| | |
|---|---|
| **Nemko Test Report:** | 4L0360RUS1Rev1 |
| **Applicant:** | Communication Components, Inc.<br>89 Leuning Street<br>2nd Floor<br>Hackensack, NJ 07606 |
| **Equipment Under Test: (E.U.T.)** | DAC-850-125 |
| **In Accordance With:** | **FCC Part 22, Subpart H**<br>850 MHz Cellular Band Amplifier |
| **Tested By:** | Nemko Dallas Inc.<br>802 N. Kealy<br>Lewisville, TX<br>75057-3136 |
| **Authorized By:** |  <br>Tom Tidwell, Frontline Group Manager |
| **Date:** | June 2, 2004 |

# Table of Contents

## Section 1. Summary of Test Results

| | |
|---|---|
| Manufacturer: | Communication Components, Inc. |
| Model No.: | DAC-850-125 |
| Serial No.: | 005066 |

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, Subpart H.

| | | | |
|---|---|---|---|
| ☒ | 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

## Summary Of Test Data

| NAME OF TEST | PARA. NO. | SPEC. | RESULT |
|---|---|---|---|
| RF Power Output | 22.913(a) | 500W ERP | Complies |
| Occupied Bandwidth | 22.917(c) | Input/Output | Complies |
| Spurious Emissions at Antenna Terminals | 22.917 | -13 dBm | Complies |
| Field Strength of Spurious Emissions | 22.917 | -13 dBm E.I.R.P. | Complies |
| Frequency Stability | 22.355 | 1.5 ppm | NA |

**Footnotes:**

(1) Device does not demodulate input RF.

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

.

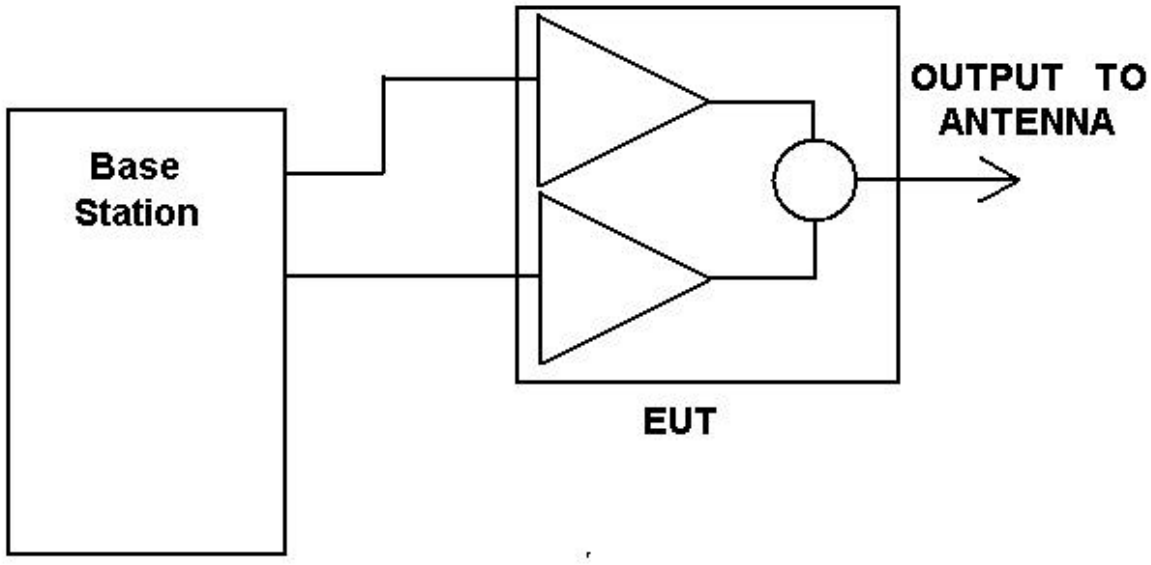
## Section 2. General Equipment Specification

| | | |
|---|---|---|
| **Supply Voltage Input:** | | |
| **Frequency Range:** | | 869.2 to 893.8 MHz<br>**Note: At the highest and lowest channels, the power output must be reduced to 3 Watts for GSM and 5.8 Watts for EDGE modulations to achieve bandedge compliance.** |
| **Type of Modulation and Designator:** | | **CDMA (F9W)** ☐ **GSM (G7W)** ☒ **NADC (DXW)** ☐ **EDGE (G7W)** ☒ **AMPS (F8W, F1D)** ☐ |
| **Output Impedance:** | | 50 ohms |
| **RF Output (Rated):** | **Downlink:** | Per Channel: 62.5 W<br>Total: 125 W |
| | **Uplink:** | Per Channel: NA W<br>Total: NA W |
| **Frequency Translation:** | | **F1-F1** ☒ **F1-F2** ☐ **N/A** ☐ |
| **Band Selection:** | | **Software** ☐ **Duplexer Change** ☐ **Fullband Coverage** ☒ |

## Description of Operation

The device is a base station amplifier operating in the 850 MHz cellular band utilizing GSM and GSM EDGE technology. Each input outputs 62.5 Watts single carrier only and input into a combiner prior to output. The device is rated at 125 Watts combined power.

## System Diagram



## Section 3. RF Power Output

| NAME OF TEST: RF Power Output | PARA. NO.: 2.1046 |
|---|---|
| TESTED BY: David Light | DATE: 5/12/2004 |

**Test Results:** Complies.

**Test Data:**

| | Modulation Type | Per Channel Power Output (dBm) | Composite Power Output (dBm) | Per Channel Power Output (Watts) | Composite Power Output (Watts) |
|---|---|---|---|---|---|
| | GSM | 47.96 | 50.96 | 62.5 | 125 |
| | EDGE | 47.96 | 50.96 | 62.5 | 125 |

Note: RF power output must be reduced at 869.2 and 893.8 MHZ to 3 Watts for GSM and 5.8 Watts for EDGE modulations to adhere to bandedge requirements.

**Equipment Used:** 1036-1604-1054-1629-

**Measurement Uncertainty:** +/- 1.7 dB

**Temperature:** 24 ?C

**Relative Humidity:** 45 %

## Section 4. Occupied Bandwidth

| NAME OF TEST: Occupied Bandwidth | PARA. NO.: 2.1049 |
|---|---|
| TESTED BY: David Light | DATE: 5/12/2004 |

**Test Results:** Complies.

**Test Data:** See attached plots

## Test Data – Occupied Bandwidth

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

**Nemko Dallas, Inc.**

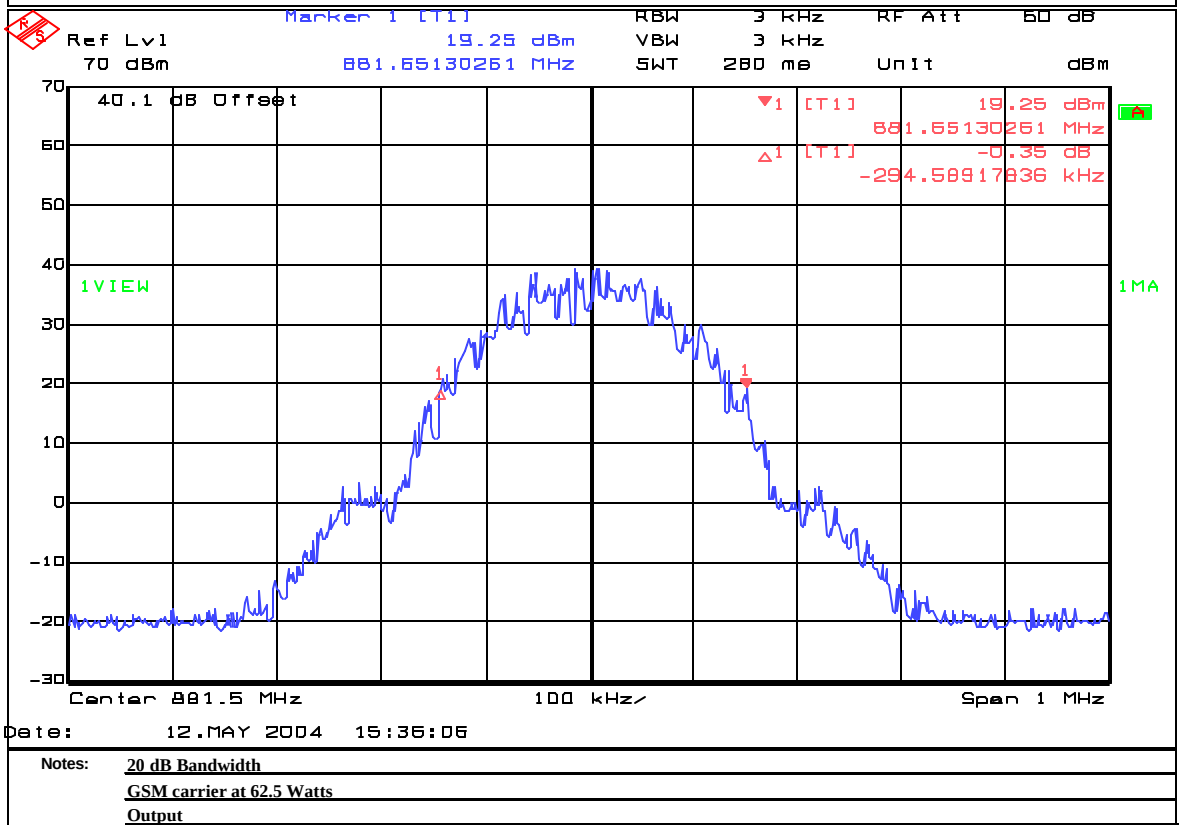
**Data Plot** **Occupied Bandwidth**

Page 1 of 4 Complete x

Job No.: 4L0360 Date: 5/12/2004 Preliminary:
Specification: PT 22 Temperature(°C): 24
Tested By: David Light Relative Humidity(%) 45
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD
Sample Number: 1
Location: Lab 1 RBW: 3 kHz Measurement
Detector Type: Peak VBW: 3 kHz Distance: NA m

**Test Equipment Used**

Antenna: Directional Coupler: 1054
Pre-Amp: Cable #1: 1629
Filter: Cable #2:
Receiver: 1036 Cable #3:
Attenuator #1 1604 Cable #4:
Attenuator #2: Mixer:
Additional equipment used:
Measurement Uncertainty: +/-1.7 dB




Notes: **20 dB Bandwidth**
**GSM carrier at 62.5 Watts**
**Output**

## Test Data – Occupied Bandwidth

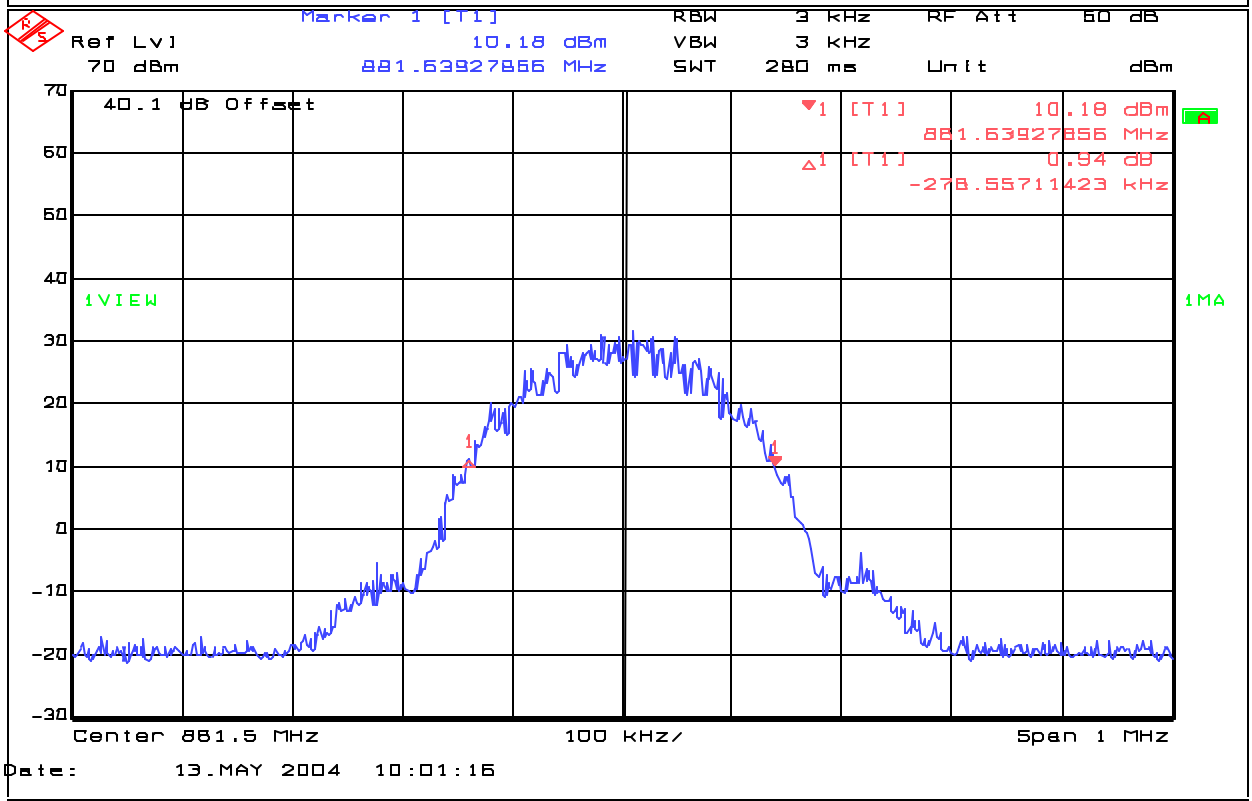
**Dallas Headquarters:**
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

**Nemko Dallas, Inc.**

**Data Plot** **Occupied Bandwidth**

Page ~~2~~ of 4

Job No.: 4L0360 Date: 5/12/2004
Specification: PT 22 Temperature(°C): 24
Tested By: David Light Relative Humidity(%) 45
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD




Notes: **20 dB Bandwidth**
**GSM Input**

## Test Data – Occupied Bandwidth

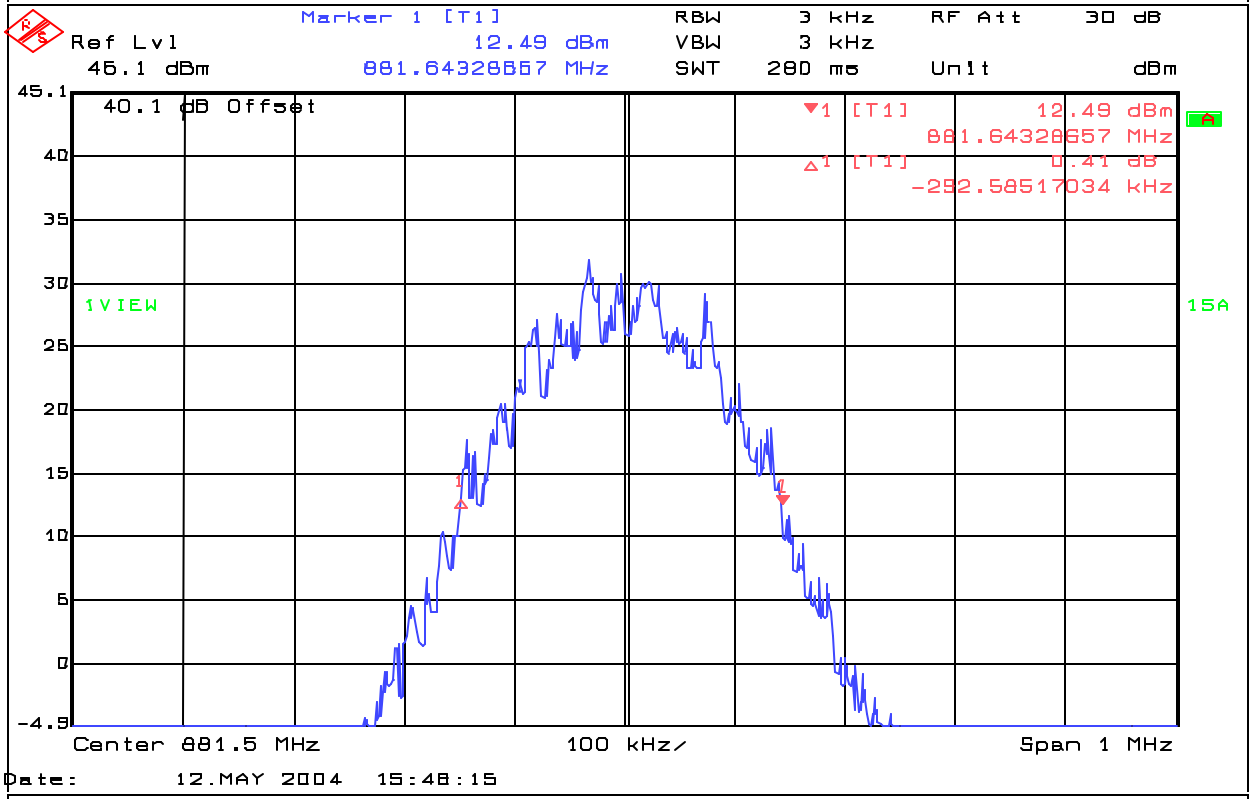
**Dallas Headquarters:**
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

**Nemko Dallas, Inc.**

**Data Plot** **Occupied Bandwidth**

Page 3 of 4

Job No.: 4L0360 Date: 5/12/2004
Specification: PT 22 Temperature(°C): 24
Tested By: David Light Relative Humidity(%) 45
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD




Notes: 20 dB Bandwidth
EDGE carrier at 62.5 Watts
Output

## Test Data – Occupied Bandwidth

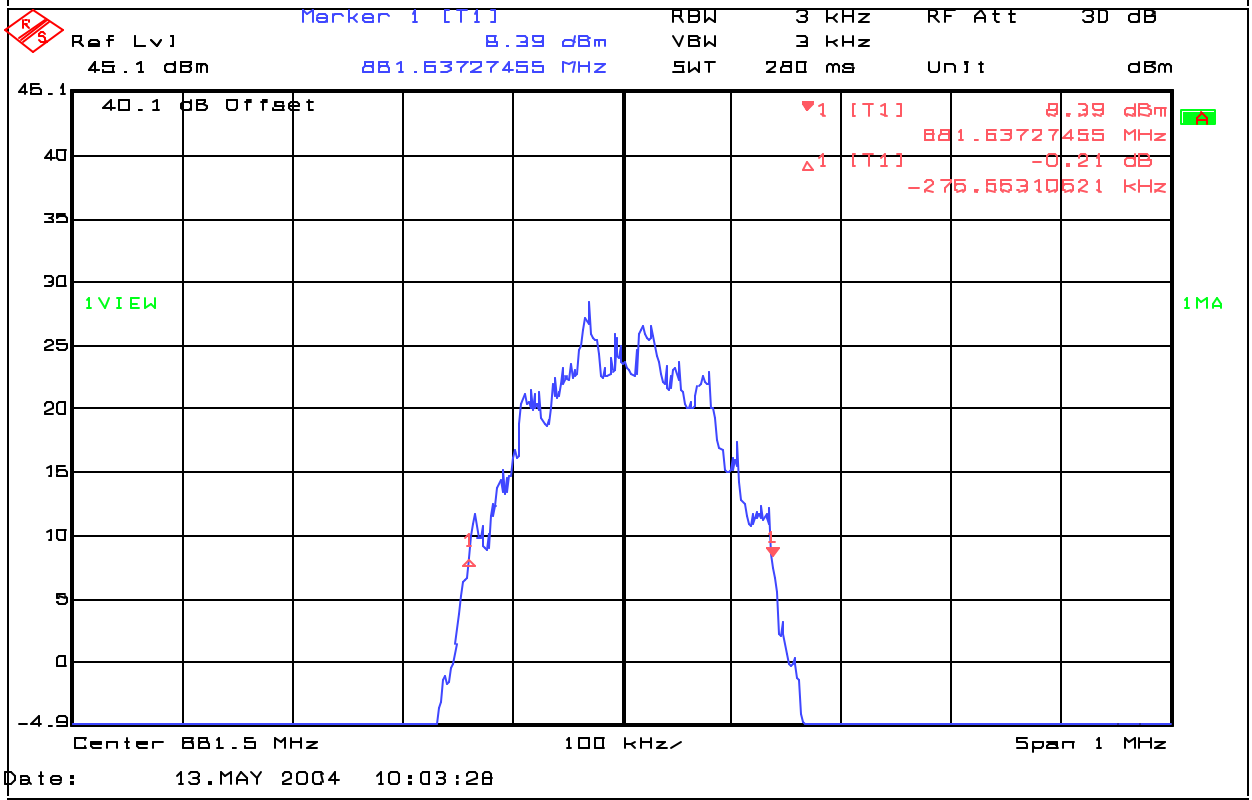
**Dallas Headquarters:**
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

**Nemko Dallas, Inc.**

**Test Plot:** **Occupied Bandwidth**

Page 4 of 4

Job No.: 4L0360 Date: 5/12/2004
Specification: PT 22 Temperature(°C): 24
Tested By: David Light Relative Humidity(%) 45
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD




Notes: 20 dB Bandwidth
EDGE Input

## Section 5. Spurious Emissions at Antenna Terminals

| NAME OF TEST: Spurious Emissions @ Antenna Terminals | PARA. NO.: 2.1051 |
|---|---|
| TESTED BY: David Light | DATE: 5/12/2004 |

**Test Results:** Complies.

**Test Data:** See attached plots

## Test Data – Spurious Emissions at Antenna Terminals

Lowest channel at full power

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

**Nemko Dallas, Inc.**

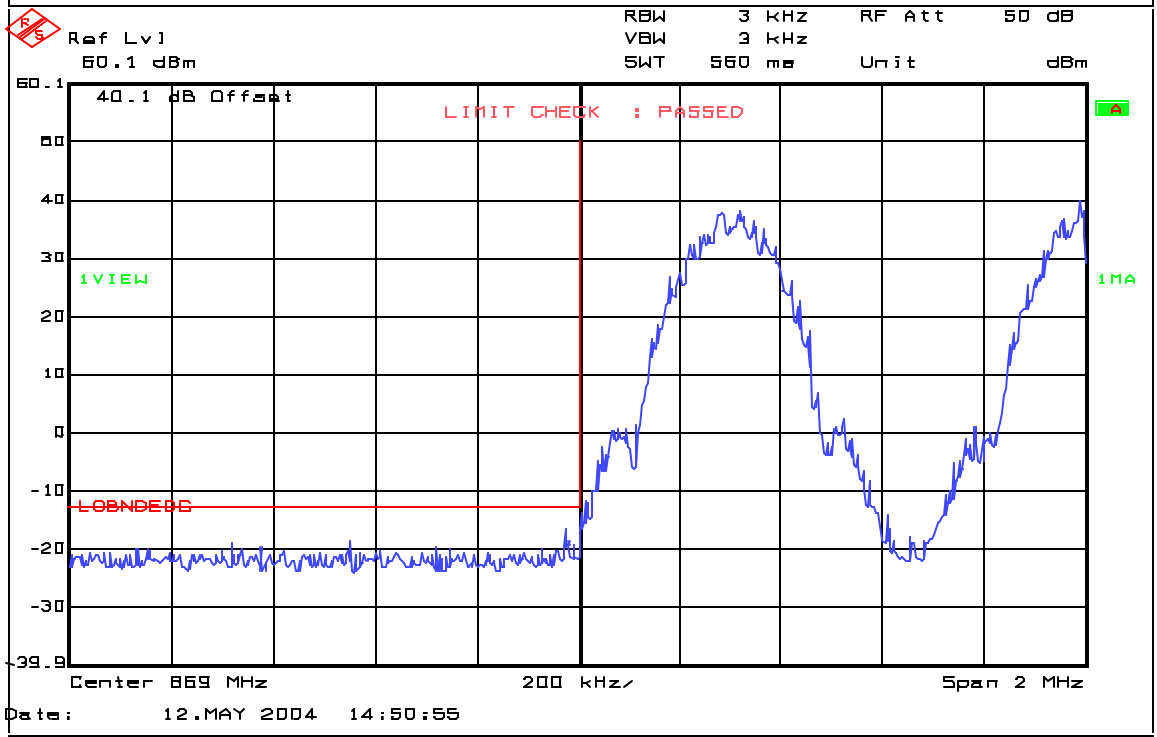
**Data Plot** **Spurious Emissions at Antenna Terminals**

Page 1 of 5 Complete X

Job No.: 4L0360 Date: 5/12/2004 Preliminary:
Specification: PT22 Temperature(°C): 24
Tested By: David Light Relative Humidity(%) 45
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD
Sample Number: 1
Location: Lab 1 RBW: Refer to plots Measurement
Detector Type: Peak VBW: Refer to plots Distance: NA m

**Test Equipment Used**

Antenna: Directional Coupler: 1054
Pre-Amp: Cable #1: 1629
Filter: 1060 Cable #2:
Receiver: 1036 Cable #3:
Attenuator #1 1604 Cable #4:
Attenuator #2: Mixer:
Additional equipment used: 1055 1058
Measurement Uncertainty: +/-1.7 dB




Notes: **Tx @ 869.3 and 870.0 MHz - 47.97 dBm (62.5 Watts) each. 125 Watts composite power**
**869.3 MHz is lowest channel**
**GSM**

## Test Data – Spurious Emissions at Antenna Terminals

Highest channel at full power

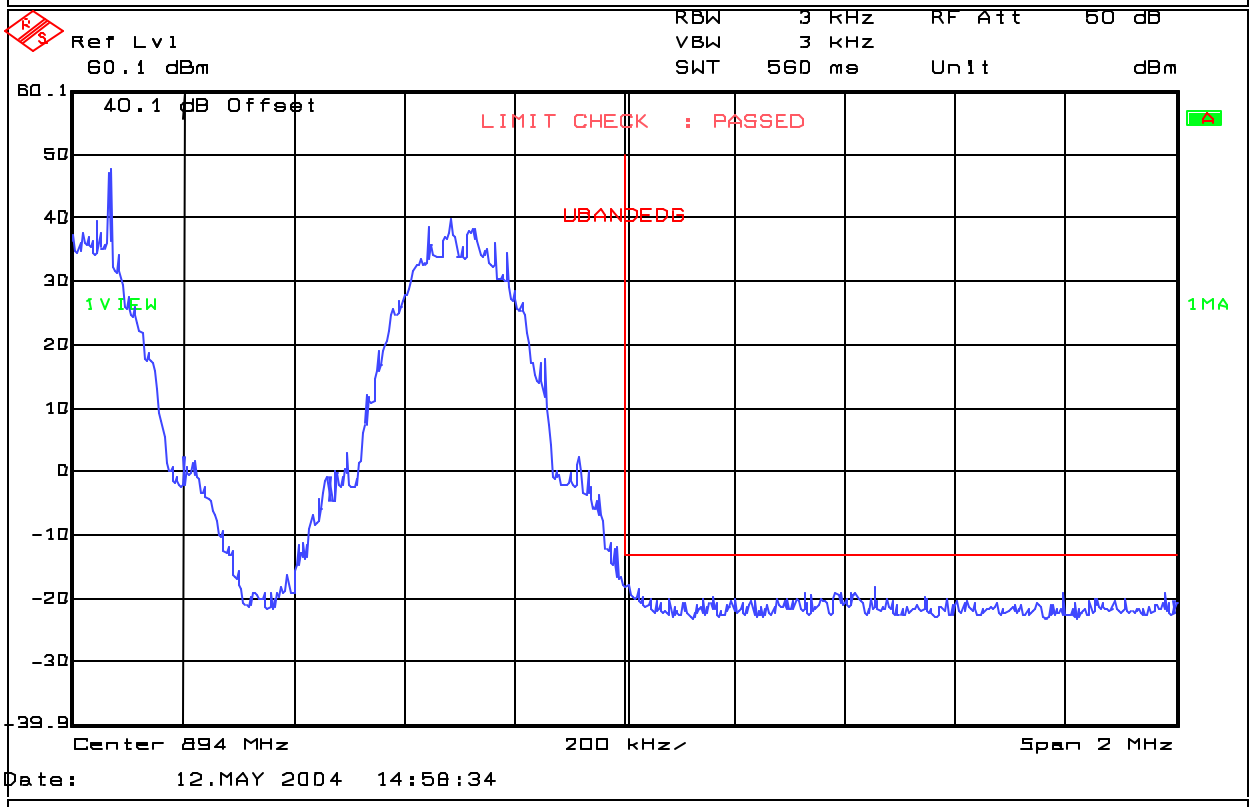
**Dallas Headquarters:**
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

**Nemko Dallas, Inc.**

**Data Plot** **Spurious Emissions at Antenna Terminals**

Page ~~2~~ of 5

Job No.: 4L0360 Date: 5/12/2004
Specification: PT22 Temperature(°C): 24
Tested By: David Light Relative Humidity(%) 45
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD




Notes: **Tx @ 893.7 and 893.0 MHz - 47.97 dBm (62.5 Watts) each. 125 Watts composite power**
**893.7 is highest channel**
**GSM**

## Test Data – Spurious Emissions at Antenna Terminals

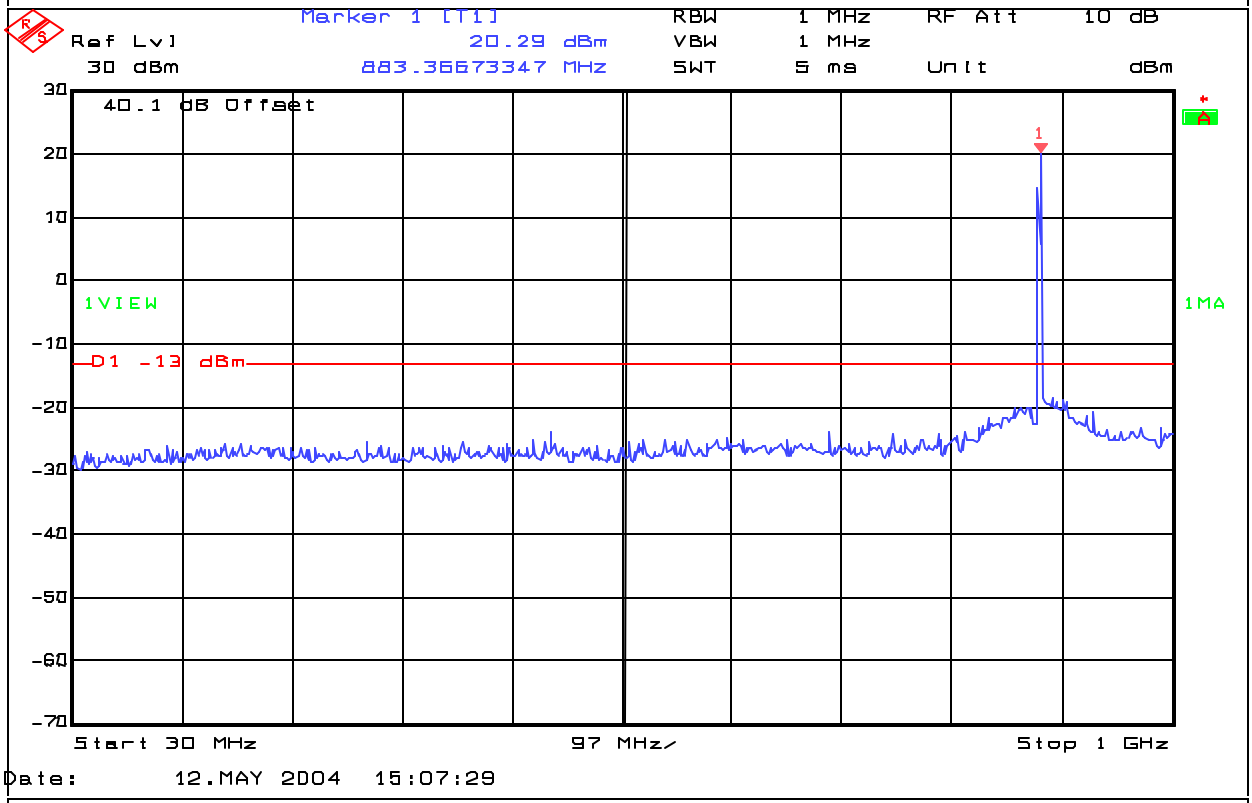
**Nemko Dallas, Inc.**

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

**Data Plot** **Spurious Emissions at Antenna Terminals**

Page 3 of 5

Job No.: 4L0360 Date: 5/12/2004
Specification: PT22 Temperature(°C): 24
Tested By: David Light Relative Humidity(%) 45
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD




Notes: **Marker indicates carrier (NOTCHED)**
**Tx 2 carriers at 125 Watts composite power**
**GSM**

## Test Data – Spurious Emissions at Antenna Terminals

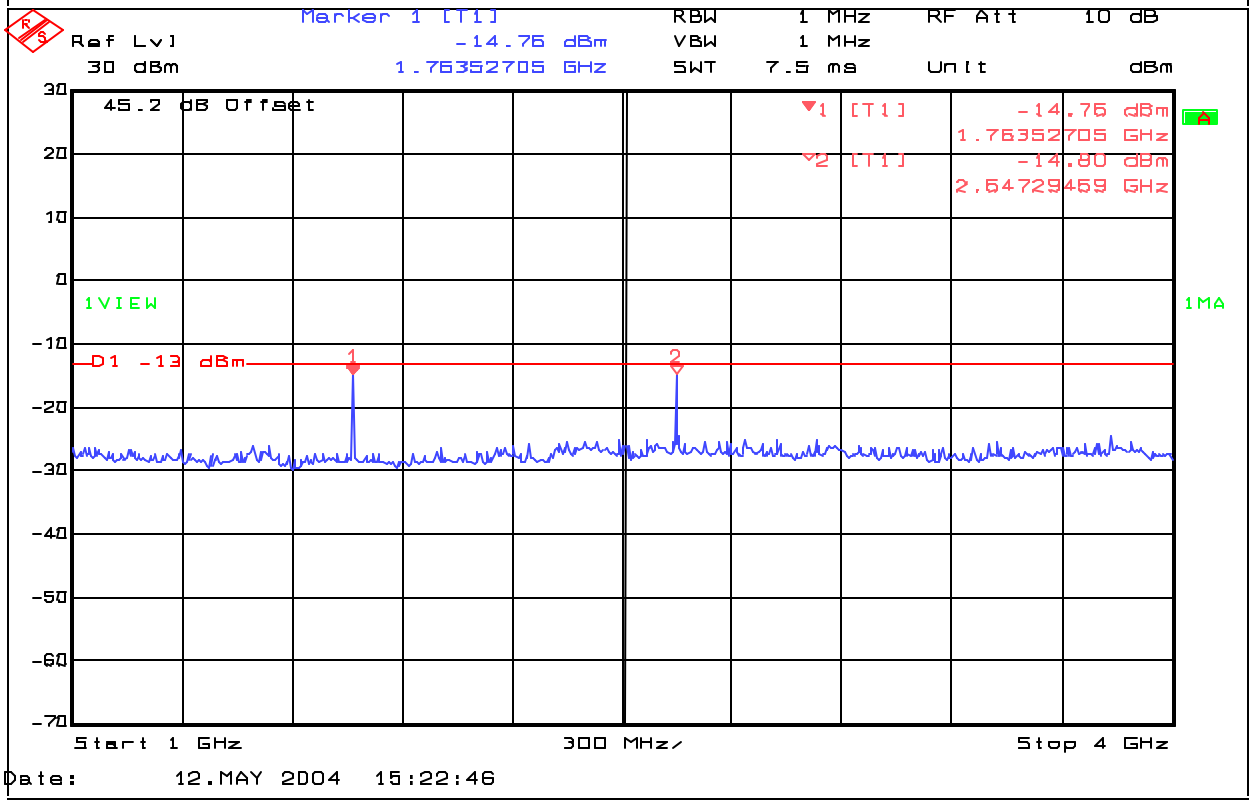
**Dallas Headquarters:**
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

**Nemko Dallas, Inc.**

**Test Plot:** **Spurious Emissions at Antenna Terminals**

Page 4 of 5

Job No.: 4L0360 Date: 5/12/2004
Specification: PT22 Temperature(°C): 24
Tested By: David Light Relative Humidity(%) 45
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD




Notes: **Markers indicate highest emissions**
**Tx 2 carriers at 125 Watts composite power**
**GSM**

## Test Data – Spurious Emissions at Antenna Terminals

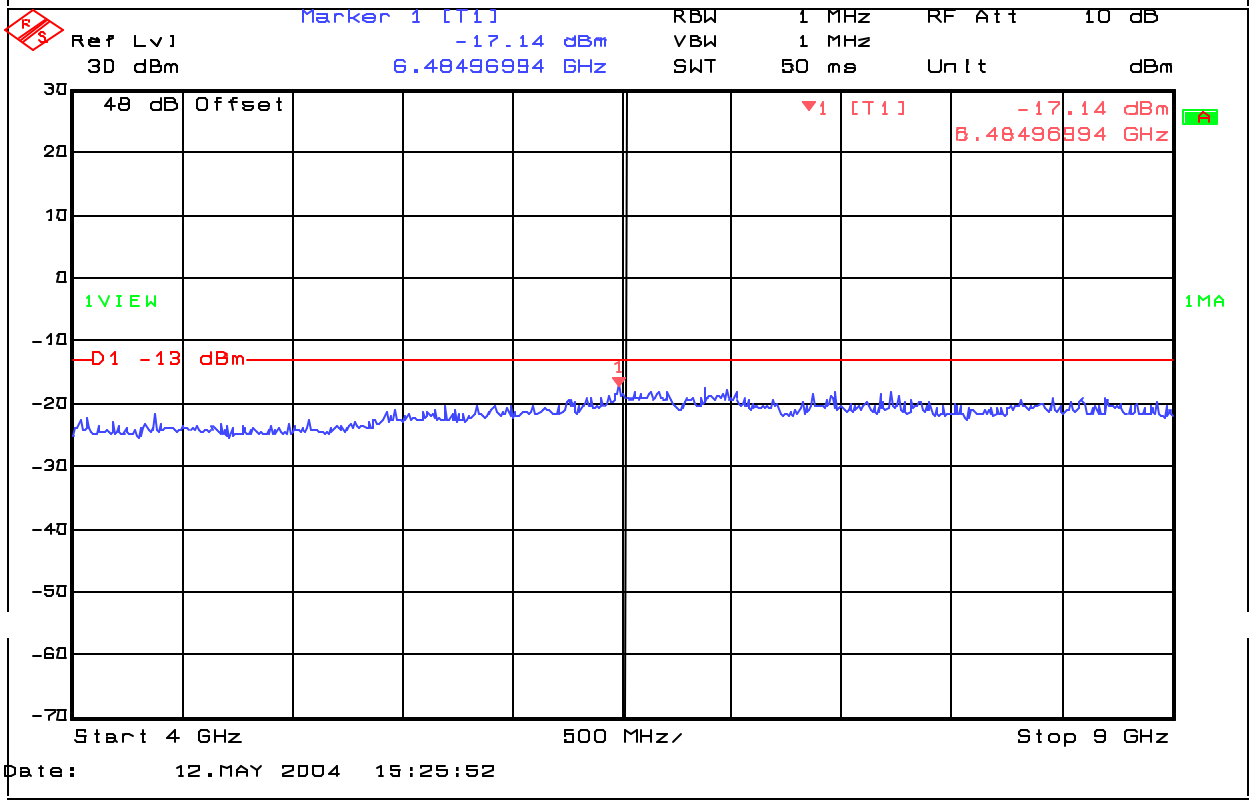
**Dallas Headquarters:**
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

**Nemko Dallas, Inc.**

**Test Plot:** **Spurious Emissions at Antenna Terminals**

Page 5 of 5

Job No.: 4L0360 Date: 5/12/2004
Specification: PT22 Temperature(°C): 24
Tested By: David Light Relative Humidity(%) 45
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD




Notes: **Marker indicates highest emission (Noise floor)**
**Tx 2 carriers at 125 Watts composite power**
**GSM**

## Test Data – Spurious Emissions at Antenna Terminals

Lowest channel at full power

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

**Nemko Dallas, Inc.**

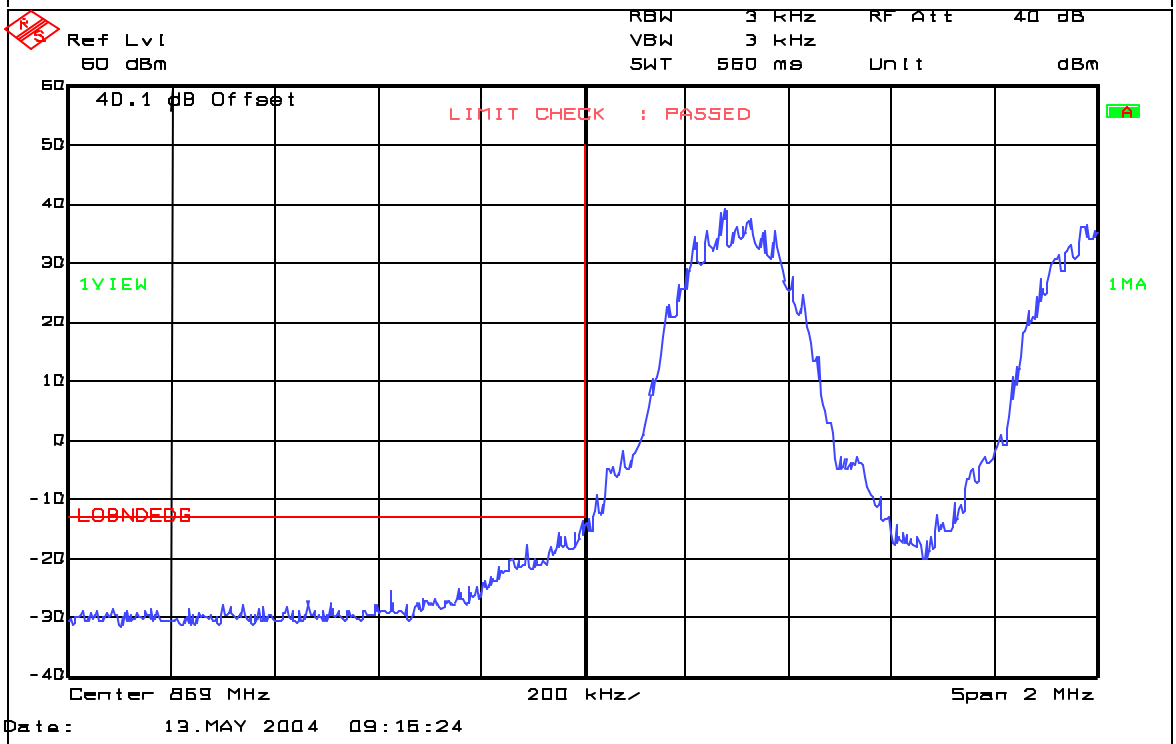
**Data Plot** **Spurious Emissions at Antenna Terminals**

Page 1 of 5 Complete X

Job No.: 4L0360 Date: 5/13/2004 Preliminary:
Specification: PT 22 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD
Sample Number: 1
Location: Lab 1 RBW: Refer to plots Measurement
Detector Type: Peak VBW: Refer to plots Distance: NA m

**Test Equipment Used**

Antenna: Directional Coupler: 1054
Pre-Amp: Cable #1: 1629
Filter: 1060 Cable #2:
Receiver: 1036 Cable #3:
Attenuator #1 1604 Cable #4:
Attenuator #2: Mixer:
Additional equipment used: 1055 1058
Measurement Uncertainty: +/-1.7 dB




**Notes:** **Tx @ 869.3 and 870.0 MHz - 47.97 dBm (62.5 Watts) each. 125 Watts composite power**
**869.3 MHz is lowest channel**
**EDGE**

## Test Data – Spurious Emissions at Antenna Terminals

Highest channel at full power

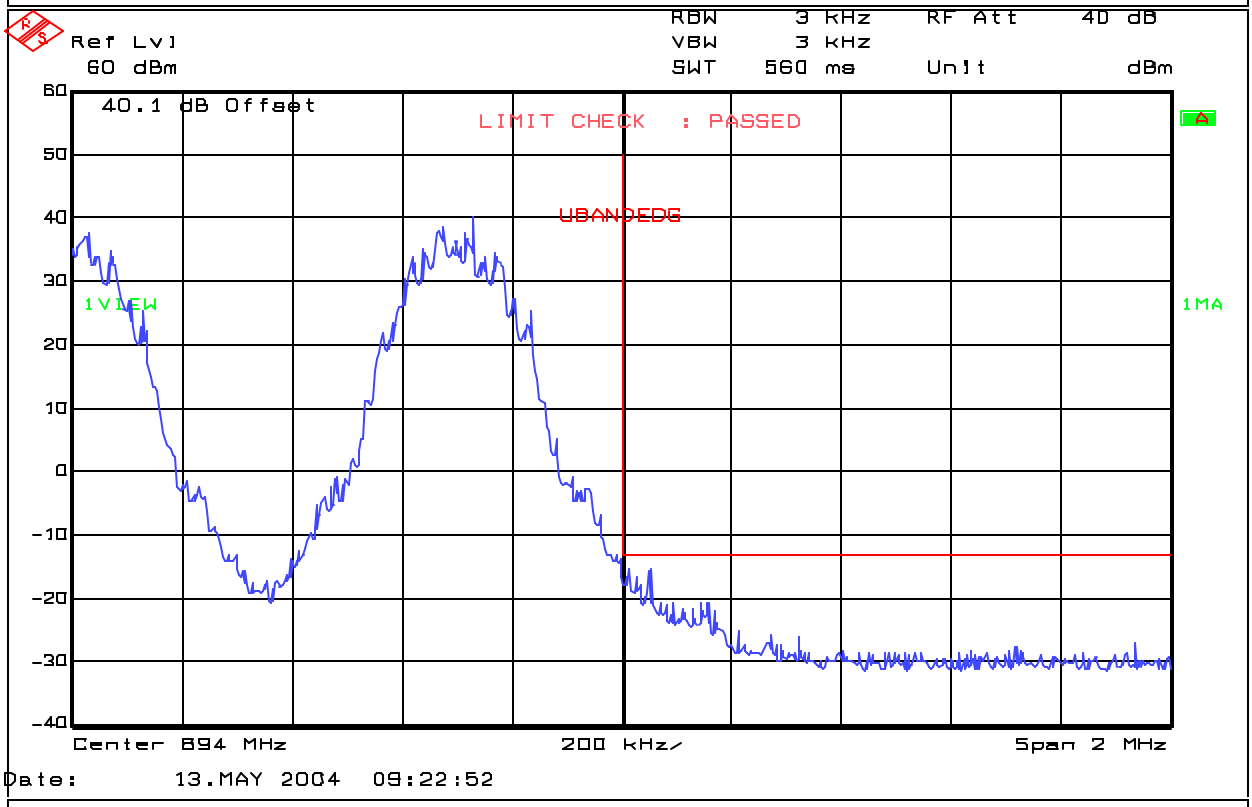
**Dallas Headquarters:**
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

**Nemko Dallas, Inc.**

**Data Plot** **Spurious Emissions at Antenna Terminals**

Page ~~2~~ of 5

Job No.: 4L0360 Date: 5/13/2004
Specification: PT 22 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD




Notes: **Tx @ 893.7 and 893.0 MHz - 47.97 dBm (62.5 Watts) each. 125 Watts composite power**
**893.7 is highest channel**
**EDGE**

## Test Data – Spurious Emissions at Antenna Terminals

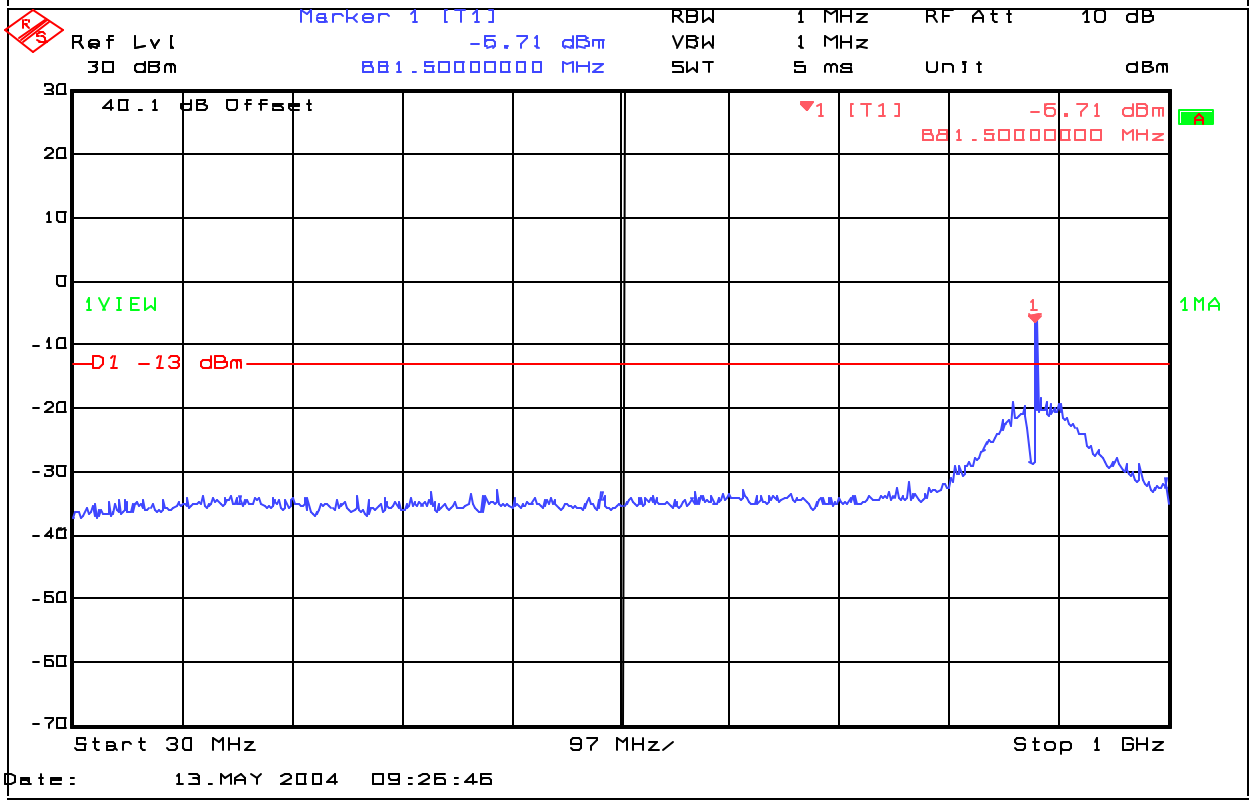
**Dallas Headquarters:**
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

**Nemko Dallas, Inc.**

**Data Plot** **Spurious Emissions at Antenna Terminals**

Page 3 of 5

Job No.: 4L0360 Date: 5/13/2004
Specification: PT 22 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD




Notes: **Marker indicates carrier (NOTCHED)**
**Tx 2 carriers at 125 Watts composite power**
**EDGE**

## Test Data – Spurious Emissions at Antenna Terminals

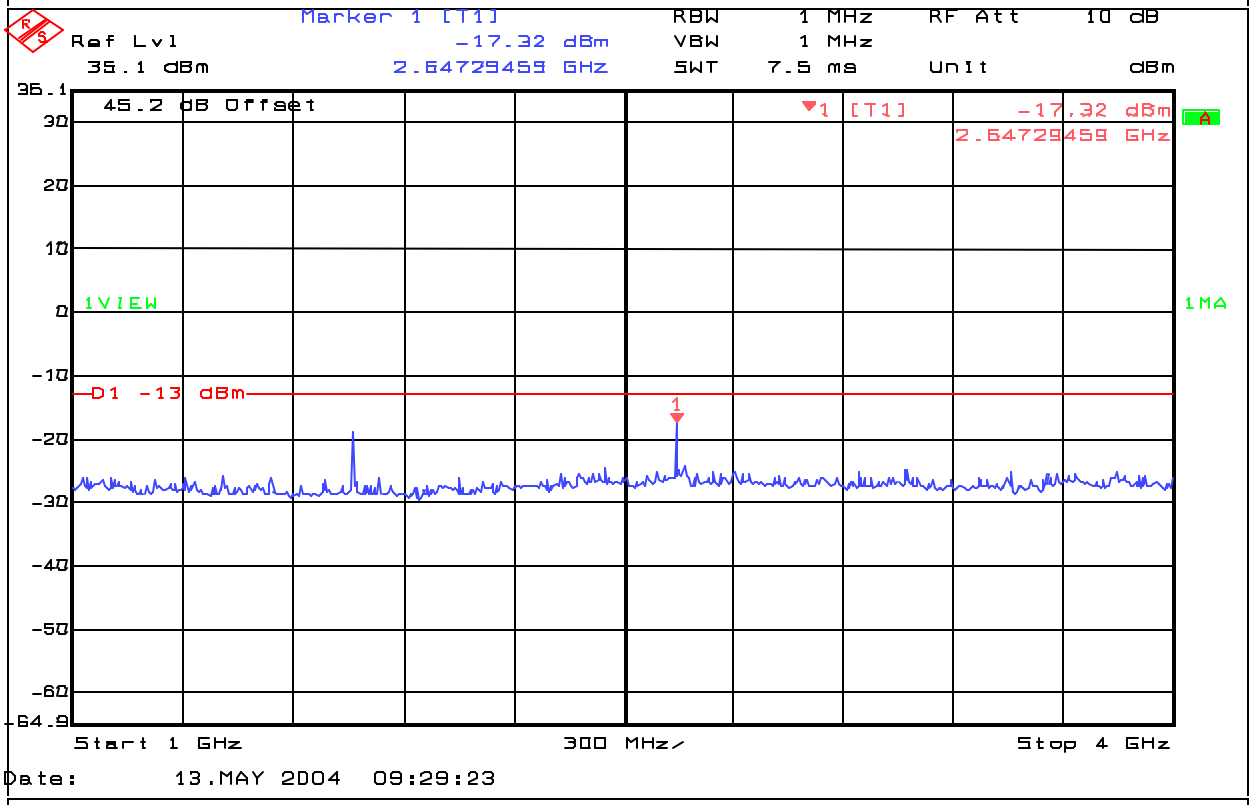
**Dallas Headquarters:**
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

**Nemko Dallas, Inc.**

**Test Plot:** **Spurious Emissions at Antenna Terminals**

Page 4 of 5

Job No.: 4L0360 Date: 5/13/2004
Specification: PT 22 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD




Notes: Markers indicate highest emissions
Tx 2 carriers at 125 Watts composite power
EDGE

## Test Data – Spurious Emissions at Antenna Terminals

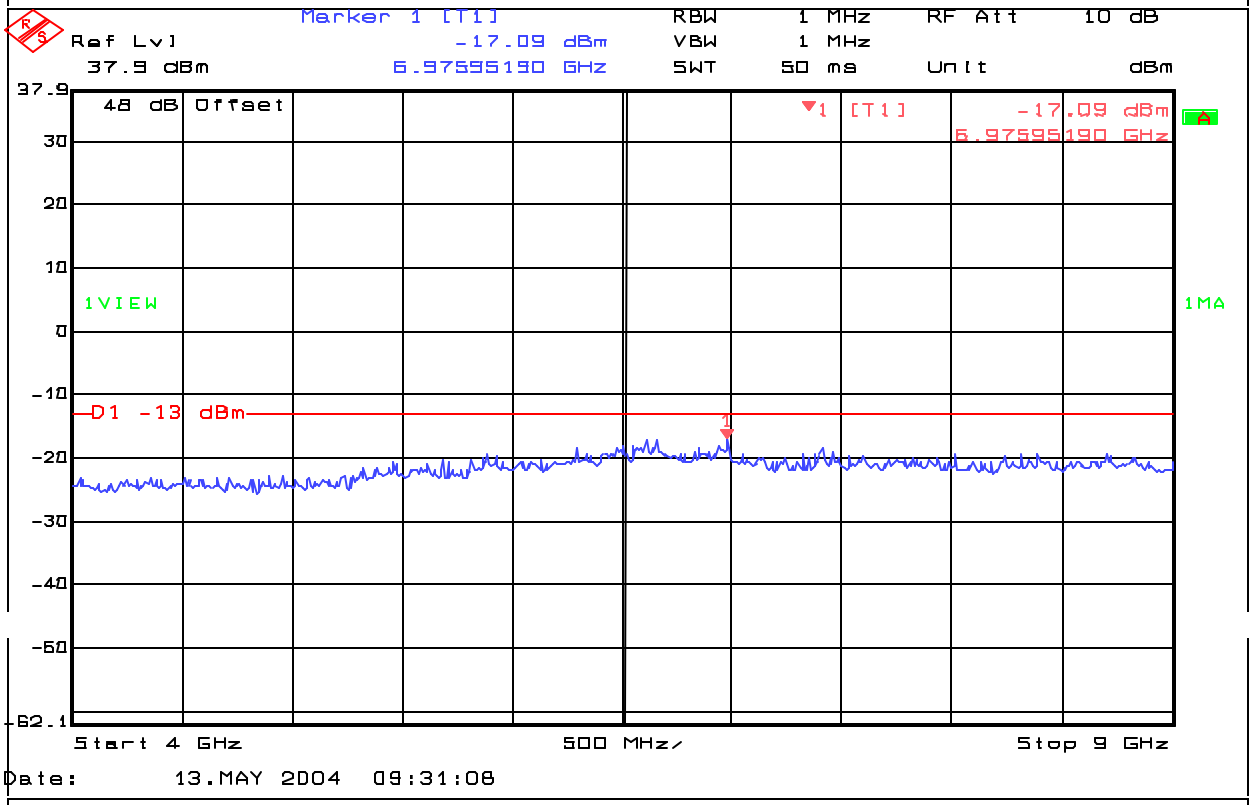
**Dallas Headquarters:**
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

**Nemko Dallas, Inc.**

**Test Plot:** **Spurious Emissions at Antenna Terminals**

Page 5 of 5

Job No.: 4L0360 Date: 5/13/2004
Specification: PT 22 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: DAC-850-125
Configuration: TX FULL POWER INTO LOAD




Notes: **Marker indicates highest emission (Noise floor)**
**Tx 2 carriers at 125 Watts composite power**
**EDGE**

## Test Data – Spurious Emissions at Antenna Terminals

Reduced power at lowest channel

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

**Nemko Dallas, Inc.**

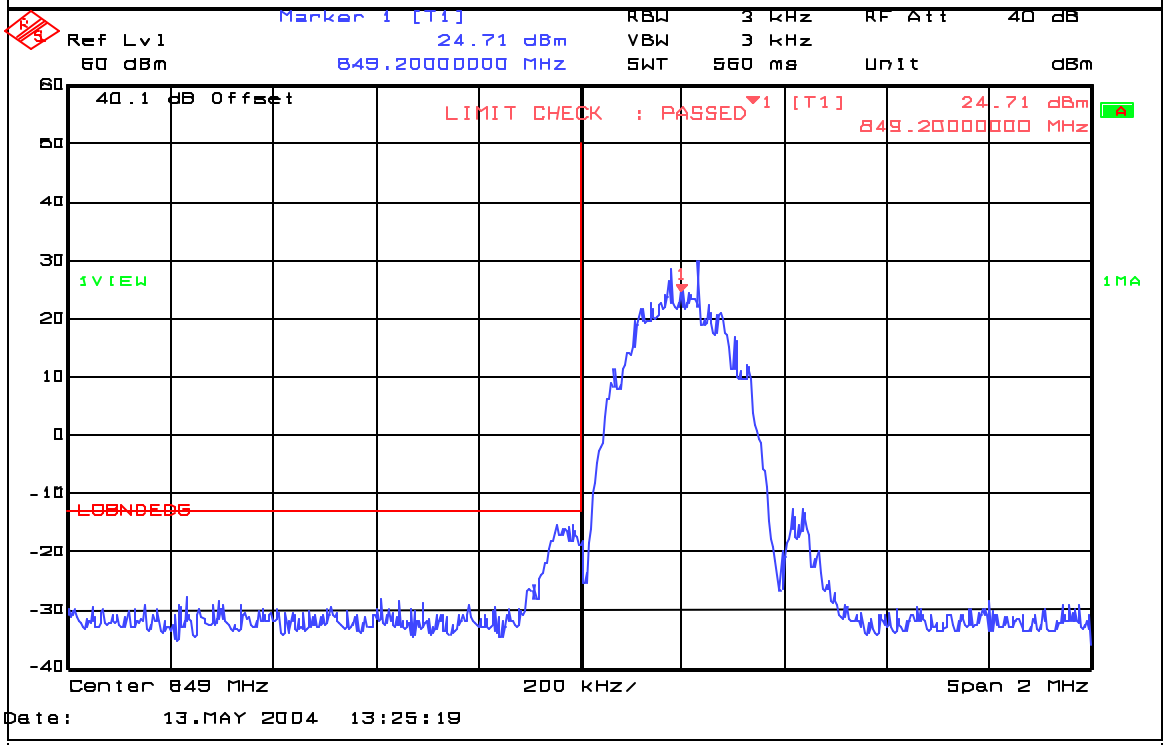
**Data Plot** **Spurious Emissions at Antenna Terminals**

Page 1 of 4 Complete X

Job No.: 4L0360 Date: 5/13/2004 Preliminary:
Specification: PT 22 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: DAC-850-125
Configuration: TX AT REDUCED POWER
Sample Number: 1
Location: Lab 1 RBW: Refer to plots Measurement
Detector Type: Peak VBW: Refer to plots Distance: NA m

**Test Equipment Used**

Antenna: Directional Coupler: 1054
Pre-Amp: Cable #1: 1629
Filter: 1060 Cable #2:
Receiver: 1036 Cable #3:
Attenuator #1 1604 Cable #4:
Attenuator #2: Mixer:
Additional equipment used: 1055 1058
Measurement Uncertainty: +/-1.7 dB




Notes: **EDGE**
**Power output requires lowering RF power to 5.8 Watts to meet bandedge requirements.**

## Test Data – Spurious Emissions at Antenna Terminals

Reduced power at highest channel

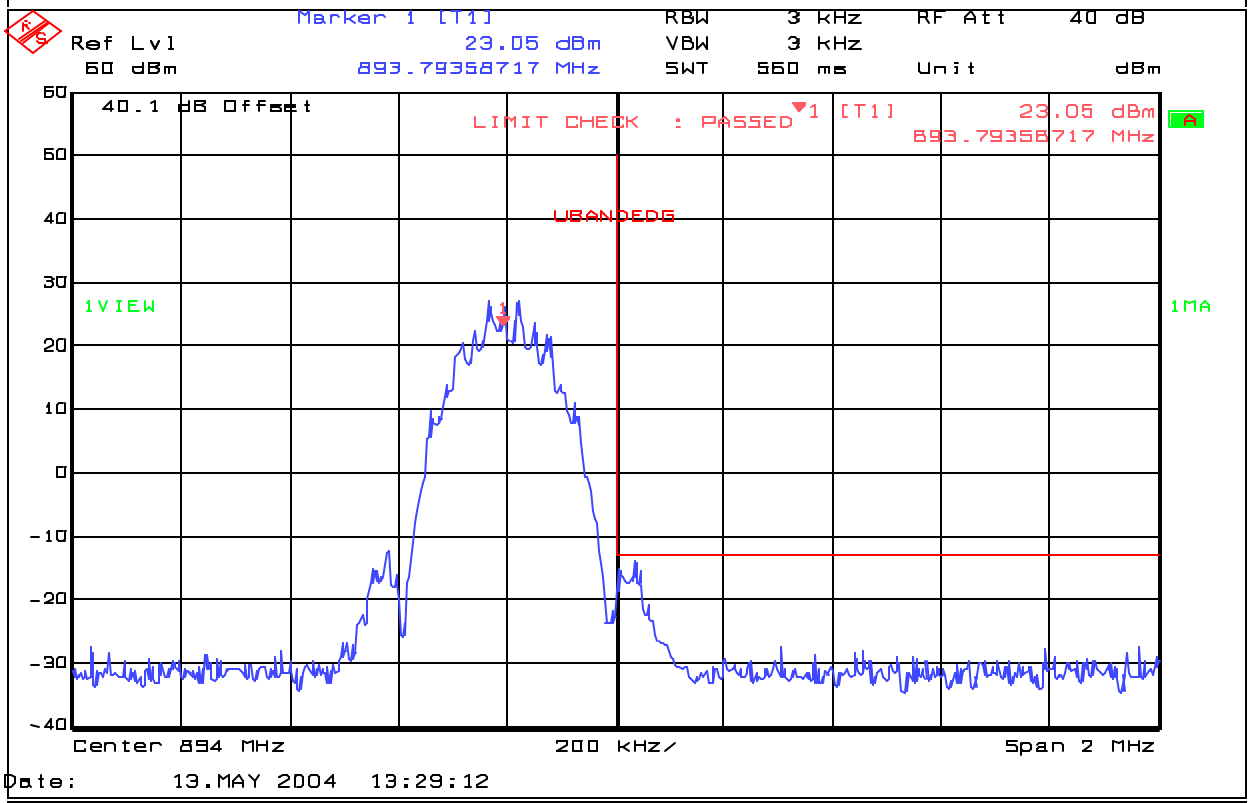
**Dallas Headquarters:**
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

**Nemko Dallas, Inc.**

**Data Plot** **Spurious Emissions at Antenna Terminals**

Page 2 of 4

Job No.: 4L0360 Date: 5/13/2004
Specification: PT 22 Temperature(°C): 22
Tested By: David Light Relative Humidity(%): 50
E.U.T.: DAC-850-125
Configuration: TX AT REDUCED POWER




**Notes:** **EDGE**
**Power output requires lowering RF power to 5.8 Watts to meet bandedge requirements.**

## Test Data – Spurious Emissions at Antenna Terminals

Reduced power at lowest channel

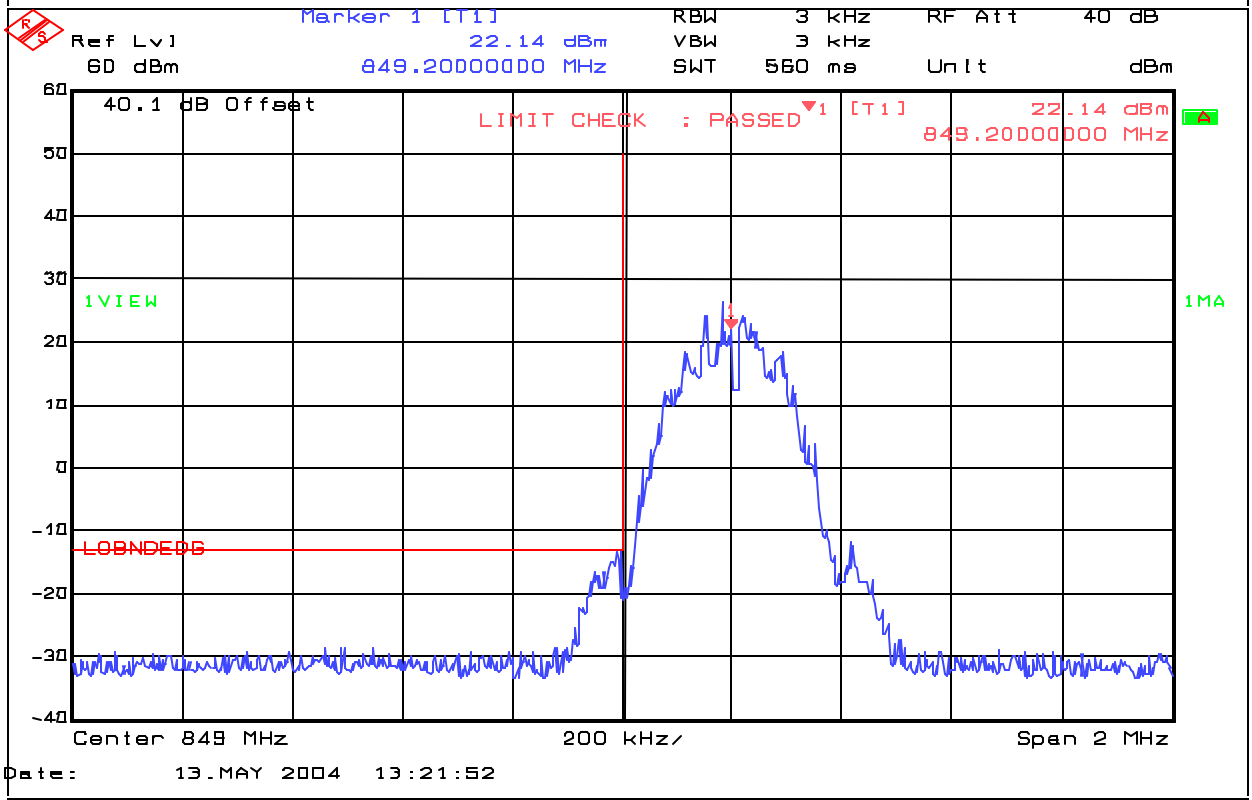
**Dallas Headquarters:**
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

**Nemko Dallas, Inc.**

**Data Plot** **Spurious Emissions at Antenna Terminals**

Page 3 of 4

Job No.: 4L0360 Date: 5/13/2004
Specification: PT 22 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: DAC-850-125
Configuration: TX AT REDUCED POWER




**Notes:** **GSM**
**Power output requires lowering RF power to 3.0 Watts to meet bandedge requirements.**

## Test Data – Spurious Emissions at Antenna Terminals

Reduced power at highest channel

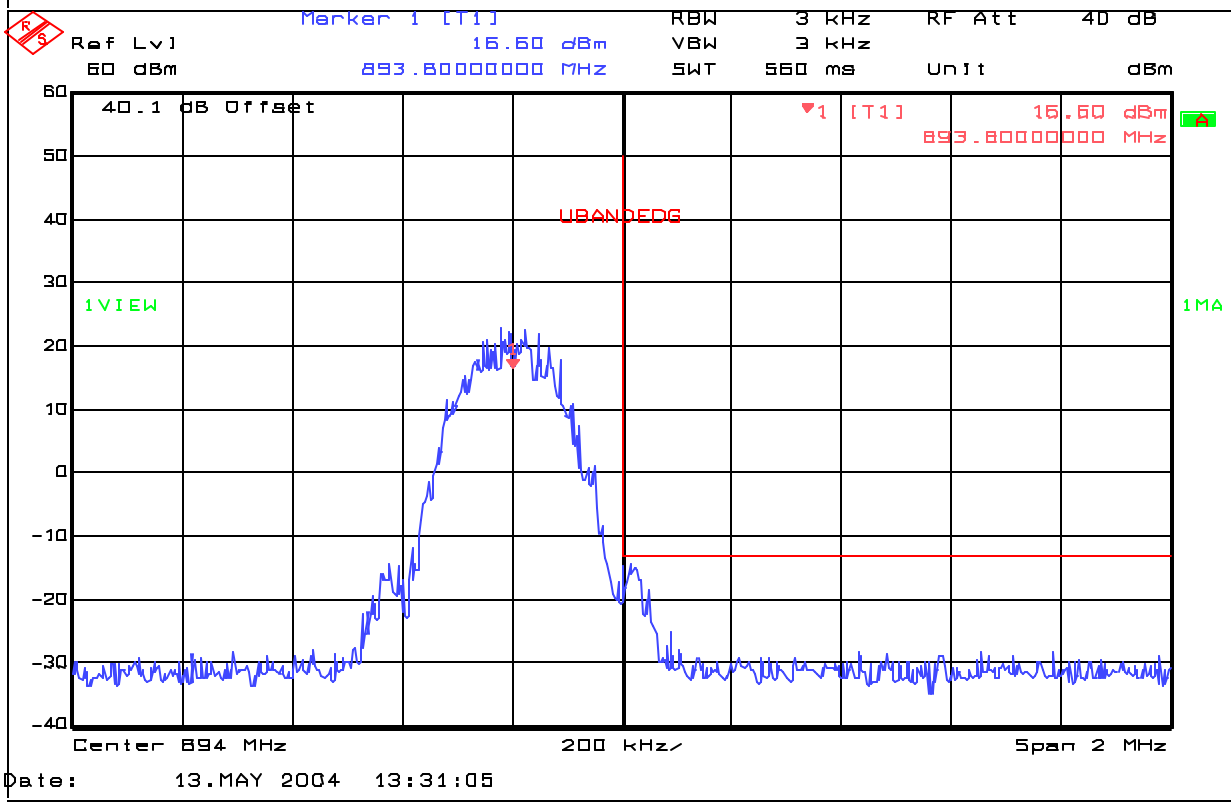
**Dallas Headquarters:**
802 N. Kealy
Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

**Nemko Dallas, Inc.**

**Test Plot:** **Spurious Emissions at Antenna Terminals**

Page 4 of 4

Job No.: 4L0360 Date: 5/13/2004
Specification: PT 22 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 50
E.U.T.: DAC-850-125
Configuration: TX AT REDUCED POWER




**Notes:** **GSM**
**Power output requires lowering RF power to 3.0 Watts to meet bandedge requirements.**

## Section 6. Field Strength of Spurious

| NAME OF TEST: Field Strength of Spurious | PARA. NO.: 2.1053 |
|---|---|
| TESTED BY: David Light | DATE:5/14/2004 |

**Test Results:** Complies.

**Test Data:** See attached table.

## Test Data – Field Strength of Spurious Emissions

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

**Nemko Dallas, Inc.**

### ERP Substitution Method

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Job No.: PT 22 Date: 5/14/2004 Preliminary

Specification: 4L0360 Temperature(°C): 20

Tested By: David Light Relative Humidity(%) 60

E.U.T.: DAC-850-125

Configuration: TX FULL POWER INTO LOAD

Sample No: 1

Location: AC 3 RBW: 1 MHz Measurement

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

**Test Equipment Used**

Antenna: 1304 Directional Coupler:

Pre-Amp: 1016 Cable #1: 1484

Filter: Cable #2: 1485

Receiver: 1464 Cable #3:

Attenuator #1 Cable #4:

Attenuator #2: Mixer:

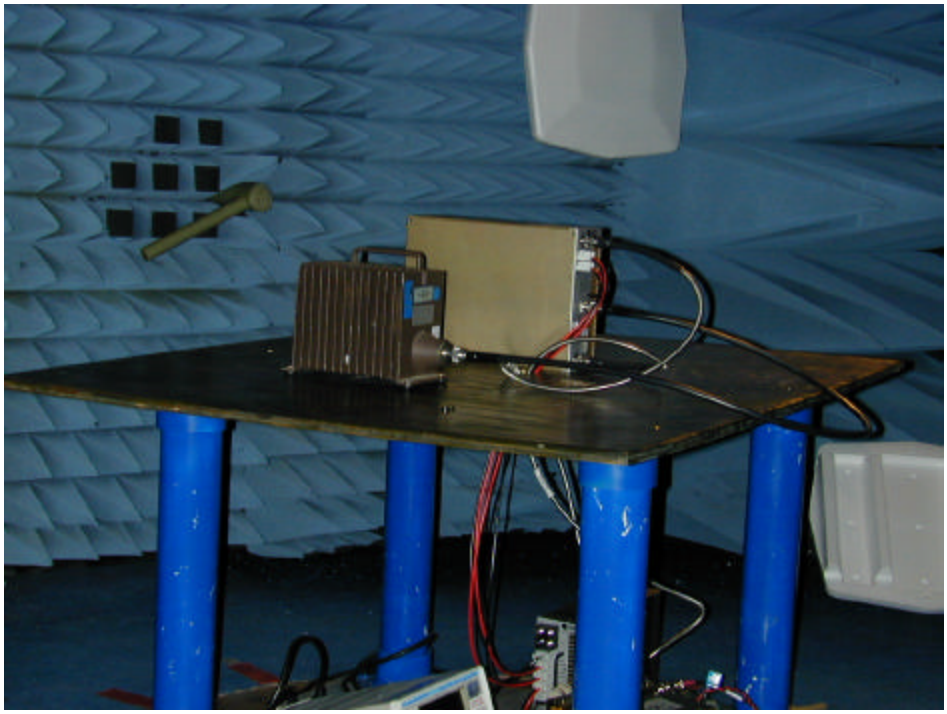
Additional equipment used:

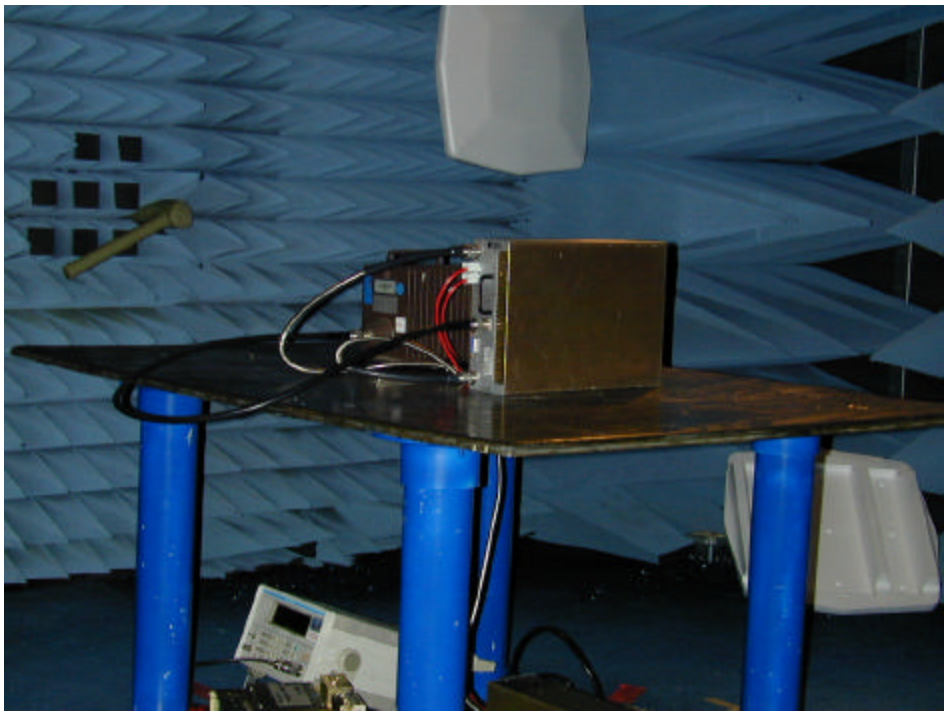
Measurement Uncertainty: +/-1.7 dB

| Frequency (MHz) | Meter Reading (dBm) | Substitution Level (dBm) | | Pre-Amp Gain (dB) | Substitution Antenna Gain (dBd) | ERP (dBm) | Limit (dBm) | Margin (dB) | Polarity | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Tx @ 881.5 MHz |
| 1763 | -32.0 | -33.9 | | 32.9 | 7.3 | -33.9 | -13.0 | -20.9000 | V | |
| 2644.5 | -26.0 | -23.5 | | 33 | 8.0 | -23.5 | -13.0 | -10.5000 | V | |
| 3526 | -48.7 | -38.0 | | 32.6 | 8.6 | -38.0 | -13.0 | -24.9667 | V | |
| 4407.5 | -69.3 | -57.4 | | 33.4 | 8.2 | -57.4 | -13.0 | -44.3667 | V | |
| 5289 | -73.0 | -64.0 | | 32.3 | 8.2 | -64.0 | -13.0 | -50.9667 | V | Noise floor |
| 6170.5 | -74.6 | -65.7 | | 31.6 | 9.6 | -65.7 | -13.0 | -52.7000 | V | Noise floor |
| 7052 | -73.0 | -64.3 | | 32.1 | 8.8 | -64.3 | -13.0 | -51.2667 | V | Noise floor |
| 7933.5 | -72.0 | -63.1 | | 32.9 | 9.2 | -63.1 | -13.0 | -50.0667 | V | Noise floor |
| 8815 | -73.0 | -62.1 | | 33.9 | 9.4 | -62.1 | -13.0 | -49.0667 | V | Noise floor |
| | | | | | | | | | | |
| 1763 | -34.2 | -34.1 | | 32.9 | 7.3 | -34.1 | -13.0 | -21.1000 | H | |
| 2644.5 | -25.6 | -23.1 | | 33 | 8.0 | -23.1 | -13.0 | -10.1000 | H | |
| 3526 | -46.2 | -43.3 | | 32.6 | 8.6 | -43.3 | -13.0 | -30.3000 | H | |
| 4407.5 | -66.5 | -65.1 | | 33.4 | 8.2 | -65.1 | -13.0 | -52.0667 | H | |
| 5289 | -73.0 | -67.0 | | 32.3 | 8.2 | -67.0 | -13.0 | -53.9667 | H | Noise floor |
| 6170.5 | -74.6 | -67.5 | | 31.6 | 9.6 | -67.5 | -13.0 | -54.5333 | H | Noise floor |
| 7052 | -73.0 | -64.8 | | 32.1 | 8.8 | -64.8 | -13.0 | -51.7667 | H | Noise floor |
| 7933.5 | -72.0 | -63.4 | | 32.9 | 9.2 | -63.4 | -13.0 | -50.4000 | H | Noise floor |
| 8815 | -73.0 | -64.7 | | 33.9 | 9.4 | -64.7 | -13.0 | -51.7333 | H | Noise floor |
| | | | | | | | | | | |

**Notes:** **Measured all emissions to the 10th harmonic**

## Test Setup Photos





## Section 7. 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 |
| 1060 | TUNABLE NOTCH FILTER | K&L 3TNF-500/1000-N/N | 162 | CBU | N/A |
| 1604 | ATTENUATOR | NARDA 776B-20 | NONE | CBU | N/A |
| 1054 | DUAL DIRECTIONAL COUPLER | NARDA 3020A | 34366 | CBU | N/A |
| 1055 | DUAL DIRECTIONAL COUPLER | NARDA 3022 | 73393 | CBU | N/A |
| 1058 | DUAL DIRECTIONAL COUPLER | HEWLETT PACKARD 11692D | 1212A03366 | CBU | N/A |
| 1629 | CABLE, 6 ft | MEGAPHASE 10311 1GVT4 | N/A | CBU | N/A |
| 1464 | Spectrum analyzer | Hewlett Packard 8563E | 3551A04428 | 02/11/03 | 02/11/05 |
| 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 |
| 1304 | HORN ANTENNA | ELECTRO METRICS RGA-60 | 6151 | 09/22/03 | 09/22/05 |
| 759 | ANTENNA, LOG PERIODIC | A.H. SYSTEMS SAS-200/510 | 556 | 07/02/03 | 07/01/04 |
| 760 | Antenna biconical | Electro Metrics MFC-25 | 477 | 06/05/03 | 06/04/04 |
| 791 | PREAMP, 25dB | ICC LNA25 | 398 | 10/27/03 | 10/26/04 |

# ANNEX A - TEST DETAILS

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

**Minimum Standard:** Para. No. 22.913(a). The maximum effective radiated power (ERP) of base transmitters and cellular repeaters must not exceed 500 watts.

**Method of Measurement:**

Detachable Antenna:
The peak power at antenna terminals is measured using an in-line peak power meter or a spectrum analyzer with sufficient bandwidth. 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 (Voice & SAT) PARA. NO.: 2.1049**

**Minimum Standard:** Not defined by FCC. Input vs. Output.

**Method Of Measurement:**

Spectrum Analyzer Settings:

RBW: 300 Hz
VBW: ? RBW
Span: 100 kHz
Sweep: Auto

Input Signal Characteristics (F3E/F3D):

RF level: Maximum recommended by manufacturer
AF1 frequency: 6 kHz
AF1 level: sufficient to produce 2 kHz deviation
AF2 frequency: 2.5 kHz
AF2 level: sufficient to produce 12 kHz deviation.

**NAME OF TEST: Occupied Bandwidth (WB Data)** **PARA. NO.: 2.1049**

**Minimum Standard:** Not defined by FCC. Input vs. Output.

**Method Of Measurement:**

Spectrum Analyzer Settings:
RBW: 300 Hz
VBW: ? RBW
Span: 200 kHz
Sweep: Auto

Input Signal Characteristics:
RF level: Maximum recommended by manufacturer
AF1 frequency: 10 kHz, random bit sequence
AF1 level: sufficient to produce 8 kHz deviation

**NAME OF TEST: Occupied Bandwidth (ST)** **PARA. NO.: 2.1049**

**Minimum Standard:** Not defined by FCC. Input vs. Output.

**Method Of Measurement:**

Spectrum Analyzer Settings:
RBW: 300 Hz
VBW: ? RBW
Span: 200 kHz
Sweep: Auto

Input Signal Characteristics:
RF level: Maximum recommended by manufacturer
AF1 frequency: 10 kHz tone
AF1 level: sufficient to produce 8 kHz deviation

**NAME OF TEST: Occupied Bandwidth (Digital Modulation) PARA. NO.: 2.1049**

**Minimum Standard:** Not defined by FCC. Input vs. Output.

**Method Of Measurement:**

Spectrum Analyzer Settings:
RBW: CDMA (30 kHz), GSM (30 kHz), NADC (1 kHz) and CDPD (1 kHz)
VBW: ? RBW
Span: As required
Sweep: Auto

Input Signal Characteristics:
RF level: Maximum recommended by manufacturer

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

**Minimum Standard:** Para. No. 22.917(a). Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. This is equivalent to -13 dBm absolute power.

**Method Of Measurement:**

Spectrum Analyzer Settings:
RBW: 30 kHz (AMPS). As required for digital modulations.
VBW: ? RBW
Start Frequency: 0 MHz
Stop Frequency: 10 GHz
Sweep: Auto

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

**Minimum Standard:** Para. No. 22.917(a). Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. This is equivalent to -13 dBm absolute power.

**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. 22.355. The transmitter carrier frequency shall remain within the tolerances given in Table C-1.

Table C-1

| Freq. Range (MHz) | Base, fixed | Mobile > 3 W | Mobile ? 3 W |
|---|---|---|---|
| 821 to 896 | 1.5 | 2.5 | 2.5 |

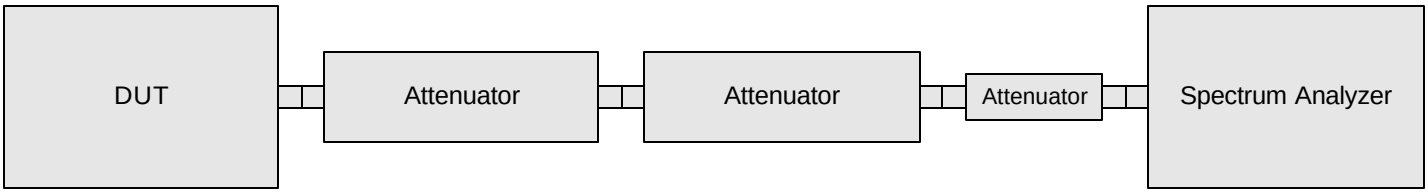
**Method Of Measurement:**

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.

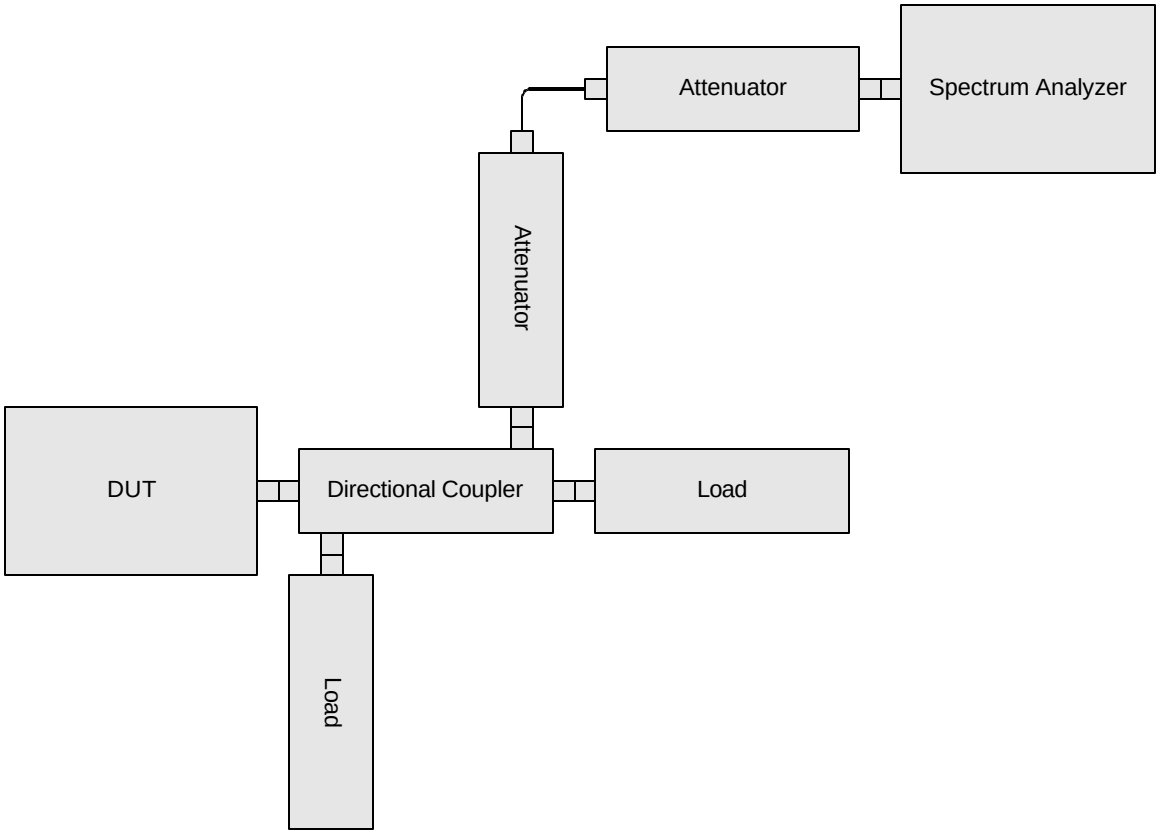
Frequency Stability With Temperature Variation:
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30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

# ANNEX B - TEST DIAGRAMS

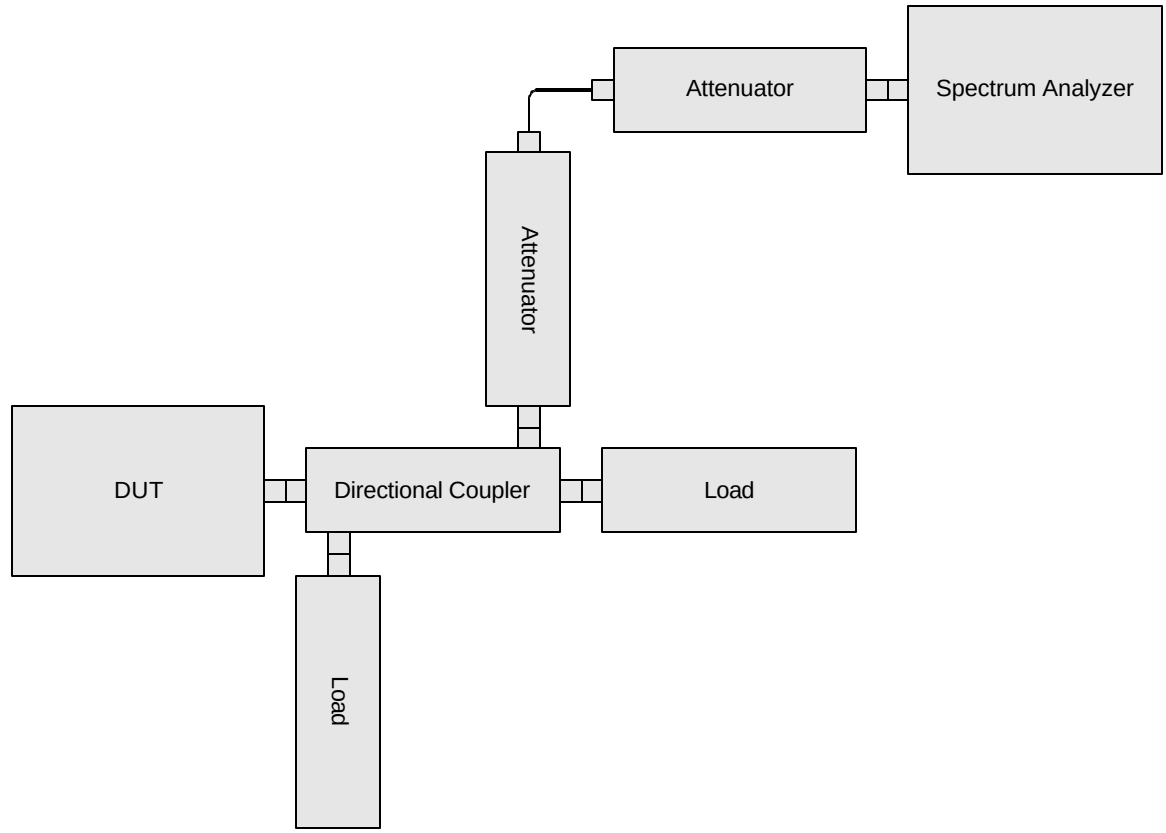
### Para. No. 2.1046 - R.F. Power Output

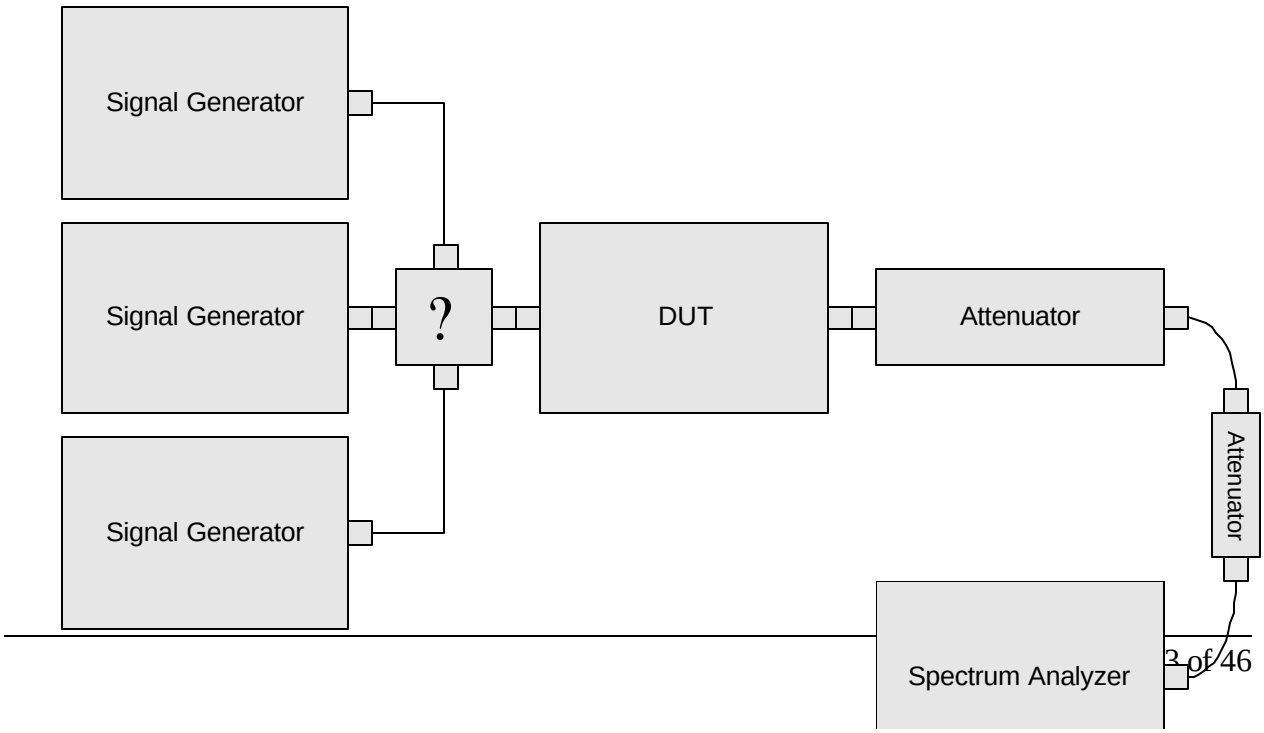



### Para. No. 2.1049 - Occupied Bandwidth

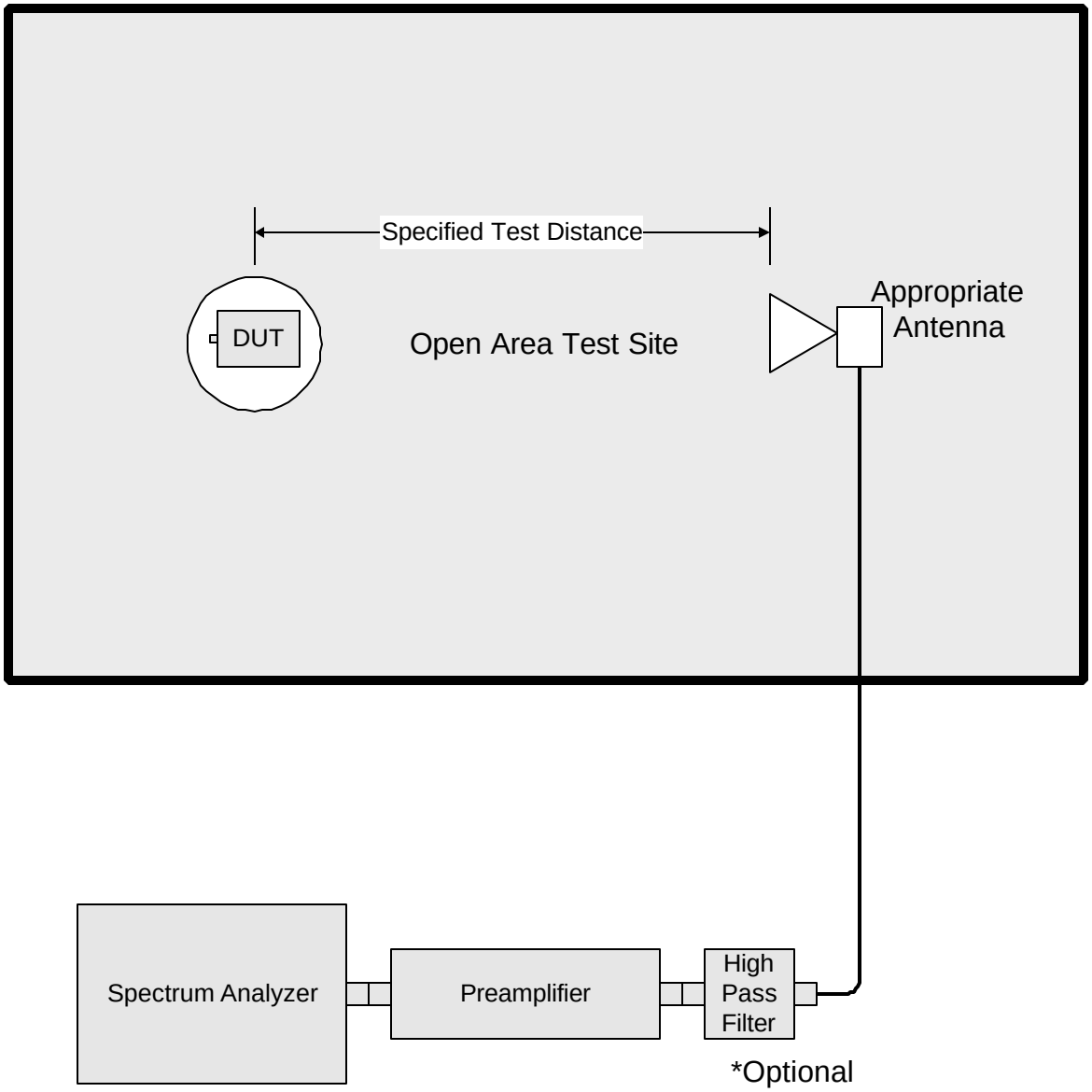


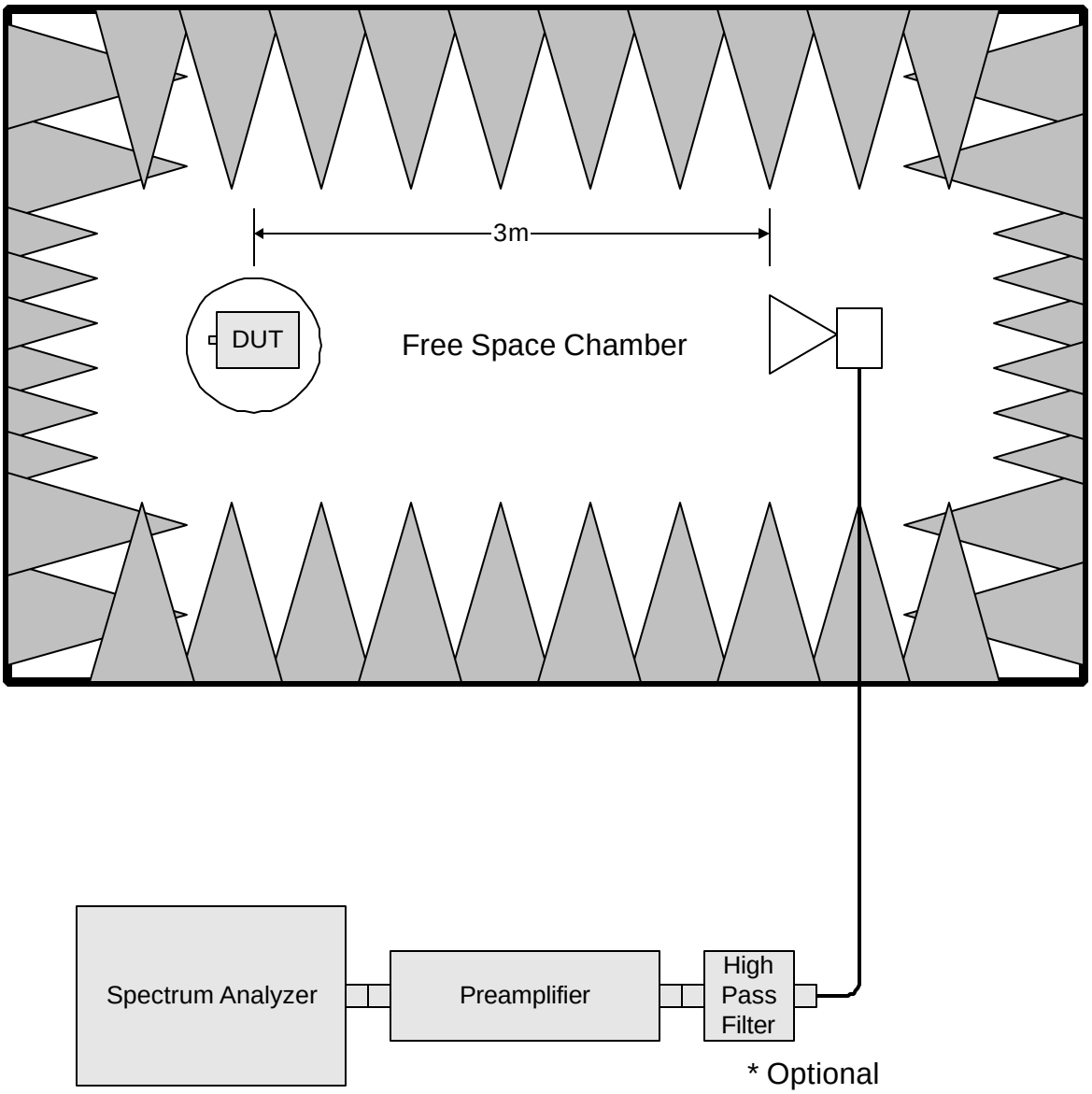
**Para. No. 2.1051 Spurious Emissions at Antenna Terminals**



**Para. No. 2.1053 - Field Strength of Spurious Radiation**




3m
DUT
Free Space Chamber
Spectrum Analyzer
Preamplifier
High Pass Filter
* Optional

**Para. No. 2.1055 - Frequency Stability**