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

Table of Contents

Section 1. Summary of Test Results

Manufacturer: Andrew Corporation

Model No.: TFAN 80/19

Serial No.: 042202202

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 90, Subpart I.

☒ 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	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 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.

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Section 2. General Equipment Specification

Transmitter

Supply Voltage Input: 115 Vac

Frequency Range: 851 to 869 MHz

Tunable Bands: Full band coverage

Type(s) of Modulation:

F3E (Voice)	F1D	F2D	D7W (iDEN)	Other
☒	☒	☐	☒	☐

Maximum Input: +10 dBm

Output Impedance: 50 ohms

RF Power Output (rated):
Single: 21 dBm (125.9mW)
Composite: 17.5 dBm (56 mW)

Operator Selection of Operating Frequency: None

Power Output Adjustment Capability: Software

Frequency Translation:

F1-F1	F1-F2	N/A
☒	☐	☐

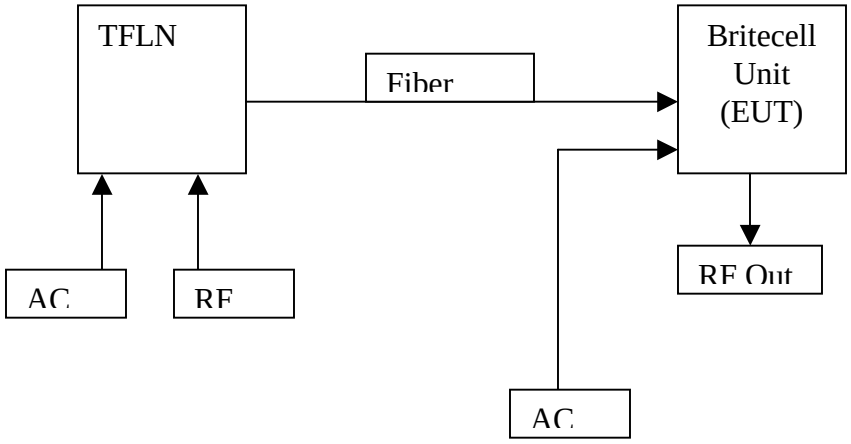
Band Selection:

Software	Duplexer Change	Fullband Coverage
☐	☐	☒

Description of Operation

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

Section 4. Occupied Bandwidth

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).

Test Data – Occupied Bandwidth (Input/Output)

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

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Data Plot **Occupied Bandwidth**

Page 1 of 4

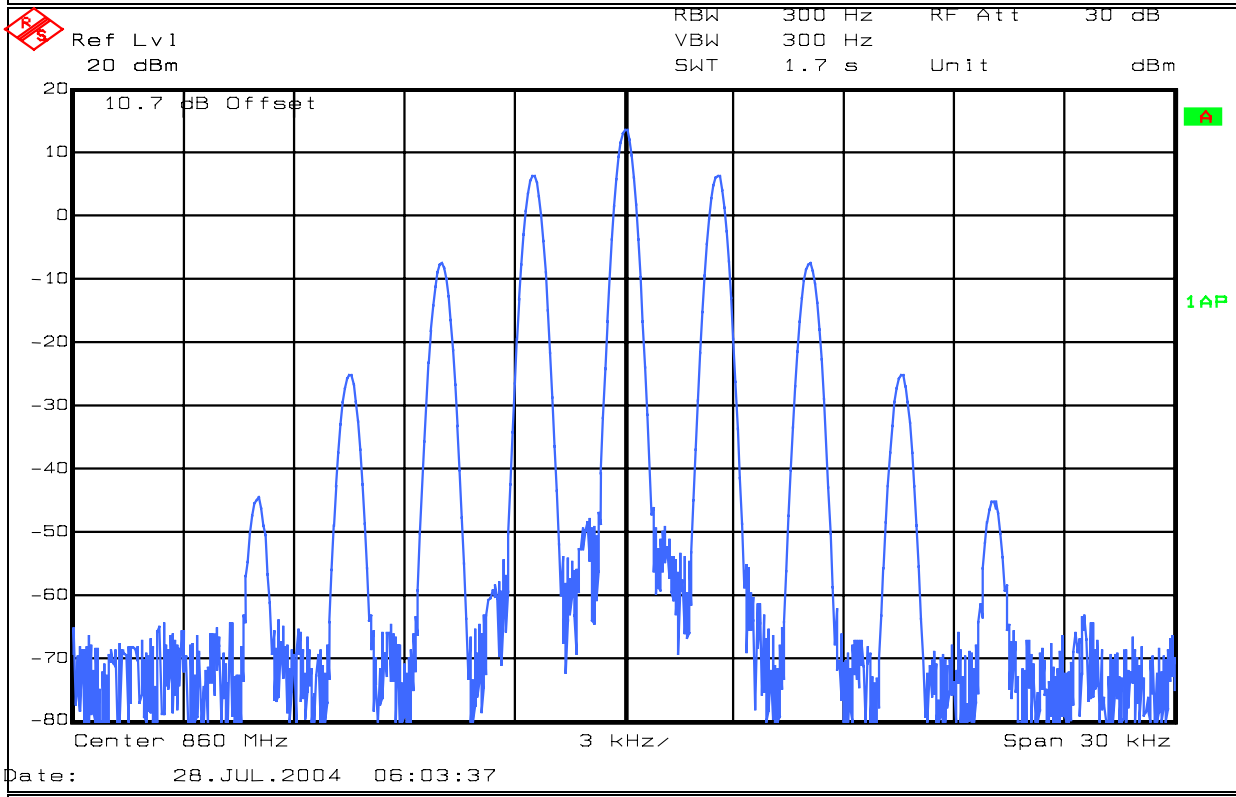
Complete X
Preliminary:

Job No.:
Date: 7/28/2004
Specification:
Temperature(°C): 22
Tested By: David Light
Relative Humidity(%) 40
E.U.T.: Dual Band Amp
Configuration: Tx full 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:	
Pre-Amp:		Cable #1:	1626
Filter:		Cable #2:	1627
Receiver:	1036	Cable #3:	
Attenuator #1	1471	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:
Measurement Uncertainty: +/-1.7 dB



Notes: **ANALOG OUTPUT**
2.5 kHz TONE - 2 kHz DEVIATION

Test Data – Occupied Bandwidth (Input/Output)

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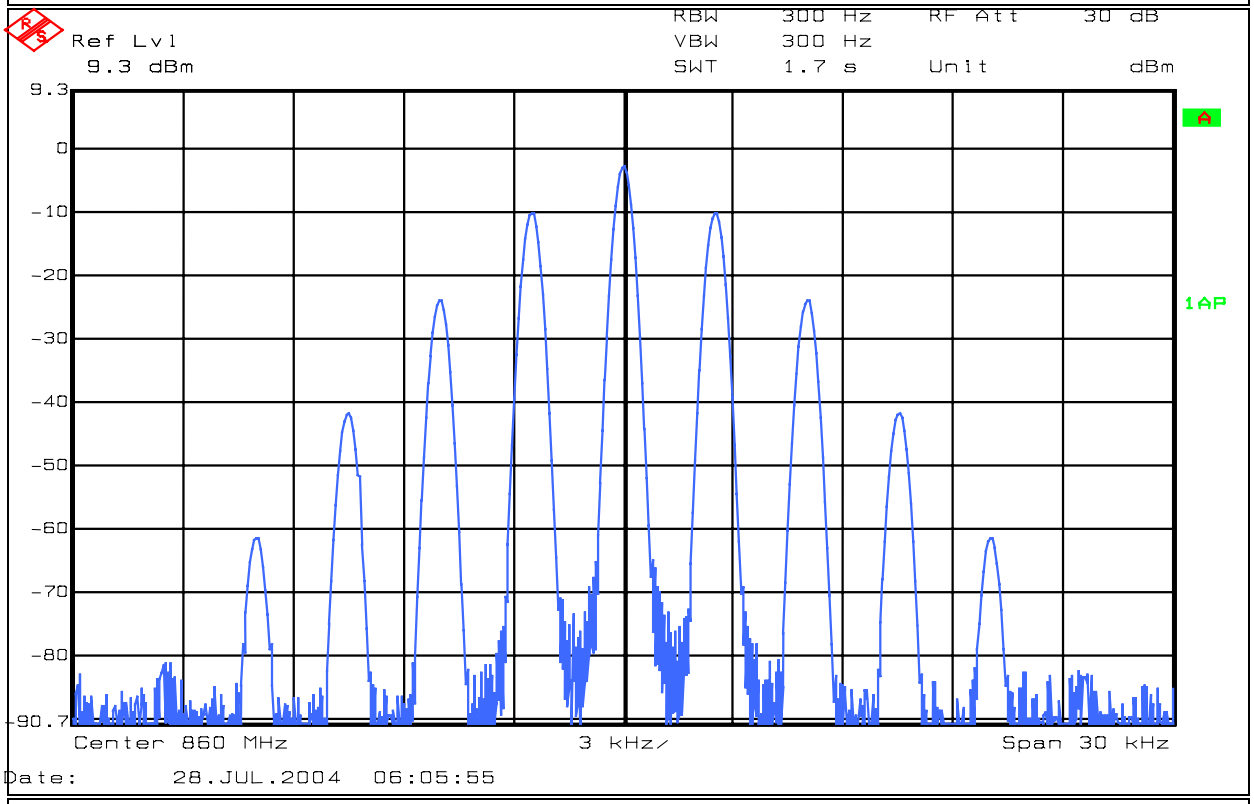
Data Plot **Occupied Bandwidth**

Page 2 of 4

Job No.: Date: 7/28/2004
Specification: Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 40
E.U.T.: Dual Band Amp
Configuration: Tx full power



Notes: **ANALOG INPUT**
2.5 kHz TONE - 2 kHz DEVIATION

Test Data – Occupied Bandwidth (Input/Output)

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Data Plot **Occupied Bandwidth**

Page 3 of 4

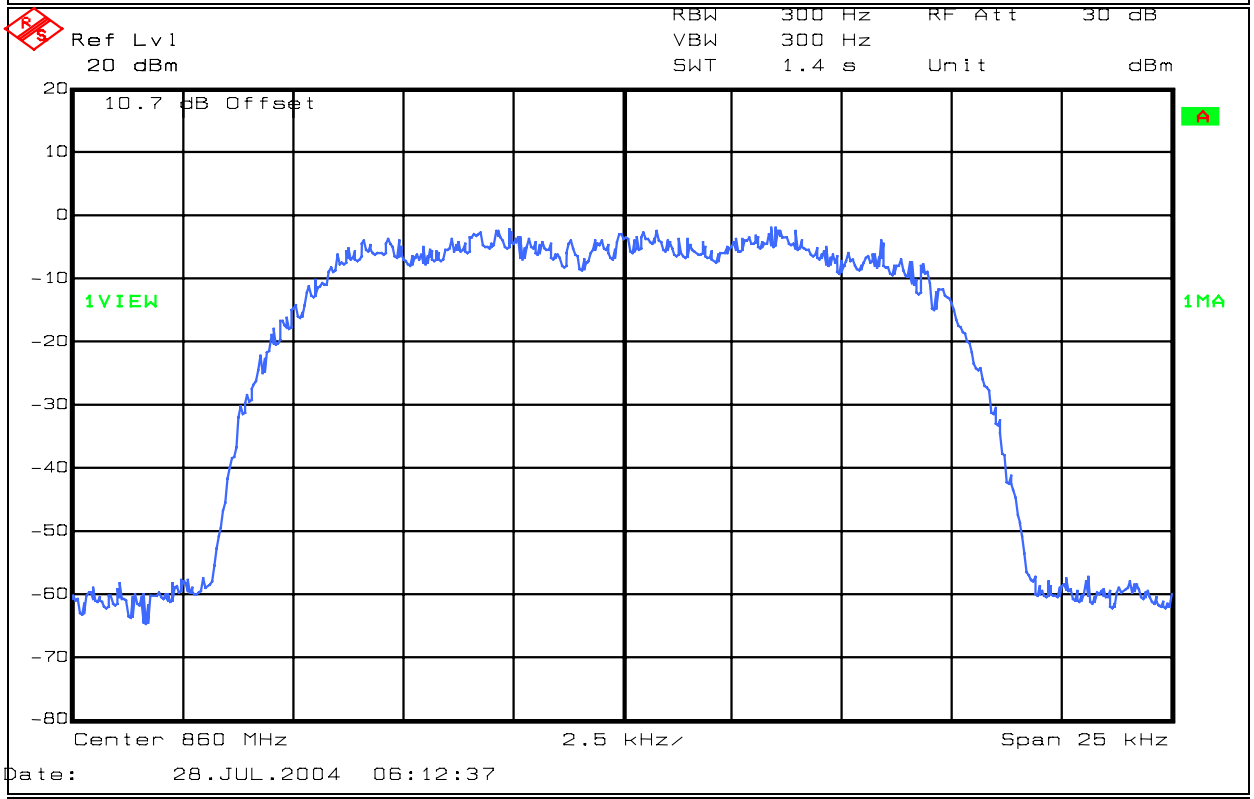
Job No.: Date: 7/28/2004

Specification: Temperature(°C): 22

Tested By: David Light Relative Humidity(%) 40

E.U.T.: Dual Band Amp

Configuration: Tx full power



Notes: **iDEN Output**

Test Data – Occupied Bandwidth (Input/Output)

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Data Plot **Occupied Bandwidth**

Page 4 of 4

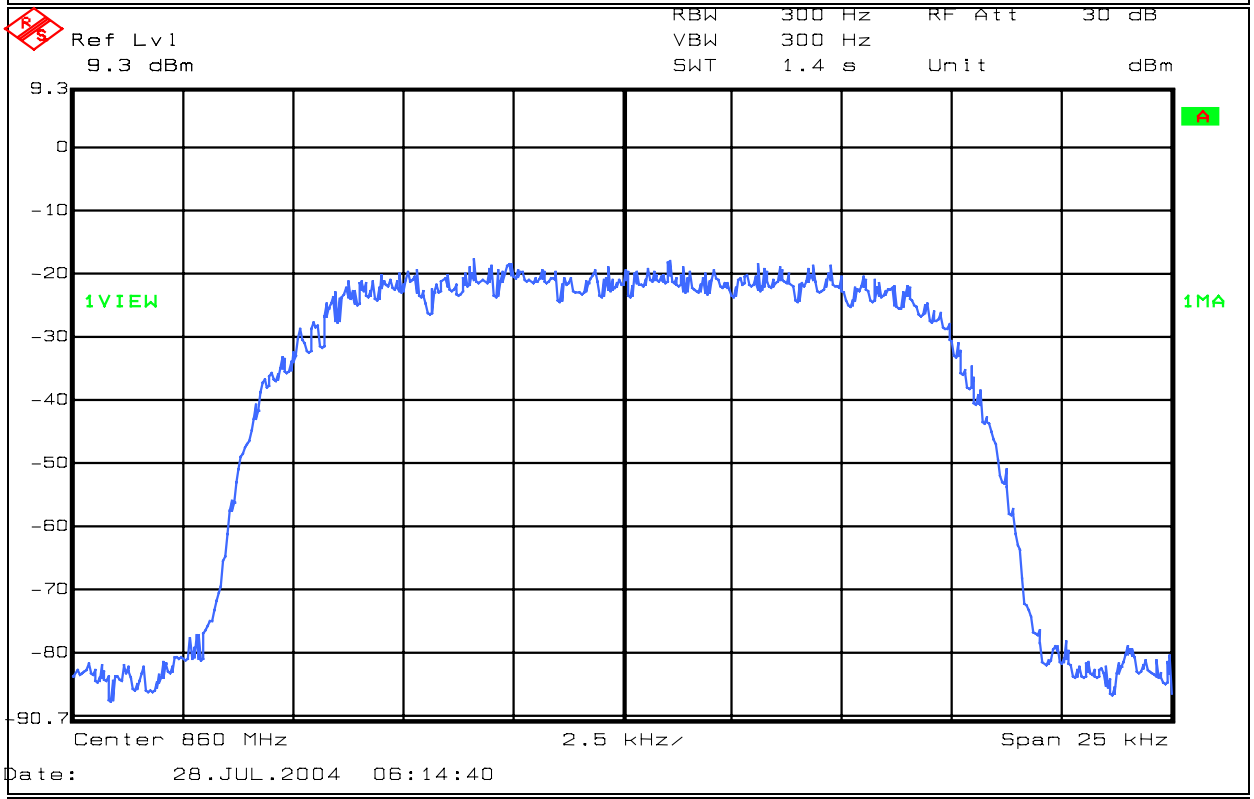
Job No.: Date: 7/28/2004

Specification: Temperature(°C): 22

Tested By: David Light Relative Humidity(%) 40

E.U.T.: Dual Band Amp

Configuration: Tx full power



Notes: **iDEN Input**

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).

