| Nemko Test Report:                | 4L0490RUS2REV2   |
|-----------------------------------|--|
| Applicant:                        | Andrew Corporation   |
| Equipment Under Test:<br>(E.U.T.) | TFAN 80/19   |
| In Accordance With:               | FCC Part 90, Subpart I Private Land Mobile Repeater            |
| Tested By:                        | Nemko Dallas Inc.<br>802 N. Kealy<br>Lewisville, TX 75057-3136 |
| Authorized By:                    | Tom Tidwell, Frontline Group Manager                           |
| Date:                             | 18 October, 2004   |
| Total Number of Pages:            | 36   |

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| Section 1.    | Summary of Test  | Results               |                          |
|---------------|--|-----------------------|--------------------------|
|               |  |                       |                          |
| Manufacturer: | Andrew Corporation   |                       |                          |
| Model No.:    | TFAN 80/19   |                       |                          |
| Serial No.:   | 042202202  |                       |                          |
| General:      | All measurements are   | traceable to nation   | nal standards.           |
|               | ere conducted on a sample of the ith FCC Part 90, Subpart I. | e equipment for the J | purpose of demonstrating |
|               | New Submission   |                       | Production Unit          |
|               | Class II Permissive Change                                   |                       | Pre-Production Unit      |
|               | THIS TEST REPORT RELATE                                      | S ONLY TO THE IT      | EM(S) TESTED.            |

THE FOLLOWING DEVIATIONS FROM, ADDITIONS TO, OR EXCLUSIONS FROM THE TEST SPECIFICATIONS HAVE BEEN MADE. NONE

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### **Summary Of Test Data**

| NAME OF TEST                               | PARA. NO.         | SPEC. | RESULT   |
|--|-------------------|-------|----------|
| RF Power Output                            | 90.205            |       | Complies |
| Audio Frequency Response                   | TIA EIA-603.3.2.6 | N/A   | N/A      |
| Audio Low-Pass Filter Response             | TIA EIA-603.3.2.6 | N/A   | N/A      |
| Modulation Limiting                        | TIA EIA-603.3.2.6 | N/A   | N/A      |
| Occupied Bandwidth                         | 90.210            | Plots | Complies |
| Spurious Emissions at Antenna<br>Terminals | 90.210            | Plots | Complies |
| Field Strength of Spurious Emissions       | 90.210            |       | Complies |
| Frequency Stability                        | 90.213            |       | N/A      |
| Transient Frequency Behavior               | 90.214            | N/A   | N/A      |

### **Footnotes For N/A's:**

- (1) Since the E.U.T. does not contain modulation circuitry modulation testing was not performed.
- (2) Since the E.U.T. is not a keyed carrier system, Transient Frequency Behavior was not performed.

.

# Section 2. General Equipment Specification

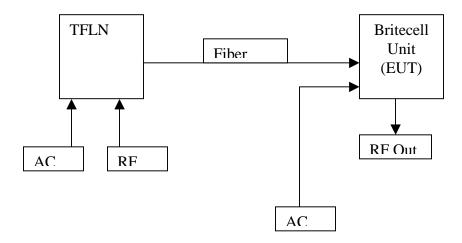
| Transmitter                     |                       |                           |         |         |                    |                      |
|---------------------------------|-----------------------|---------------------------|---------|---------|--------------------|----------------------|
| Supply Voltage Input:           |                       | 115 Vac                   |         |         |                    |                      |
| Frequency Range:                |                       | 851 to 869 l              | MHz     |         |                    |                      |
| Tunable Bands:                  |                       | Full band co              | overage |         |                    |                      |
| Type(s) of Modulation:          |                       | F3E<br>(Voice)            | F1D     | F2D     | D7W<br>(iDEN)      | Other                |
| Maximum Input:                  |                       | +10 dBm                   |         |         |                    |                      |
| Output Impedance:               |                       | 50 ohms                   |         |         |                    |                      |
| RF Power Output (rated):        | Single:<br>Composite: | 21 dBm (12<br>17.5 dBm (5 |         |         |                    |                      |
| Operator Selection of Operating | Frequency:            | None                      |         |         |                    |                      |
| Power Output Adjustment Capa    | bility:               | Software                  |         |         |                    |                      |
| Frequency Translation:          |                       |                           | ]       | F1-F1   | F1-F2              | N/A                  |
| Band Selection:                 |                       |                           | So      | oftware | Duplexer<br>Change | Fullband<br>Coverage |

### **Description of Operation**

**TFAN 80/19** 

Britecell Plus is a radio over fiber system operation in the 1900 PCS and SMR bands.

### **System Diagram**



# Section 3. RF Power Output

NAME OF TEST: RF Power Output PARA. NO.: 2.985

TESTED BY: Dustin Oaks DATE: 8/13/04

**Test Results:** Complies.

**Measurement Data:** 

| Modulation | Measured Power (mW) | Measured Power (dBm) | Rated Power (dBm) |
|------------|---------------------|----------------------|-------------------|
| Analog     | 11.4mW              | 21.14                | 21.00             |
| iDEN       | 5.7mW               | 15.12                | 15.00             |

Nemko Dallas

EQUIPMENT:

FCC PART 90, SUBPART I PRIVATE LAND MOBILE REPEATER TEST REPORT NO.: 4L0490RUS2REV2

# Section 4. Occupied Bandwidth

**TFAN 80/19** 

NAME OF TEST: Occupied Bandwidth PARA. NO.: 2.989

TESTED BY: David Light DATE: 7/29/04

**Test Results:** Complies.

**Test Data:** See attached graph(s).

Page 8 of 36

Date:

