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

Table of Contents

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".

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

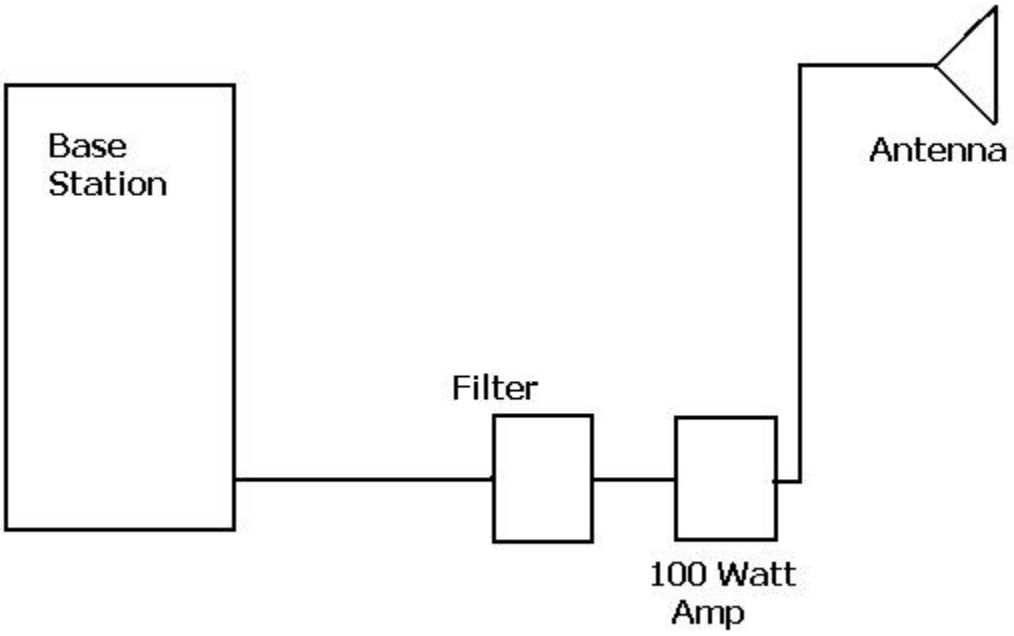
Supply Voltage Input:		
Frequency Bands:	**Downlink:**	☒ Block A : 1930 – 1945 MHz ☒ Block D : 1945 – 1950 MHz ☒ Block B : 1950 – 1965 MHz ☒ Block E : 1965 – 1970 MHz ☒ Block F : 1970 – 1975 MHz ☒ Block C : 1975 – 1990 MHz **1930.2 to 1989.8 MHz**
Frequency Bands:	**Uplink:**	☐ Block A : 1850 – 1865 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
		CDMA (F9W) ☒ **GSM (GXW)** ☐ **EDGE (G7W)** ☐
Output Impedance:		50 ohms
		Per channel: NA W Total: NA W
		Per channel: 100 W Total: 100 W
		F1-F1 ☒ **F1-F2** ☐ **N/A** ☐
		Software ☐ **Duplexer** ☒ **Fullband** ☐

Note – This amplifier was tested using PCS block filters that must be used when installed to achieve compliance for spurious emissions.

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

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

Data Plot — Occupied Bandwidth

Page 1 of 6 — Complete ____ Preliminary: ____

Job No.:	3l0075r	Date:	5/18/2003
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
Detector Type:	Refer to plots	VBW:	Refer to plots

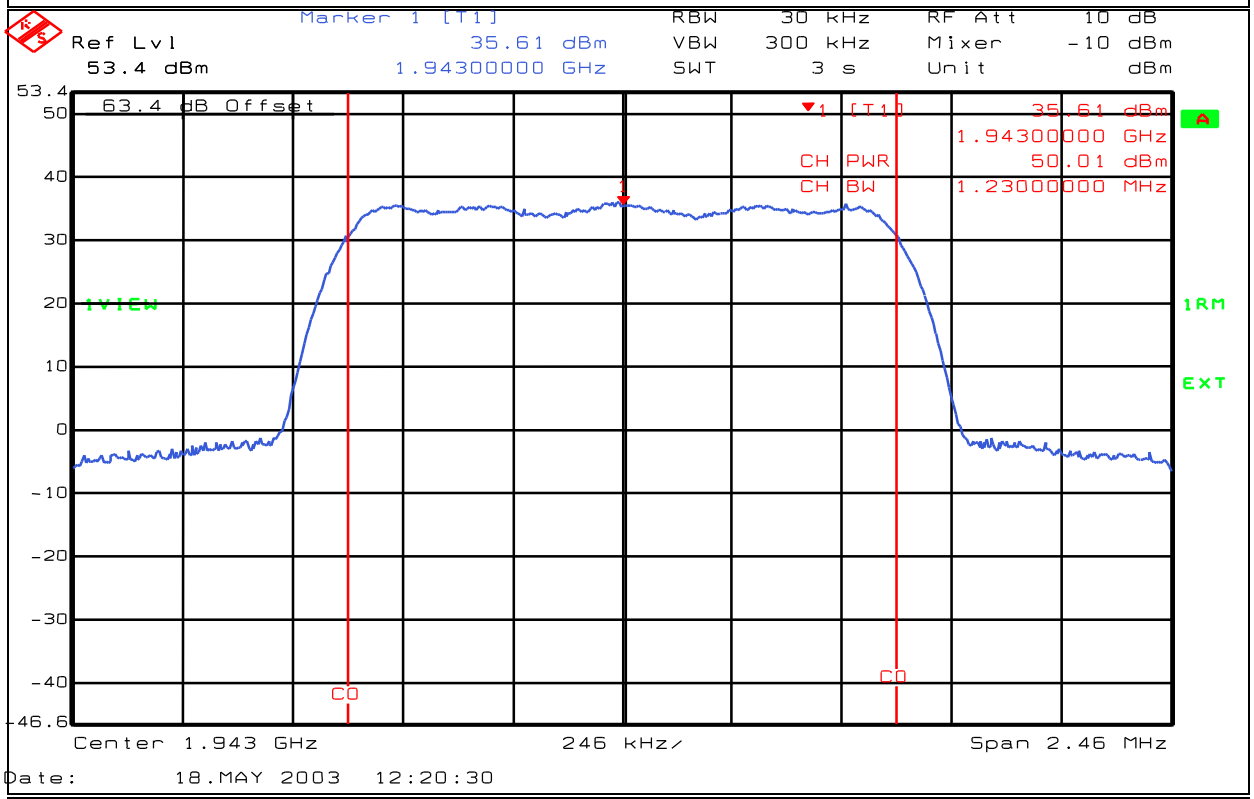
Measurement Distance: NA m

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



Notes: **OUTPUT CDMA**

Test Data – Occupied Bandwidth

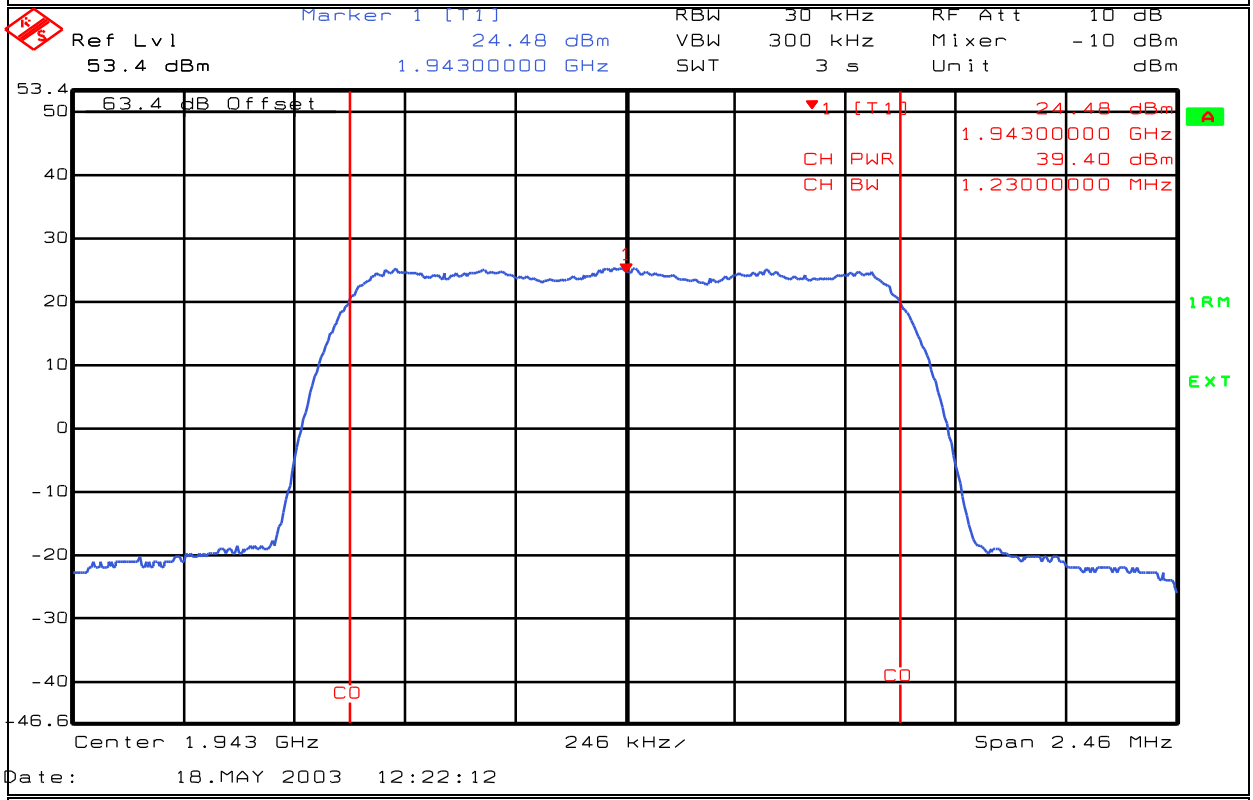
Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

Data Plot **Occupied Bandwidth**

Page 2 of 6

Job No.:	3l0075r	Date:	5/18/2003
Specification:	PT 24	Temperature(°C):	22
Tested By:	Lance Walker	Relative Humidity(%)	40
E.U.T.:	PCS AMPLIFIER		
Configuration:	TX		



Notes: **INPUT CDMA**

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 %

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

Data Plot — Spurious Emissions at Antenna Terminals

Page 1 of 5

Complete ____
Preliminary: ____

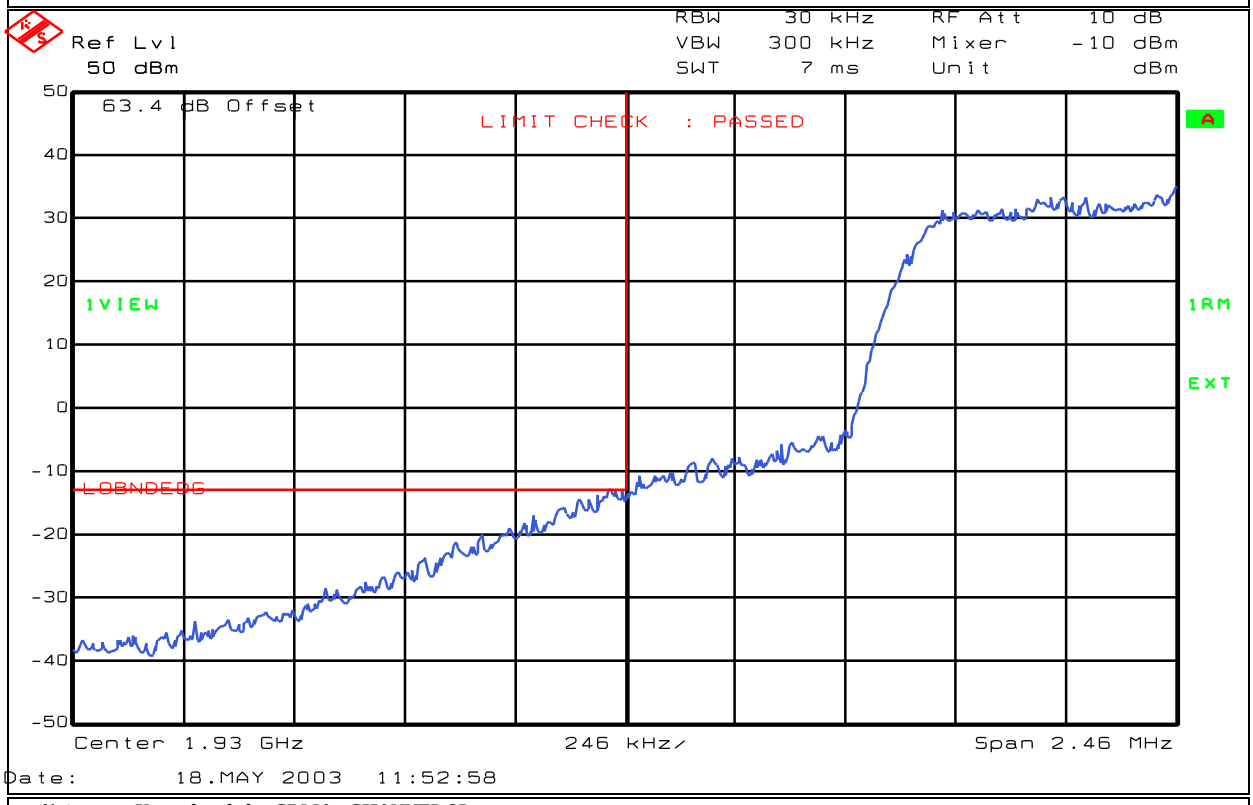
Job No.:	3L0075R	Date:	5/18/2003
Specification:	PT 24	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	PCS AMP		
Configuration:	TX		
Sample Number:	1		
Location:	Lab 1	RBW:	Refer to plots
Detector Type:	Refer to plots	VBW:	Refer to plots

Measurement 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



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

Test plots – Spurious Emissions at Antenna Terminals

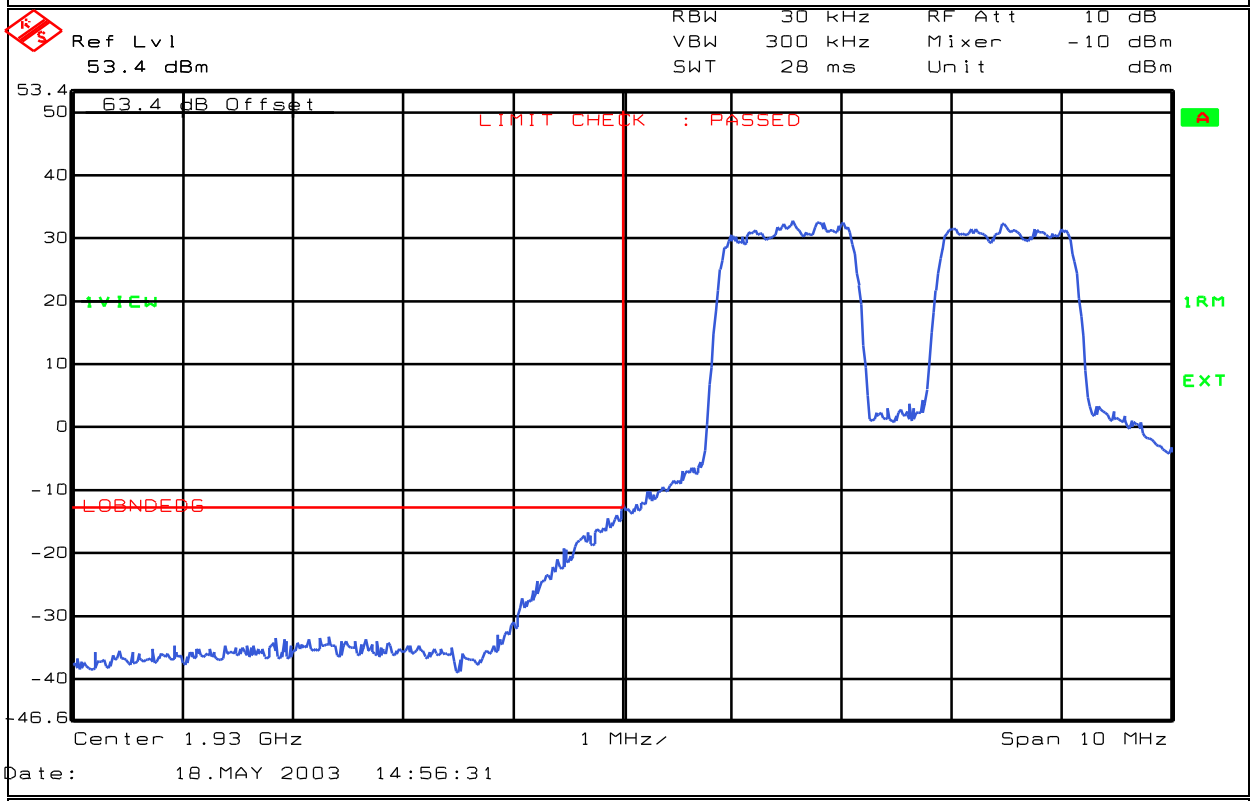
Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

Data Plot — Spurious Emissions at Antenna Terminals

Page 2 of 5

Job No.:	3L0075R	Date:	5/18/2003
Specification:	PT 24	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	PCS AMP		
Configuration:	TX		



Notes: **INTERMODULATION CHARACTERISTICS - LOWER BANDEDGE - CDMA**
TX A 1931.5 AND 1933.5 MHz
47 dBm PER CARRIER (50 dBm COMPOSITE)

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Lewisville, TX 75057
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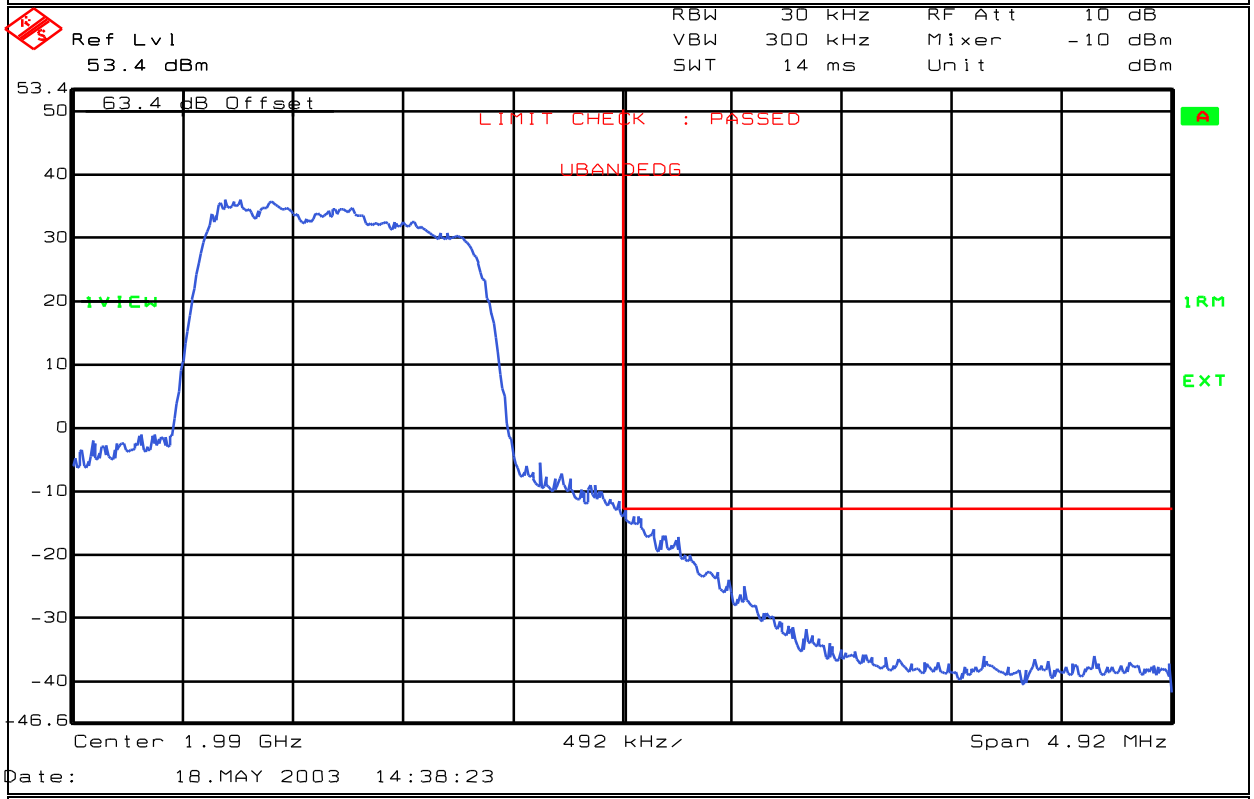
Fax: (972) 436-2667

Nemko Dallas, Inc.

Test Plot: Spurious Emissions at Antenna Terminals

Page 4 of 5

Job No.:	3L0075R	Date:	5/18/2003
Specification:	PT 24	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	PCS AMP		
Configuration:	TX		



Notes: **Lower bandedge CDMA - CHANNEL 1175**
100 WATT OUTPUT AT ANTENNA TERMINAL

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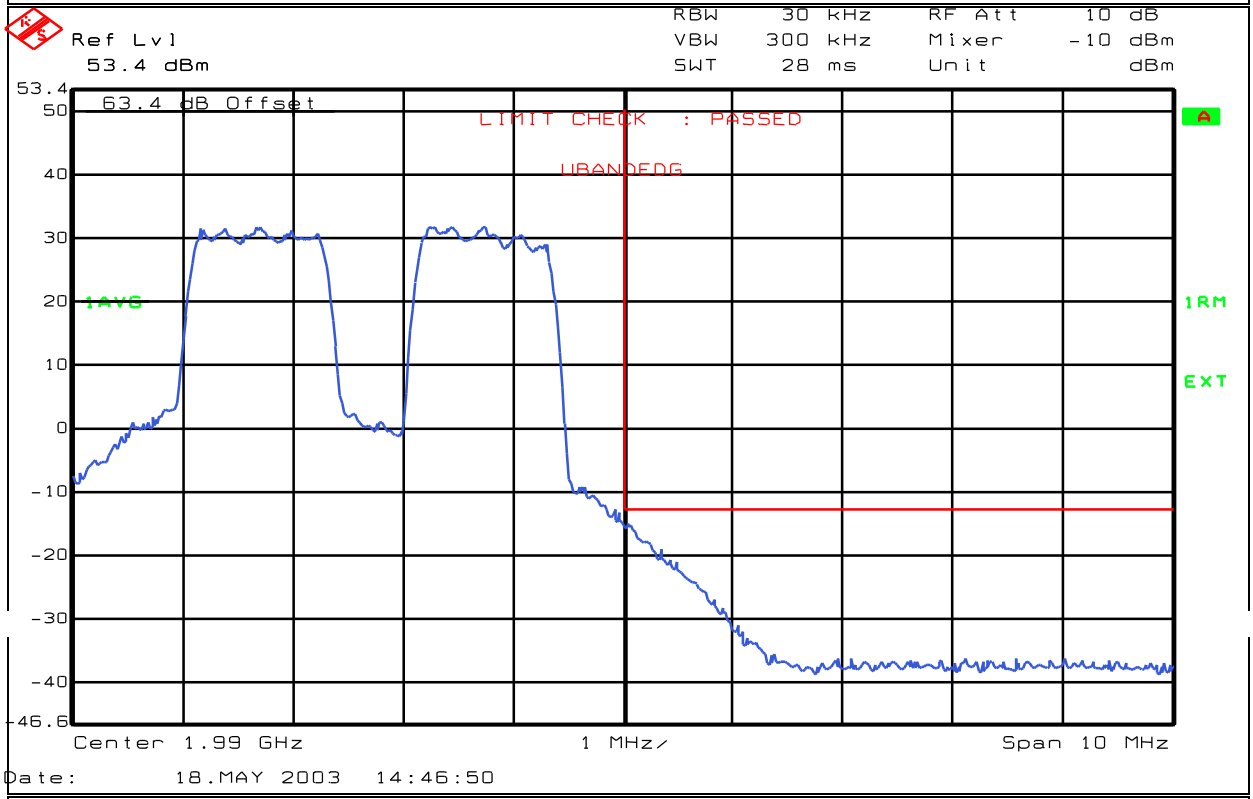
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

Test Plot: Spurious Emissions at Antenna Terminals

Page 5 of 5

Job No.:	3L0075R	Date:	5/18/2003
Specification:	PT 24	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	PCS AMP		
Configuration:	TX		



Notes: **INTERMODULATION CHARACTERISTICS - UPPER BANDEDGE - CDMA**
TX A 1986.7 AND 1988.75 MHz
46.1 dBm PER CARRIER (49.1 dBm COMPOSITE)

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Lewisville, TX 75057
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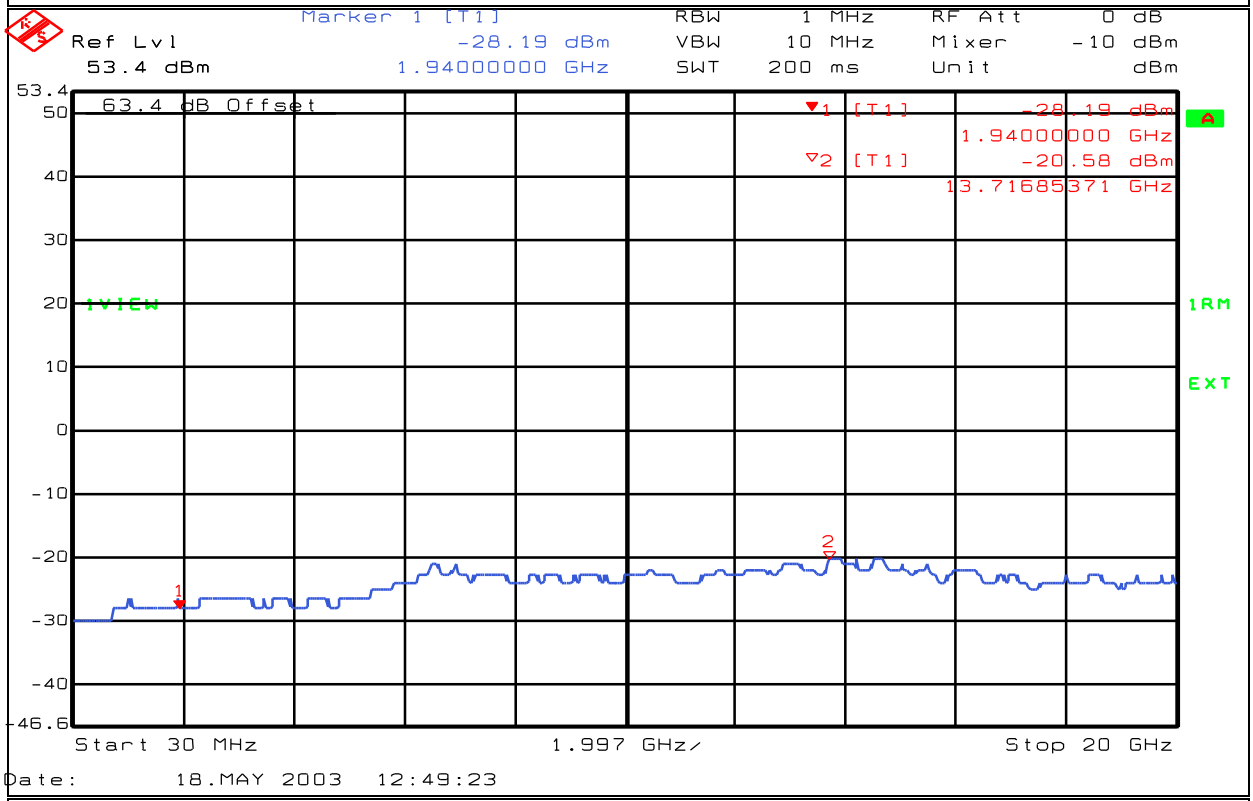
Fax: (972) 436-2667

Data Plot — Spurious Emissions at Antenna Terminals

Page 3 of 5

Job No.:	3L0075R	Date:	5/18/2003
Specification:	PT 24	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	PCS AMP		
Configuration:	TX		



Notes: SPURIOUS EMISSIONS
MARKER 1 INDICATES CARRIER (NOTCHED) AND MARKER 2 INDICATES HIGHEST EMISSION

Test plots – Spurious Emissions at Antenna Terminals

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

Dallas Headquarters:
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.

EIRP Substitution Method

Page 1 of 1 — Complete X

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

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:

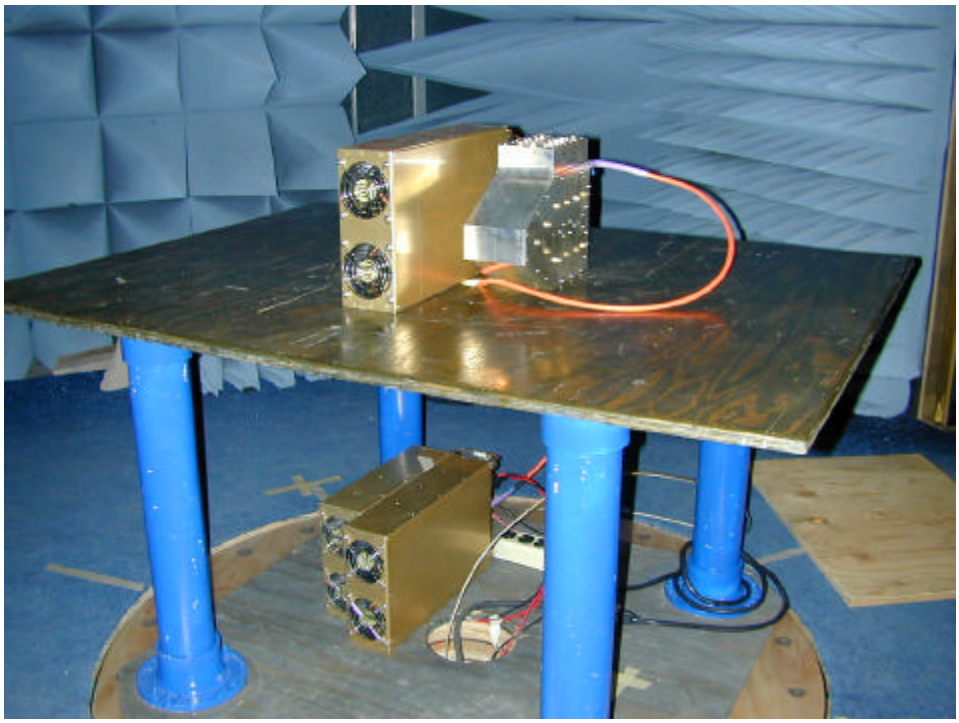
Additional equipment used:

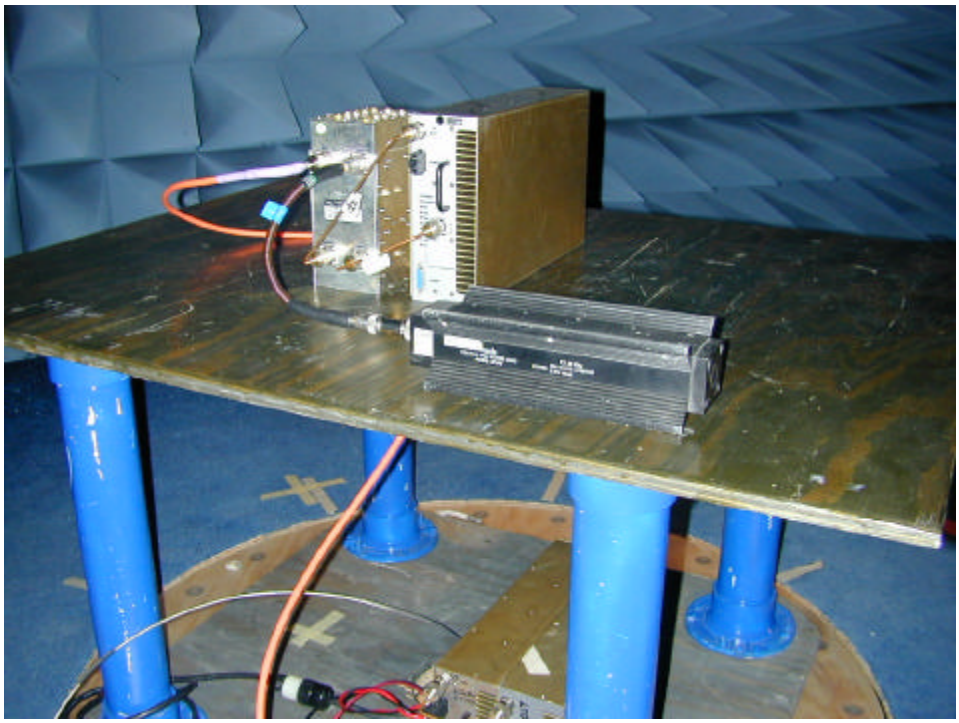
Measurement Uncertainty: +/-1.7 dB

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





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

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: ≥ RBW
Span: 5 MHz
Sweep: Auto
Mask: Set markers to -26 dB from peak of CW.

GSM

RBW: 3 kHz
VBW: ≥ RBW
Span: 2 MHz
Sweep: Auto
Mask: Set markers to -26 dB from peak of CW.

NADC

RBW: 1 kHz
VBW: ≥ 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.

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

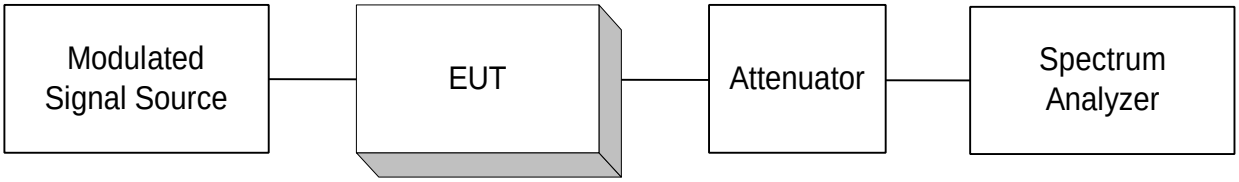
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10 MHz ref, in of the 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

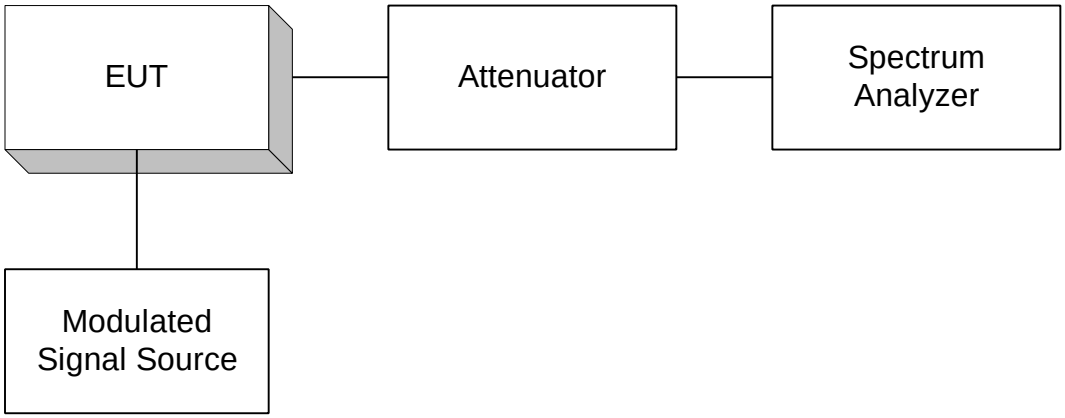
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

ANNEX B - TEST DIAGRAMS

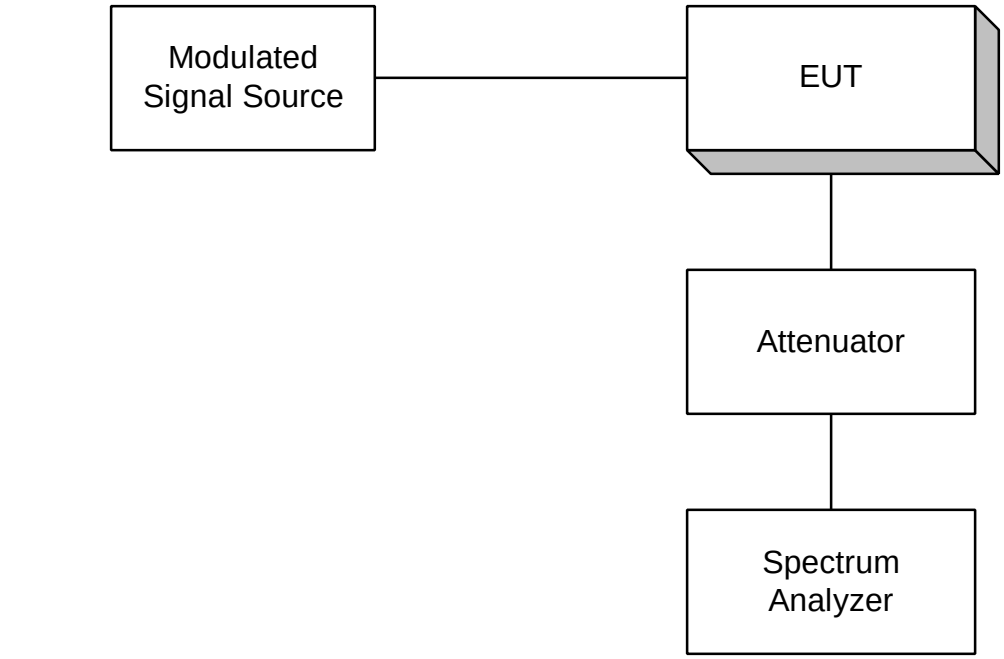
Para. No. 2.985 - R.F. Power Output

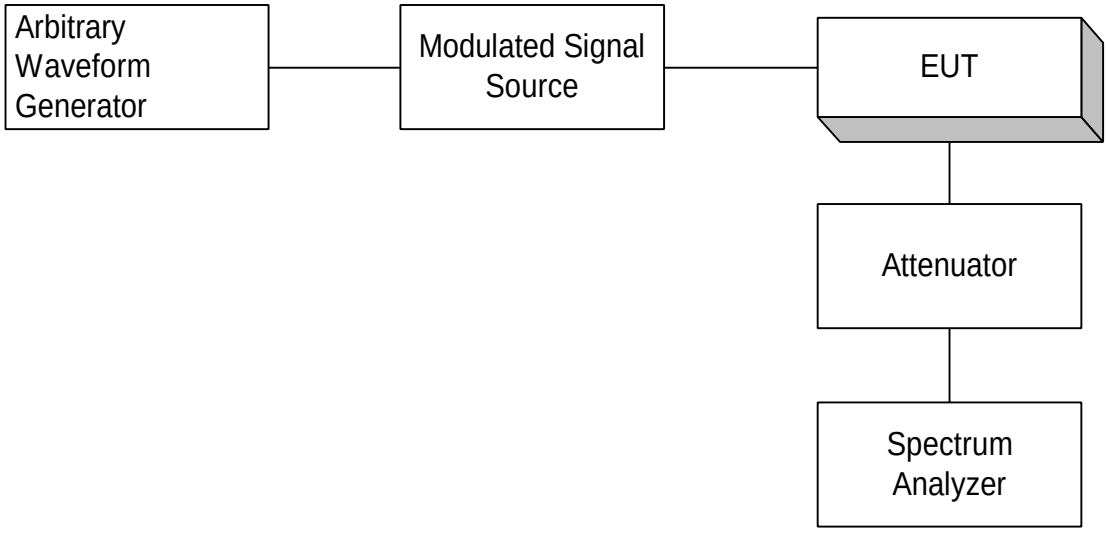


Para. No. 2.989 - Occupied Bandwidth

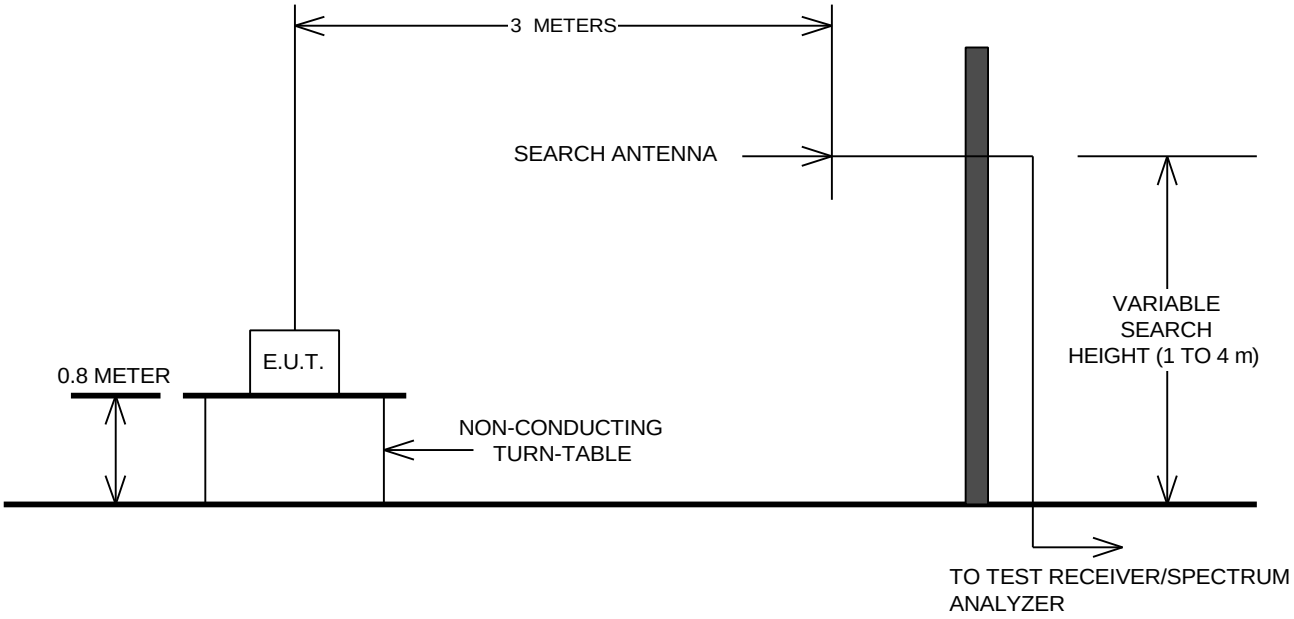


Para. No. 2.991 Spurious Emissions at Antenna Terminals





Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability