Nemko Test Report:	43893RUS1
Applicant:	NavWorx Incorporated 3906 Industrial Street, Suite 100 Rowlett, TX 75088 USA
Equipment Under Test: (E.U.T.)	ADS600-B Universal Access Transceiver
FCC Identifier:	W4QADS600BA1S
In Accordance With:	**CFR Title 47 Part 87, Subpart D** Aeronautical Transmitter
Tested By:	Nemko USA Inc. 802 N. Kealy Lewisville, TX 75057-3136

TESTED BY: _____ **DATE:** **12 May 2010**
Tom Tidwell, Wireless Engineer

APPROVED BY: _____ **DATE:** **20 May 2010**
David Light, Wireless Verificator

Number of Pages: 27

Table of Contents

Section 1. Summary of Test Results

Manufacturer: Navworx, Inc.

Model No.: ADS600-B

Serial No.: 999

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 CFR Part 87. Testing was performed using test methods described in EIA/TIA 603C.

☒	New Submission	☐	Production Unit
☐	Class II Permissive Change	☒	Pre-Production Unit

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 100426-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
RF Power Output	2.1046/87.131	Complies
Modulation Characteristics	2.1047	Complies[1]
Occupied Bandwidth	2.1049(c)/87.135	Complies
Spurious Emissions at Antenna Terminals	2.1051/87.139(l)	Complies
Field Strength of Spurious Emissions	2.1053/87.139	Complies
Frequency Stability	2.1055/87.133/87.147(a)	Complies

Footnotes:

[1]The transceiver is not voice-modulated. The transmitter only sends GPS location coordinates and other navigation data to ground monitoring stations.

The modulation is FSK, binary phase coherent. Modulation index of 0.6 baseband filtered using cosine filter. The data rate is 1.041666MHz (period = 960ns)

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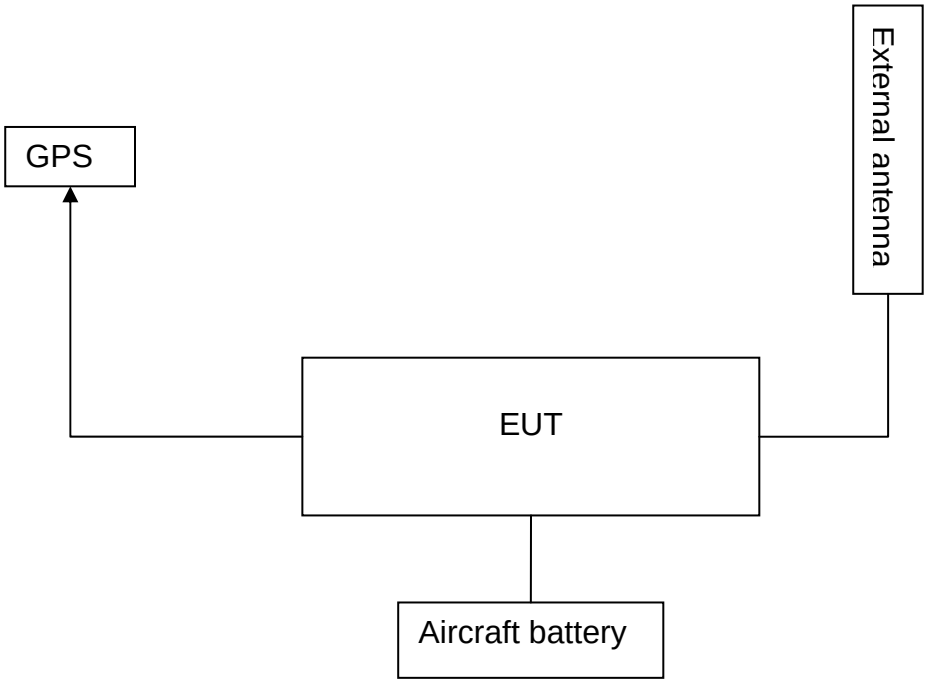
Section 2. General Equipment Specification

Supply Voltage Input:	13.56 Vdc nominal
Frequency Range:	978 MHz fixed
Tunable Bands:	N/A. The EUT is fix tuned
Type(s) of Modulation:	F1D (FSK) data only
Emission designator:	1M26F1D
Output Impedance:	50 ohms
RF Power Output (rated):	40 W (nominal) 46 dBm
Channel Spacing(s):	N/A
Operator Selection of Operating Frequency:	Not selectable by user
Power Output Adjustment Capability:	Not adjustable by user

Description of EUT

Product is portable ADS-B UAT transceiver, designed to meet DO-282B specifications. The product is housed in a metal enclosure for EMI/RFI purposes.

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: T. Tidwell	DATE: 30 April 2010

Test Results: Complies.

Measurement Data:

Frequency (MHz)	Measured Power (dBm)	Measured Power (W)
978	46.01	39.9

Equipment Used: 1064, 1065, 1469, 1036, 1627, 1629

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 37 %

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049
TESTED BY: T. Tidwell	DATE: 7 May 2010

Test Results: Complies.

Test Data: See attached plot(s).

Minimum requirement: See mask on plots.

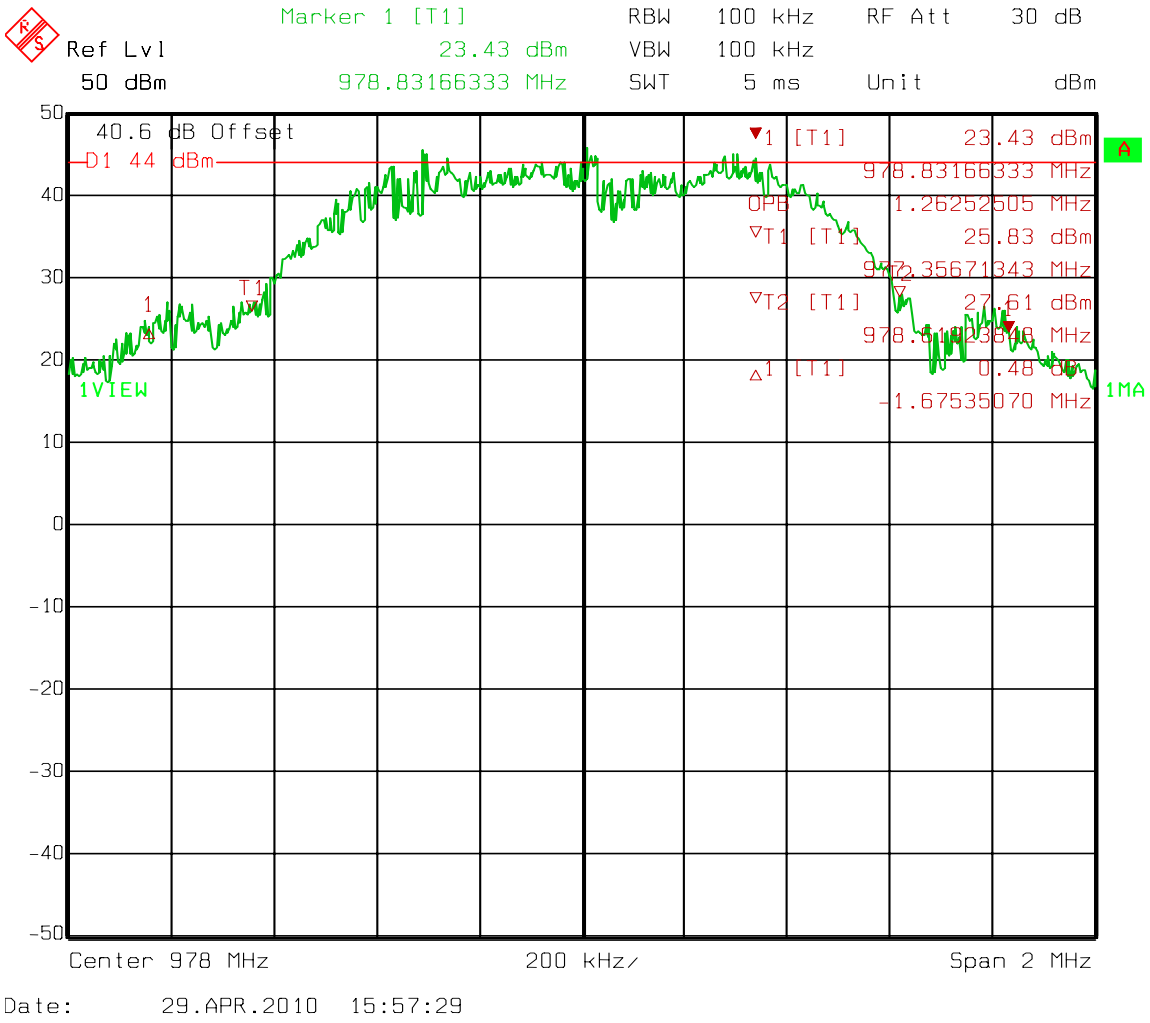
Equipment Used: 1064, 1065, 1469, 1036, 1627, 1629

Measurement Uncertainty: $1X10^{-7}$ ppm

Temperature: 22 °C

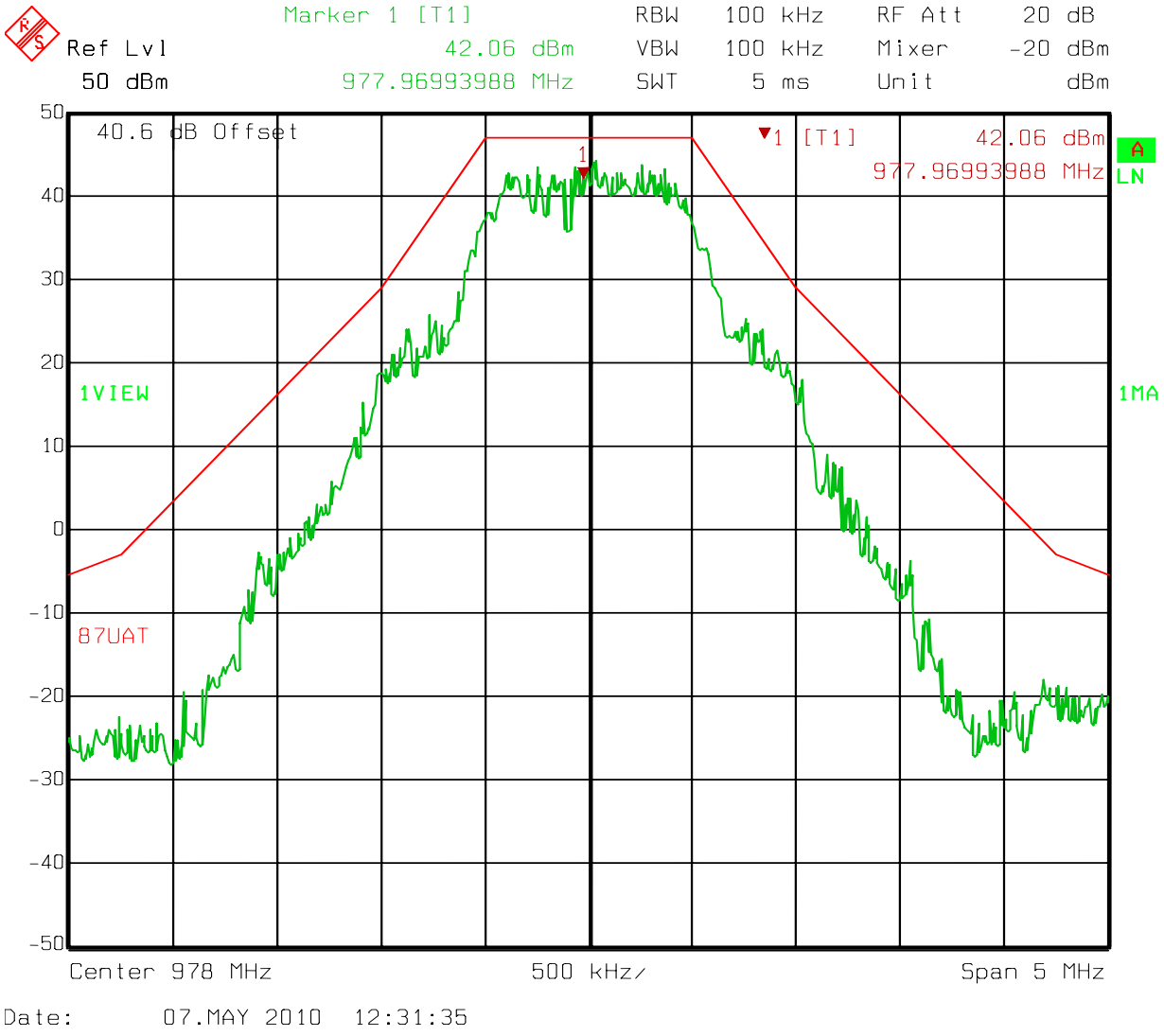
Relative Humidity: 37 %

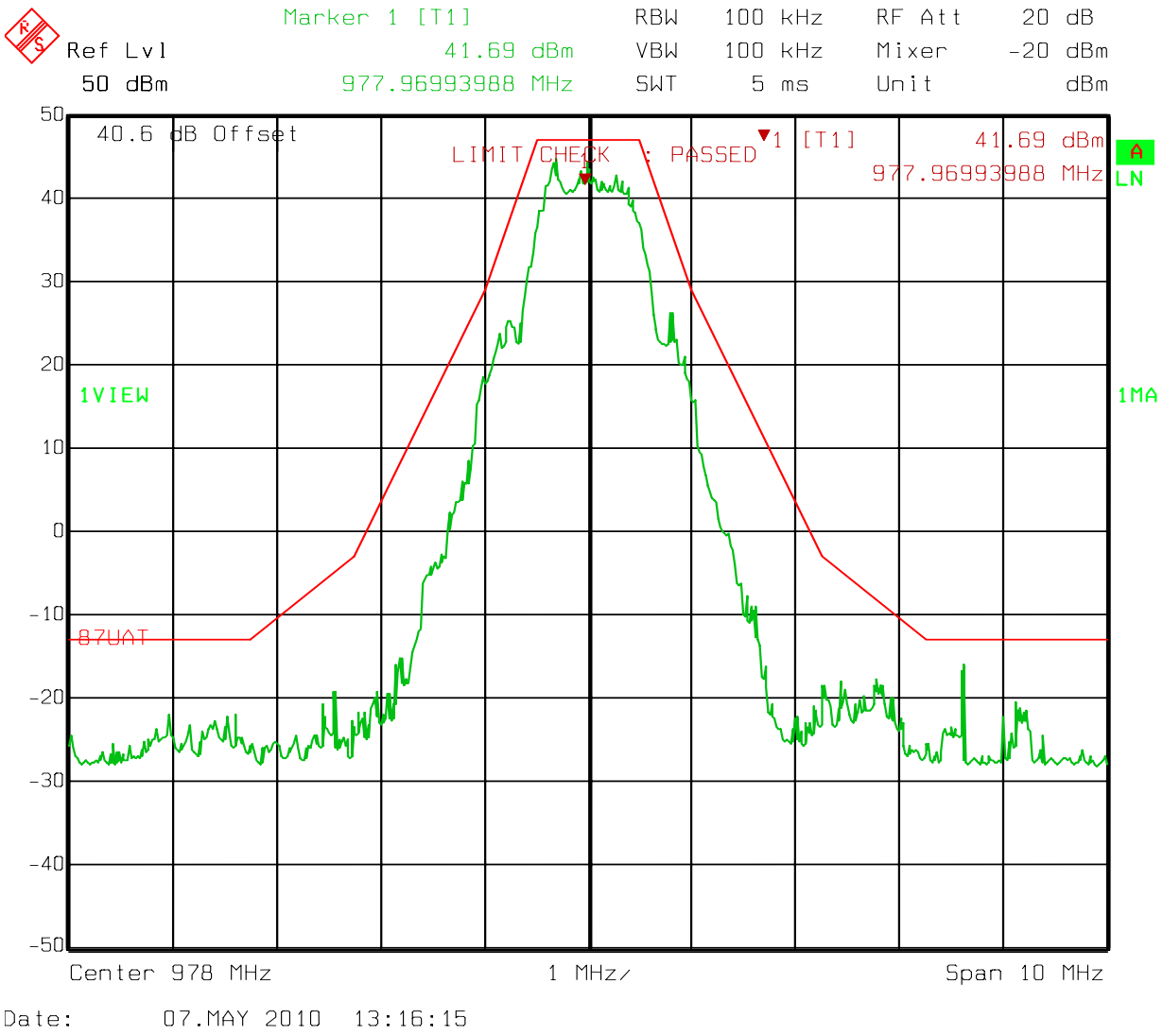
99% Occupied BW



99% OBW = 1.263 MHz

Test Data – Occupied Bandwidth




Marker 1 [T1]
41.69 dBm
977.96993988 MHz
RBW 100 kHz
VBW 100 kHz
SWT 5 ms
RF Att 20 dB
Mixer -20 dBm
Unit dBm
Ref Lvl
50 dBm
40.6 dB Offset
LIMIT CHECK : PASSED
1 [T1]
41.69 dBm
977.96993988 MHz
A
LN
1VIEW
1MA
87UAT
50
40
30
20
10
0
-10
-20
-30
-40
-50
Center 978 MHz
1 MHz/
Span 10 MHz
Date: 07.MAY 2010 13:16:15

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: T. Tidwell	DATE: 30 April 2010

Test Results: Complies.

Test Data: See attached plot(s).

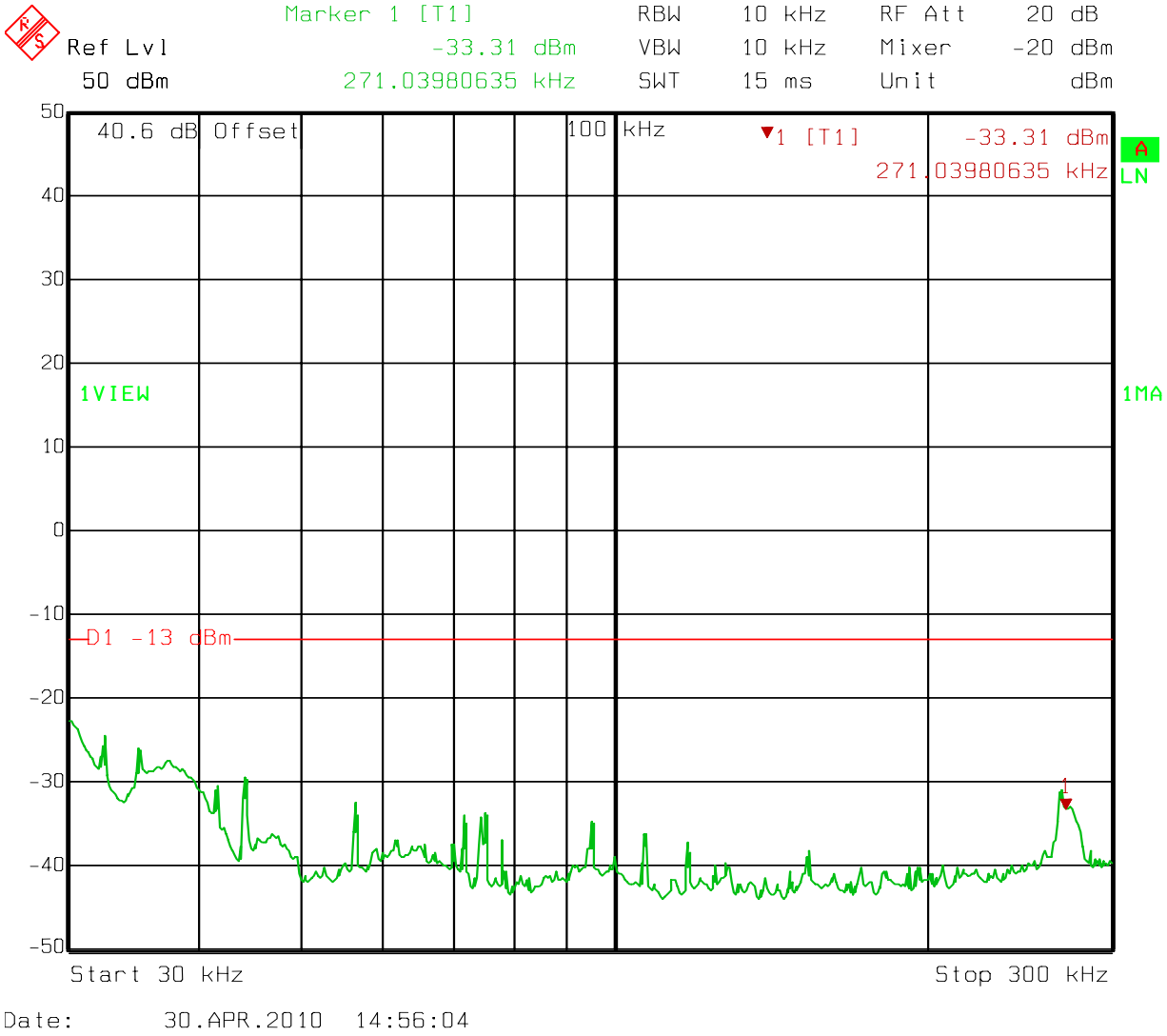
Equipment Used: 1064, 1065, 1469, 1036, 1627, 1629

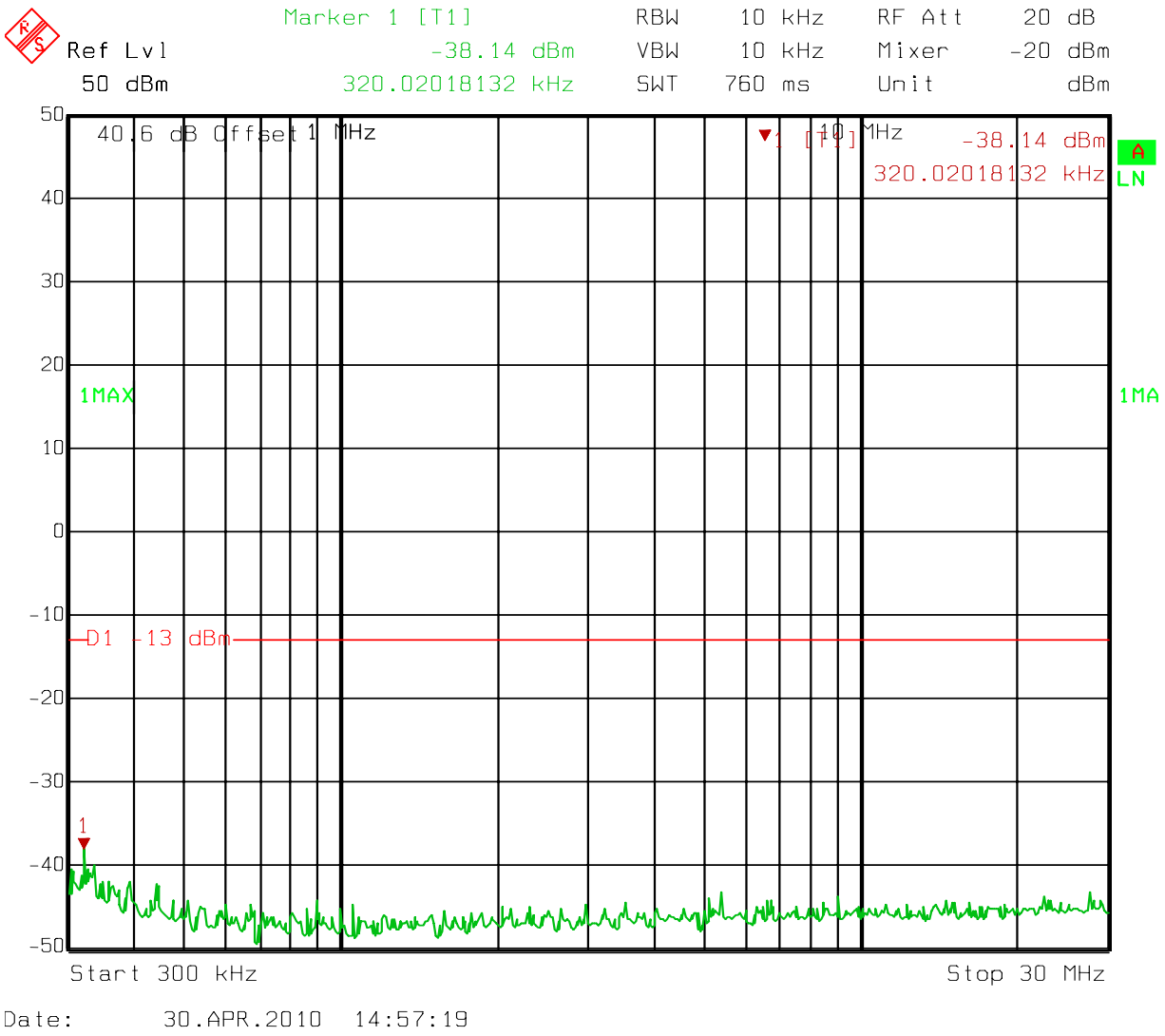
Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

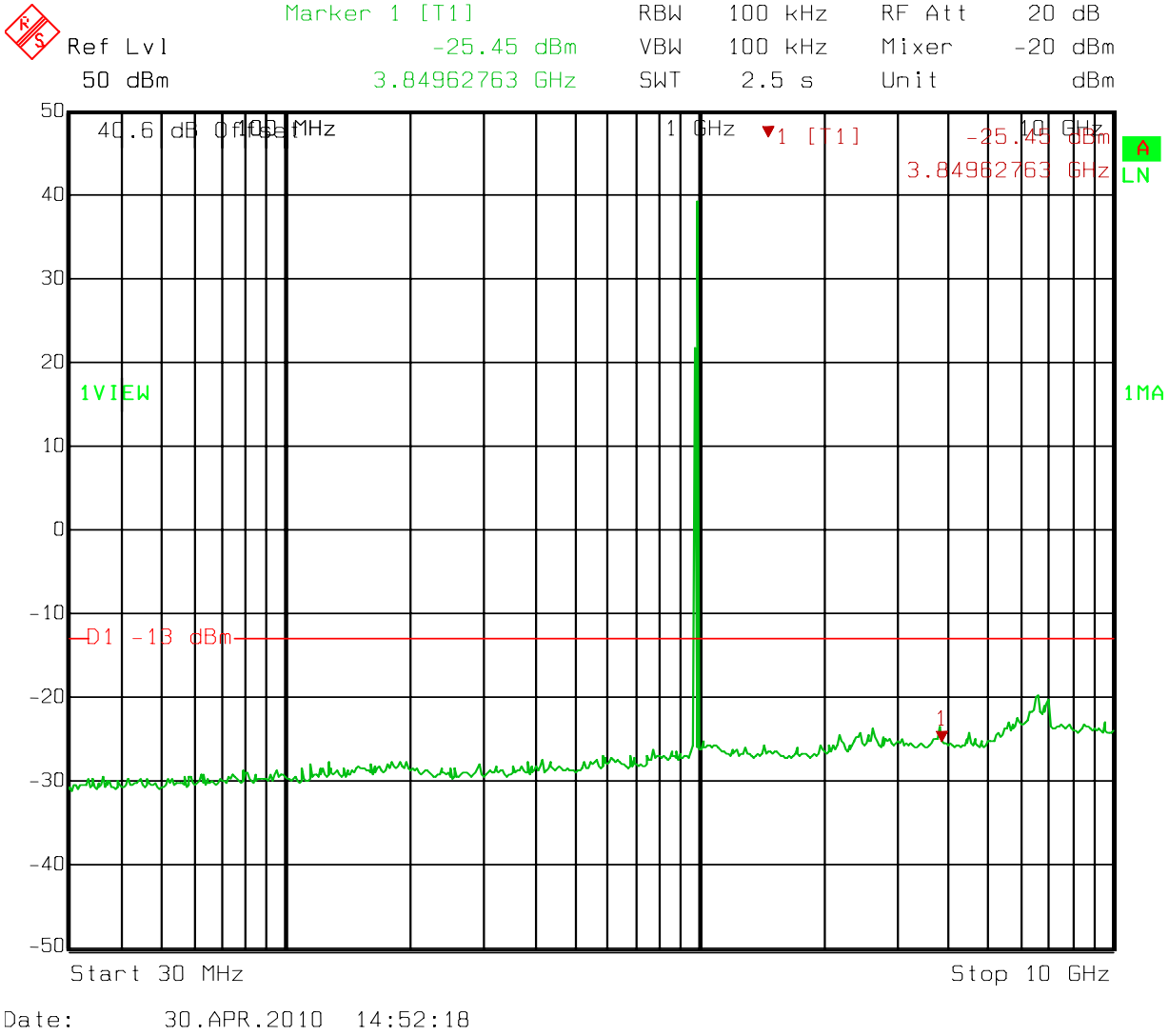
Relative Humidity: 37 %

Test Data – Spurious Emissions at Antenna Terminals




Marker 1 [T1]
Ref Lvl
50 dBm
-38.14 dBm
320.02018132 kHz
RBW 10 kHz
VBW 10 kHz
SWT 760 ms
RF Att 20 dB
Mixer -20 dBm
Unit dBm
40.6 dB Offset
1 MHz
10 MHz
-38.14 dBm
320.02018132 kHz
A
LN
1MAX
1MA
D1 -13 dBm
50
40
30
20
10
0
-10
-20
-30
-40
-50
Start 300 kHz
Stop 30 MHz
Date: 30.APR.2010 14:57:19

Test Data – Spurious Emissions at Antenna Terminals



Section 6. Field Strength of Spurious Emissions

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.1053
TESTED BY: T. Tidwell	DATE: 30 April 2010

Test Results: Complies.

Test Data: See attached table.

Equipment Used: 1767, 1783, 1763, 1304

Measurement Uncertainty: +/-1.7 dB

Temperature: 22 °C

Relative Humidity: 37 %

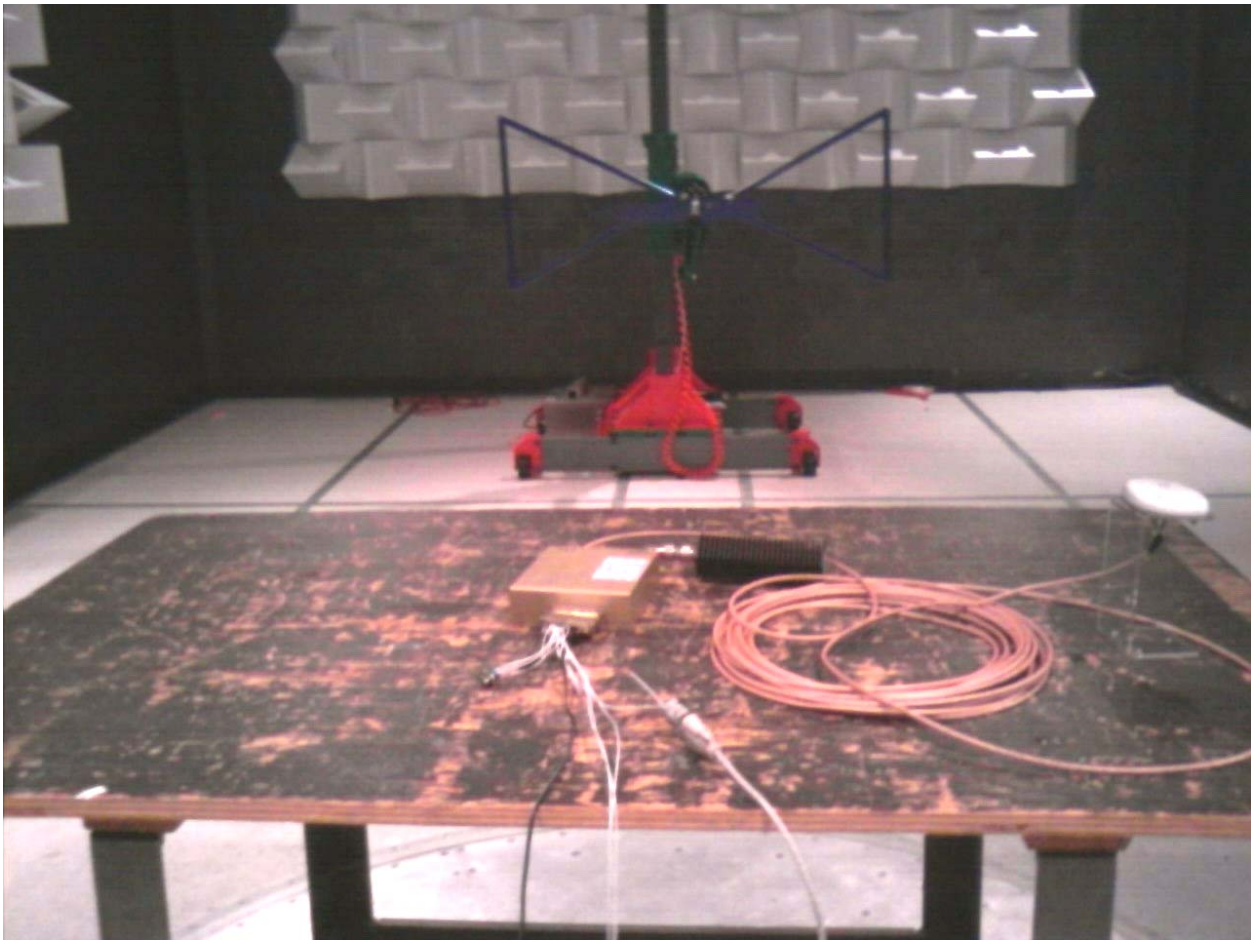
Note: An IF bandwidth of 100 kHz was used on the spectrum analyzer/receiver.

Test Data - Radiated Emissions

Frequency (MHz)	Meter Reading (dBm)	Substitution Level (dBm)	Substitution Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarity
1048	-89.0	-57.2	3.7	-53.5	-13.0	-40.5400	V
1048	-89.0	-57.3	3.7	-53.6	-13.0	-40.6400	H
2048	-89.0	-54.1	5.6	-48.5	-13.0	-35.4600	V
2048	-89.0	-52.2	5.6	-46.6	-13.0	-33.5600	H
1956	-87.0	-55.9	6.2	-49.7	-13.0	-36.6700	V
1956	-87.0	-53.5	6.2	-47.3	-13.0	-34.2700	H
2934	-83.0	-46.1	7.1	-39.0	-13.0	-25.9600	V
2934	-83.0	-49.4	7.1	-42.3	-13.0	-29.2600	H
3912	-83.0	-40.5	8.0	-32.6	-13.0	-19.5500	V
3912	-83.0	-49.1	8.0	-41.2	-13.0	-28.1500	H
4890	-78.0	-36.6	9.1	-27.5	-13.0	-14.5400	V
4890	-78.0	-43.0	9.1	-33.9	-13.0	-20.9400	H
5868	-80.0	-39.6	8.4	-31.2	-13.0	-18.2300	V
5868	-81.0	-44.4	8.4	-36.0	-13.0	-23.0300	H
6846	-77.0	-35.9	9.6	-26.3	-13.0	-13.3300	V
6846	-77.0	-38.9	9.6	-29.3	-13.0	-16.3300	H
7827	-79.0	-37.4	9.0	-28.4	-13.0	-15.4400	V
7827	-79.0	-38.6	9.0	-29.6	-13.0	-16.6400	H
8802	-76.0	-34.8	9.6	-25.3	-13.0	-12.2500	V
8802	-75.0	-33.6	9.6	-24.1	-13.0	-11.0500	H
9780	-75.0	-33.2	9.8	-23.5	-13.0	-10.4500	V
9780	-76.0	-33.2	9.8	-23.5	-13.0	-10.4500	H

Notes:

Photograph of Test Setup



Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 2.1055
TESTED BY: T. Tidwell	DATE: 7 May 2010

Test Results: Complies.

Measurement Data: See attached table.

Standard Test Frequency:	978.000000	MHz
Standard Test Voltage:	13.56	Vdc

Equipment Used: 1064, 1065, 1469, 1659, 1627, 1629, 0689

Measurement Uncertainty: 1×10^{-6} ppm

Frequency Stability

Page 1 of 1

Job No.: 43893RUS1 Date: 5/7/2010

Specification: CFR Title 47, Part 87, Subpart D

Tested By: T. Tidwell

E.U.T.: Model PADS600-B UAT Transceiver

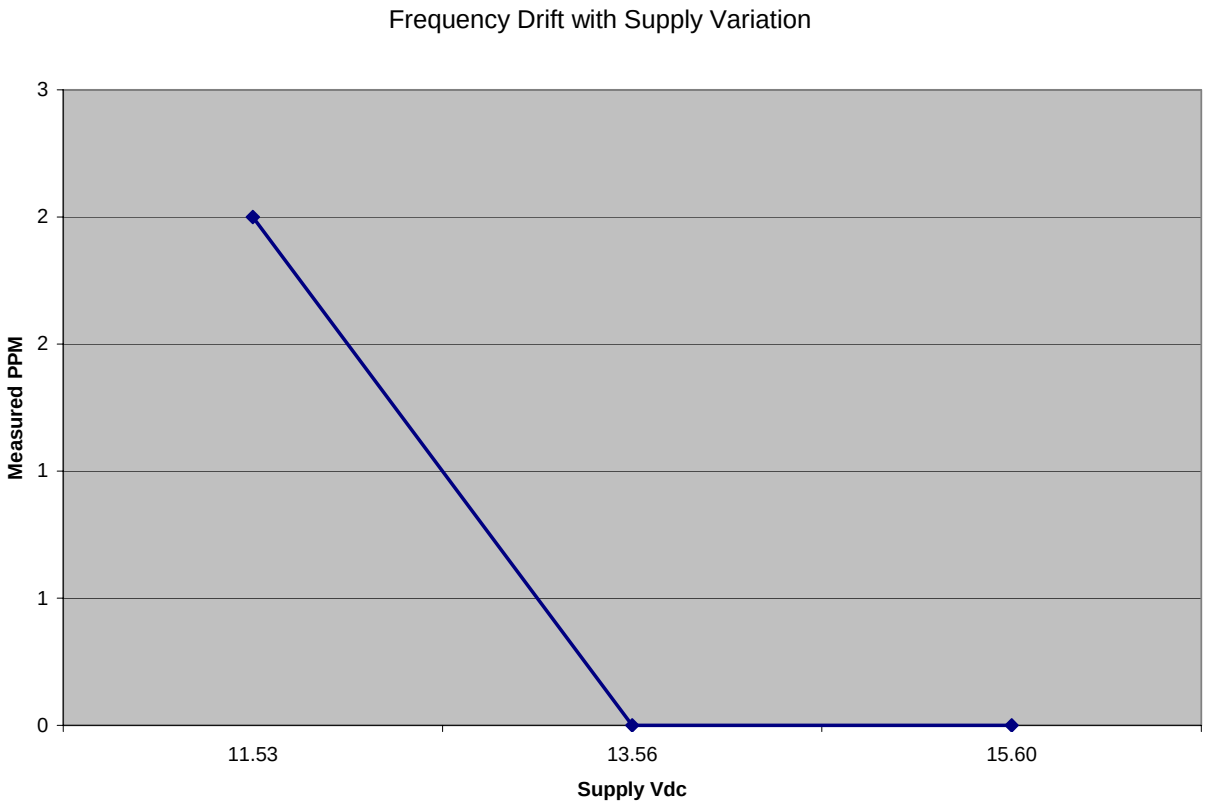
Configuration: Transmit once per second

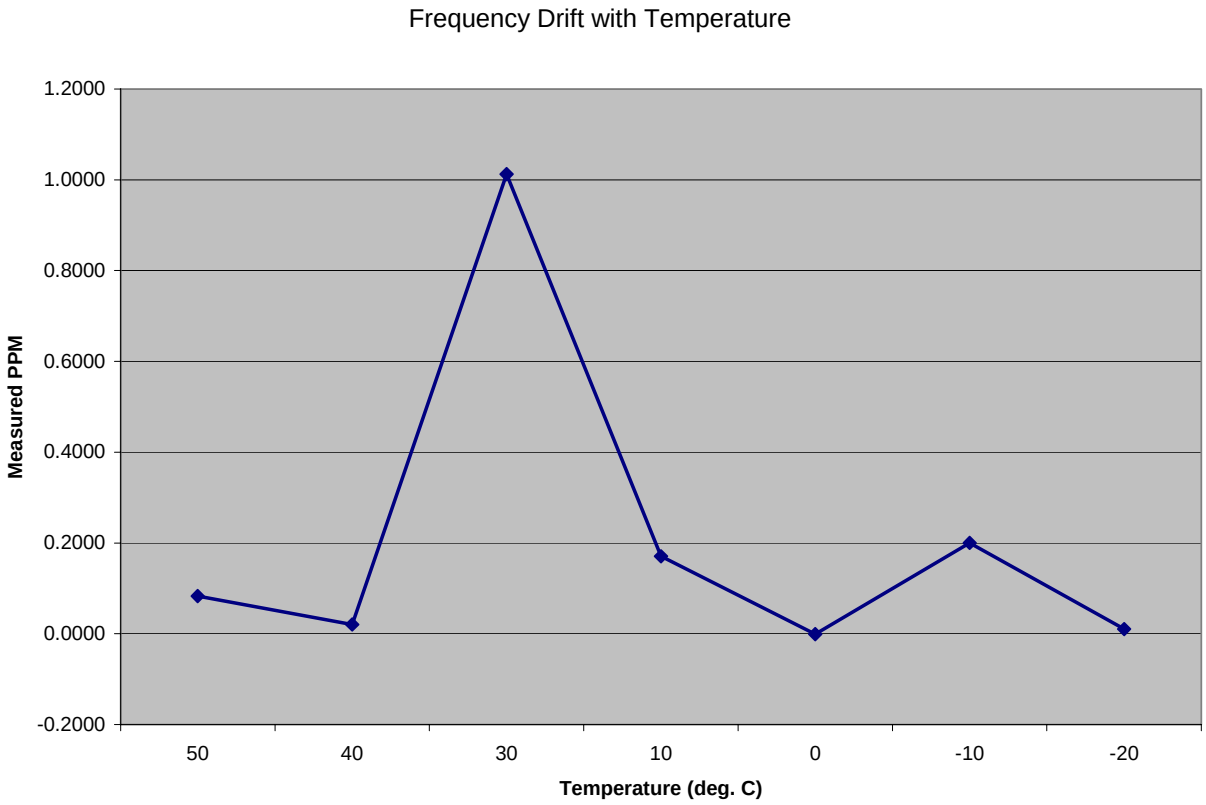
Sample Number: 999

Standard Test Frequency 978.000000 MHz

Temp (°C)	Measured Frequency (MHz)		Test Voltage	Frequency Error (Hz)	Limit (+/-Hz)	Error (ppm)	Comment
20	978.000002		11.53	2	19560.0	0.0020	
20	978.000000		13.56	0	19560.0	0.0000	
20	978.000000		15.60	0	19560.0	0.0000	
50	978.000081		13.56	81	19560.0	0.0828	
40	978.000020		13.56	20	19560.0	0.0204	
30	978.000990		13.56	990	19560.0	1.0123	
10	978.000167		13.56	167	19560.0	0.1708	
0	977.999999		13.56	-1	19560.0	-0.0010	
-10	978.000196		13.56	196	19560.0	0.2004	
-20	978.000010		13.56	10	19560.0	0.0102	

Notes:


Frequency Drift with Supply Variation
3
2
2
1
1
0
Measured PPM
11.53
13.56
15.60
Supply Vdc

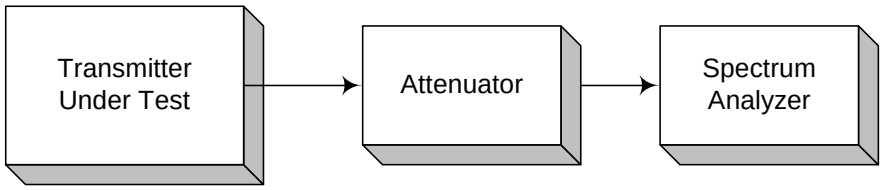

Frequency Drift with Temperature
1.2000
1.0000
0.8000
0.6000
0.4000
0.2000
0.0000
-0.2000
Measured PPM
50
40
30
10
0
-10
-20
Temperature (deg. C)

Section 8. Test Equipment List

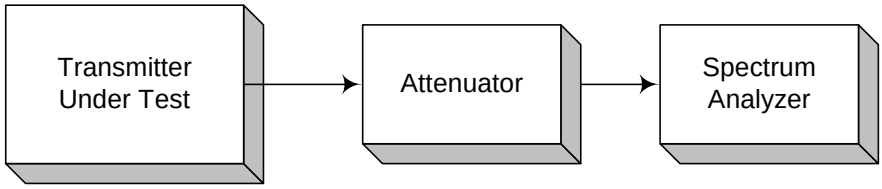
Asset Tag	Description	Manufacturer	Model	Serial #	Next Cal
283	Environmental Chamber with controller # 1190489	Envirotronics	SH27 & 2030-22844	129010083	06-Oct-2010
689	Power Supply, Dual Meter Adjustable	Astron Corp.	VS-50M	9211006	N/R
1036	Spectrum Analyzer	Rohde & Schwartz	FSEK30	830844/006	10-Jan-2011
1064	Attenuator	Narda	776B-20		N/R
1065	Attenuator	Narda	776B-10		N/R
1304	Antenna, Horn	Electro Metrics	RGA-60	6151	09-Sep-2010
1469	Attenuator, 10 dB, DC 18 GHz	MCL Inc.	BW-S10W2 10db-2WDC		N/R
1627	Cable, 5 ft	Megaphase	10312 1GVT4		N/R
1629	Cable, 6 ft	Megaphase	10311 1GVT4		N/R
1659	Spectrum Analyzer	Rohde & Schwartz	FSP	973353	28-May-2010
1763	Antenna, Bilog	Schaffner	CBL 6111D	22926	28-Jan-2011
1767	Receiver, EMI Test 20 Hz - 26.5 GHz - 150 - +30 dBm LCD	Rohde & Schwartz	ESIB26	837491/0002	04-Nov-2010
1783	Cable				29-Sep-2010

ANNEX A - TEST DIAGRAMS

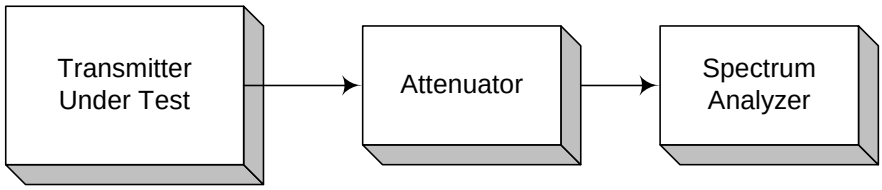
Para. No. 2.985 - R.F. Power Output



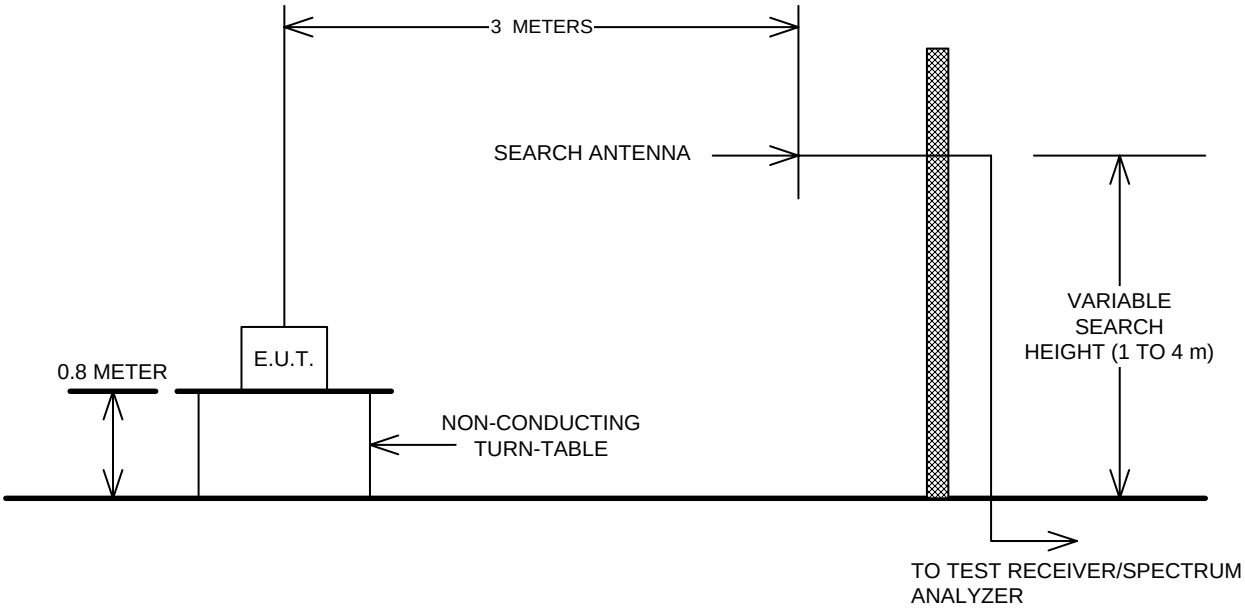
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 - Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability