Nemko Test Report:	4L0347RUS1
Applicant:	Andrew Corporation 108 Rand Park Drive Garner, NC 27529
Equipment Under Test: (E.U.T.)	TFAM2332/4
In Accordance With:	**FCC Part 22, Subpart H**
Tested By:	Nemko Dallas Inc. 802 N. Kealy Lewisville, TX 75057-3136
Authorized By:	 Dustin Oaks, Account Manager
Date:	05/28/2004

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Section 1. Summary of Test Results

Manufacturer:	Andrew Corporation
Model No.:	TFAM2332/4
Serial No.:	041501103

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)	Mask	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	Complies

Modulation characteristics were not tested since the E.U.T. processes but does not produce a modulated waveform.

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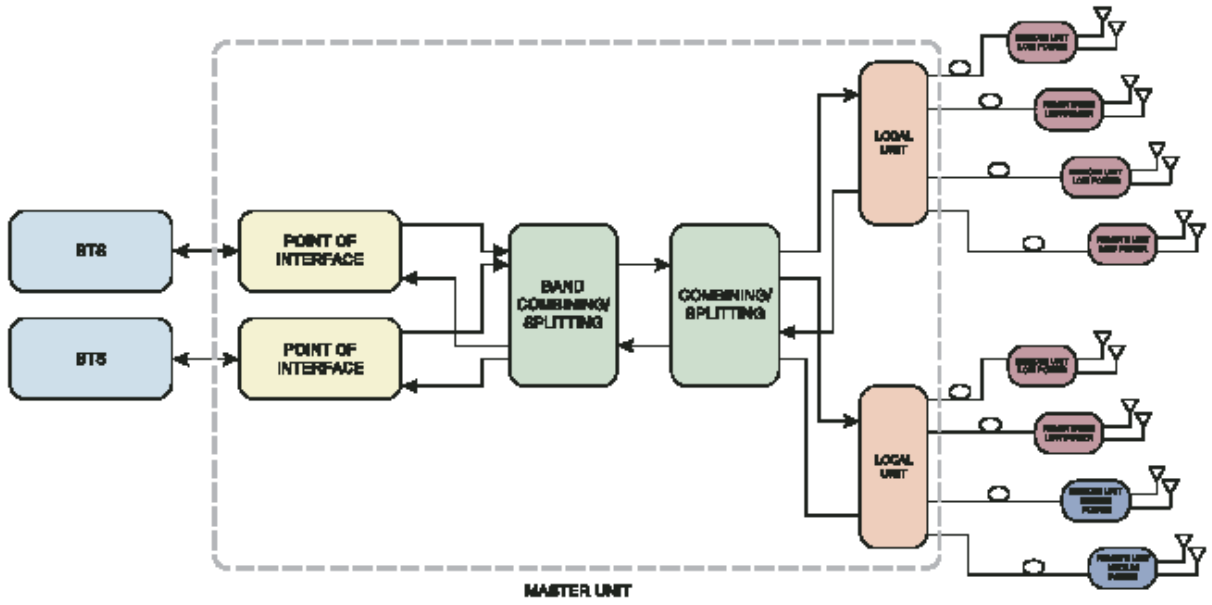
Section 2. General Equipment Specification

Supply Voltage Input:						
Frequency Range:	**Downlink:**	869.04 – 893.7 MHz				
Frequency Range:	**Uplink:**	824 – 849 MHz				
Type of Modulation and Designator:		**CDMA (F9W)** ☒	**GSM (GXW)** ☒	**NADC (DXW)** ☒	**EDGE (G7W)** ☒	**AMPS (F8W, F1D)** ☒
Output Impedance:		50 ohms				
RF Output (Rated per carrier):						
	Number of Carriers:	1	2	4		8
	CDMA:	21	17	13		9
	GSM:	27	20	17		13
	NADC:	24	18.5	15		11
	EDGE:	23	18	15		11
	Analog:	27	20	17		13
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

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 5/26/04

Test Results: Complies.

Test Data:

Modulation Type	Single Carrier (dBm)	Per Channel Power Output (dBm)	Composite Power Output (dBm)
Analog	27	20	23
CDMA	21	17	20
GSM	27	20	23
NADC	24	18.5	21.5
CDPD	23	18	21

Equipment Used: 1036-1064-1042

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 40 %

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 5/26/04

Test Results: Complies.