Notes:

28.JUL.2004

2.5 kHz TONE - 2 kHz DEVIATION

ANALOG OUTPUT

06:03:37

#### EQUIPMENT: **TFAN 80/19**

### **Test Data – Occupied Bandwidth (Input/Output)**



Dallas Headquarters: 802 N. Kealy Lewisville, TX 75057

Tel: (972) 436-9600 Fax: (972) 436-2667

|                   | IKO Dai           | las, Inc.                                    |          |  |  |  |          |              |           |                     |      |
|-------------------|-------------------|--|----------|--|--|--|----------|--------------|-----------|---------------------|------|
| <u> Data Plot</u> |                   |  |          | <u>Oc</u>  | cupied Ba  | <u>ındwidth</u>                                  |          |              |           |                     |      |
| Page 1 of         | f <u>4</u>        |  |          |  |  |  |          | Complete     | X         |                     |      |
| b No.:            |                   |  |          | Date:  | 7/28/2004  |  |          | Preliminary: |           |                     |      |
| pecification:     |                   |  | Tem      | perature(°C):                                    | 22   |  |          |              |           |                     |      |
| ested By:         | David Li          | ight   | Relative | Humidity(%)                                      | 40   |  |          |              |           |                     |      |
| U.T.:             | Dual Bar          | nd Amp                                       |          |  |  |  |          |              |           |                     |      |
| onfiguration:     | Tx full p         | ower   |          |  |  |  |          |              |           |                     |      |
| mple Number:      | 1                 |  |          | -  |  |  |          |              |           |                     |      |
| cation:           | Lab 1             | 1  |          |  | RBW: I   | Refer to plots                                   |          | Measurement  |           |                     |      |
| etector Type:     | Peak              | <u>:                                    </u> |          |  | VBW: <u>1</u>                                    | Refer to plots                                   |          | Distance:    | na ı      | m                   |      |
| est Equipme       | ent Used          | <u>l</u>                                     |          |  |  |  |          |              |           |                     |      |
| itenna:           |                   | ='   |          | Direc  | tional Coupler:                                  |  |          |              |           |                     |      |
| -Amp:             |                   |  |          |  | Cable #1:  | 1626   |          |              |           |                     |      |
| ter:              |                   |  |          |  | Cable #2:  | 1627   |          |              |           |                     |      |
| ceiver:           | 1036              | <del></del>                                  |          |  | Cable #3:  | <u> </u>   |          |              |           |                     |      |
| enuator #1        | 1471              |  |          |  | Cable #4:  |  |          |              |           |                     |      |
| enuator #2:       |                   |  |          |  | Mixer:   | -  |          |              |           |                     |      |
| ditional equip    | ment used         | :  |          |  |  |  |          |              |           |                     |      |
| asurement Un      |                   | +/-1.7 0                                     | IB       |  |  |  |          |              |           |                     |      |
|                   |                   |  |          |  |  |  |          |              |           |                     |      |
|                   |                   |  |          |  |  | RBW  |          | Hz RF        | - Att     | 30 dB               |      |
| Ref               |                   |  |          |  |  | VBW  | 300      | Hz           |           |                     |      |
|                   | dBm               |  |          |  |  | SWT  | 1.7      | s Ur         | nīt       | dBm                 | 1    |
| 20 10             | 1.7 b             | B Offs                                       | e t      |  |  |  |          |              |           |                     | 1    |
|                   | Γ.                |  | -        |  |  |  |          |              |           |                     | A    |
| 10                |                   |  |          | ļ  |  | <u> </u>   |          | ļ            |           | ļ                   |      |
|                   |                   |  |          |  | Α  | ///  |          |              |           |                     |      |
| _                 |                   |  |          |  | 1/\  | $H \setminus A$                                  |          |              |           |                     |      |
|                   |                   |  |          | †  | 1/ \   |  |          |              |           | i                   | 1    |
|                   |                   |  |          |  | 1/ \   |  |          |              |           |                     |      |
| - 10              |                   |  |          | <u> </u>   |  |  | Λ.       |              |           |                     |      |
|                   |                   |  |          | 1 /\   |  |  | / /      |              |           |                     | 1 AF |
|                   |                   |  |          | 1 / 1  |  |  | I / \    |              |           |                     |      |
| -20               |                   |  |          |  |  |  |          |              |           | i                   | 1    |
|                   |                   |  | ٨        | 111  |  |  |          | Λ            |           |                     |      |
| -30               |                   |  |          | +  | +  |  |          | $\perp$      |           |                     |      |
|                   |                   |  | I /\     |  |  |  | 1 1      | I / \        |           |                     |      |
|                   |                   |  |          | 111  |  |  |          | 1 / 1        |           |                     |      |
| -40               |                   |  |          |  | 1  |  |          |              |           |                     |      |
|                   |                   | ٨  |          |  |  |  |          | 1   1        | Λ.        |                     |      |
| -50               | $\longrightarrow$ |  |          | +  |  |  | $\sqcup$ | +            | $\square$ | 1                   | Į    |
|                   |                   |  |          |  | .[] [/]  | Man.   |          |              |           |                     |      |
|                   | - 1               | / \  |          |  |  | TWI  |          | 1   1        |           |                     |      |
| -60               | -+                |  |          | <del>                                     </del> |  | <del>                                     </del> |          | ,            |           | 1                   | 1    |
|                   | allel             | الأألية.                                     | h, I ha  |  |  |  |          |              | h ( h.    | LAL                 |      |
| -70 H-W           |                   |  |          |  | <del>                                     </del> |  | L-11     | عيا المالية  | ╟┪═╫╁╅┼   | المرابا ومواللا الم |      |
|                   |                   | // //  | W ľ      | 7  | '  |  |          | TI N         |           |                     |      |
| -80               | ter 8             | 60 MHz                                       |          |  |  | kHz/   |          |              | Spar      | 30 kHz              |      |

Page 9 of 36

### **Test Data – Occupied Bandwidth (Input/Output)**



#### Dallas Headquarters:

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

Nemko Dallas, Inc. Occupied Bandwidth **Data Plot** Page 2 of 4 Job No.: Date: 7/28/2004 Temperature(°C): 22 Specification: Tested By: David Light Relative Humidity(%) 40 Dual Band Amp E.U.T.: Configuration: Tx full power RBW 300 Hz 30 dB Ref Lv1 VBW 300 Hz 9.3 dBm SWT 1.7 s Unit dBm 9.3 A -10-20 1AP -30 -4r -50 -60 -70 -80 860 MHz 3 kHz/ Date: 28.JUL.2004 06:05:55 ANALOG INPUT Notes: 2.5 kHz TONE - 2 kHz DEVIATION

### **Test Data – Occupied Bandwidth (Input/Output)**



#### Dallas Headquarters:

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

Nemko Dallas, Inc. **Data Plot Occupied Bandwidth** Page <u>3</u> of 4 Date: <u>7/28/200</u>4 Job No.: Specification: Temperature(°C): 22 Tested By: David Light Relative Humidity(%) 40 E.U.T.: Dual Band Amp Configuration: Tx full power RBW 30 dB 300 Hz Ref Lv1 VBW 300 Hz 20 dBm SWT 1.4 s Unit dBm dB Offset Α Muller - 1C 1VIEW 1MA -20 -30 -40 -50 -60 -80 2.5 kHz/ Center 860 MHz Span 25 kHz 28.JUL.2004 06:12:37 ate: iDEN Output Notes:

### **Test Data – Occupied Bandwidth (Input/Output)**



#### Dallas Headquarters:

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

Nemko Dallas, Inc. **Data Plot Occupied Bandwidth** Page 4\_of 4 Date: <u>7/28/200</u>4 Job No.: Specification: Temperature(°C): 22 Tested By: David Light Relative Humidity(%) 40 E.U.T.: Dual Band Amp Configuration: Tx full power RBW 30 dB 300 Hz Ref Lv1 VBW 300 Hz 9.3 dBm SWT 1.4 s Unit dBm Α -10 -20 1VIEW 1MA -30 -50 -60 -90.7 2.5 kHz/ Center 860 MHz Span 25 kHz 28.JUL.2004 06:14:40 Date: iDEN Input Notes:

Nemko Dallas

EQUIPMENT:

FCC PART 90, SUBPART I PRIVATE LAND MOBILE REPEATER **TEST REPORT NO.: 4L0490RUS2REV2** 

# Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals PARA. NO.: 2.991

TESTED BY: David Light DATE: 7/27/04

**Test Results:** Complies.

**Test Data:** See attached graph(s).

**TFAN 80/19** 

Page 13 of 36

### **Test Data – Spurious Emissions at Antenna Terminals**



802 N. Kealy Lewisville, TX 75057

Tel: (972) 436-9600 Fax: (972) 436-2667

Dallas Headquarters:

#### Nemko Dallas, Inc.

| Data Plot        |                           |                    | Emis              | ssion M  | <u> Iasks</u> |               |                |              |                |     |
|------------------|---------------------------|--------------------|-------------------|----------|---------------|---------------|----------------|--------------|----------------|-----|
| Page 1 of        | f <u>4</u>                |                    |                   |          |               |               | Complete       | X            |                |     |
| Job No.:         | 4L0490R                   | I                  | Date: 7/28        | 3/2004   |               |               | Preliminary:   |              |                | ·-  |
| Specification:   | PT90                      | Temperature        | e(°C): 22         | 2        |               |               | •              |              |                |     |
| Tested By:       | David Light               | Relative Humidi    | ty(%) 40          | 0        |               |               |                |              |                |     |
| E.U.T.:          | DUAL BAND AMP             | <del></del>        |                   |          |               |               |                |              |                |     |
| Configuration:   | TX FULL POWER             |                    |                   |          |               |               |                |              |                |     |
| Sample Number:   | 1                         |                    |                   |          |               |               |                |              |                |     |
| Location:        | Lab 1                     |                    |                   | RBW: Re  | fer to plots  |               | Measurement    |              |                |     |
| Detector Type:   | Peak                      |                    |                   |          | fer to plots  |               | Distance:      | NA m         | 1              |     |
| 31               |                           |                    |                   |          |               |               | •              | -            |                |     |
| Test Equipme     | ent Used                  |                    |                   |          |               |               |                |              |                |     |
| Antenna:         |                           |                    | Directional C     | Coupler: |               |               |                |              |                |     |
| Pre-Amp:         |                           |                    | Ca                | able #1: | 1627          |               |                |              |                |     |
| Filter:          |                           |                    |                   | able #2: | 1628          |               |                |              |                |     |
| Receiver:        | 1036                      |                    |                   |          |               |               |                |              |                |     |
| Attenuator #1    | 1471                      |                    |                   | able #4: |               |               |                |              |                |     |
| Attenuator #2:   |                           |                    |                   | Mixer:   |               |               |                |              |                |     |
| Additional equip | ment used:                |                    |                   |          |               |               |                |              |                |     |
| Measurement Un   |                           | B                  |                   |          |               |               |                |              |                |     |
|                  |                           |                    |                   |          |               |               |                |              |                |     |
|                  |                           | Marker 1           | [T1]              |          | RBU           | 300           |                | Att          | 40 dB          |     |
| Ref              |                           |                    | -61.97            |          | VBW           | 300           |                |              |                |     |
|                  | dBm                       | 867.45             | 5000000           | MHZ      | SWT           | 5.6           | s Ur           | nīt          | dBm            |     |
| 21               | 1.7 dB Offse              | e t                |                   |          | 1             |               |                |              |                |     |
|                  |                           |                    |                   |          | . \           |               |                |              |                | A   |
| 10               |                           |                    |                   |          |               |               |                |              |                |     |
|                  |                           |                    |                   | /        |               |               |                |              |                |     |
|                  |                           |                    |                   |          |               |               |                |              |                |     |
| 0                |                           |                    | <del> </del>      |          |               |               |                |              |                |     |
|                  |                           |                    | 1/                |          |               |               |                |              |                |     |
| -10              |                           |                    | $\longrightarrow$ |          |               |               |                |              |                |     |
| FCC              | 90H                       | <del></del>        | IJ                |          | \             |               |                |              |                | 1MA |
|                  |                           |                    | / /               | -        | . `           |               |                |              |                |     |
| -20              |                           |                    |                   |          |               |               |                |              |                |     |
|                  |                           |                    | /                 |          |               |               |                |              |                |     |
| -30              |                           | <b></b>            |                   |          |               | $\overline{}$ |                |              |                |     |
|                  |                           | /                  | 1 11              |          |               |               |                |              |                |     |
| 4.5              |                           | /                  | - I II            |          |               | ,             |                |              |                |     |
| -40              |                           |                    |                   |          | 411111        |               |                |              |                |     |
|                  |                           | /                  | 4 11              | -1111//  | 11 1 1 1 1 1  |               |                |              |                |     |
| -50              |                           | /                  |                   |          | ╜┼┼┼┼         |               |                |              |                |     |
|                  |                           |                    |                   | N        | 11 411 1      |               |                |              |                |     |
| coll J.          | 1                         | . 1                | الدالينا          |          | W 111.1       | \tall         |                |              |                |     |
| -60              | April Language Alda Marin | Mar Hat Physia I V | WAY VIEW          |          |               | MILIANIA P    | Andrea Par     | W LAHLAN, DA | AL MUNICIPAL A |     |
| 1 444            | III mahaa an ah           | May odd .          | • v   v   v       | *        | V ·           | MARIN         | אויי אוויייייי | Chick - mai  | Marchille, an  |     |
| -70              | •                         | · · ·              |                   |          |               |               | <u> </u>       |              |                |     |
|                  |                           |                    |                   |          |               |               |                |              |                |     |
| -79              |                           |                    |                   |          |               |               |                |              |                |     |
|                  | ter 867.5 M               | ⊣z                 |                   | 10 k     | :Hz/          |               |                | Span         | 100 kHz        |     |
| Date:            |                           | 004 06:25          | 1:21              |          |               |               |                |              |                |     |
|                  |                           | 00.20              |                   |          |               |               |                |              |                |     |
| Notes:           | ANALOG                    |                    |                   |          |               |               |                |              |                |     |
|                  |                           |                    |                   |          |               |               |                |              |                |     |
| 1                |                           |                    |                   |          |               |               |                |              |                |     |

### 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. **Emission Masks Data Plot** Page 2 of 4 4L0490R Job No.: Date: 7/28/2004 PT90 Temperature(°C): 22 Specification: Tested By: David Light Relative Humidity(%) 40 E.U.T.: DUAL BAND AMP Configuration: TX FULL POWER RBW 300 Hz 40 dB Ref Lvl 300 Hz VBW 21 dBm SWT 4.2 s Unit dBm dB Offse A SSED 10 - 10 <del>1D/11 E I</del>/1 3 dBm 1MA -20 -30 -40 -50 -60 Center 860 MHz 7.5 kHz/ Span 75 kHz 28.JUL.2004 06:40:39 Date: ANALOG Notes:

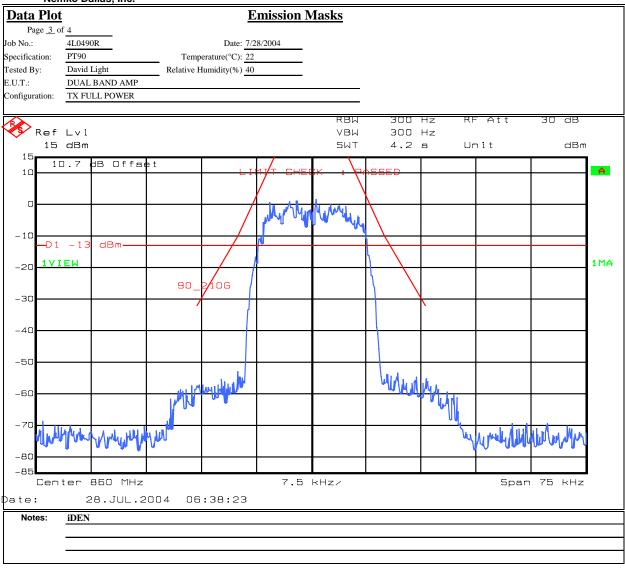
### Test Data - Spurious Emissions at Antenna Terminals



#### Dallas Headquarters:

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Nemko Dallas, Inc.



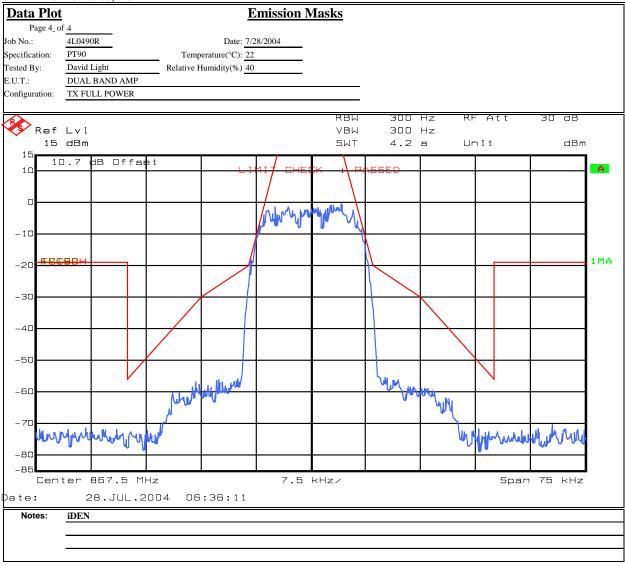
### Test Data - Spurious Emissions at Antenna Terminals



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Nemko Dallas, Inc.



Nemko Dallas, Inc.

TEST REPORT NO.: 4L0490RUS2REV2

### Test Data - Spurious Emissions at Antenna Terminals



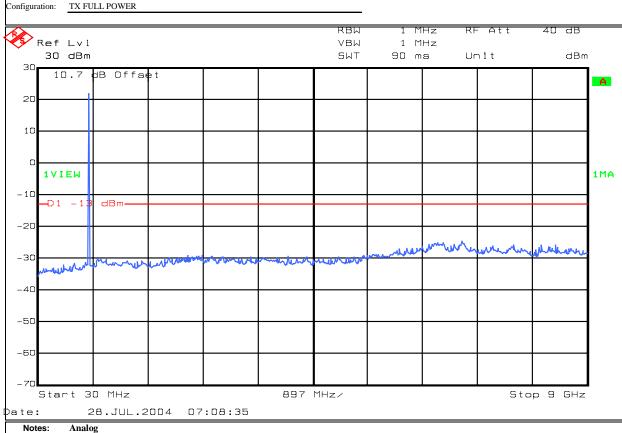
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**Data Plot Spurious Emissions at Antenna Terminals** Page <u>2</u> of 6 Job No.: 4L0490R Date: 7/28/2004

PT90 Temperature(°C): 22 Specification: Tested By: David Light Relative Humidity(%) 40 DUAL BAND AMP

E.U.T.: Configuration: TX FULL POWER



Analog 21 dBm Output

MID CHANNEL

### Test Data – Spurious Emissions at Antenna Terminals



Dallas Headquarters:

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Nemko Dallas, Inc. **Data Plot Spurious Emissions at Antenna Terminals** Page <u>5</u> of 6 4L0490R Date: 7/28/2004 Job No.: Specification: PT90 Temperature(°C): 22 David Light Relative Humidity(%) 40 Tested By: E.U.T.: DUAL BAND AMP Configuration: TX FULL POWER RBL dВ 30 Ref Lvl 15.88 dBm VBW 1 MHz 860.00000000 MHz 20 dBm SWT 90 ms dBm Unit 18.7∔dB Offs∉t A - 10 1MA -20 -30 \_4r -50 -60 -70 -80 897 MHz/ Stop 9 GHz 28.JUL.2004 07:05:20 ate: Notes: iDEN 15 dBm Output MID CHANNEL

The spectrum was investigated in detail on three channels. The plot shown is indicative of the noise floor readings found for all channels and modulations.

### 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                 | iko Dalias, inc.        |               | Ωοο          | upied Baı     | dwidth         |  |              |       |               |     |
|---------------------------|-------------------------|---------------|--------------|---------------|----------------|--|--------------|-------|---------------|-----|
|                           |                         |               | <u> </u>     | upicu Dai     | <u>luwiuii</u> |  | 0 1          | v     |               |     |
| Page 1 of                 |                         |               | ъ.           | T (20 (200 4  |                |  |              | X     |               |     |
| Job No.:                  | 4L0490                  | _             |              | 7/28/2004     |                |  | Preliminary: |       |               | ı   |
| Specification:            | PT90                    | -             | erature(°C): | 22            |                |  |              |       |               |     |
| Tested By:                | David Light             |               | lumidity(%)  | 40            |                |  |              |       |               |     |
| E.U.T.:                   | SMR BAND BOOST          | ER            |              |               |                |  |              |       |               |     |
| Configuration:            | TX                      |               |              |               |                |  |              |       |               |     |
| Sample Number:            | 1                       |               |              |               |                |  |              |       |               |     |
| Location:                 | Lab 1                   |               |              | RBW: Re       | efer to plots  |  | Measurement  |       |               |     |
| Detector Type:            | Peak                    |               |              | VBW: Re       | efer to plots  |  | Distance:    | na n  | ı             |     |
| Test Equipme              | ent Used                |               |              |               |                |  |              |       |               |     |
| Antenna:                  |                         |               | Direction    | onal Coupler: |                |  |              |       |               |     |
| Pre-Amp:                  |                         |               |              | Cable #1:     | 1627           |  |              |       |               |     |
| Filter:                   |                         |               |              | Cable #2:     | 1628           |  |              |       |               |     |
| Receiver:                 | 1036                    |               |              | Cable #3:     |                |  |              |       |               |     |
| Attenuator #1             | 1471                    |               |              | Cable #4:     |                |  |              |       |               |     |
| Attenuator #2:            |                         |               |              | Mixer:        |                |  |              |       |               |     |
| Additional equip          | ment used:              |               |              |               |                |  |              |       |               |     |
| Measurement Un            |                         | iB            |              |               |                |  |              |       |               |     |
|                           |                         |               |              |               |                |  |              |       |               |     |
| ₹ <b>À</b>                |                         | Marker        | 1 [T1]       |               | RBM            |  | Hz RF        | - Att | 30 dB         |     |
| Ref                       | L v 1                   |               | -25.         | 88 dBm        | VBW            | 30 k   | Hz           |       |               |     |
| 20                        | dBm                     | 850           | .788577      | 15 MHz        | SWT            | 5 m  | s Ur         | ٦īt   | dBm           | 1   |
| 20 10                     | 1.7 dB Offs             | <b>b</b> +    |              |               |                |  |              |       |               |     |
|                           |                         |               |              |               |                | _  |              |       | $\sim$        | A   |
| 10                        |                         |               |              |               |                |  |              |       |               |     |
|                           |                         |               |              |               |                | \  |              | /     |               |     |
| 0                         |                         |               |              |               |                |  |              | /     | $\overline{}$ |     |
| -10                       |                         |               |              |               |                |  |              | /_    |               |     |
| <u>+ ₩</u>                | <del>PDEDC</del>        |               |              |               |                | \  |              | / /   | \             | 1MA |
| -20                       |                         | 1             |              |               | /              |  |              |       | )             |     |
| -30                       |                         |               |              |               | /              | <del>                                     </del> |              |       |               |     |
| -40                       |                         |               |              |               |                | \  |              | /     |               |     |
|                           |                         | /             | \ .          |               |                |  |              |       |               |     |
| -50                       | _                       | 1             | \ <i>\</i>   |               |                |  |              |       |               |     |
| -60                       | <u> </u>                | ١,            | V            | /             |                |  | V            |       |               |     |
| \_                        |                         | 1             | MIC          | ,             |                |  |              |       |               |     |
| -70                       |                         |               |              |               |                |  |              |       |               |     |
| -80                       | 051.30                  |               |              |               |                |  |              |       | 4             |     |
| Cen <sup>.</sup><br>Date: | er 851 MHz:<br>28.JUL.2 | יחח4 חב       | :49:40       | 100           | KHZ/           |  |              | 5pa   | n 1 MHz       |     |
| Notes:                    | Analog                  |               | .+J.4U       |               |                |  |              |       |               |     |
|                           | 14.5 dBm per carri      | er - 17.5 dBm | Composite    |               |                |  |              |       |               |     |

### 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 Occupied Bandwidth** Page 2 of 4 Job No.: 4L0490 Date: 7/28/2004 PT90 Temperature(°C): 22 Specification: Tested By: David Light Relative Humidity(%) 40 E.U.T.: SMR BAND BOOSTER Configuration: RBW 30 kHz 30 dB Ref Lvl -24.35 dBm VBW 30 kHz 20 dBm 869.20941884 MHz SWT 5 ms dBm Un i t 10.7 dB Offset A 10 – 1 ∩ 1MA -20 -30 -40 -50 -60 -80 100 kHz/ Center 869 MHz Span 1 MHz 28.JUL.2004 06:52:08 Date: Notes: 14.5 dBm per carrier - 17.5 dBm Composite

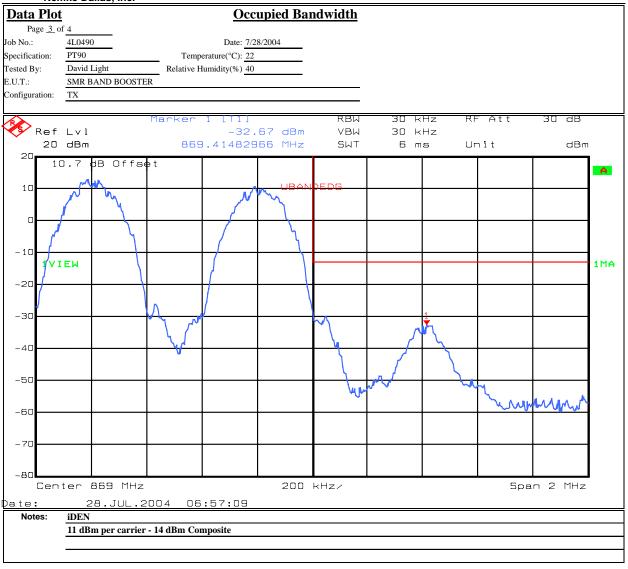
### Test Data - Spurious Emissions at Antenna Terminals



#### Dallas Headquarters:

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

Nemko Dallas, Inc.



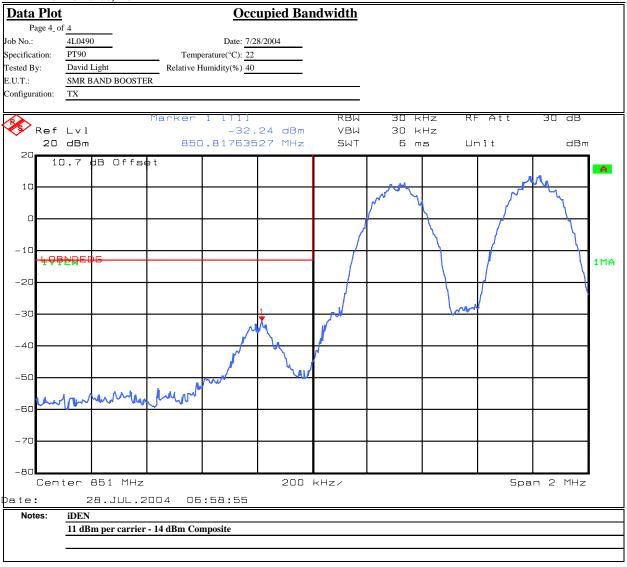
### Test Data - Spurious Emissions at Antenna Terminals



#### Dallas Headquarters:

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Nemko Dallas, Inc.



# *EQUIPMENT:*

**TFAN 80/19** 

#### Section 6. **Field Strength of Spurious Emissions**

NAME OF TEST: Field Strength of Spurious Emissions PARA. NO.: 2.993

TESTED BY: Brian Boyea DATE: 7/29/04

**Test Results:** Complies.

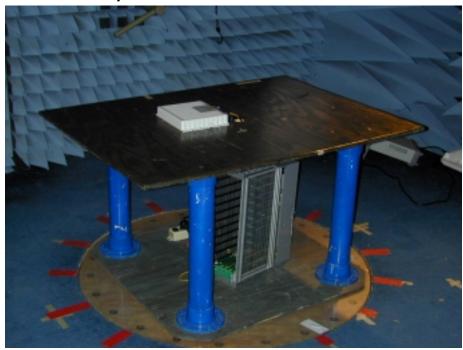
**Test Data:** There were no emissions detected above the noise floor which was

> at least 20 dB below the specification limit of -13 dBm ERP. The spectrum was searched to the 10<sup>th</sup> harmonic of the carrier and was

investigated on 3 channels.

See page A5 for applicable limit. **Note:** 

# **Photographs of Test Setup**





# Section 7. Test Equipment List

| Nemko ID | Description                | Manufacturer<br>Model Number   | Serial Number | Calibration<br>Date | Calibration<br>Due |
|----------|----------------------------|--------------------------------|---------------|---------------------|--------------------|
| 1036     | SPECTRUM ANALYZER          | ROHDE & SCHWARZ<br>FSEK30      | 830844/006    | 03/22/04            | 03/23/06           |
| 1471     | 10 db Attenuator DC 18 Ghz | MCL Inc.<br>BW-S10W2 10db-2WDC | NONE          | CBU                 | N/A                |
| 1626     | CABLE, 5 ft                | MEGAPHASE<br>10311 1GVT4       | N/A           | CBU                 | N/A                |
| 1627     | CABLE, 5 ft                | MEGAPHASE<br>10312 1GVT4       | N/A           | CBU                 | N/A                |
| 1304     | HORN ANTENNA               | ELECTRO METRICS<br>RGA-60      | 6151          | 09/22/03            | 09/22/05           |
| 1484     | Cable 2.0-18.0 Ghz         | Storm<br>PR90-010-072          |               | 07/30/04            | 07/30/05           |
| 1485     | Cable 2.0-18.0 Ghz         |                                |               | 07/30/04            | 07/30/05           |
| 1016     | Pre-Amp                    | HEWLETT PACKARD<br>8449A       | 2749A00159    | 10/27/03            | 10/26/04           |
| 1464     | Spectrum analyzer          | Hewlett Packard<br>8563E       | 3551A04428    | 02/11/03            | 02/11/05           |

# **ANNEX A - TEST METHODOLOGIES**

### **Nemko Dallas**

FCC PART 90, SUBPART I PRIVATE LAND MOBILE REPEATER TEST REPORT NO.: 4L0490RUS2REV2

EQUIPMENT: TFAN 80/19

NAME OF TEST: RF Power Output PARA. NO.: 2.985

**Minimum Standard:** Para. No. 90.205(a). The maximum allowable station ERP is

dependent upon the stations HAAT and required service area and

will be authorized in accordance with Table 1 of 90.205(d).

### **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.

NAME OF TEST: Spurious Emissions at Antenna Terminals PARA. NO.: 2.991

**Test Method:** RBW: 1% of emission bandwidth in the 0 - 1 GHz range.

1 MHz at frequencies above 1 GHz.

VBW = RBW

The spectrum is searched up to 10 times the fundamental frequency.

Page 29 of 36

NAME OF TEST: Occupied Bandwidth PARA. NO.: 2.989

Minimum Standard: Para. No. 90.210, see table 1 below for applicable mask.

### Table 1

| Frequency Band (MHz) | Mask for equipment with Low Pass Filter | Mask for equipment without Low Pass Filter |
|----------------------|---|--|
| Below 25             | A or B                                  | A or C                                     |
| 25 - 50              | В                                       | С  |
| 72 - 76              | В                                       | С  |
| 150 - 174            | B, D or E                               | C, D or E                                  |
| 150 Paging only      | В                                       | С  |
| 220 - 222            | F                                       | F  |
| 421 - 512            | B, D or E                               | C, D or E                                  |
| 450 paging only      | В                                       | Н  |
| 806 - 821/851 - 866  | В                                       | G  |
| 821 - 824/ 866 - 869 | В                                       | H  |
| 896 - 901/ 935 - 940 | I                                       | J  |
| 902 - 928            | K                                       | K  |
| 929 - 930            | В                                       | G  |
| Above 940            | В                                       | С  |
| All other bands      | В                                       | С  |

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NAME OF TEST: Field Strength of Spurious PARA. NO.: 2.993

**Minimum Standard:** Para. No. 90.210, see table 1 for applicable mask.

**Test Method:** The substitution antenna method was used to measure erp of

spurious emissions. This method is described in EIA/TIA 603. The field strength of the emission is measured and recorded. The EUT is then replaced with a substitution antenna of known gain against a dipole. The substitution antenna is fed with a calibrated signal which is adjusted until the previously recorded value is repeated. The erp of the spurious signal is the level required to repeat the previously measured level. If the substitution antenna gain is calibrated and expressed as dBi (referenced to an isotropic radiator instead of a dipole), the result is adjusted by 2.15 dB so

that the result is erp not eirp.

## NAME OF TEST: Frequency Stability PARA. NO.: 2.995

Minimum Standard: Para. No. 990.213. The transmitter carrier frequency shall remain

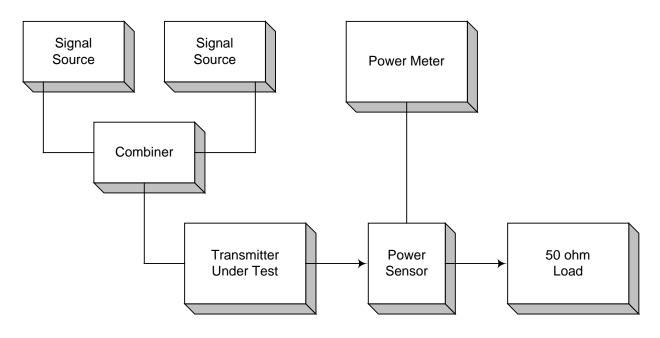
within the assigned frequency below in ppm.

### Table 2

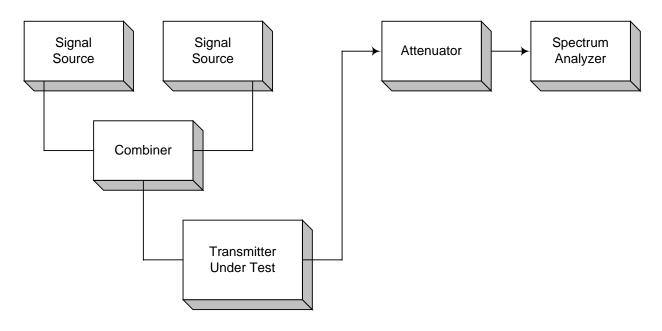
| Frequency Band | Fixed And Base | Mobile            | Stations          |
|----------------|----------------|-------------------|-------------------|
| (MHz)          | Stations       | > 2 Watts o/p pwr | < 2 Watts o/p pwr |
| Below 25       | 100            | 100               | 200               |
| 25 - 50        | 20             | 20                | 50                |
| 72 - 76        | 5              | -                 | 50                |
| 150 - 174      | 5              | 5                 | 5                 |
| 220 - 222      | 0.1            | 1.5               | 1.5               |
| 421 - 512      | 2.5            | 5                 | 5                 |
| 806 - 821      | 1.5            | 2.5               | 2.5               |
| 821 - 824      | 1.0            | 1.5               | 15                |
| 851 - 866      | 1.5            | 2.5               | 2.5               |
| 866 - 869      | 1.0            | 1.5               | 1.5               |
| 869 - 901      | 0.1            | 1.5               | 1.5               |
| 902 - 928      | 2.5            | 2.5               | 2.5               |
| 929 - 930      | 1.5            | -                 | -                 |
| 935 - 940      | 0.1            | 1.5               | 1.5               |
| 1427 - 1435    | 300            | 300               | 300               |
| Above 2450     | -              | -                 | -                 |

### **ANNEX B - TEST DIAGRAMS**

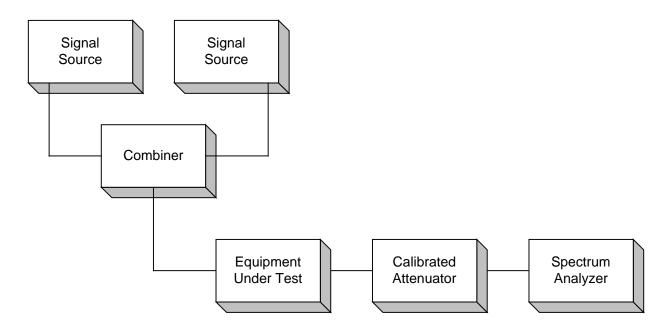
Para. No. 2.985 - R.F. Power Output



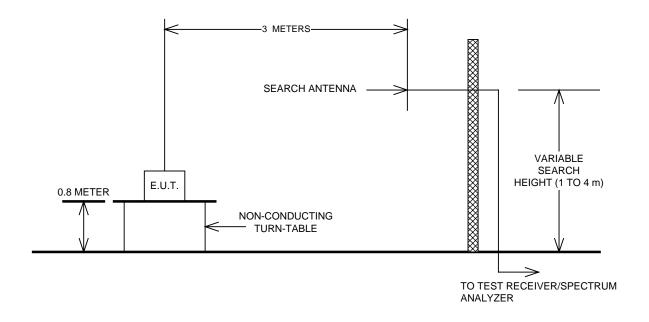
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 - Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