Test Data – Spurious Emissions at Antenna Terminals

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

Nemko Dallas, Inc.

Data Plot **Emission Masks**

Page 1 of 4 Complete X

Job No.: 4L0490R Date: 7/28/2004 Preliminary:

Specification: PT90 Temperature(°C): 22

Tested By: David Light Relative Humidity(%) 40

E.U.T.: DUAL BAND AMP

Configuration: TX FULL 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:

Pre-Amp: Cable #1: 1627

Filter: Cable #2: 1628

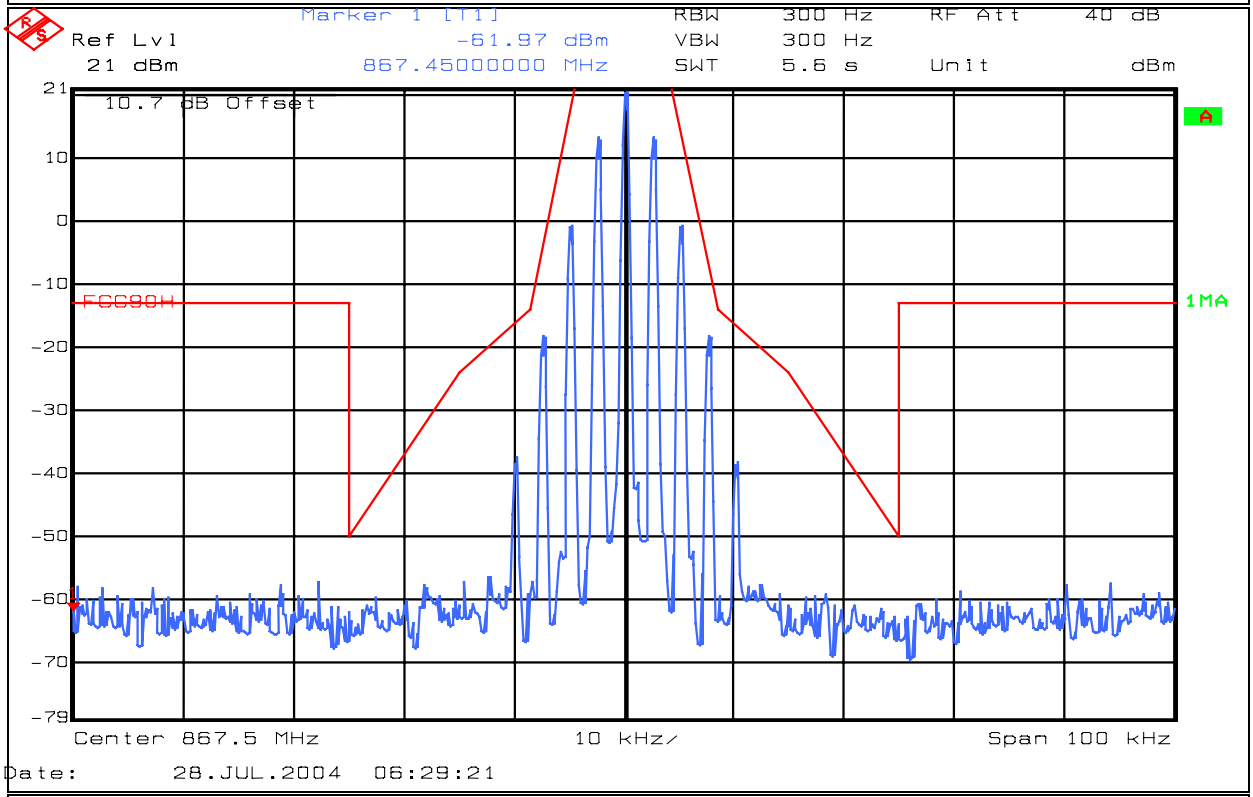
Receiver: 1036 Cable #3:

Attenuator #1 1471 Cable #4:

Attenuator #2: Mixer:

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB



Notes: **ANALOG**

Test Data – Spurious Emissions at Antenna Terminals

Dallas Headquarters:
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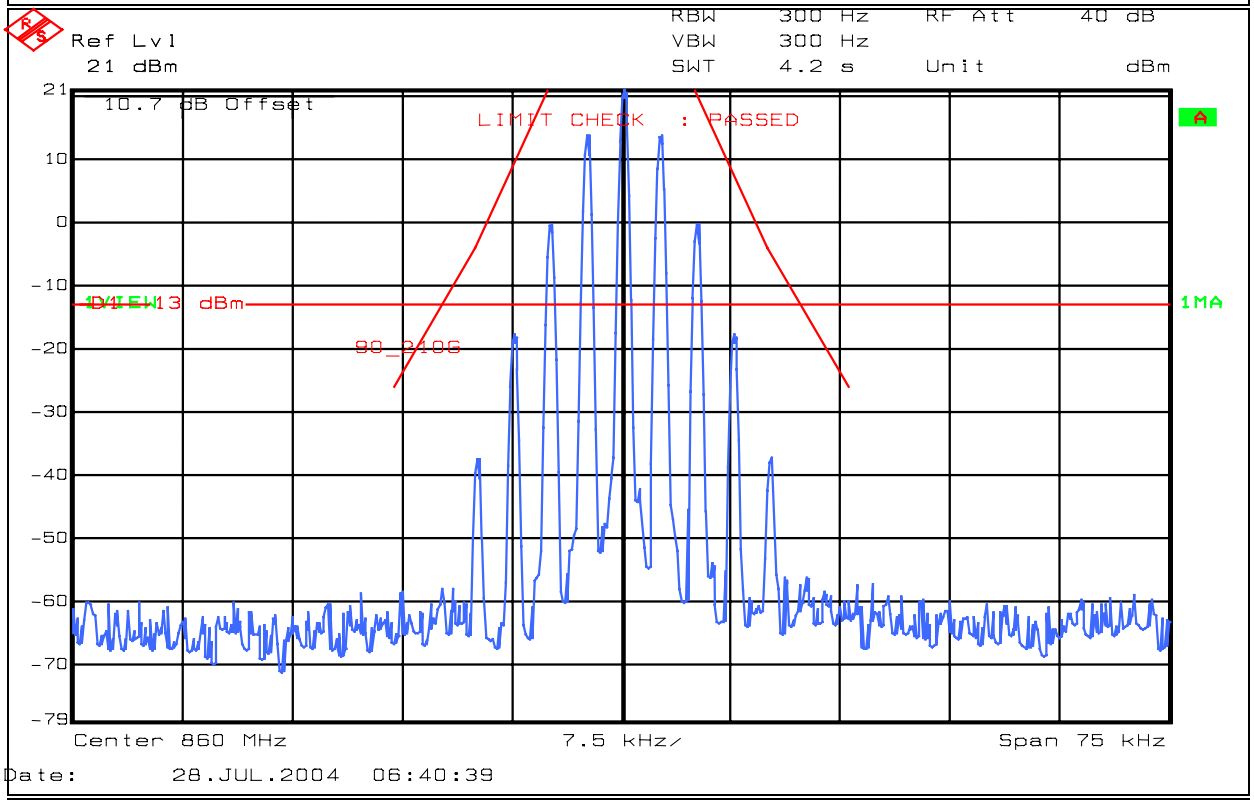
Fax: (972) 436-2667

Nemko Dallas, Inc.

Data Plot **Emission Masks**

Page 2 of 4

Job No.:	4L0490R	Date:	7/28/2004
Specification:	PT90	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	DUAL BAND AMP		
Configuration:	TX FULL POWER		



Notes: ANALOG

Test Data – Spurious Emissions at Antenna Terminals

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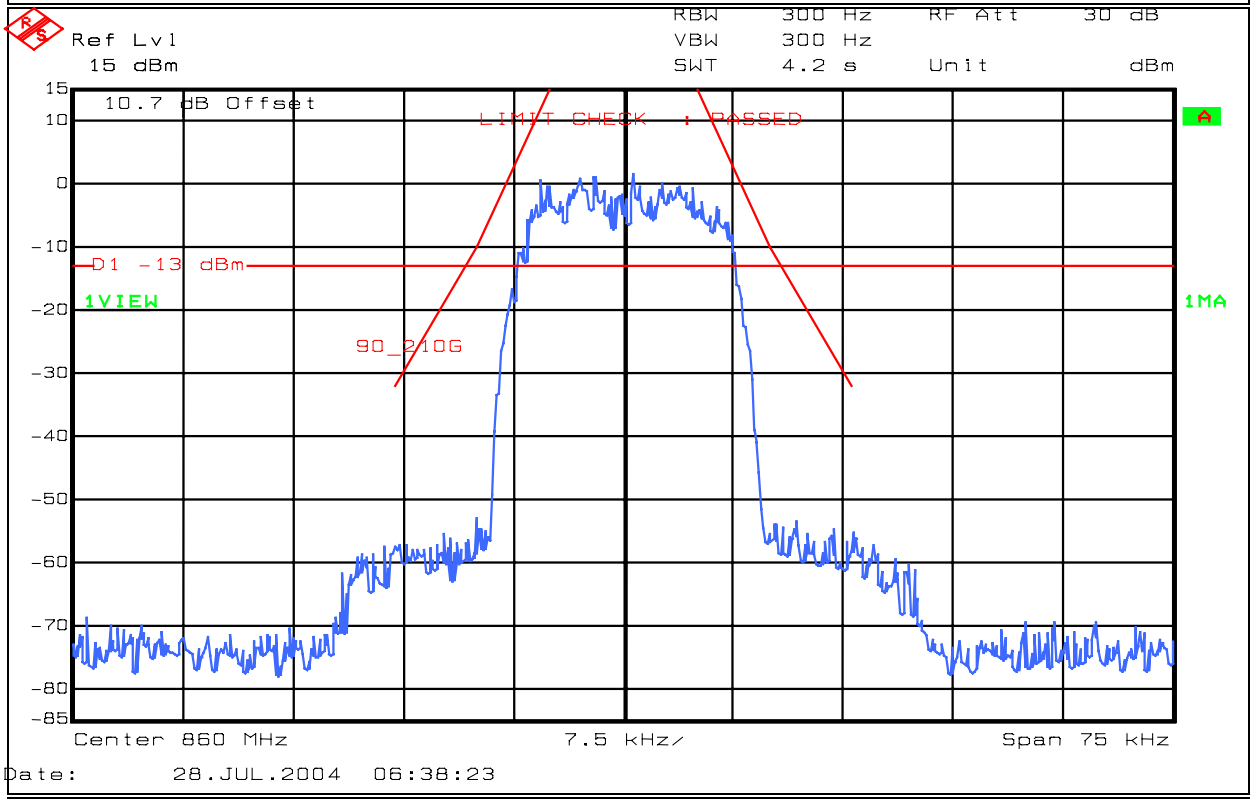
Nemko Dallas, Inc.

Data Plot **Emission Masks**

Page 3 of 4

Job No.:	4L0490R	Date:	7/28/2004
Specification:	PT90	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	DUAL BAND AMP		
Configuration:	TX FULL POWER		



Notes: **iDEN**

Test Data – Spurious Emissions at Antenna Terminals

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Fax: (972) 436-2667

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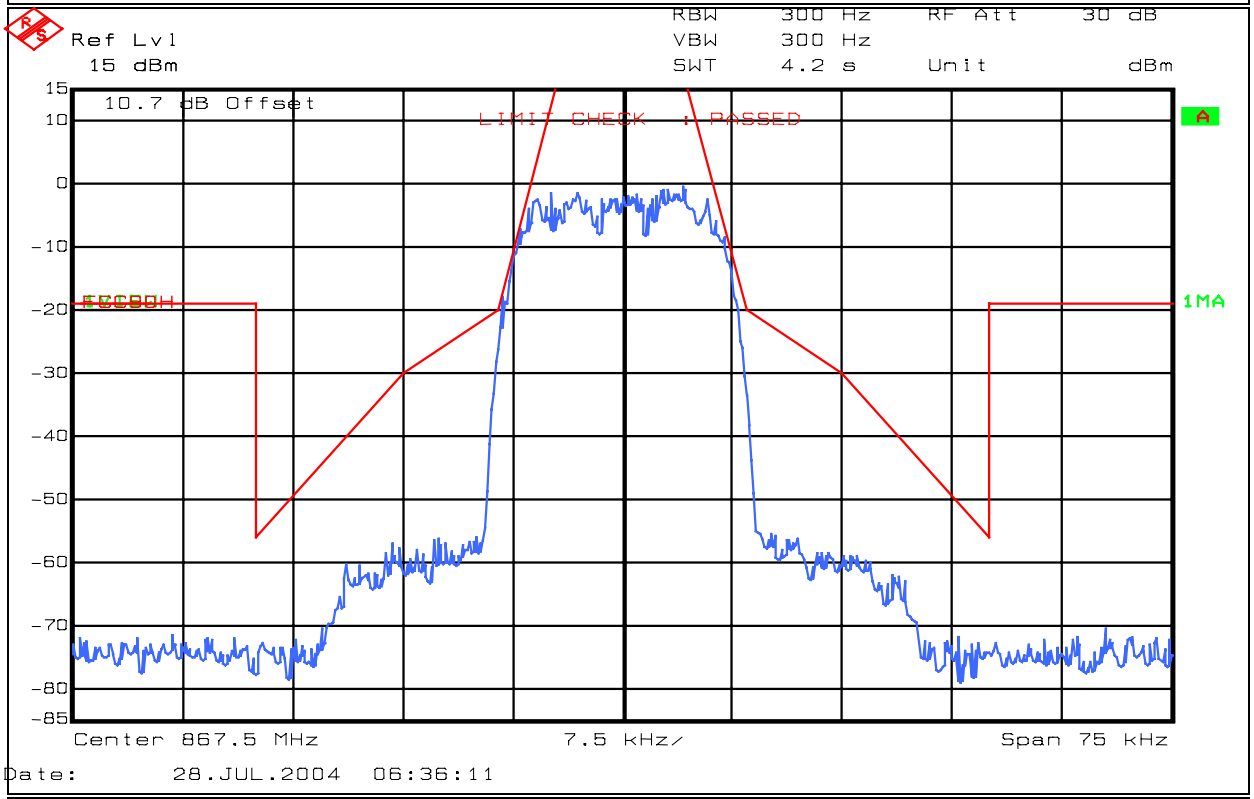
Data Plot **Emission Masks**

Page 4 of 4

Job No.:	4L0490R	Date:	7/28/2004
Specification:	PT90	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	DUAL BAND AMP		
Configuration:	TX FULL POWER		



Notes: **iDEN**

Test Data – Spurious Emissions at Antenna Terminals

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

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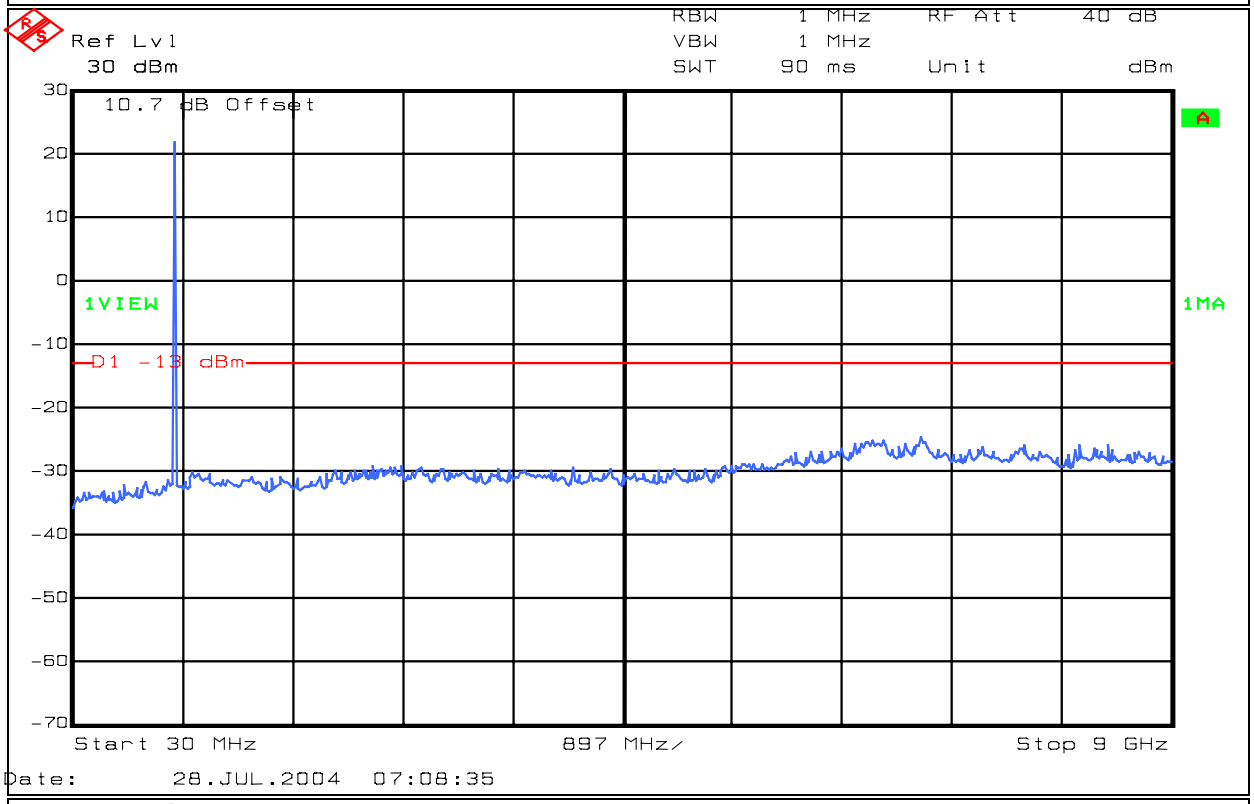
Job No.:	4L0490R	Date:	7/28/2004
Specification:	PT90	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	DUAL BAND AMP		
Configuration:	TX FULL POWER		



