

Nemko Test Report No.:

3L0075RUS1Rev2

Applicant:

Communication Components, Inc.
89 Leuning Street
Second Floor
Hackensack, NJ 07606

Equipment Under Test:

100Watt Amplifier

In Accordance With:

FCC Part 24, Subpart E

Tested By:

Nemko Dallas Inc.
802 N. Kealy
Lewisville, Texas 75057-3136



Authorized By:

Tom Tidwell, Frontline Manager

Date:

1/23/04

Total Number of Pages:

30

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EQUIPMENT: **100 Watt Amplifier** **Test Report Number 3L0075RUS1Rev2**

Section 1. Summary of Test Results

Manufacturer: Communication Components, Inc.

Model No.: 100 Watt Amplifier

Serial No.: None

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.

See “ Summary of Test Data”.

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Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	24.232	100W	Complies
Occupied Bandwidth (CDMA)	24.238	Input/Output	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	Complies
Frequency Stability	24.235	N/A	N/A

Footnotes:

(1) Modulation characteristics were not tested since the E.U.T. amplifies but does not produce a modulated waveform.

Measurement uncertainty for each test configuration is expressed to 95% probability.

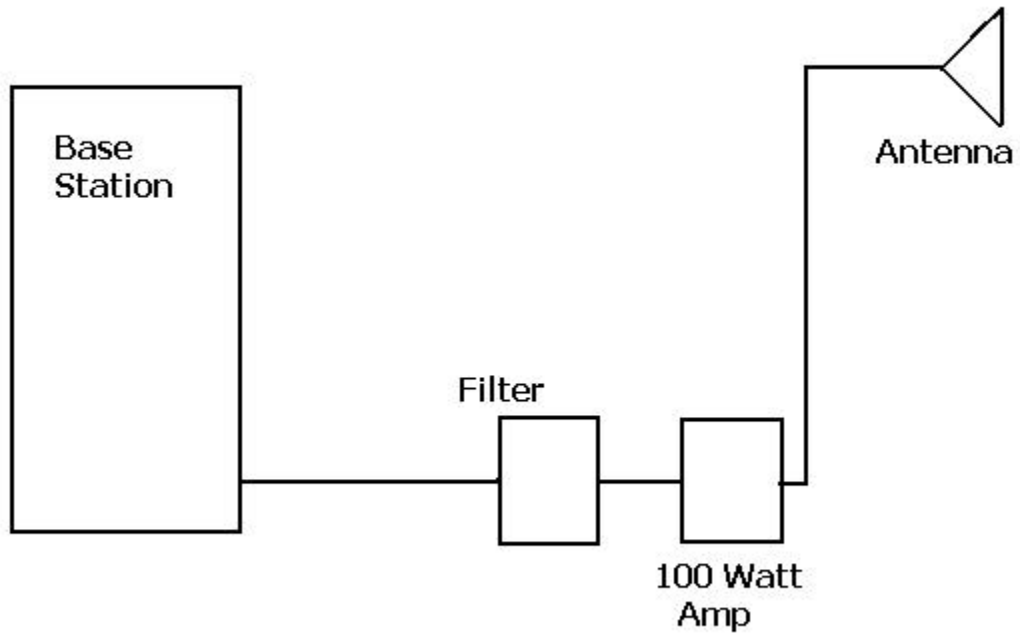
Section 2. General Equipment Specification

Supply Voltage Input:														
Frequency Bands:	Downlink:	<input checked="" type="checkbox"/> Block A : 1930 – 1945 MHz <input checked="" type="checkbox"/> Block D : 1945 – 1950 MHz <input checked="" type="checkbox"/> Block B : 1950 – 1965 MHz <input checked="" type="checkbox"/> Block E : 1965 – 1970 MHz <input checked="" type="checkbox"/> Block F : 1970 – 1975 MHz <input checked="" type="checkbox"/> Block C : 1975 – 1990 MHz 1930.2 to 1989.8 MHz												
Frequency Bands:	Uplink:	<input type="checkbox"/> Block A : 1850 – 1865 MHz <input type="checkbox"/> Block B : 1865 – 1870 MHz <input type="checkbox"/> Block C : 1870 – 1885 MHz <input type="checkbox"/> Block D : 1885 – 1890 MHz <input type="checkbox"/> Block E : 1890 – 1895 MHz <input type="checkbox"/> Block F : 1895 – 1910 MHz												
		<table border="0"> <tr> <td>CDMA (F9W)</td> <td>GSM (GXW)</td> <td>EDGE (G7W)</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	CDMA (F9W)	GSM (GXW)	EDGE (G7W)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
CDMA (F9W)	GSM (GXW)	EDGE (G7W)												
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>												
Output Impedance:	50 ohms													
	<table border="0"> <tr> <td>Per channel:</td> <td>NA</td> <td>W</td> </tr> <tr> <td>Total:</td> <td>NA</td> <td>W</td> </tr> <tr> <td>Per channel:</td> <td>100</td> <td>W</td> </tr> <tr> <td>Total:</td> <td>100</td> <td>W</td> </tr> </table>		Per channel:	NA	W	Total:	NA	W	Per channel:	100	W	Total:	100	W
Per channel:	NA	W												
Total:	NA	W												
Per channel:	100	W												
Total:	100	W												
	<table border="0"> <tr> <td>F1-F1</td> <td>F1-F2</td> <td>N/A</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	F1-F1	F1-F2	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>							
F1-F1	F1-F2	N/A												
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>												
	<table border="0"> <tr> <td>Software</td> <td>Duplexer</td> <td>Fullband</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	Software	Duplexer	Fullband	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>							
Software	Duplexer	Fullband												
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>												
<p>Note – This amplifier was tested using PCS block filters that must be used when installed to achieve compliance for spurious emissions.</p>														

Description of Operation

The device is a 100 Watt base station amplifier operating in the PCS band used with CDMA signals.

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 5/18/03

Test Results: Complies.

Measurement Data:

	Modulation Type	Single Channel Output Power (dBm)	Two channel Output Power (dBm)	Composite Output Power (dBm)
Uplink	CDMA	N/A	N/A	N/A
Downlink	CDMA	50	46.1	49.1

Equipment Used: 1036-1604-1628-1064

Measurement Uncertainty: +/- 1.6 dB

Temperature: 22 °C

Relative Humidity: 40 %

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth (CDMA)	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 5/18/03

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1064-1604-1628

Measurement Uncertainty: +/- 1.6 dB

Temperature: 22 °C

Relative Humidity: 40 %

Test Data – Occupied Bandwidth



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Nemko Dallas, Inc.

Data Plot		Occupied Bandwidth																			
Page 1 of 6		Complete _____																			
Job No.: 310075r	Date: 5/18/2003	Preliminary: _____																			
Specification: PT 24	Temperature(°C): 22																				
Tested By: Lance Walker	Relative Humidity(%): 40																				
E.U.T.: PCS AMPLIFIER																					
Configuration: TX																					
Sample Number: 1																					
Location: Lab 1	RBW: Refer to plots	Measurement																			
Detector Type: Refer to plots	VBW: Refer to plots	Distance: NA m																			
Test Equipment Used																					
Antenna: _____	Directional Coupler: 1055																				
Pre-Amp: _____	Cable #1: 1628																				
Filter: _____	Cable #2: _____																				
Receiver: 1036	Cable #3: _____																				
Attenuator #1: 1064	Cable #4: _____																				
Attenuator #2: 1604	Mixer: _____																				
Additional equipment used: _____																					
Measurement Uncertainty: +/-1.7 dB																					
<table border="1"> <tr> <td>Ref Lvl</td> <td>35.61 dBm</td> <td>RBW</td> <td>30 kHz</td> <td>RF Att</td> <td>10 dB</td> </tr> <tr> <td>53.4 dBm</td> <td>1.9430000 GHz</td> <td>VBW</td> <td>300 kHz</td> <td>Mixer</td> <td>-10 dBm</td> </tr> <tr> <td></td> <td></td> <td>SWT</td> <td>3 s</td> <td>Unit</td> <td>dBm</td> </tr> </table>				Ref Lvl	35.61 dBm	RBW	30 kHz	RF Att	10 dB	53.4 dBm	1.9430000 GHz	VBW	300 kHz	Mixer	-10 dBm			SWT	3 s	Unit	dBm
Ref Lvl	35.61 dBm	RBW	30 kHz	RF Att	10 dB																
53.4 dBm	1.9430000 GHz	VBW	300 kHz	Mixer	-10 dBm																
		SWT	3 s	Unit	dBm																
<p>Center 1.943 GHz 246 kHz/ Span 2.46 MHz</p>																					
Date: 18.MAY 2003 12:20:30																					

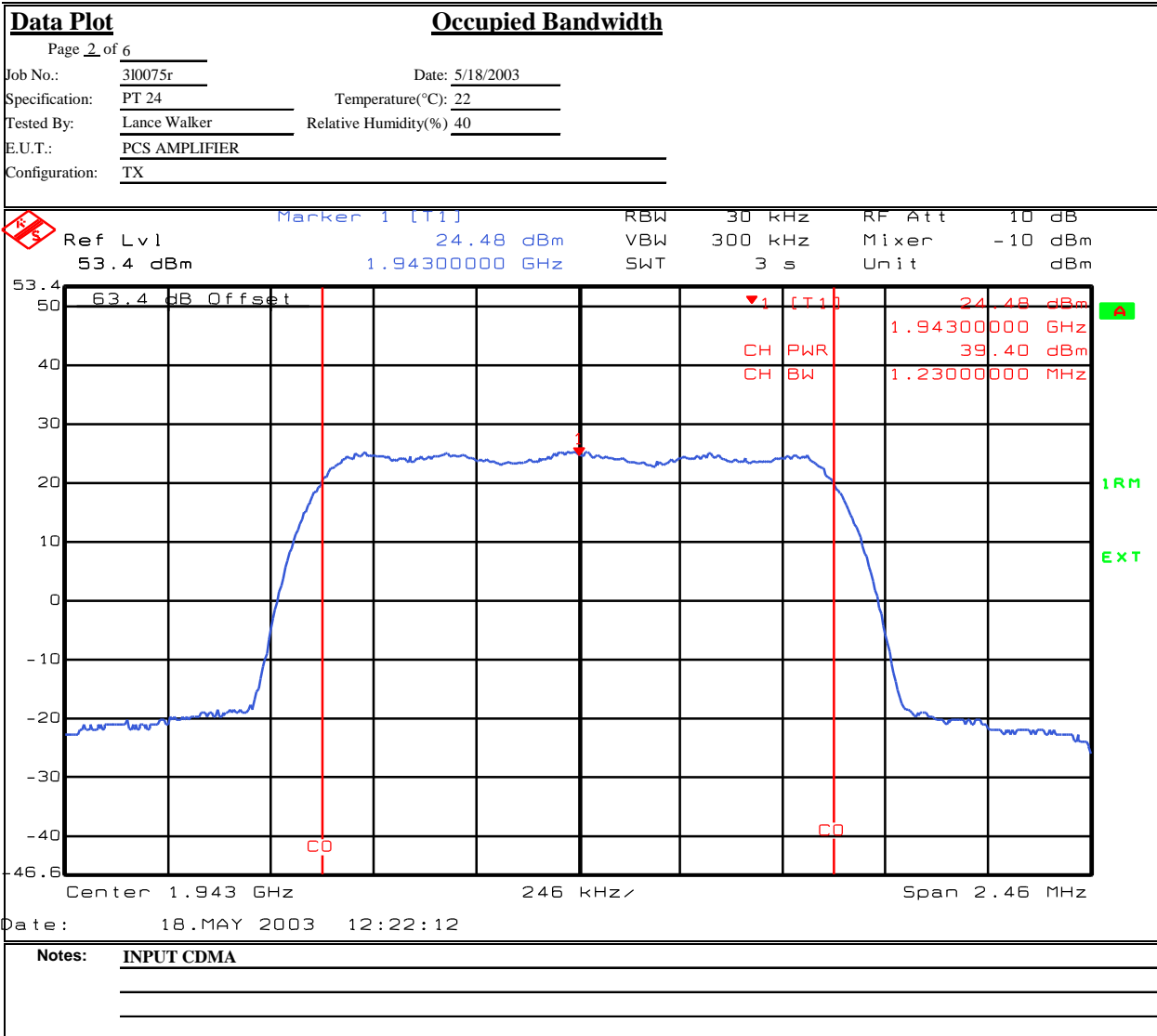
Notes: **OUTPUT CDMA**

Test Data – Occupied Bandwidth



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Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 5/18/03

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1604-1064-1628

Measurement Uncertainty: +/- 1.6 dB

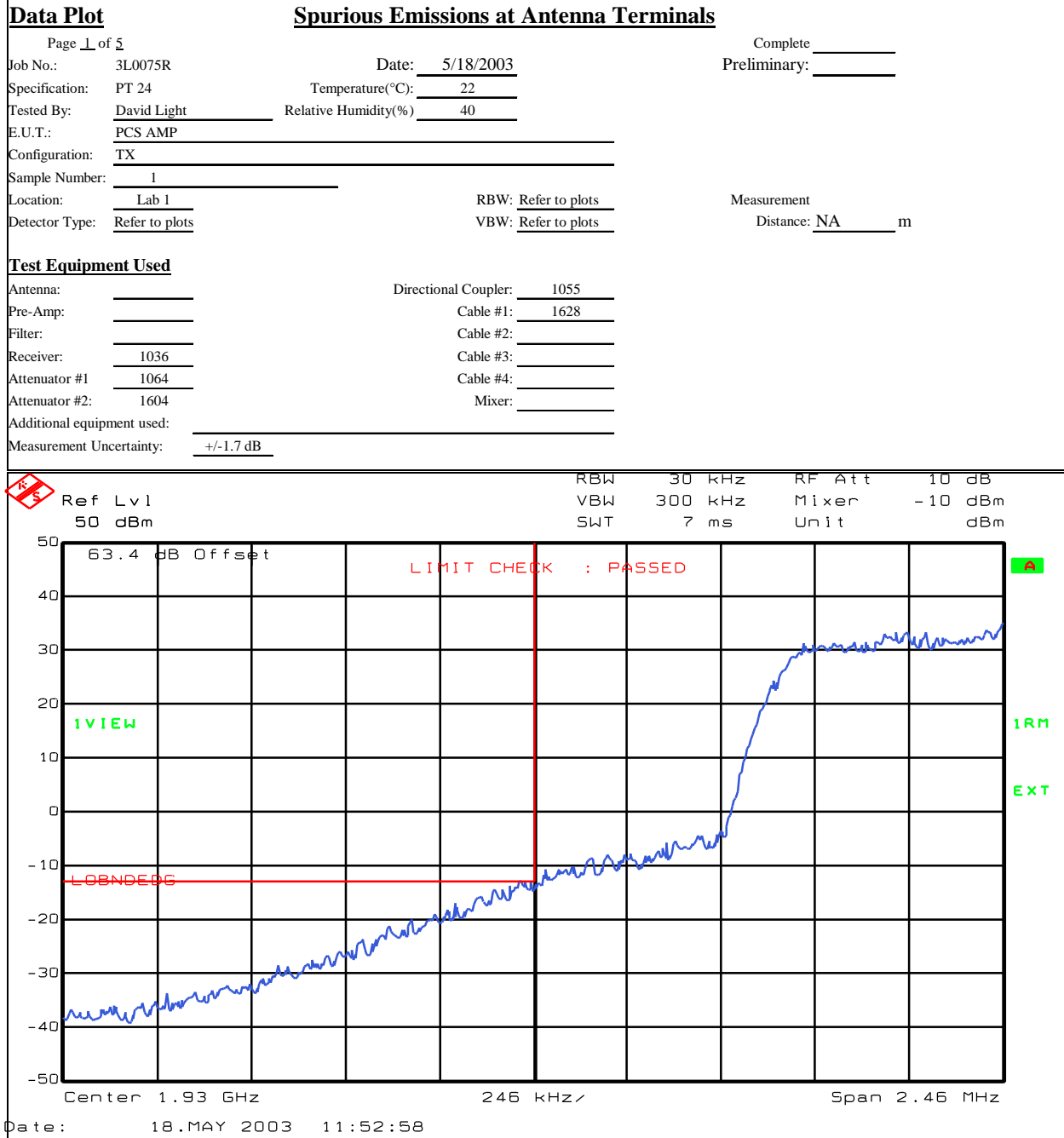
Temperature: 22 °C

Relative Humidity: 40 %



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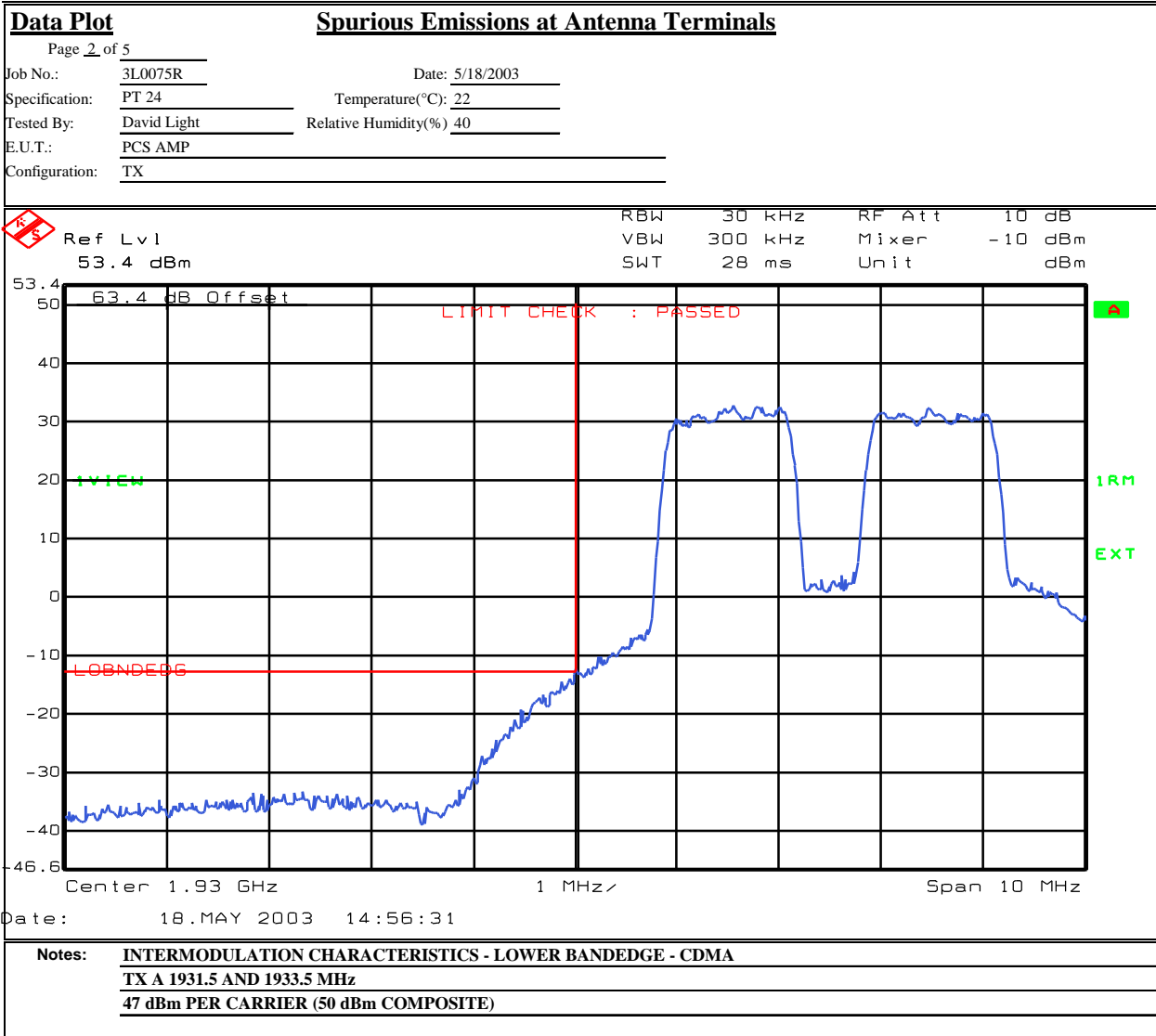
Notes: Upper bandedge CDMA - CHANNEL 25
100 WATT OUTPUT AT ANTENNA TERMINAL

Test plots – Spurious Emissions at Antenna Terminals



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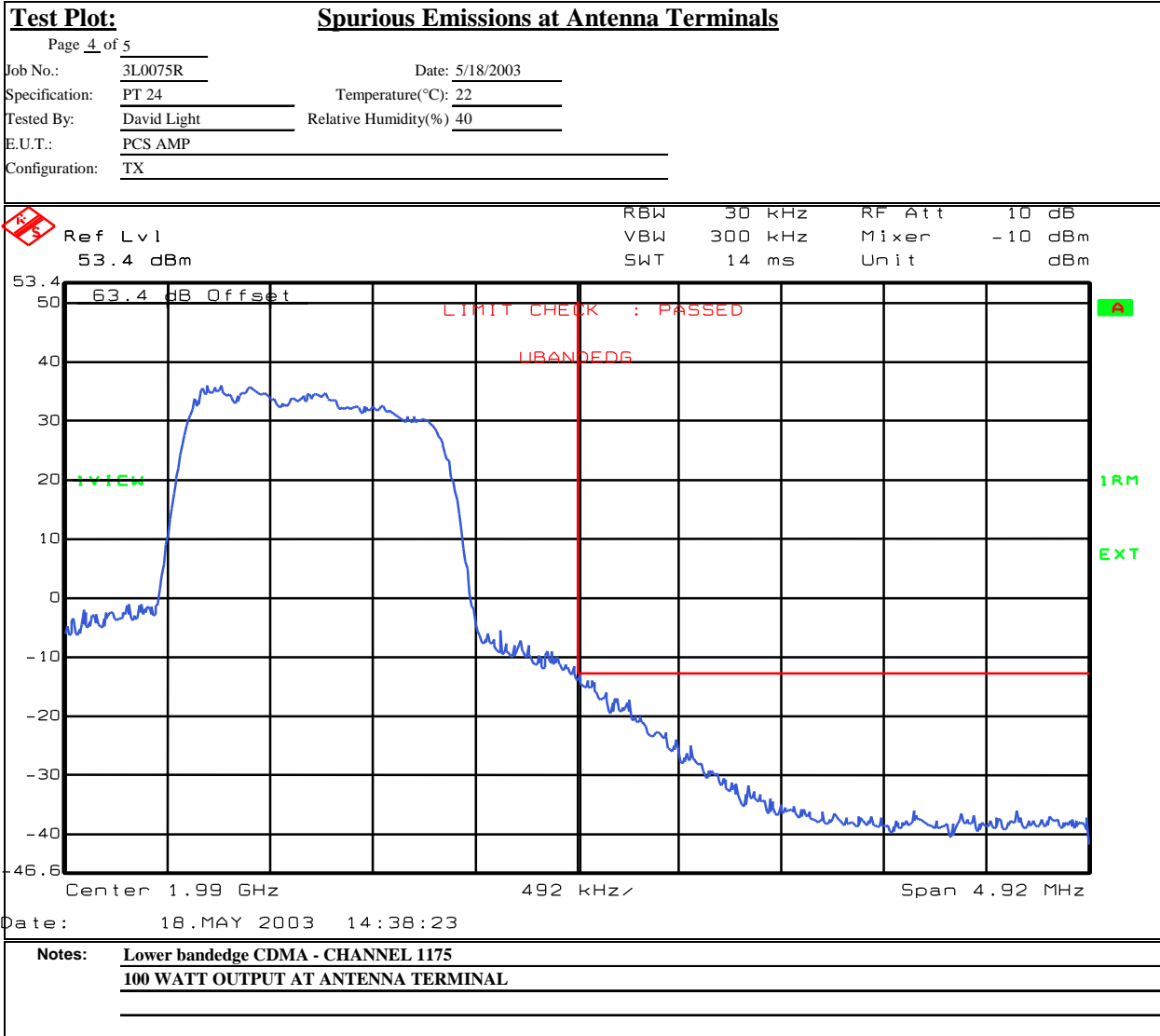




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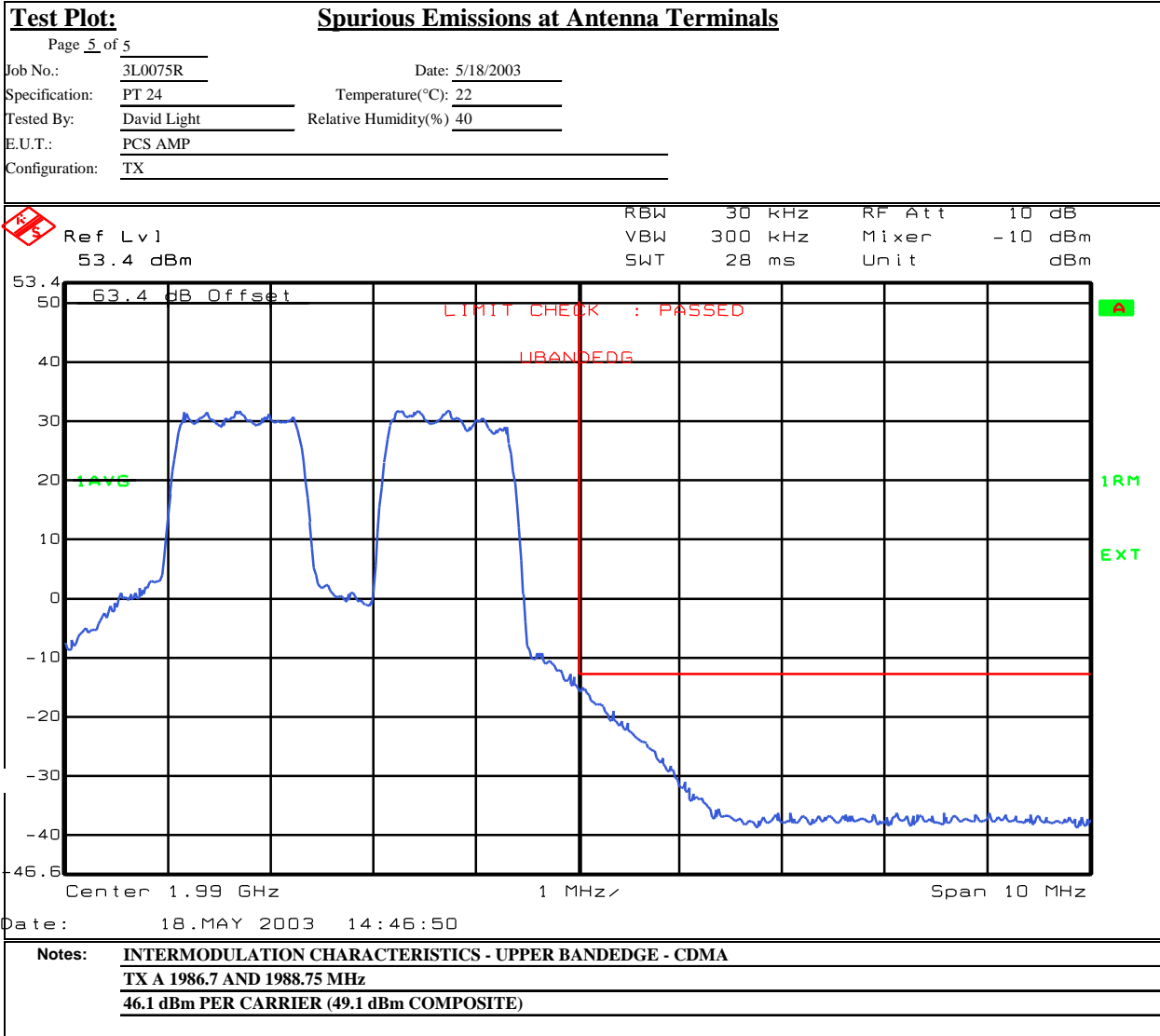




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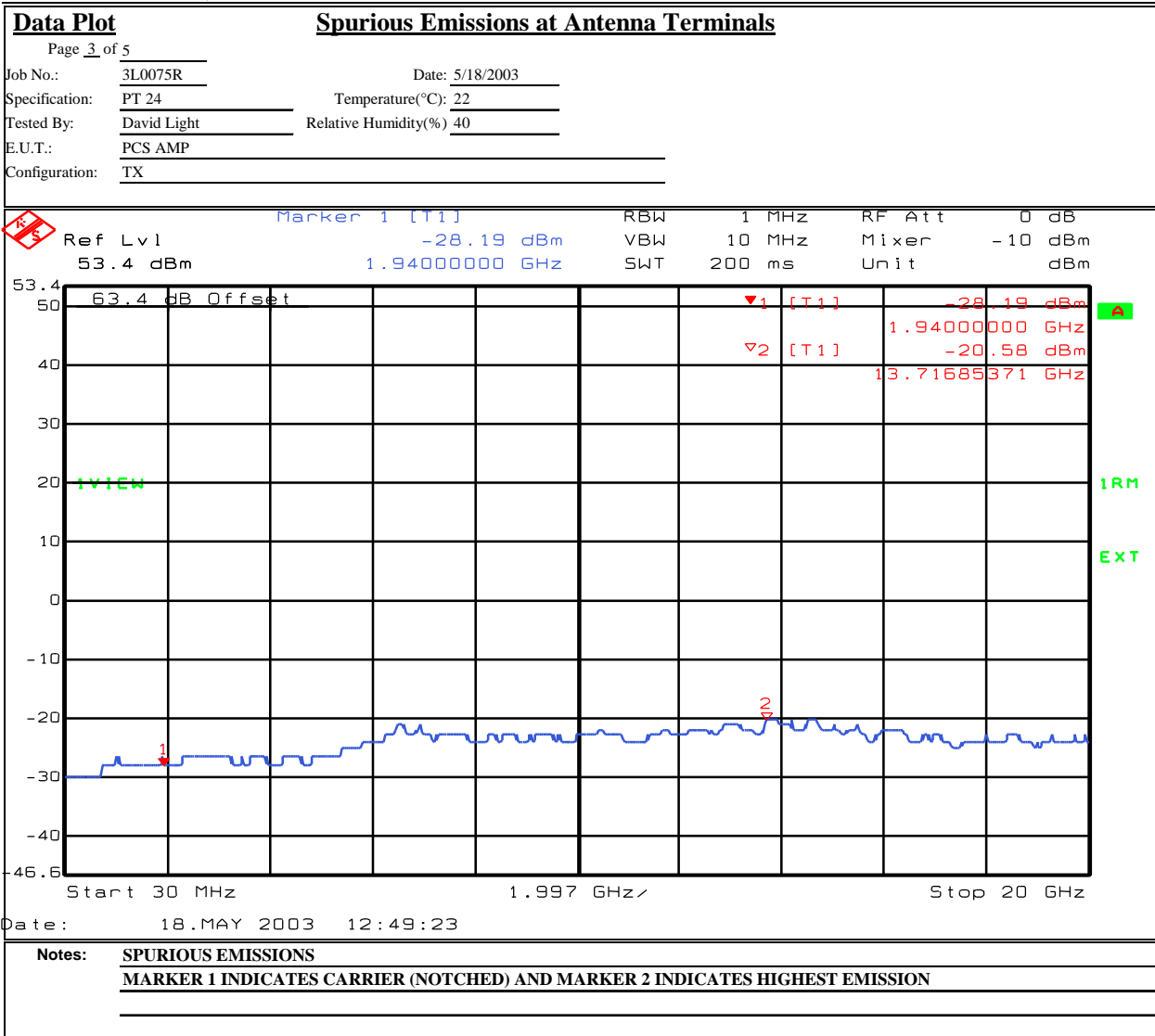




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Test plots – Spurious Emissions at Antenna Terminals

EQUIPMENT: **100 Watt Amplifier** **Test Report Number 3L0075RUS1Rev2**

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 5/18/03

Test Results: Complies.

Test Data: See attached table.

Equipment Used: 1464-1016-1484-1485-993

Measurement Uncertainty: +/- 1.6 dB

Temperature: 22 °C

Relative Humidity: 40 %

Test Data - Radiated Emissions



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EIRP Substitution Method

Page 1 of 1 Complete X
 Preliminary _____

Job No.: 3L0075R Date: 5/18/03

Specification: PT 24 Temperature(°C): 22

Tested By: David Light Relative Humidity(%) 40

E.U.T.: PCS AMLIFIER

Configuration: TX

Sample No: 1

Location: AC 3 RBW: 1 MHz Measurement

Detector Type: Peak VBW: 1 MHz Distance: 3 m

Test Equipment Used

Antenna: 1013 Directional Coupler: _____

Pre-Amp: 1016 Cable #1: 1485

Filter: _____ Cable #2: 1484

Receiver: 1036 Cable #3: _____

Attenuator #1: _____ Cable #4: _____

Attenuator #2: _____ Mixer: _____

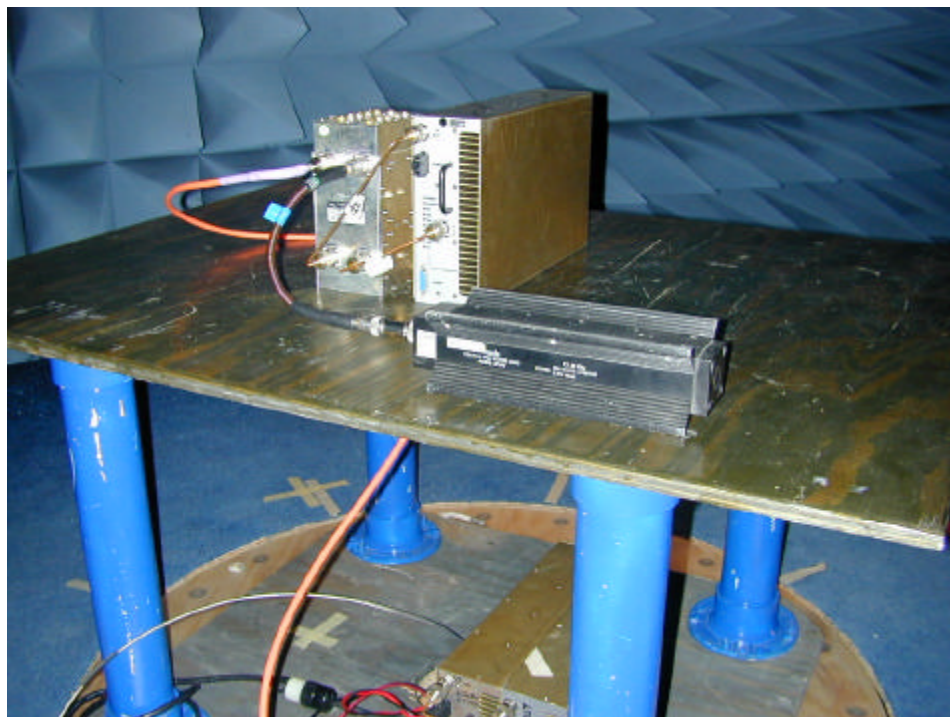
Additional equipment used: _____

Measurement Uncertainty: +/-1.7 dB

Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)	Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)	EIRP (dBm)	EIRP (mW)	Polarity	Comments
3920	-40.0	43.3	33	10.7	-19.0	0.01	V	
5880	-45.0	39.8	31.6	11.4	-25.4	0.00	V	
7840	-48.0	41.8	32.9	11.3	-27.8	0.00	V	NOISE FLOOR
9800	-48.0	41.8	34.5	12.4	-28.3	0.00	V	NOISE FLOOR
11760	-47.0	42.8	33.1	12.6	-24.7	0.00	V	NOISE FLOOR
13720	-46.0	47.7	32.8	12.7	-18.4	0.01	V	NOISE FLOOR
15680	-49.0	44.3	34.1	15.0	-23.8	0.00	V	NOISE FLOOR
17640	-48.0	50.3	34.3	12.5	-19.5	0.01	V	NOISE FLOOR
3920	-52.0	35.5	33	10.7	-38.8	0.00	H	NOISE FLOOR
5880	-50.0	37.8	31.6	11.4	-32.4	0.00	H	NOISE FLOOR
7840	-48.0	41.5	32.9	11.3	-28.1	0.00	H	NOISE FLOOR
9800	-48.0	43.3	34.5	12.4	-26.8	0.00	H	NOISE FLOOR
11760	-47.0	47.0	33.1	12.6	-20.5	0.01	H	NOISE FLOOR
13720	-46.0	47.7	32.8	12.7	-18.4	0.01	H	NOISE FLOOR
15680	-49.0	45.5	34.1	15.0	-22.6	0.01	H	NOISE FLOOR
17640	-48.0	53.5	34.3	12.5	-16.3	0.02	H	NOISE FLOOR

Notes: Searched spectrum to the 10th harmonic

Photographs of Test Setup



EQUIPMENT: **100 Watt Amplifier** Test Report Number **3L0075RUS1Rev2****Section 8. Test Equipment List**

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	12/18/01	12/19/03
1604	ATTENUATOR	NARDA 776B-20	NONE	N/A	N/A
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	02/11/03	02/11/05
1064	ATTENUATOR	NARDA 776B-20	NONE	CBU	N/A
1628	CABLE, 6 ft	MEGAPHASE TM26 S1S5 72	N/A	03/05/03	03/04/04
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	12/18/01	12/19/03
1055	DUAL DIRECTIONAL COUPLER	NARDA 3022	73393	Cal Not Req	N/A
1054	DUAL DIRECTIONAL COUPLER	NARDA 3020A	34366	Cal Not Req	N/A
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	07/15/02	07/15/03
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	07/15/02	07/15/03
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	07/30/01	07/31/03
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	07/15/02	07/15/03

Nemko Dallas

FCC PART 24, SUBPART E
BROADBAND PCS REPEATERS

EQUIPMENT: **100 Watt Amplifier** **Test Report Number 3L0075RUS1Rev2**

ANNEX A - TEST DETAILS

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:

Detachable Antenna:

The peak power at antenna terminals is measured using an in-line peak power meter. Power output is measured with the maximum rated input level.

Integral Antenna:

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.: 2.1047
---	--------------------------

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

Spectrum analyzer settings:

RBW: 30 kHz

VBW: \geq RBW

Span: 5 MHz

Sweep: Auto

Mask: Set markers to -26 dB from peak of CW.

GSM

RBW: 3 kHz

VBW: \geq RBW

Span: 2 MHz

Sweep: Auto

Mask: Set markers to -26 dB from peak of CW.

NADC

RBW: 1 kHz

VBW: \geq RBW

Span: 1 MHz

Sweep: Auto

Mask: Set markers to -26 dB from peak of CW.

NAME OF TEST: Spurious Emission at Antenna Terminals PARA. NO.: 2.1051

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

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 30 kHz (< 1MHz from Band Edge)
VBW: ≥ RBW
Sweep: Auto
Video Avg: 6 Sweeps

GSM

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 kHz (< 1 MHz from Band Edge)
VBW: ≥ RBW
Sweep: Auto
Video Avg: Disabled

NADC

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 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.

EQUIPMENT: **100 Watt Amplifier** **Test Report Number 3L0075RUS1Rev2**

NAME OF TEST: Field Strength of Spurious Radiation	PARA. NO.: 2.1053
---	--------------------------

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:

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. The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10 MHz ref, in of the signal generator. 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.

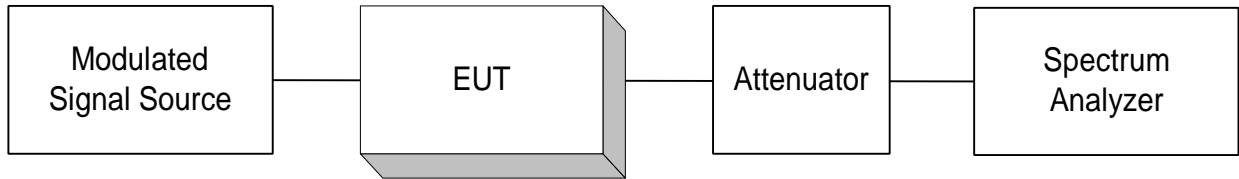
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FCC PART 24, SUBPART E
BROADBAND PCS REPEATERS

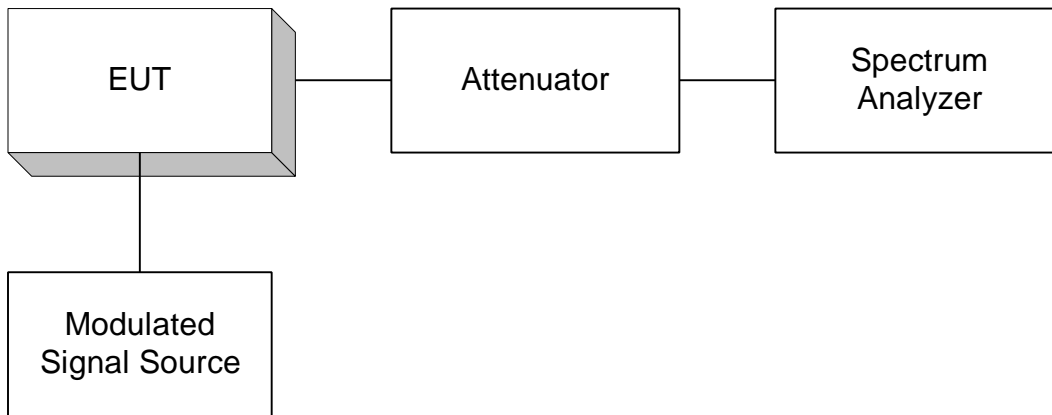
EQUIPMENT: **100 Watt Amplifier** **Test Report Number 3L0075RUS1Rev2**

ANNEX B - TEST DIAGRAMS

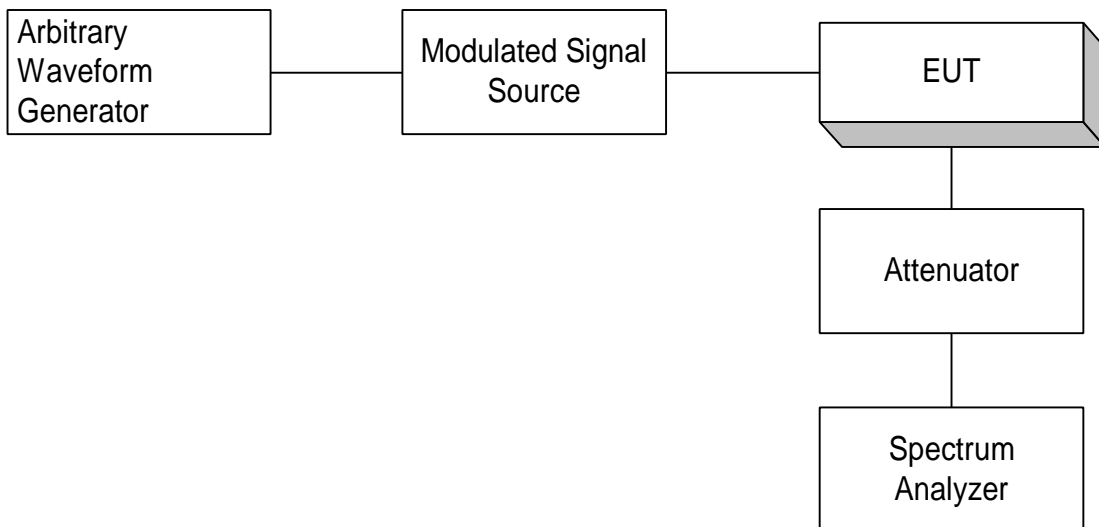
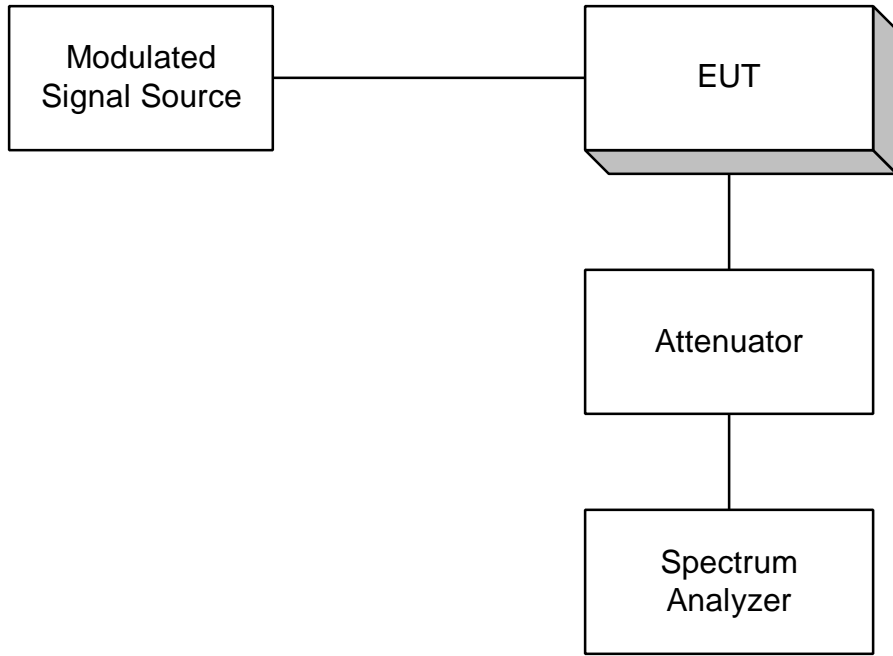
Para. No. 2.985 - R.F. Power Output



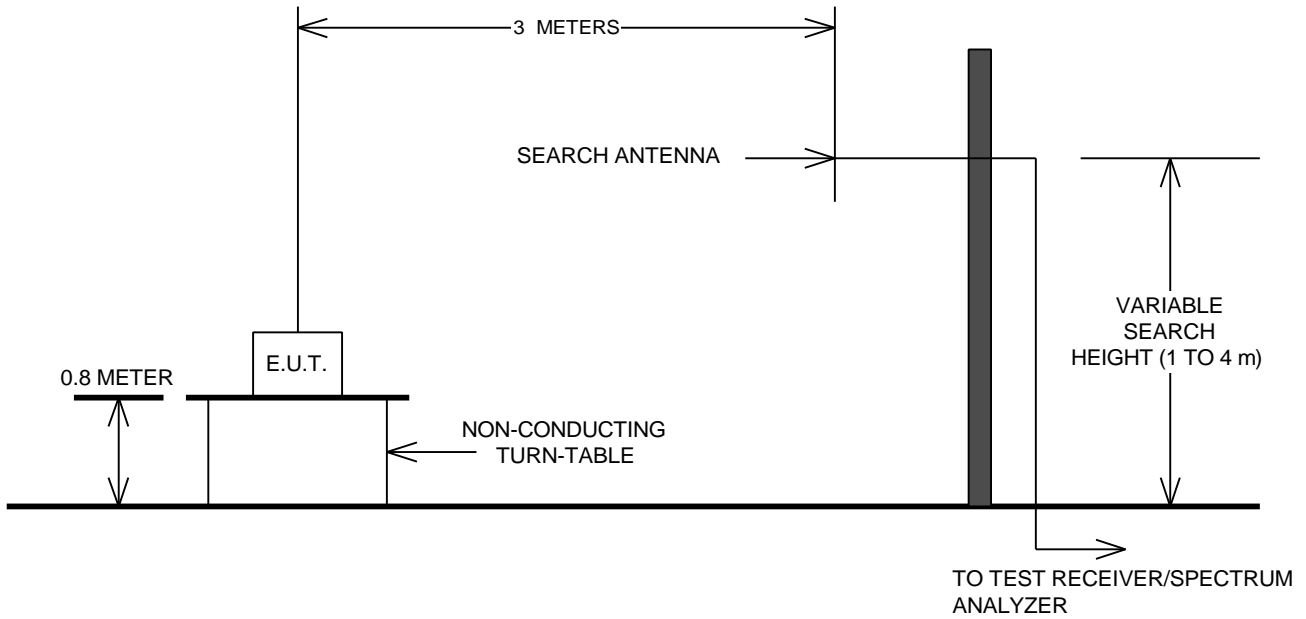
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

