

Nemko Test Report: 4L0154RUS1

Applicant: Hop On Wireless.
17000 North Dallas Parkway
Suite 105
Dallas, TX 75248

**Equipment Under Test:
(E.U.T.)** HOP 1806

In Accordance With: **FCC Part 24, Subpart E**
Broadband PCS Subscriber Station

Tested By: Nemko USA Inc.
802 N. Kealy
Lewisville, TX
75057-3136

Authorized By: 
Tom Tidwell, Frontline Group Manager

Date: 6/1/04

Table of Contents

Section 1.	Summary of Test Results	3
Section 2.	General Equipment Specification.....	5
Section 3.	RF Power Output.....	7
Section 4.	Occupied Bandwidth	8
Section 5.	Spurious Emissions at Antenna Terminals	9
Section 6.	Field Strength of Spurious	15
Section 7.	Frequency Stability	18
Section 8.	Test Equipment List.....	20
ANNEX A - TEST METHODOLOGIES		21
ANNEX B - TEST DIAGRAMS.....		27

Section 1. Summary of Test Results

Manufacturer: Hop On Wireless

Model No.: HOP 1806

Serial No.: 353543000013831

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 24, Subpart E.



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. NONE
See " Summary of Test Data".

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This report applies only to the items tested.

Summary Of Test Data

NAME OF TEST	PARA. NO.	RESULT
RF Power Output	24.232	Complies
Occupied Bandwidth (GSM)	24.238	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	Complies
Field Strength of Spurious Emissions	24.238(a)	Complies
Frequency Stability	24.235	Complies

Footnotes:

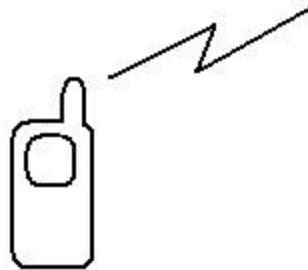
Section 2. General Equipment Specification

Frequency Bands:	☒ Block A: 1850 – 1865 MHz ☒ Block B: 1865 – 1870 MHz ☒ Block C: 1870 – 1885 MHz ☒ Block D: 1885 – 1890 MHz ☒ Block E: 1890 – 1895 MHz ☒ Block F: 1895 – 1910 MHz
Type of Modulation and Designator:	300KG7W
Necessary Bandwidth:	300 kHz
Output Impedance:	50 ohms
RF Output (Rated):	1 W

System Description

This is a cellular GSM telephone operating in the 900 MHz GSM, 1800 DCS and 1900 PCS bands.

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 4/23/04

Test Results: Complies.**Measurement Data:**

Antenna Conducted:

Modulation Type	Frequency (MHz)	Output Power (dBm)	Output Power (W)
GSM	1850.2	29.5	0.891
GSM	1867.8	29.8	0.955
GSM	1909.8	29.4	0.871

Radiated:

Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)	Limit (dBm)	EIRP (dBm)	EIRP (mW)	Polarity	Comments
1867.8	-14.4	31.0		0	9.4		26.0	398.1072	V	
1867.8	-15.4	33.0		0	9.4		27.0	501.1872	H	
1850.2	-16.0	31.0		0	9.4		24.4	275.4229	V	
1850.2	-15.2	33.0		0	9.4		27.2	524.8075	H	
1909.8	-15.7	31.0		0	9.4		24.7	295.1209	V	
1909.8	-18.6	33.0		0	9.4		23.8	239.8833	H	

Note: The device was oriented in three orthogonal axis to determine worst-case position.

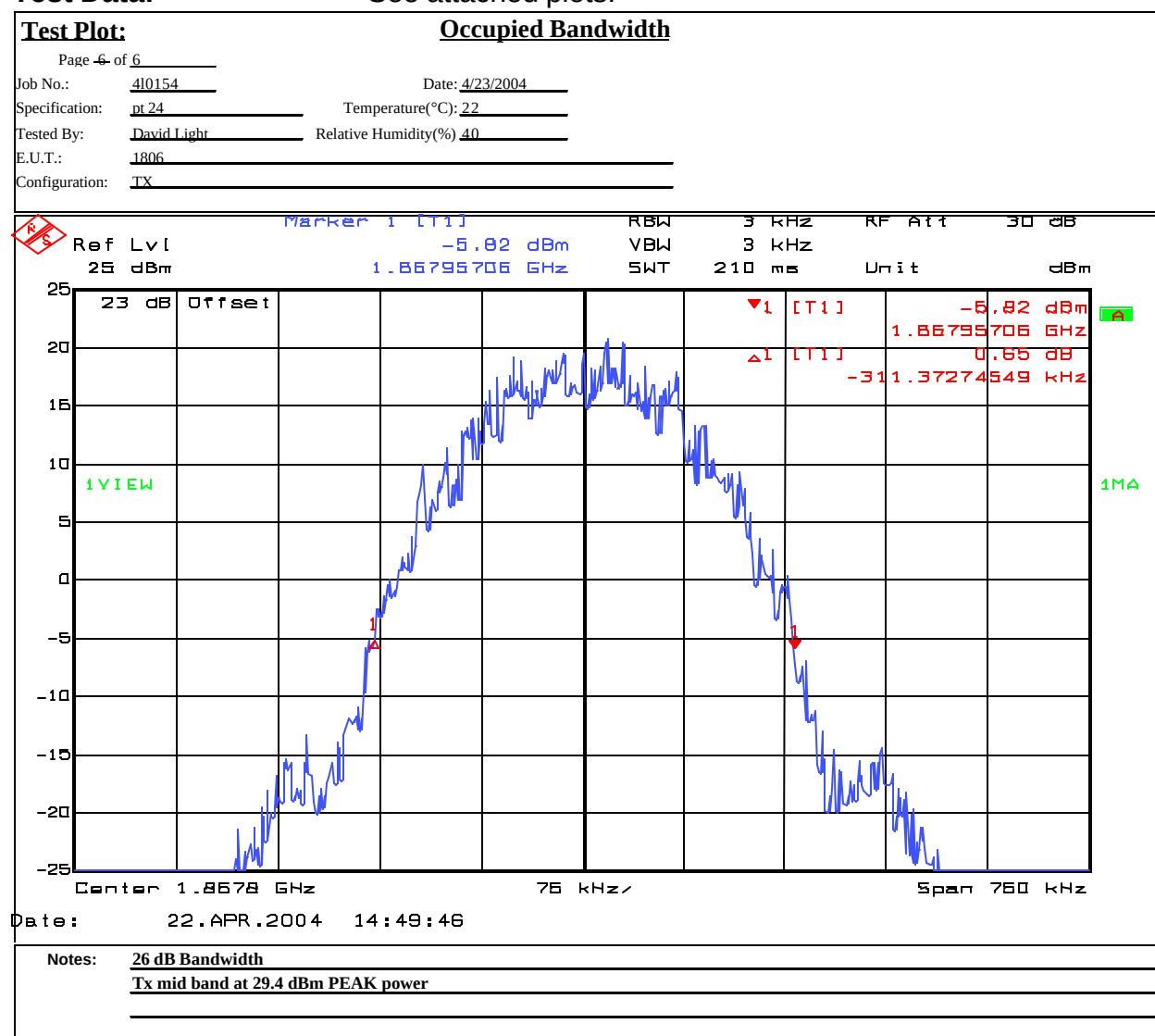
Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth (GSM)

PARA. NO.: 2.1047

TESTED BY: David Light

DATE: 4/23/04

Test Results: Complies.**Test Data:** See attached plots.

Section 5. Spurious Emissions at Antenna Terminals

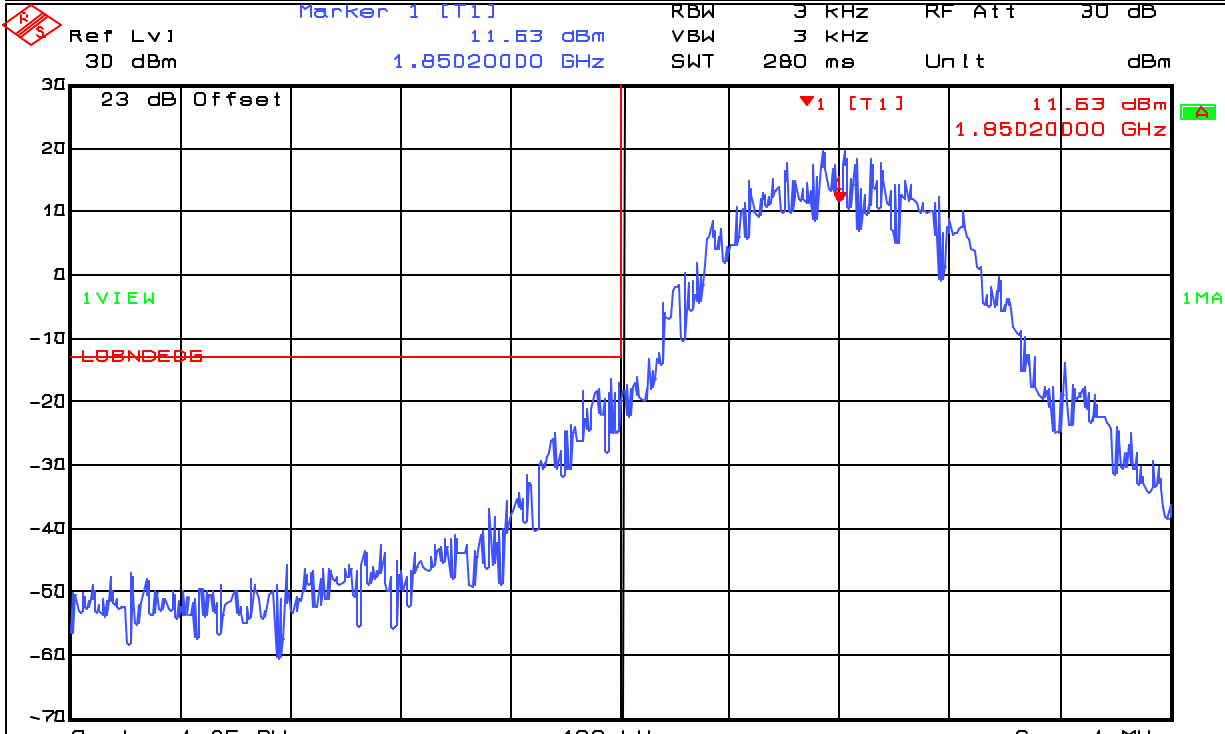
NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 4/23/04

Test Results: Complies.

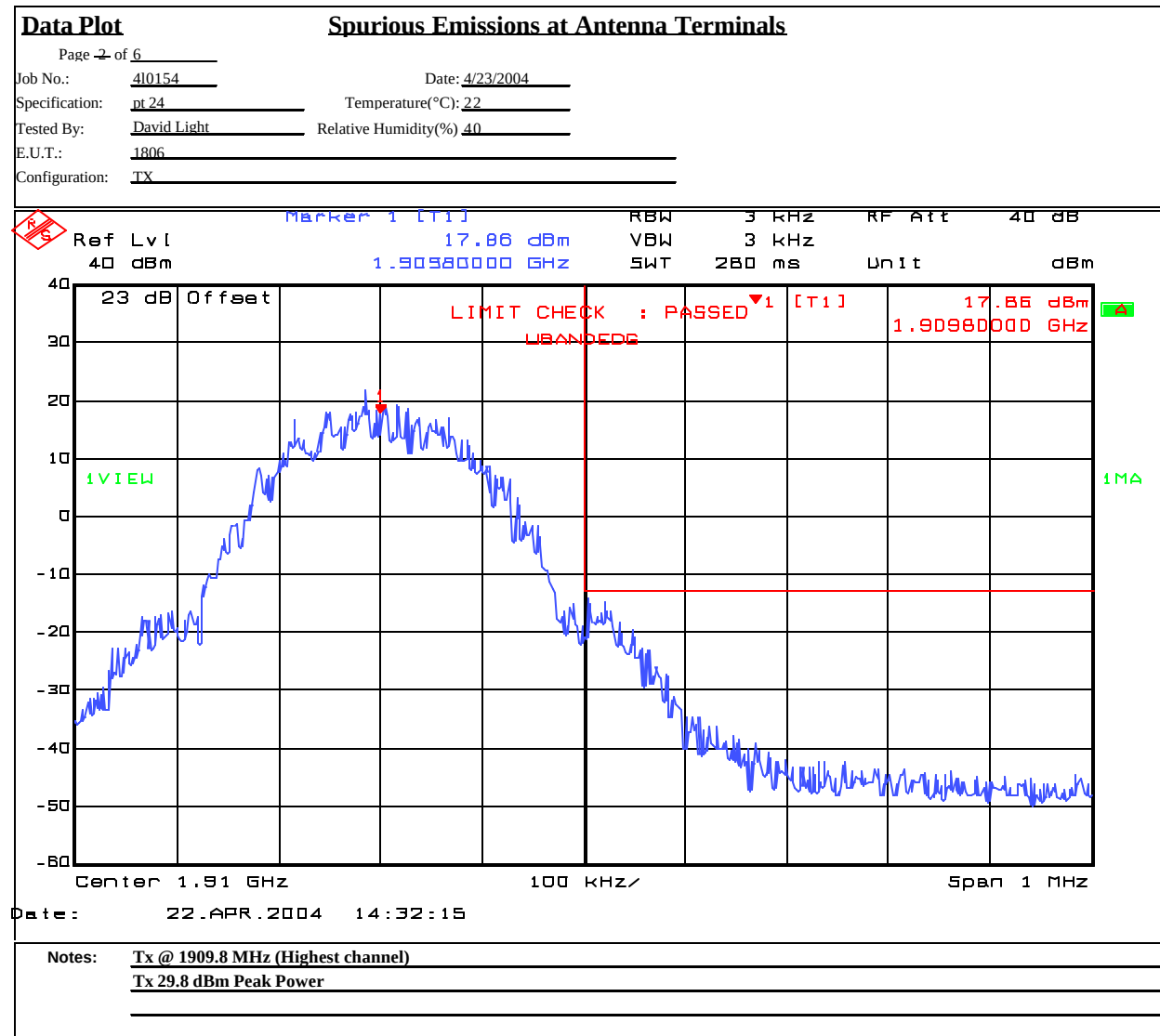
Test Data:

NAME OF TEST	WORST-CASE SPURIOUS LEVEL(dBm)
0 to 20 GHz Spurious	-29
Lower Band Edge	-18
Upper Band Edge	-14

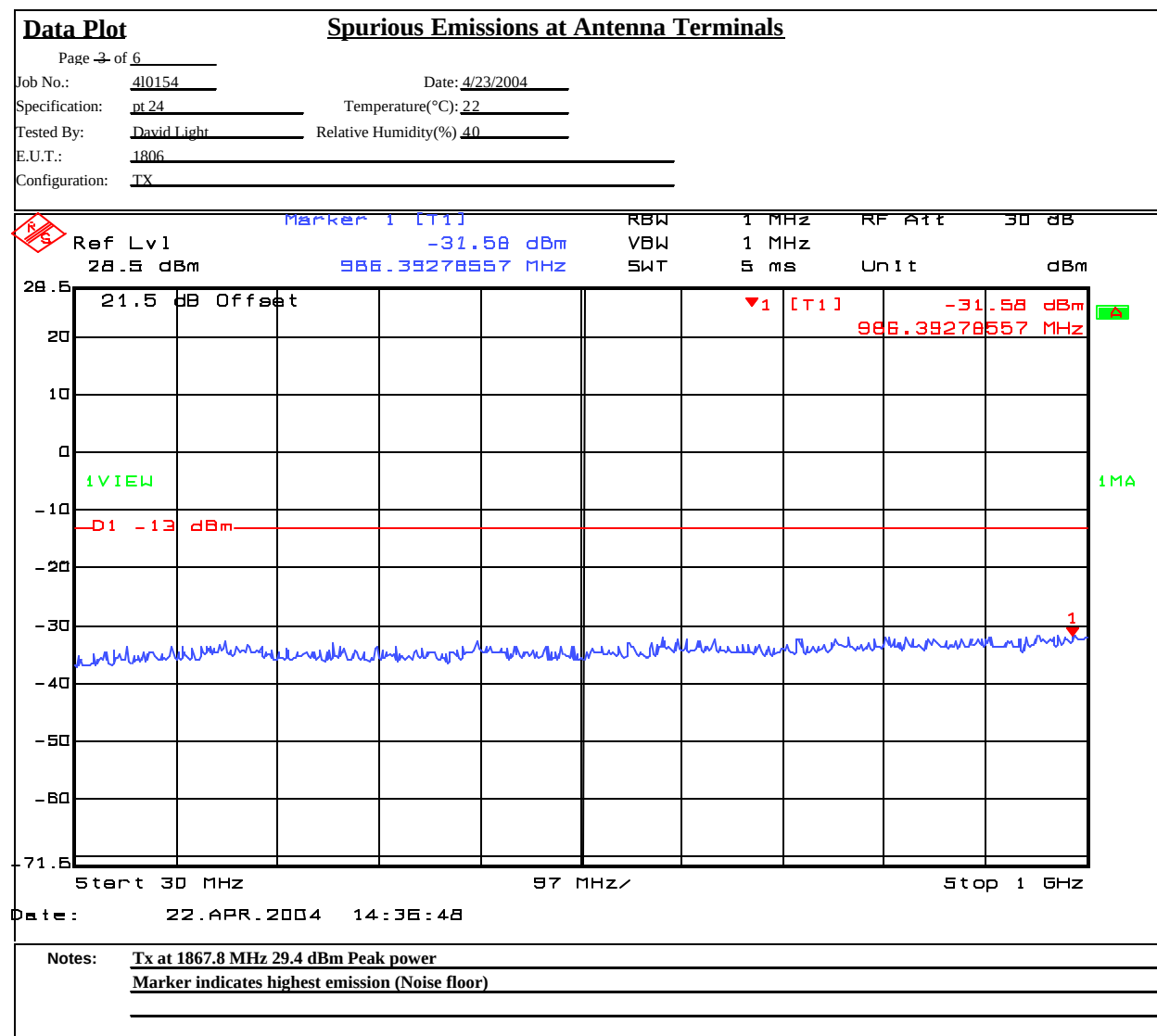
Test Data – Spurious Emissions at Antenna Terminals

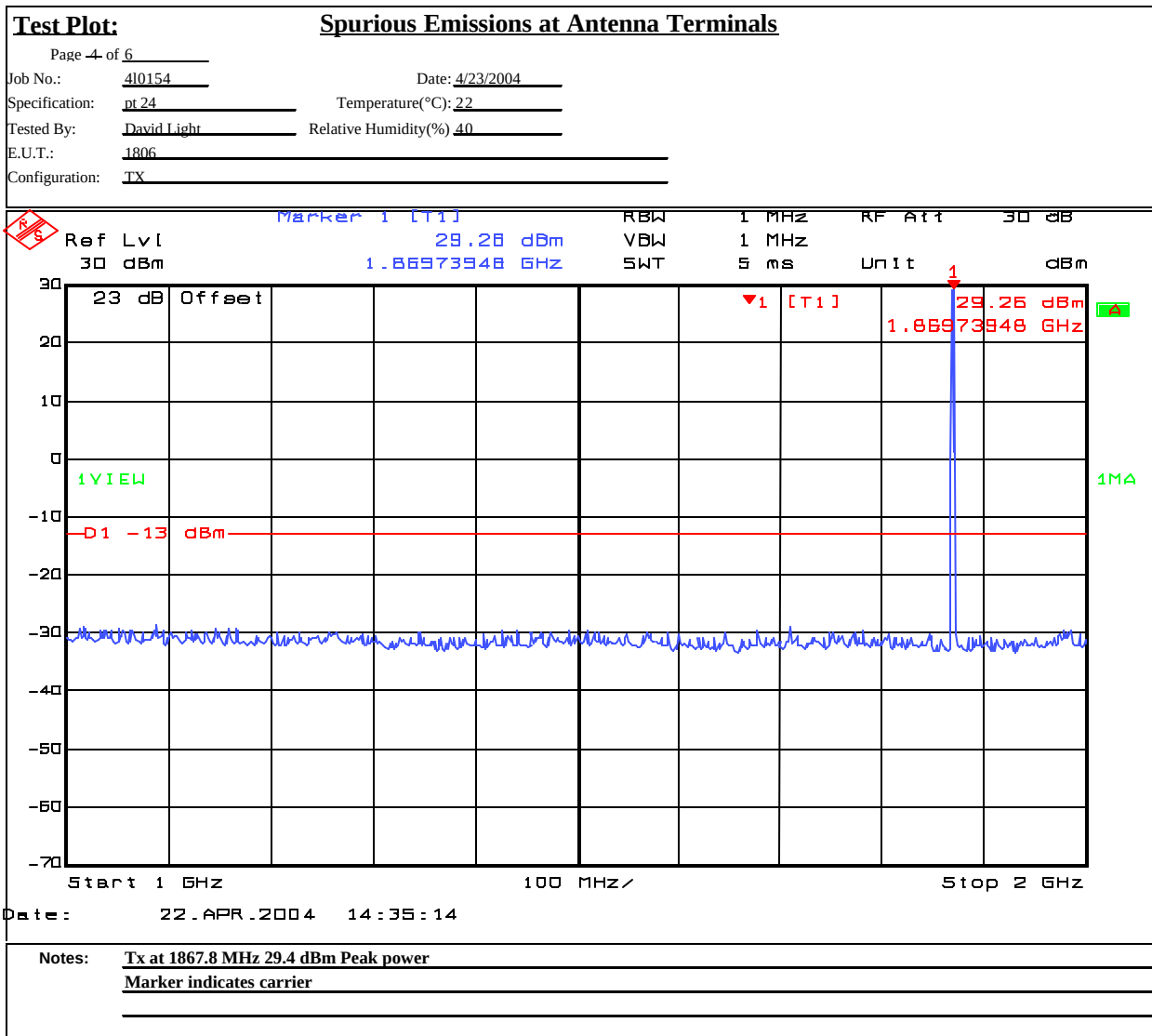
Data Plot		Spurious Emissions at Antenna Terminals	
Page 1 of 6		Complete <u>X</u>	
Job No.: 410154	Date: 4/23/2004	Preliminary: _____	
Specification: pt 24	Temperature(°C): 22		
Tested By: David Light	Relative Humidity(%): 40		
E.U.T.: 1806			
Configuration: TX			
Sample Number: 1			
Location: Lab 1	RBW: Refer to plots	Measurement Distance: NA m	
Detector Type: Peak	VBW: Refer to plots		
Test Equipment Used			
Antenna: _____	Directional Coupler: 1054		
Pre-Amp: _____	Cable #1: 1627		
Filter: _____	Cable #2: _____		
Receiver: 1036	Cable #3: _____		
Attenuator #1: _____	Cable #4: _____		
Attenuator #2: _____	Mixer: _____		
Additional equipment used: 1055 1056			
Measurement Uncertainty: +/-1.7 dB			
			
Data: 22 APR 2004 14:29:02			
Notes: Tx @ 1880.2 (Lowest channel)			
Tx power 29.5 dBm Peak power			

Test Data – Spurious Emissions at Antenna Terminals

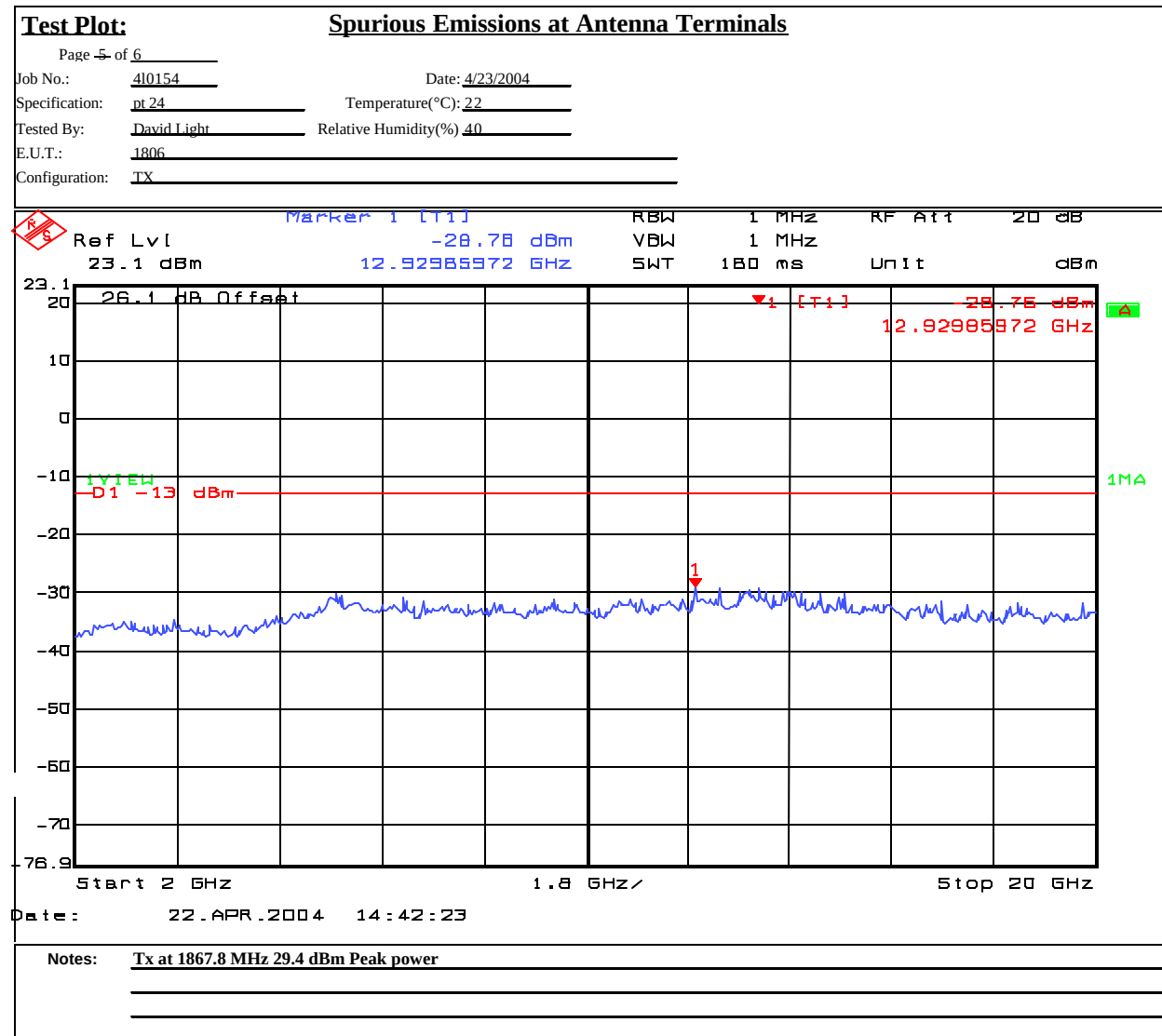


Test Data – Spurious Emissions at Antenna Terminals





Test Data – Spurious Emissions at Antenna Terminals

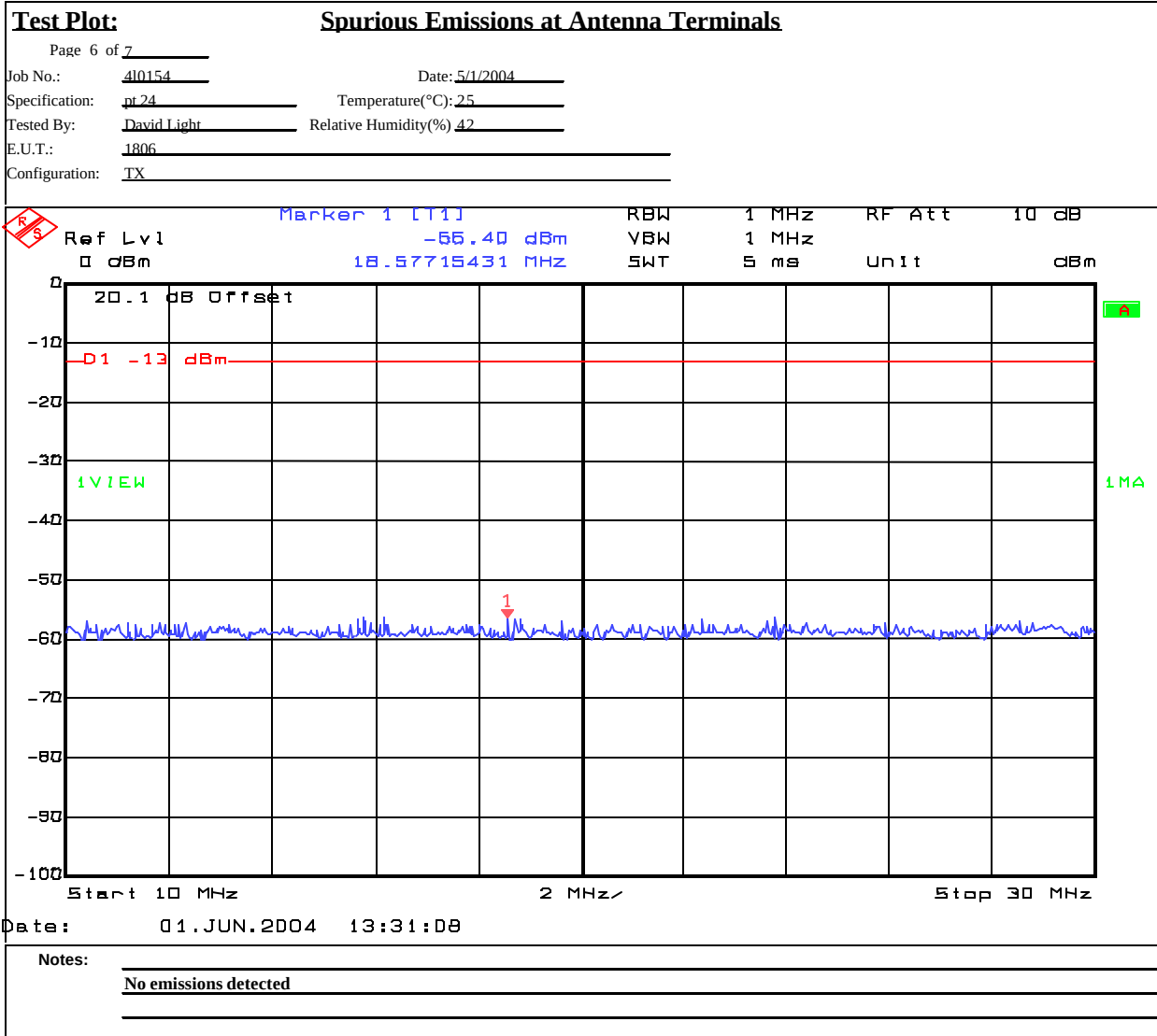


Test Data – Spurious Emissions at Antenna Terminals



Nemko Dallas, Inc.

Dallas Headquarters:

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Lewisville, TX 75057
Tel: (972) 436-9600
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Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious	PARA. NO.: 2.1053
TESTED BY: David Light	DATE: 4/26/04

Test Results: Complies.

Test Data: No emissions were detected above the noise floor which was at least 20 dB below the specification limit of -13 dBm E.I.R.P..

Note: The device was oriented in three orthogonal axis to determine worst-case position.

Photographs of Test Setup



Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 24.235
TESTED BY: David Light	DATE: 4/22/04

Test Results: Complies.

Measurement Data: Standard Test Frequency: 1867.8 MHz
 Standard Test Voltage: 3.7 Vdc

Test Data – Frequency Stability

<u>Frequency Stability</u>							
Page 1 of 1							
Job No.: 4L0154		Date: 4/22/2004					
Specification: PT 24		Temperature(°C): 22					
Tested By: David Light		Relative Humidity(%) 40					
E.U.T.: 1806							
Configuration: Tx							
Sample Number: 1							
<u>Test Equipment Used</u>							
Antenna: _____		Directional Coupler: _____					
Pre-Amp: _____		Cable #1: 1627					
Filter: _____		Cable #2: _____					
Receiver: Anritsu MT8801C s/n 6A00002950 (TRS Asset 1019462)							
Attenuator #1: _____							
Attenuator #2: _____							
Measurement Uncertainty: 1x10 ⁻¹⁷ ppm							
Standard Test Frequency 1867.800000 MHz							
Temp (°C)	Measured Frequency (MHz)	Rho	Test Voltage	Frequency Error (Hz)	Limit (+/-Hz)	Error (ppm)	Comment
20	1867.800066	NA	3.7	66	4669.5	0.04	
20	1867.800056	NA	4.3	56	4669.5	0.03	
20	1867.800028	NA	3.1	28	4669.5	0.01	
50	1867.800027	NA	3.7	27	4669.5	0.01	
40	1867.800034	NA	3.7	34	4669.5	0.02	
30	1867.800024	NA	3.7	24	4669.5	0.01	
10	1867.800079	NA	3.7	79	4669.5	0.04	
0	1867.800025	NA	3.7	25	4669.5	0.01	
-10	1867.800014	NA	3.7	14	4669.5	0.01	
-20	1867.800052	NA	3.7	52	4669.5	0.03	
-30	1867.800019	NA	3.7	19	4669.5	0.01	
Notes:							

Section 8. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1627	CABLE, 5 ft	MEGAPHASE 10312 1GVT4	N/A	07/29/03	07/28/04
283	Environmental Chamber with controller # 1189006	ENVIROTRONICS SH27 & 2030-22844	129010083	04/22/03	04/22/04
1054	DUAL DIRECTIONAL COUPLER	NARDA 3020A	34366	CBU	N/A
1055	DUAL DIRECTIONAL COUPLER	NARDA 3022	73393	CBU	N/A
1056	POWER SENSOR (2 - 26.5 GHz)	HEWLETT PACKARD 8485A (50ohm,1.0uW-100mW)	2347A02782	CBU	N/A
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	07/24/03	07/23/04
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	07/24/03	07/23/04
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	10/27/03	10/26/04
791	PREAMP, 25dB	ICC LNA25	398	10/27/03	10/26/04
	Radio Communication Analyzer	Anritsu MT8801C	6A00002950	02/25/04	02/25/05

ANNEX A - TEST METHODOLOGIES

NAME OF TEST: RF Power Output**PARA. NO.: 2.1046**

Minimum Standard: Para. No.24.232. Base stations are limited to 1640 watts peak E.I.R.P. with an antenna height up to 300 meters HAAT. In no case may the peak output power of a base station transmitter exceed 100 watts.

Method Of Measurement: CDMA Per ANSI/J-STD-008
TDMA Per ANSI/J-STD-010
PCS 1900 Per ANSI/J-STD-007

Detachable Antenna:

The peak power at antenna terminals is measured using an in-line peak power meter or a spectrum analyzer.

Integral Antenna:

Test Method: TIA/EIA-603-1992, Section 2.2.12

The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The spurious emissions were measured at a distance of 3 meters. The EUT was then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna was fed with a signal at the spurious frequency. The level of the signal was adjusted to repeat the previously measured level. The resulting erp is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

NAME OF TEST: Occupied Bandwidth**PARA. NO.: 2.1049**

Minimum Standard: Para. No. 24.238(b). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB.

Method Of Measurement:CDMA Per ANSI/J-STD-008

Spectrum analyzer settings:

RBW: 30 kHz

VBW: ? RBW

Span: 5 MHz

Sweep: Auto

GSM Per ANSI/J-STD-007

RBW: 3 kHz

VBW: ? RBW

Span: 2 MHz

Sweep: Auto

NADC Per IS-136

RBW: 1 kHz

VBW: ? RBW

Span: 1 MHz

Sweep: Auto

NAME OF TEST: Spurious Emission at Antenna Terminals	PARA. NO.: 2.1051
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Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least $43 + 10 \log (P)$ dB.

Method Of Measurement:

Spectrum analyzer settings:

CDMA Per ANSI/J-STD-008

RBW: 1 MHz (> 1 MHz from Band Edge)

RBW: 20 kHz (< 1 MHz from Band Edge)

VBW: ? RBW

Sweep: Auto

Video Avg: 6 Sweeps

GSM Per ANSI/J-STD-007

RBW: 1 MHz (> 1 MHz from Band Edge)

RBW: 3 kHz (< 1 MHz from Band Edge)

VBW: ? RBW

Sweep: Auto

Video Avg: Disabled

NADC Per IS-136

RBW: 1 MHz (> 1 MHz from Band Edge)

RBW: 1 kHz (< 1 MHz from Band Edge)

VBW: ? RBW

Sweep: Auto

Video Avg: Disabled

To demonstrate compliance at band edges the frequency of the input signal is set to the lowest and highest assigned channel and the center frequency of the spectrum analyzer is set to the upper and lower edges of the appropriate frequency block.

NAME OF TEST: Field Strength of Spurious Radiation	PARA. NO.: 2.1053
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Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least $43 + 10 \log (P)$ dB.

Test Method: TIA/EIA-603-1992, Section 2.2.12

The antenna substitution method was used to determine the equivalent radiated power at spurious frequencies. The spurious emissions were measured at a distance of 3 meters. The EUT was then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna was fed with a signal at the spurious frequency. The level of the signal was adjusted to repeat the previously measured level. The resulting erp is the signal level fed to the reference antenna corrected for gain referenced to a dipole.

NAME OF TEST: Frequency Stability**PARA. NO.: 2.1055**

Minimum Standard: Para. No. 24.235. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Method Of Measurement: CDMA Per ANSI/J-STD-008
TDMA Per ANSI/J-STD-007
NADC Per IS-136

Frequency Stability With Voltage Variation

The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. With the voltage input to the E.U.T. set to 85% S.T.V., the frequency is measured in 30 second intervals for a period of 5 minutes. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

Frequency Stability With Temperature Variation

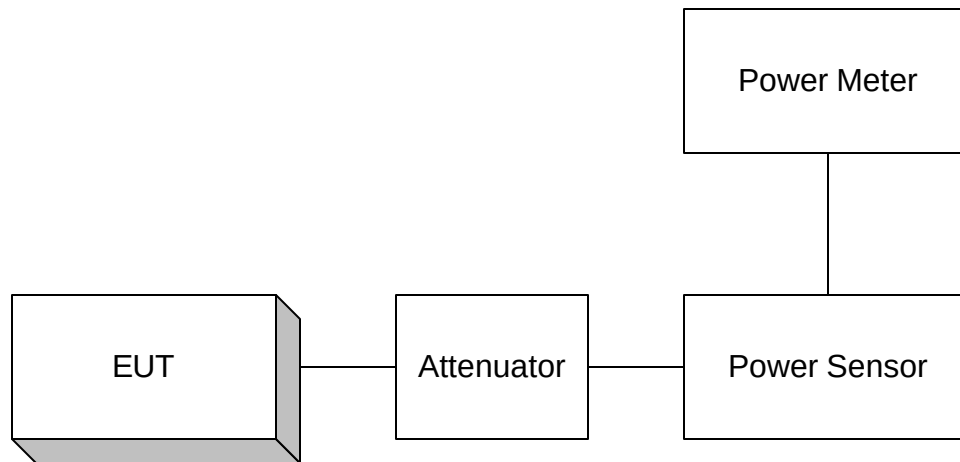
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

Digitally Modulated Signals

Equipment that produces a digitally modulated carrier is tested using a vector modulation analyzer. Frequency accuracy and rho are measured over the specified environmental extremes.

ANNEX B - TEST DIAGRAMS

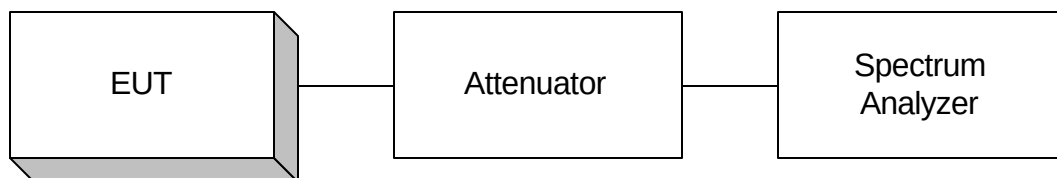
Para. No. 2.985 - R.F. Power Output



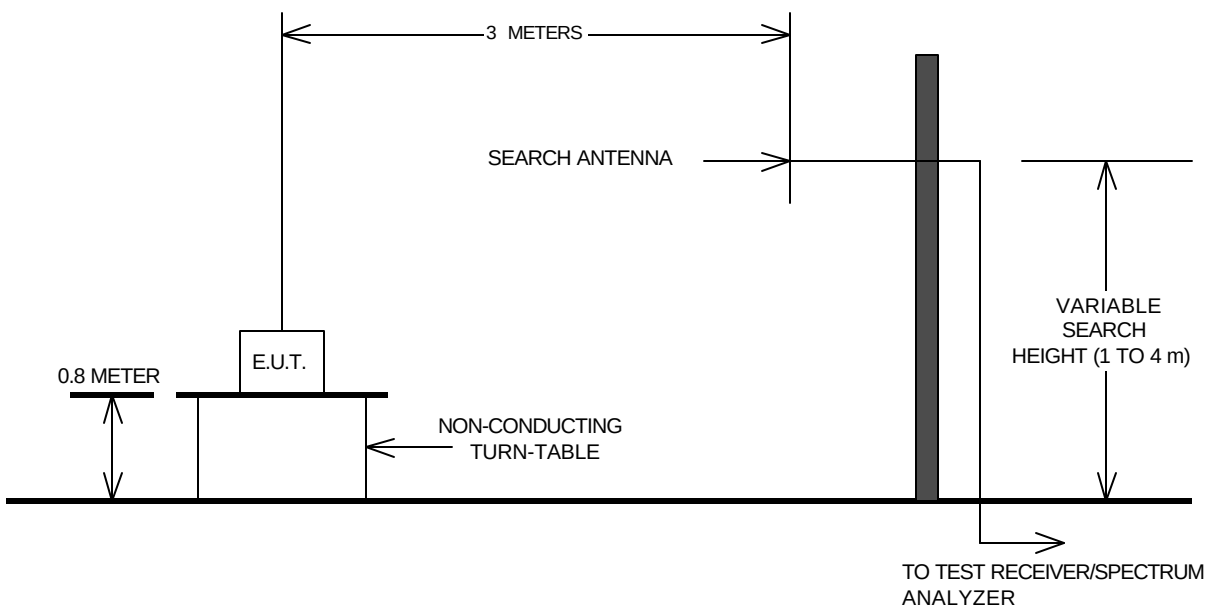
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