Notes:
Analog
21 dBm Output
MID CHANNEL

Test Data – Spurious Emissions at Antenna Terminals

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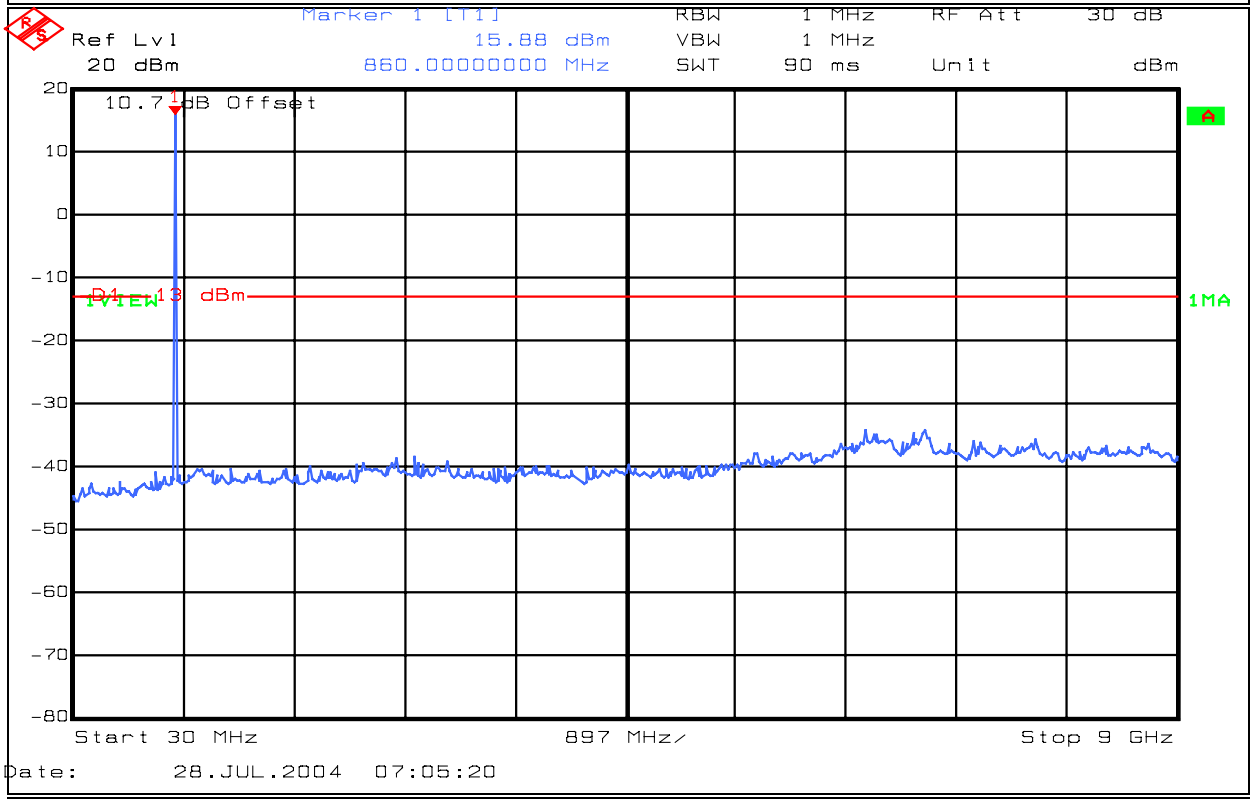
Data Plot — **Spurious Emissions at Antenna Terminals**

Page 5 of 6

Job No.:	4L0490R	Date:	7/28/2004
Specification:	PT90	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	DUAL BAND AMP		
Configuration:	TX FULL POWER		



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

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Data Plot **Occupied Bandwidth**

Page 1 of 4 Complete X

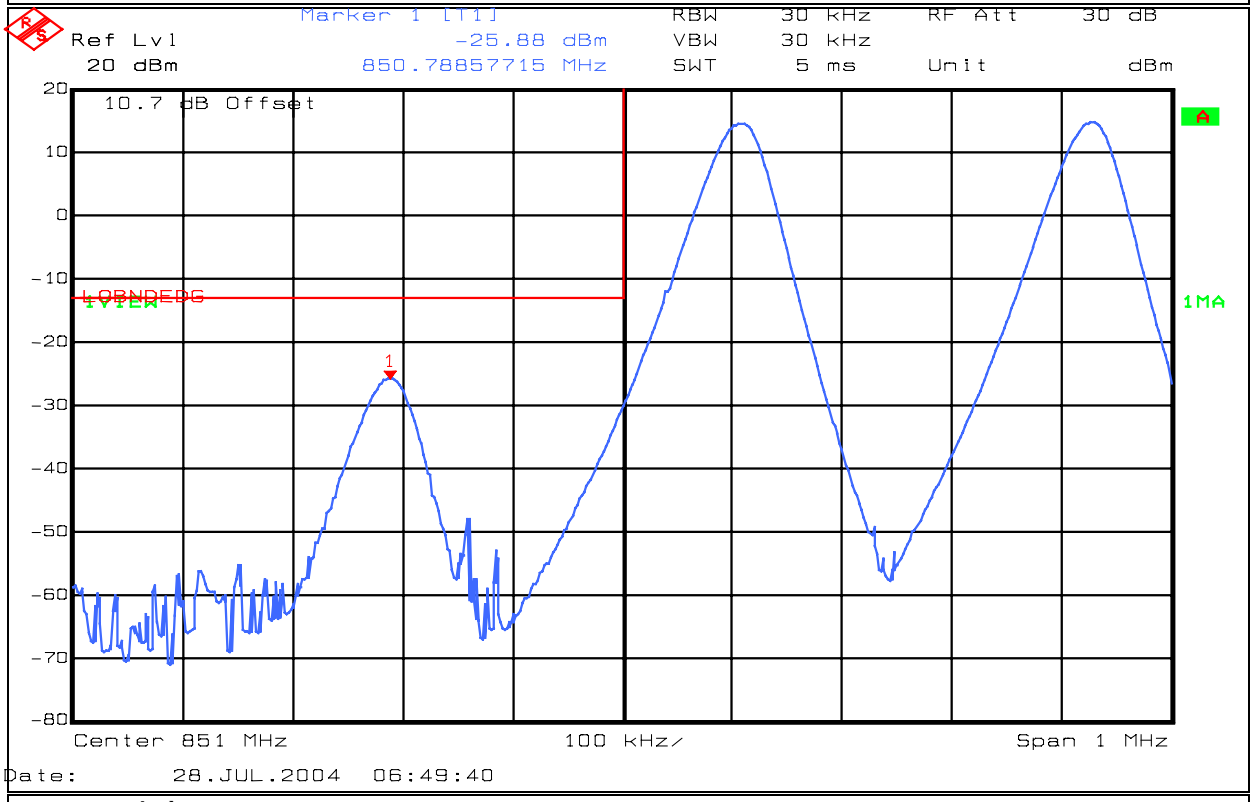
Job No.:	4L0490	Date:	7/28/2004	Preliminary:	
Specification:	PT90	Temperature(°C):	22		
Tested By:	David Light	Relative Humidity(%)	40		
E.U.T.:	SMR BAND BOOSTER				
Configuration:	TX				
Sample Number:	1				
Location:	Lab 1	RBW:	Refer to plots	Measurement	
Detector Type:	Peak	VBW:	Refer to plots	Distance:	na m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	1627
Filter:		Cable #2:	1628
Receiver:	1036	Cable #3:	
Attenuator #1	1471	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB



Notes: **Analog**

14.5 dBm per carrier - 17.5 dBm Composite

Test Data – Spurious Emissions at Antenna Terminals

Dallas Headquarters:
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Lewisville, TX 75057
Tel: (972) 436-9600
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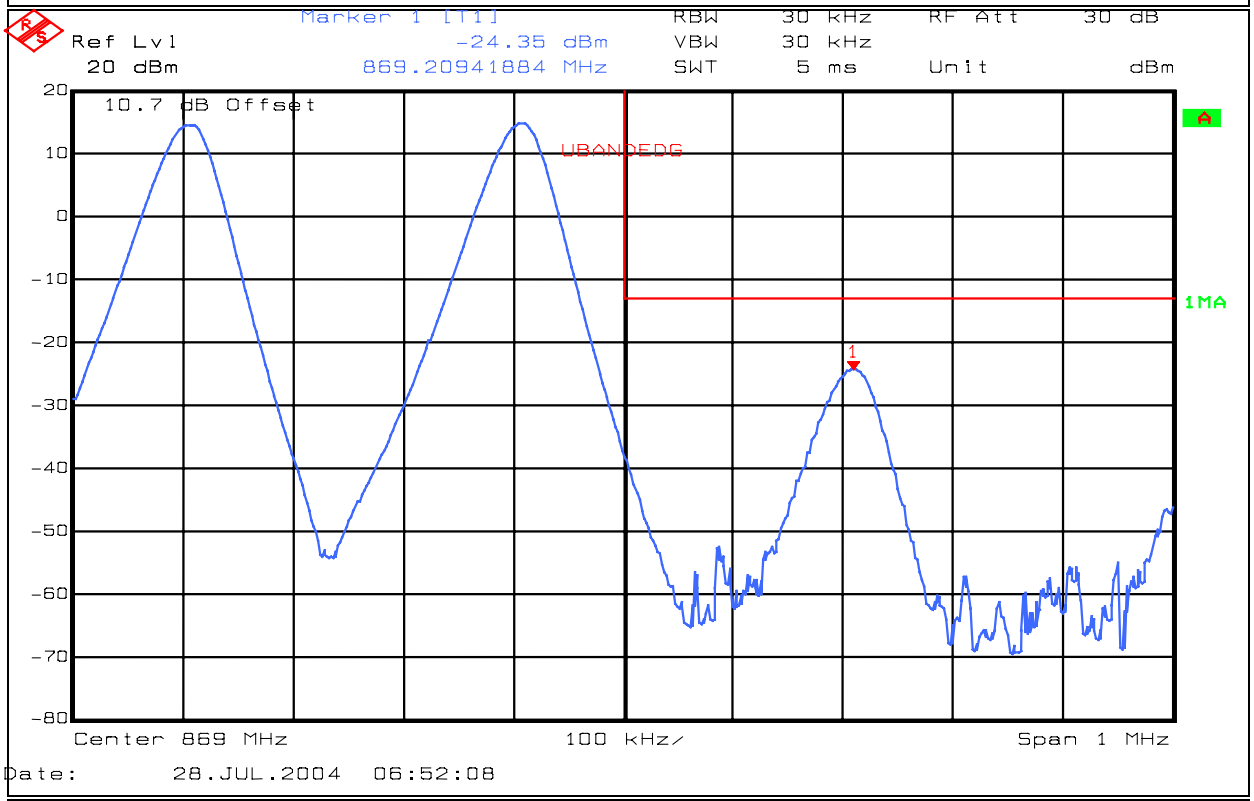
Nemko Dallas, Inc.

Data Plot **Occupied Bandwidth**

Page 2 of 4

Job No.:	4L0490	Date:	7/28/2004
Specification:	PT90	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	SMR BAND BOOSTER		
Configuration:	TX		



Notes: **Analog**
14.5 dBm per carrier - 17.5 dBm Composite

Test Data – Spurious Emissions at Antenna Terminals

Dallas Headquarters:
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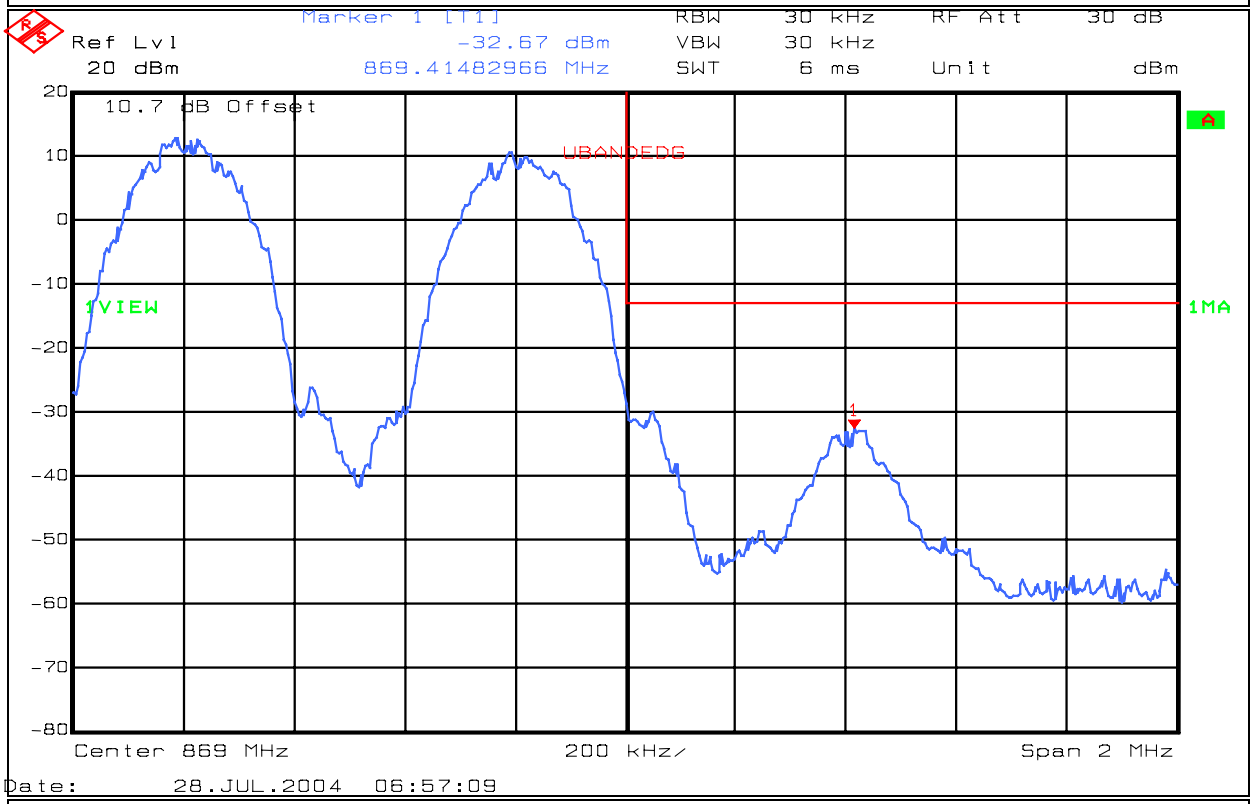
Nemko Dallas, Inc.

Data Plot **Occupied Bandwidth**

Page 3 of 4

Job No.:	4L0490	Date:	7/28/2004
Specification:	PT90	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	SMR BAND BOOSTER		
Configuration:	TX		



Notes: **iDEN**

11 dBm per carrier - 14 dBm Composite

Test Data – Spurious Emissions at Antenna Terminals

Dallas Headquarters:
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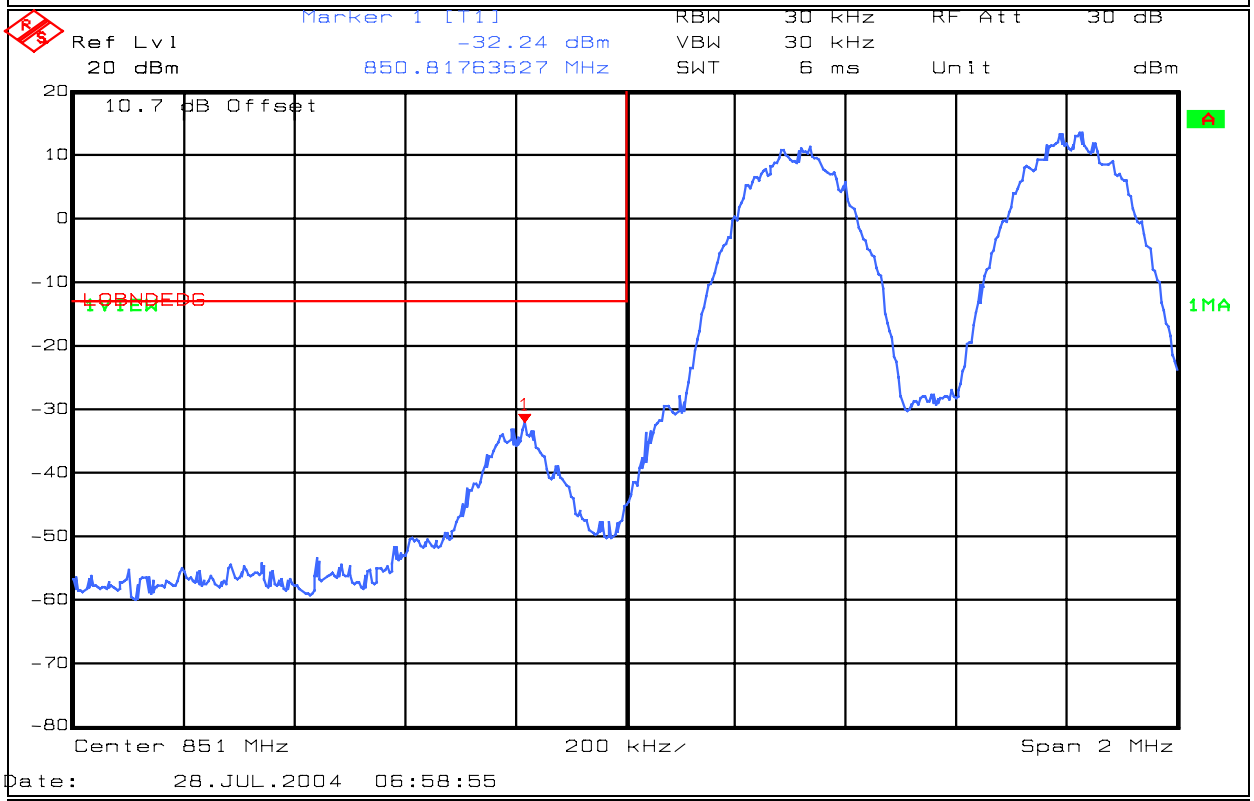
Nemko Dallas, Inc.

Data Plot **Occupied Bandwidth**

Page 4 of 4

Job No.:	4L0490	Date:	7/28/2004
Specification:	PT90	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	SMR BAND BOOSTER		
Configuration:	TX		



Notes: **iDEN**
11 dBm per carrier - 14 dBm Composite

Section 6. Field Strength of Spurious Emissions

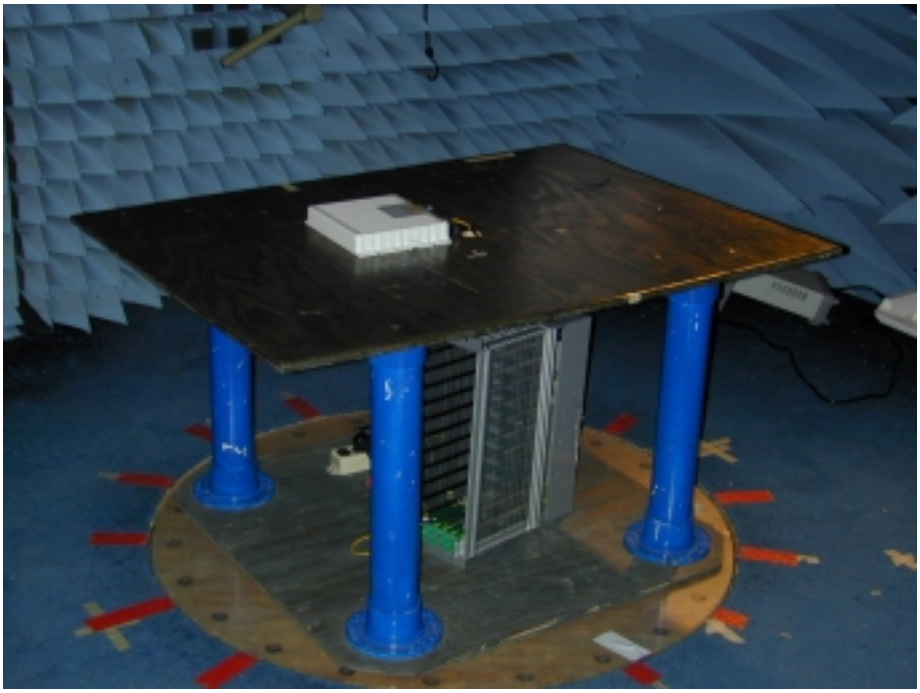
NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.993
TESTED BY: Brian Boyea	DATE: 7/29/04

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^{th} harmonic of the carrier and was investigated on 3 channels.

Note: See page A5 for applicable limit.

Photographs of Test Setup



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	03/22/04	03/23/06
1471	10 db Attenuator DC 18 Ghz	MCL Inc. BW-S10W2 10db-2WDC	NONE	CBU	N/A
1626	CABLE, 5 ft	MEGAPHASE 10311 1GVT4	N/A	CBU	N/A
1627	CABLE, 5 ft	MEGAPHASE 10312 1GVT4	N/A	CBU	N/A
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
1484	Cable 2.0-18.0 Ghz	Storm PR90-010-072	N/A	07/30/04	07/30/05
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	07/30/04	07/30/05
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	10/27/03	10/26/04
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	02/11/03	02/11/05

ANNEX A - TEST METHODOLOGIES

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.

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	B	C
72 - 76	B	C
150 - 174	B, D or E	C, D or E
150 Paging only	B	C
220 - 222	F	F
421 - 512	B, D or E	C, D or E
450 paging only	B	H
806 - 821/ 851 - 866	B	G
821 - 824/ 866 - 869	B	H
896 - 901/ 935 - 940	I	J
902 - 928	K	K
929 - 930	B	G
Above 940	B	C
All other bands	B	C

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**

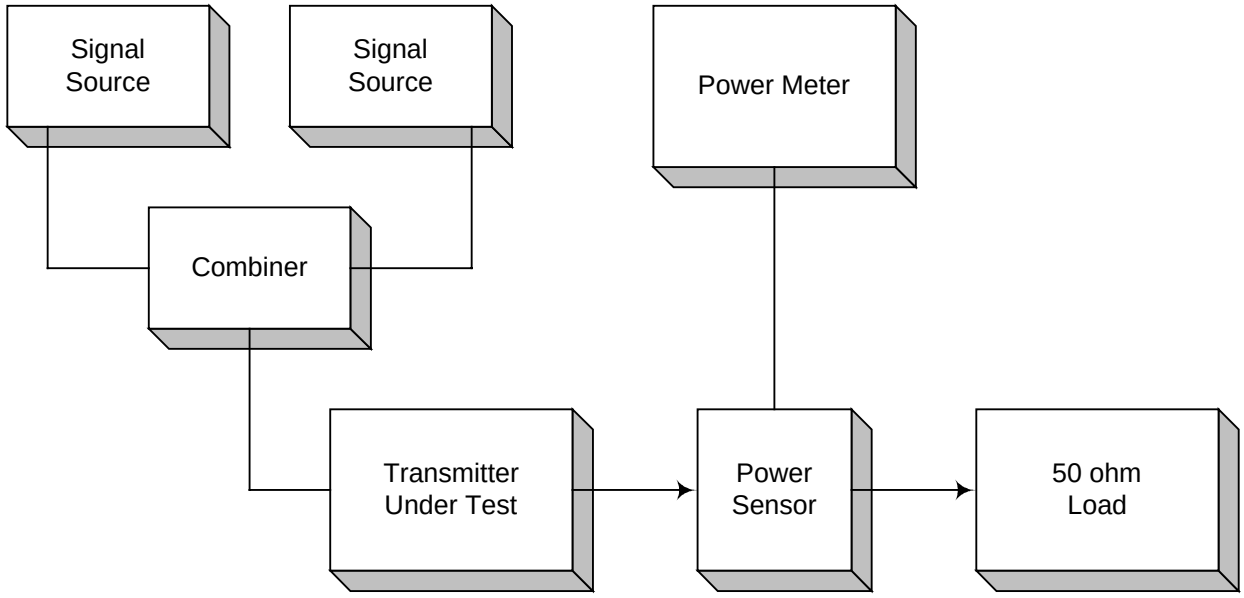
Minimum Standard: Para. No. 990.213. The transmitter carrier frequency shall remain within the assigned frequency below in ppm.

Table 2

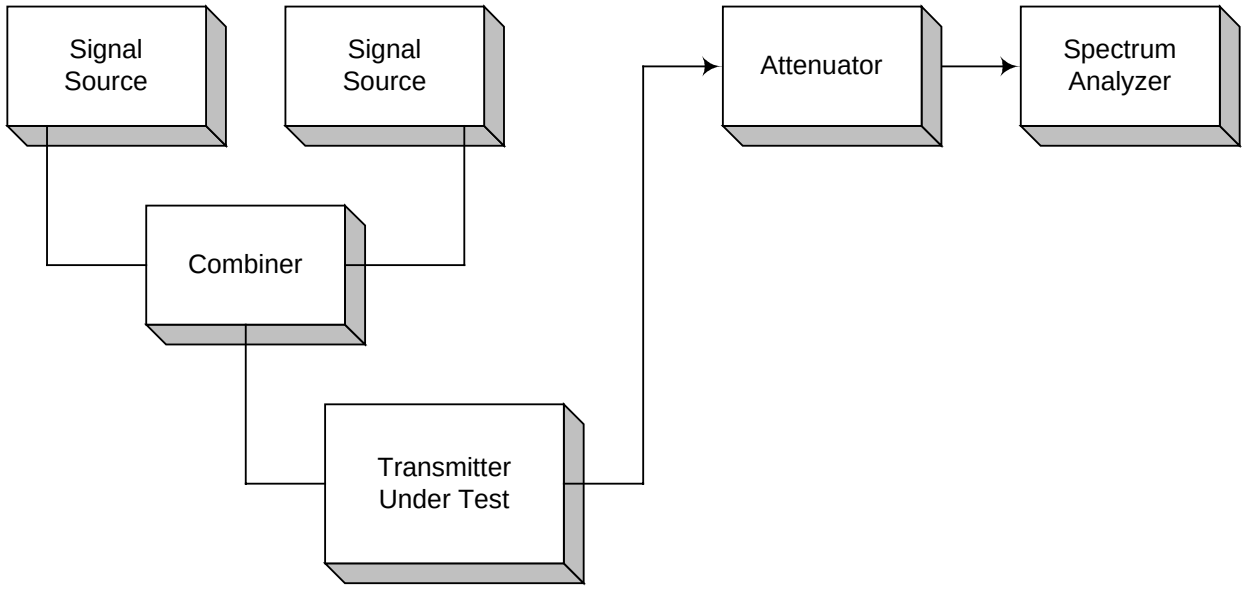
Frequency Band (MHz)	Fixed And Base Stations	Mobile Stations	
		> 2 Watts o/p pwr	< 2 Watts o/p pwr
Below 25	100	100	200
25 - 50	20	20	50
72 - 76	5	-	50
150 - 174	5	5	5
220 - 222	0.1	1.5	1.5
421 - 512	2.5	5	5
806 - 821	1.5	2.5	2.5
821 - 824	1.0	1.5	15
851 - 866	1.5	2.5	2.5
866 - 869	1.0	1.5	1.5
869 - 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

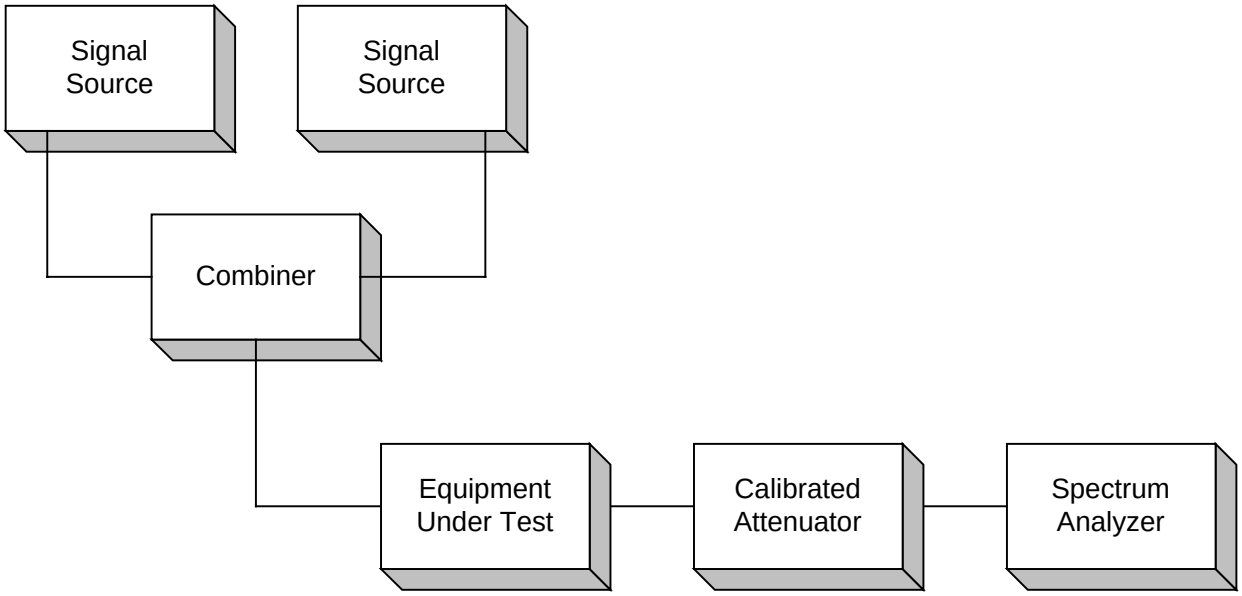
Para. No. 2.985 - R.F. Power Output



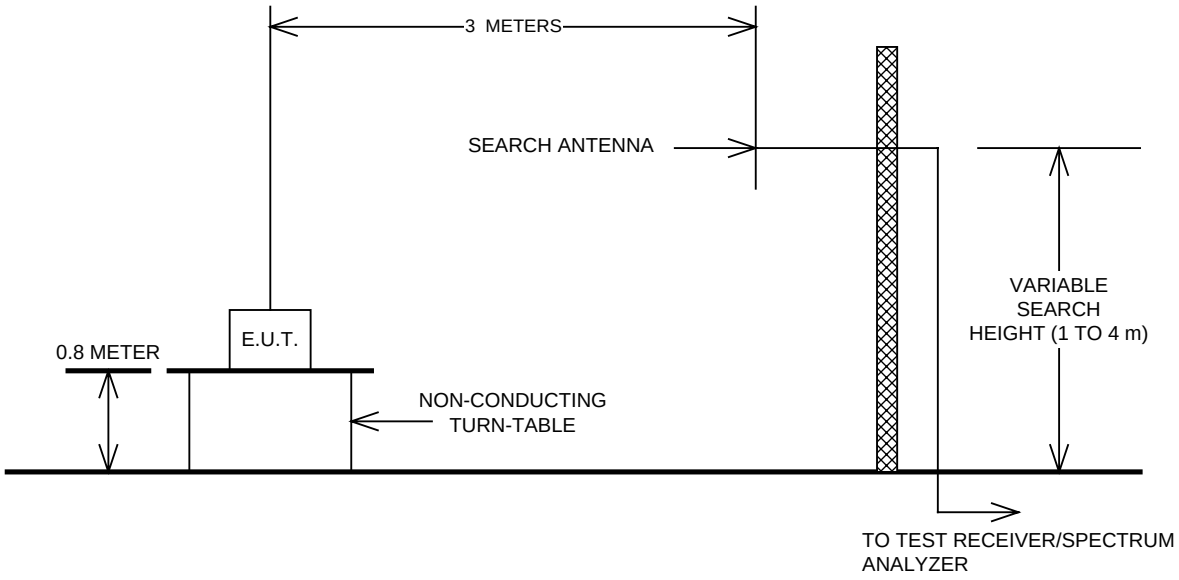
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 - Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability