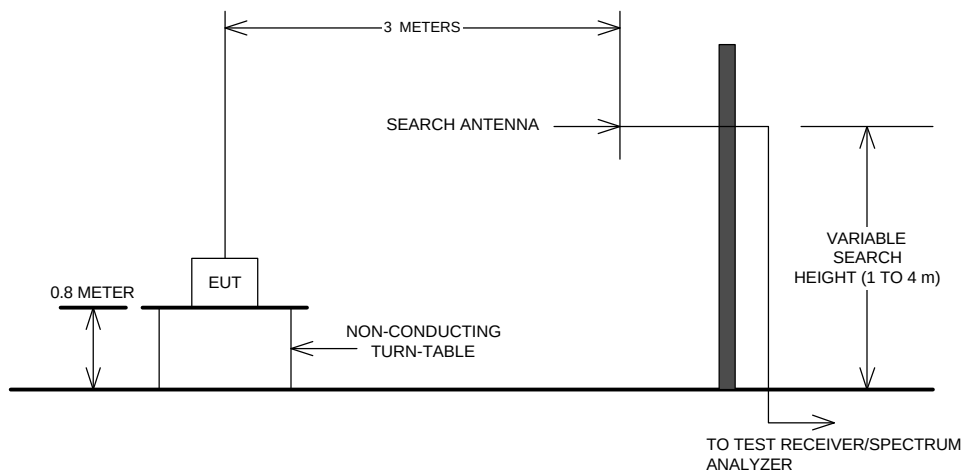


EQUIPMENT: UT-3/460-SWC800
FCC ID:H4JUT-3-460-S08

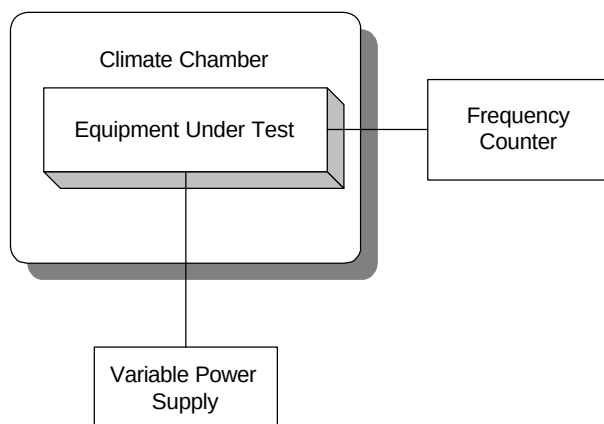
Para. No. 2.1051 - Spurious Emissions at Antenna Terminals



Para. No. 2.1053 - Field Strength of Spurious Radiation

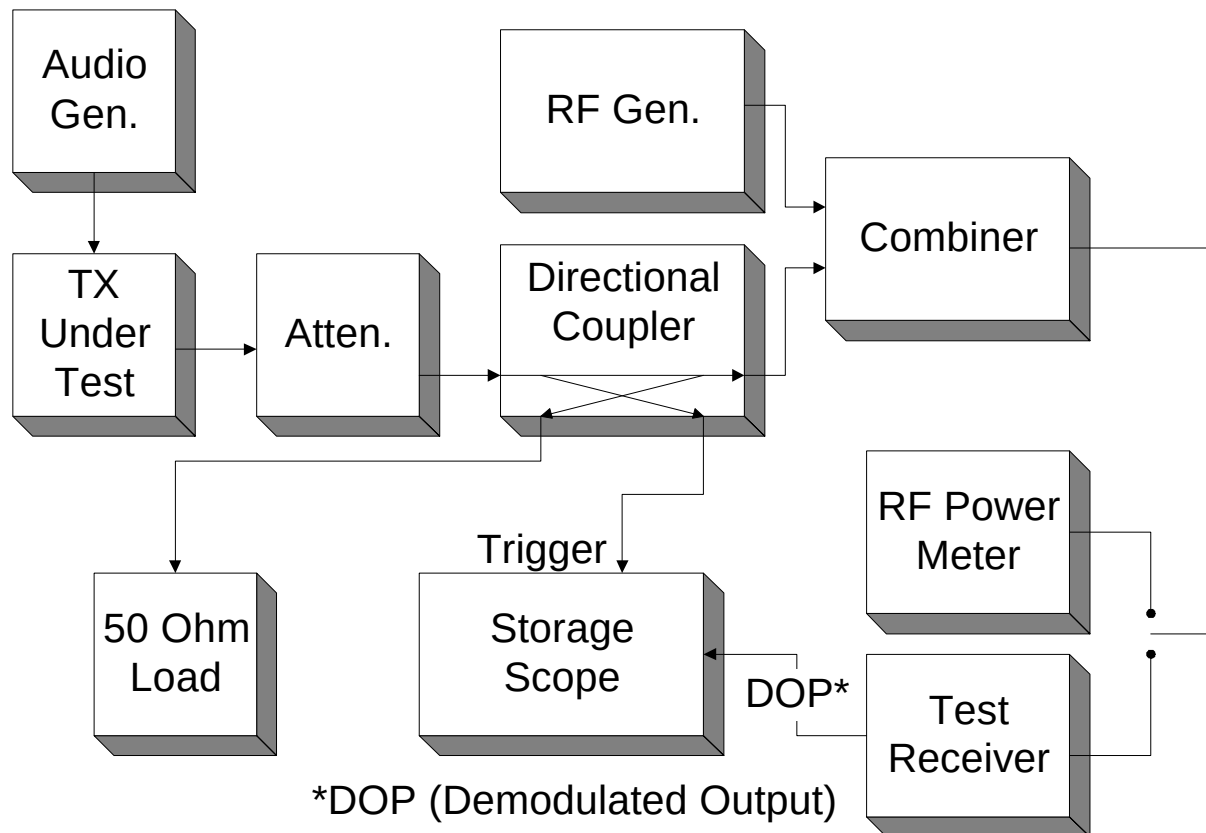


Para. No. 2.1055 - Frequency Stability



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).