Test Data: See attached plots

Measurement Uncertainty: +/- 1.6 dB

Test Data – Occupied Bandwidth

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 5 Complete X

Job No.: 4L0347 Date: 5/26/2004 Preliminary:

Specification: PT 22 Temperature(°C): 22

Tested By: David Light Relative Humidity(%) 40

E.U.T.: 800/1900 MHz AMPLIFIER

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: #N/A

Filter: Cable #2:

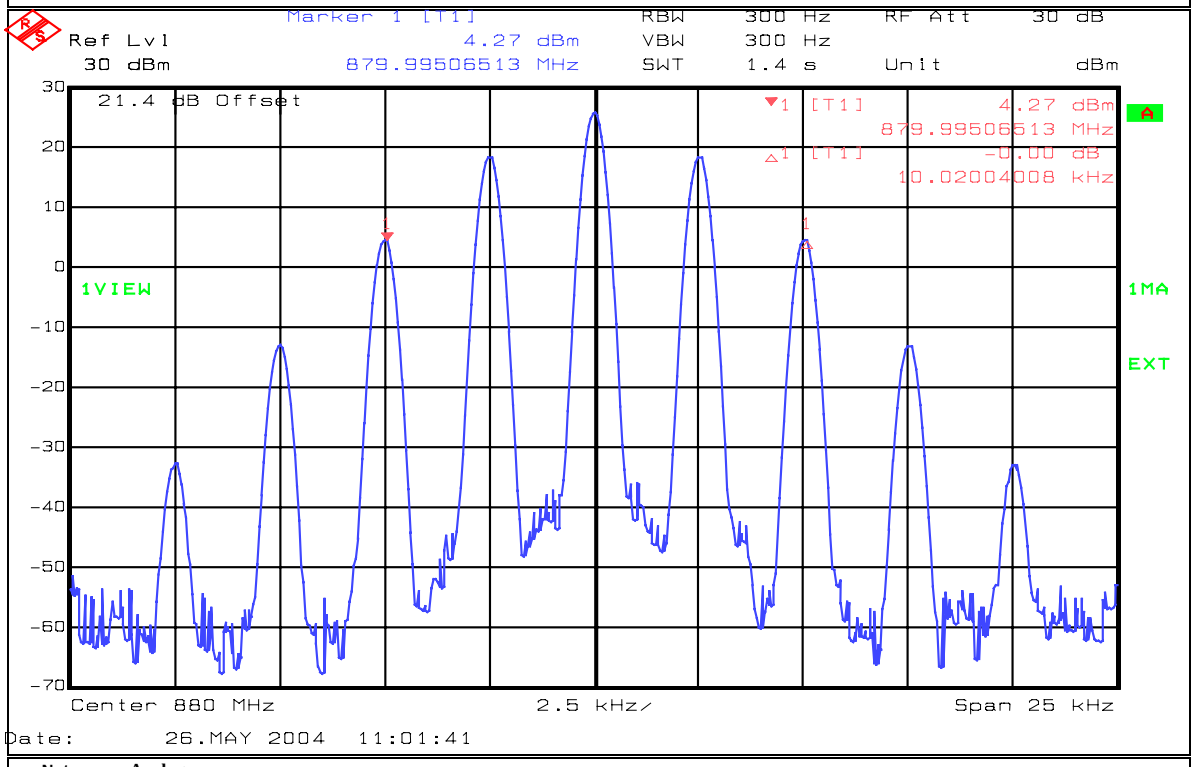
Receiver: 1036 Cable #3:

Attenuator #1 1064 Cable #4:

Attenuator #2: Mixer:

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB



Notes: **Analog**

2.5 kHz Tone - 2 kHz peak deviation

Test Data – Occupied Bandwidth

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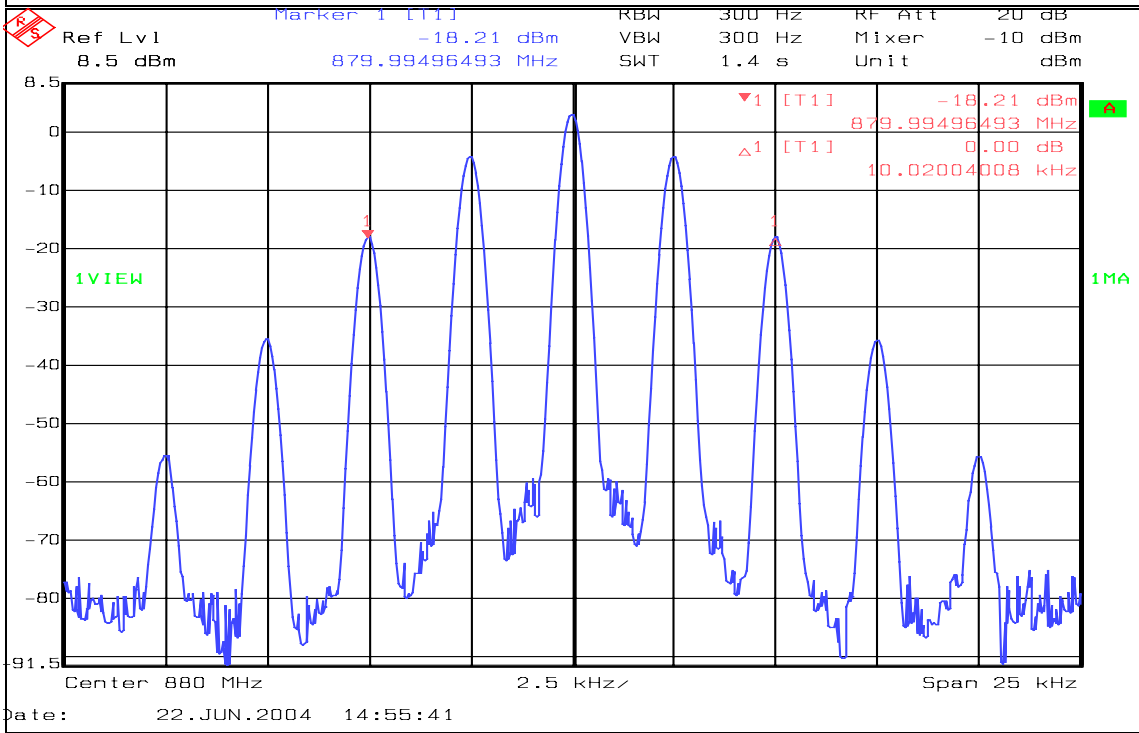
Data Plot **Occupied Bandwidth**

Page 1 of 5

Job No.:	4L0347	Date:	6/22/2004	Complete	X
Specification:	PT 22	Temperature(°C):	22	Preliminary:	
Tested By:	David Light	Relative Humidity(%)	40		
E.U.T.:	800/1900 MHz AMPLIFIER				
Configuration:	Input plots				
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:	#N/A
Filter:		Cable #2:	
Receiver:	1036	Cable #3:	
Attenuator #1		Cable #4:	
Attenuator #2:		Mixer:	
Additional equipment used:			
Measurement Uncertainty:	+/-1.7 dB		



Notes: **Analog**
Input

Test Data – Occupied Bandwidth

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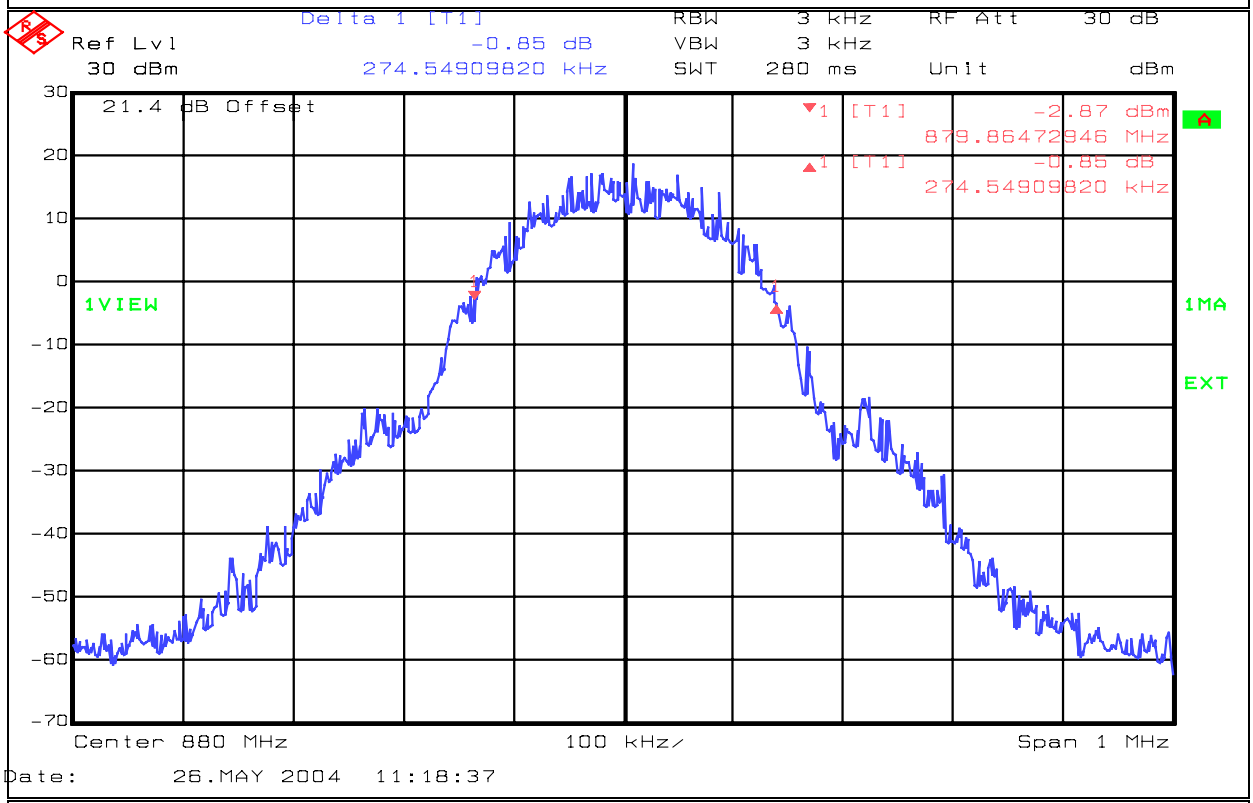
Data Plot **Occupied Bandwidth**

Page 2 of 5

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT 22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMPLIFIER		
Configuration:	Tx FULL POWER		



Notes: GSM

Test Data – Occupied Bandwidth

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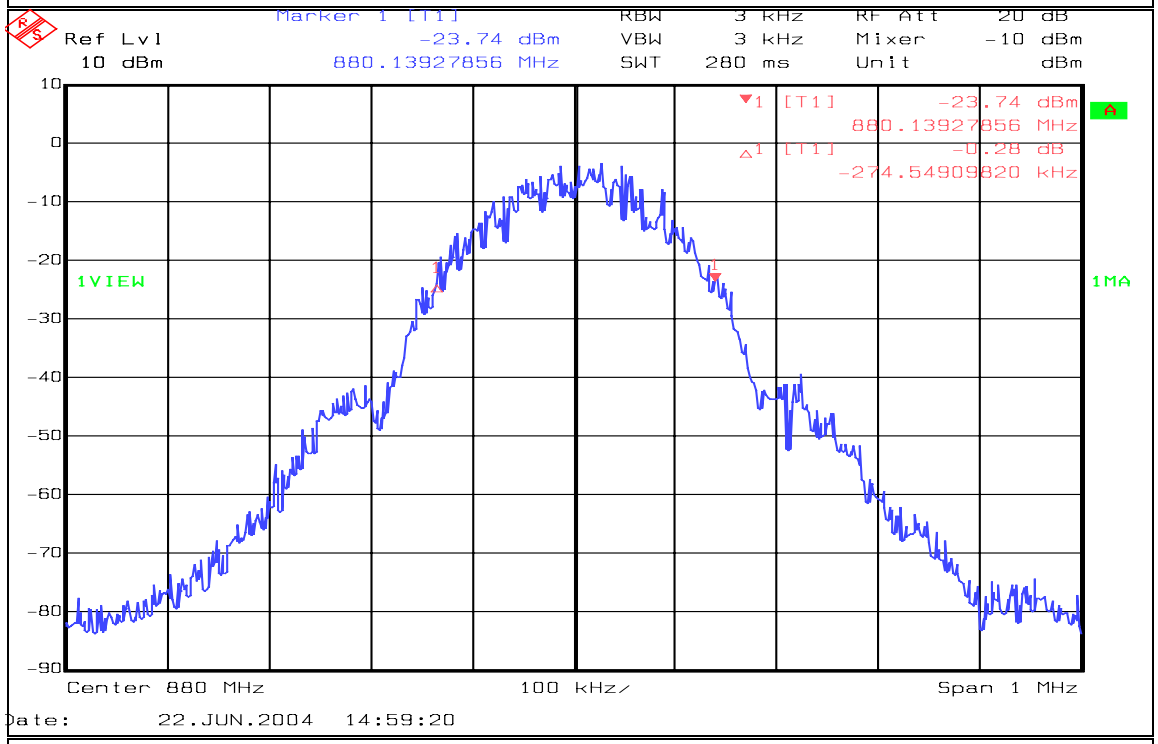
Data Plot **Occupied Bandwidth**

Page 2 of 5

Job No.: 4L0347 Date: 6/22/2004
Specification: PT 22 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 40
E.U.T.: 800/1900 MHz AMPLIFIER
Configuration: Input plots



Notes: **GSM**
Input

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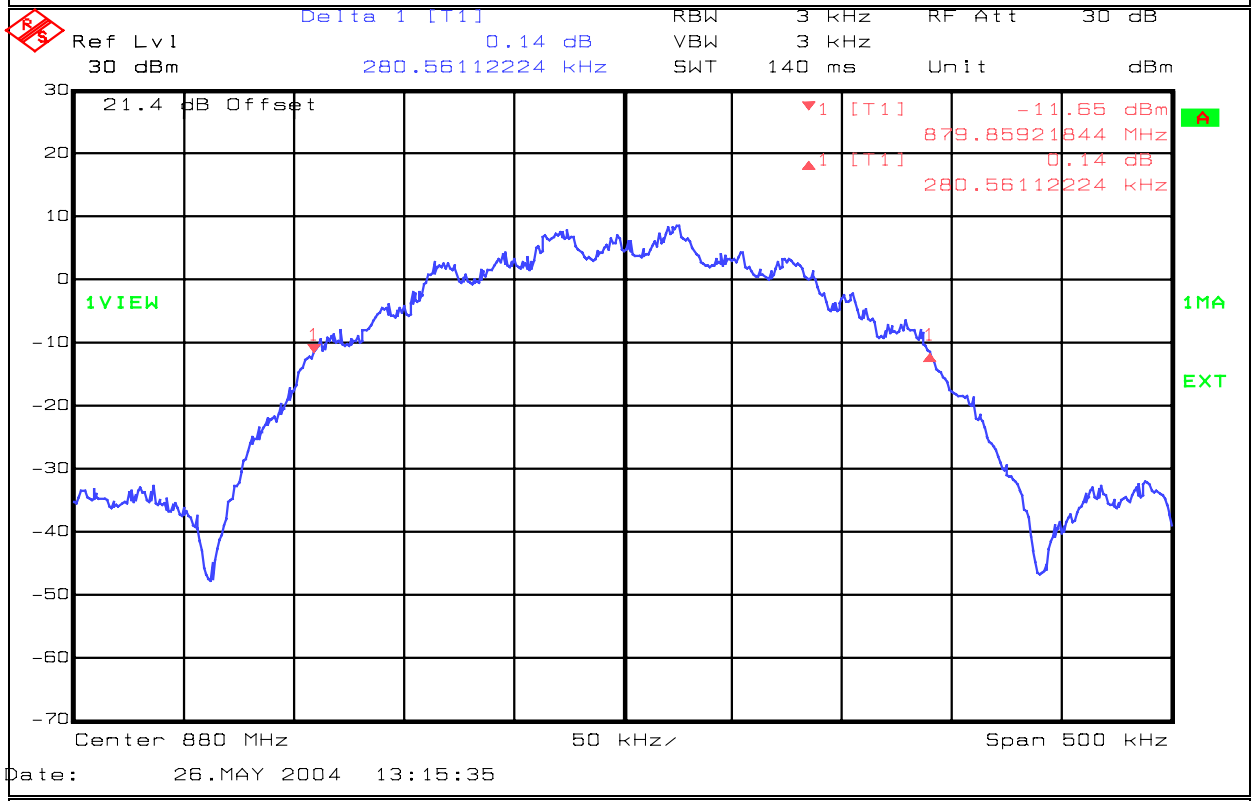
Data Plot — Occupied Bandwidth

Page 3 of 5

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT 22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMPLIFIER		
Configuration:	Tx FULL POWER		



Notes: EDGE

Test Data – Occupied Bandwidth

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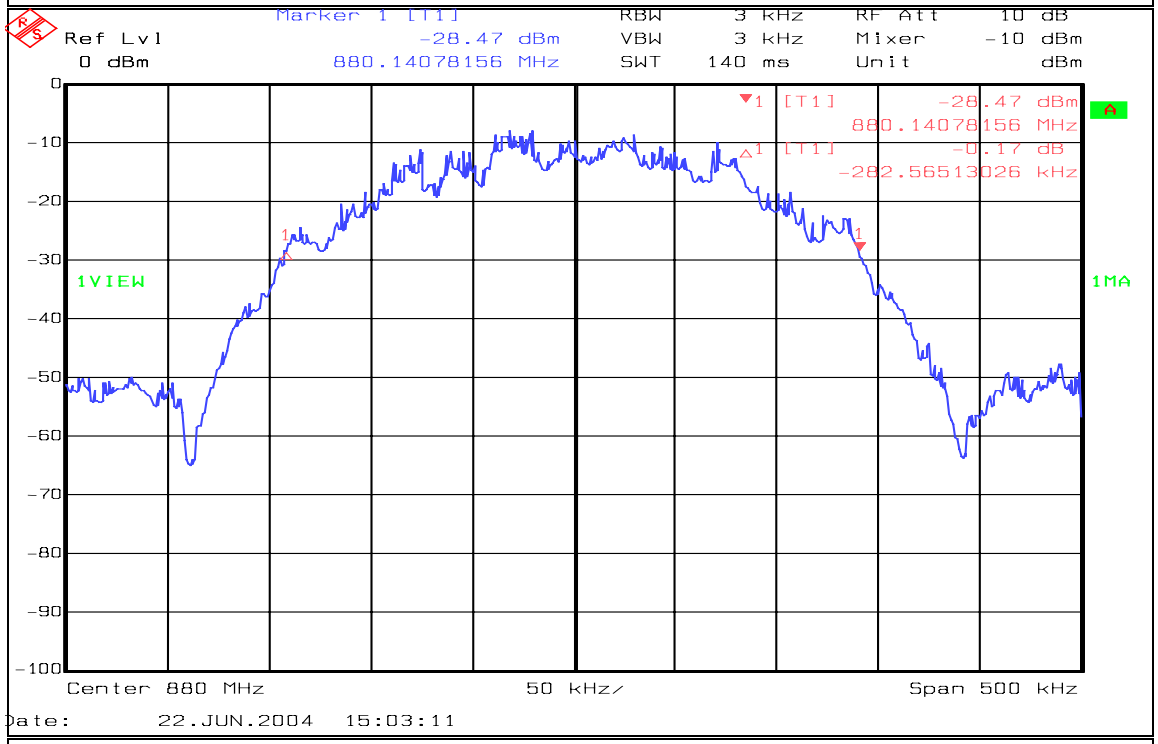
Data Plot **Occupied Bandwidth**

Page 3 of 5

Job No.:	4L0347	Date:	6/22/2004
Specification:	PT 22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMPLIFIER		
Configuration:	Input plots		



Notes: **EDGE**
Input

Test Data – Occupied Bandwidth

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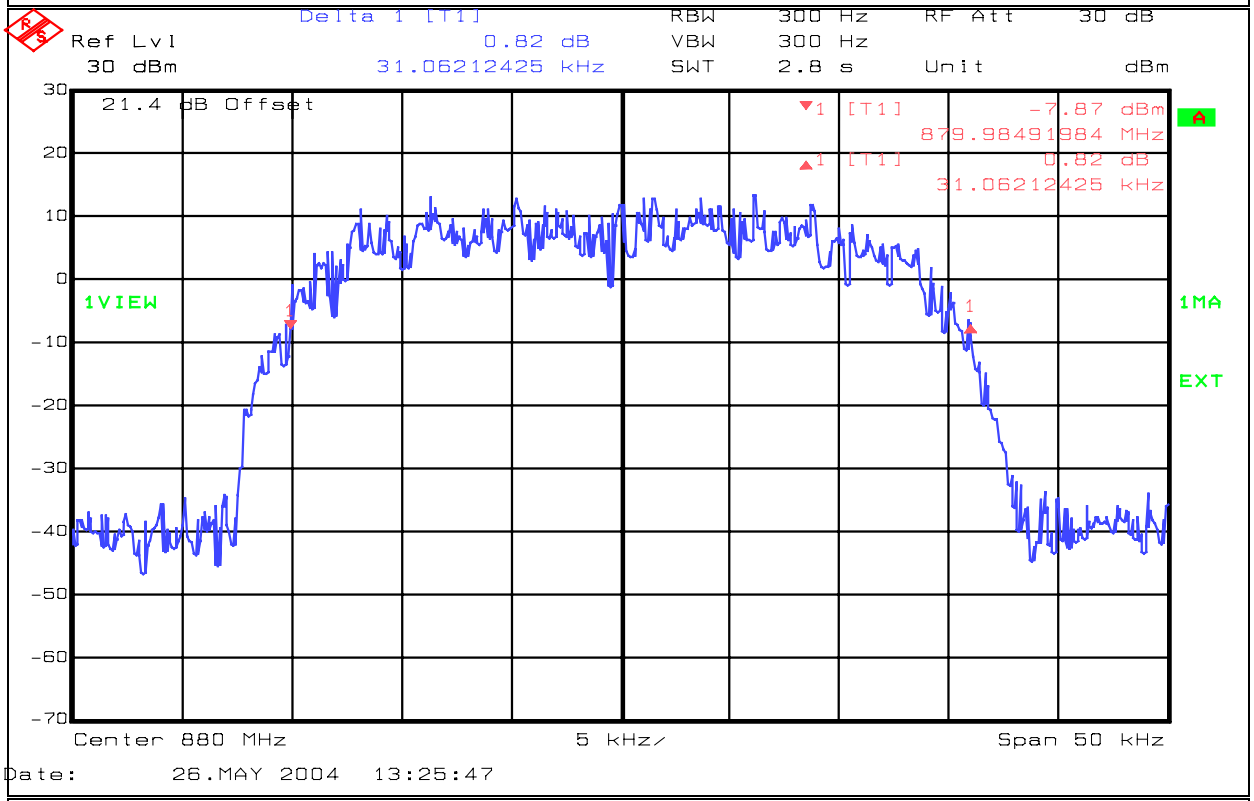
Test Plot: **Occupied Bandwidth**

Page 4 of 5

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT 22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMPLIFIER		
Configuration:	Tx FULL POWER		



Notes: TDMA

Test Data – Occupied Bandwidth

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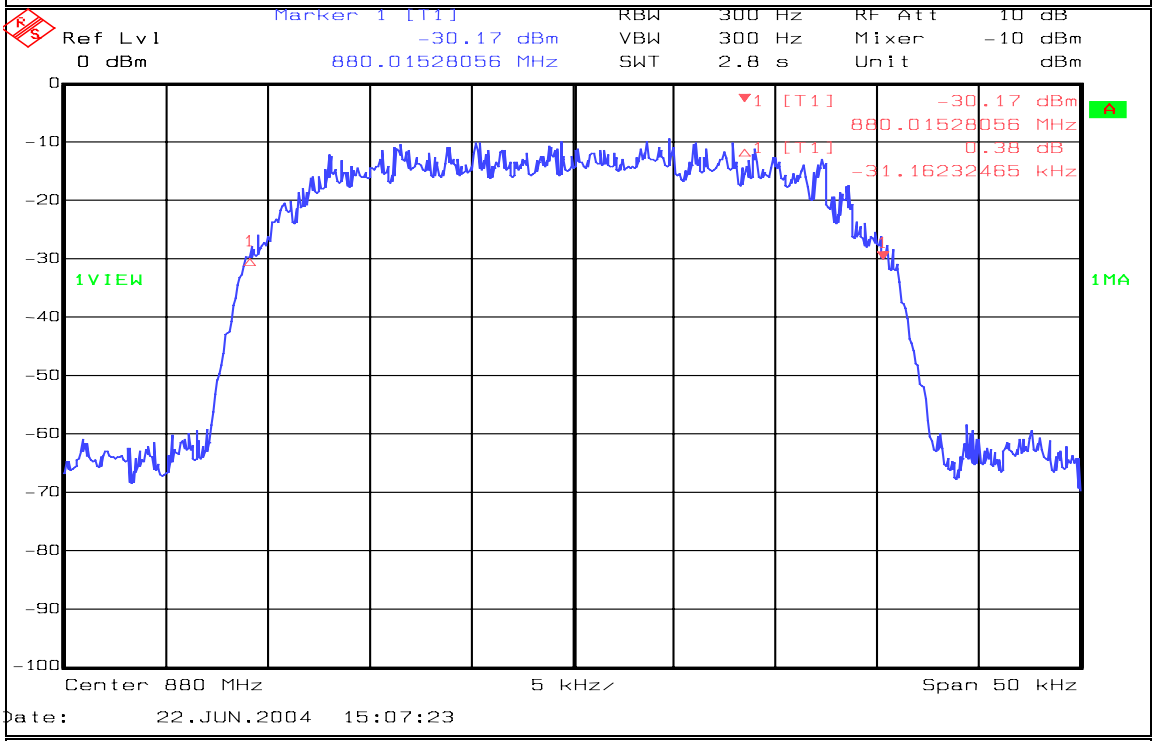
Test Plot: **Occupied Bandwidth**

Page 4 of 5

Job No.:	4L0347	Date:	6/22/2004
Specification:	PT 22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMPLIFIER		
Configuration:	Input plots		



Notes: **TDMA**
Input

Test Data – Occupied Bandwidth

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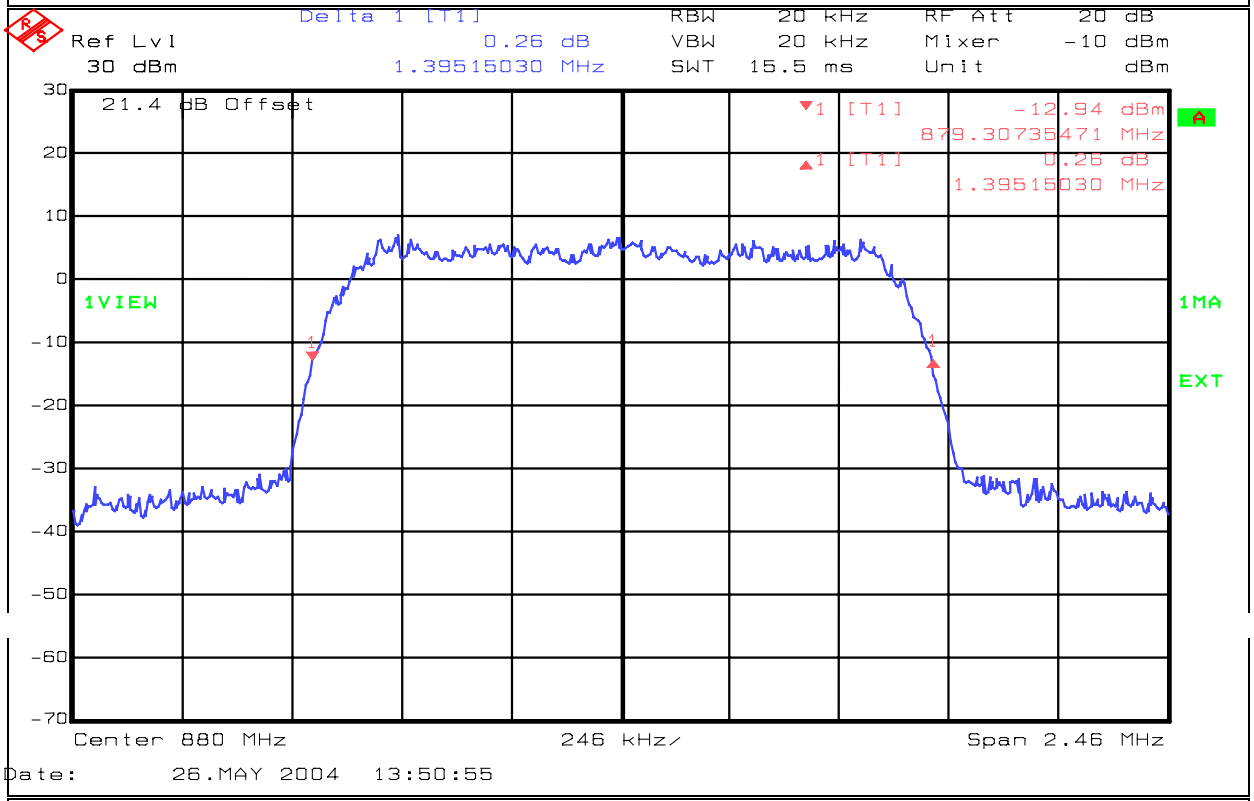
Test Plot: **Occupied Bandwidth**

Page 5 of 5

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT 22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMPLIFIER		
Configuration:	Tx FULL POWER		



Notes: CDMA

Test Data – Occupied Bandwidth

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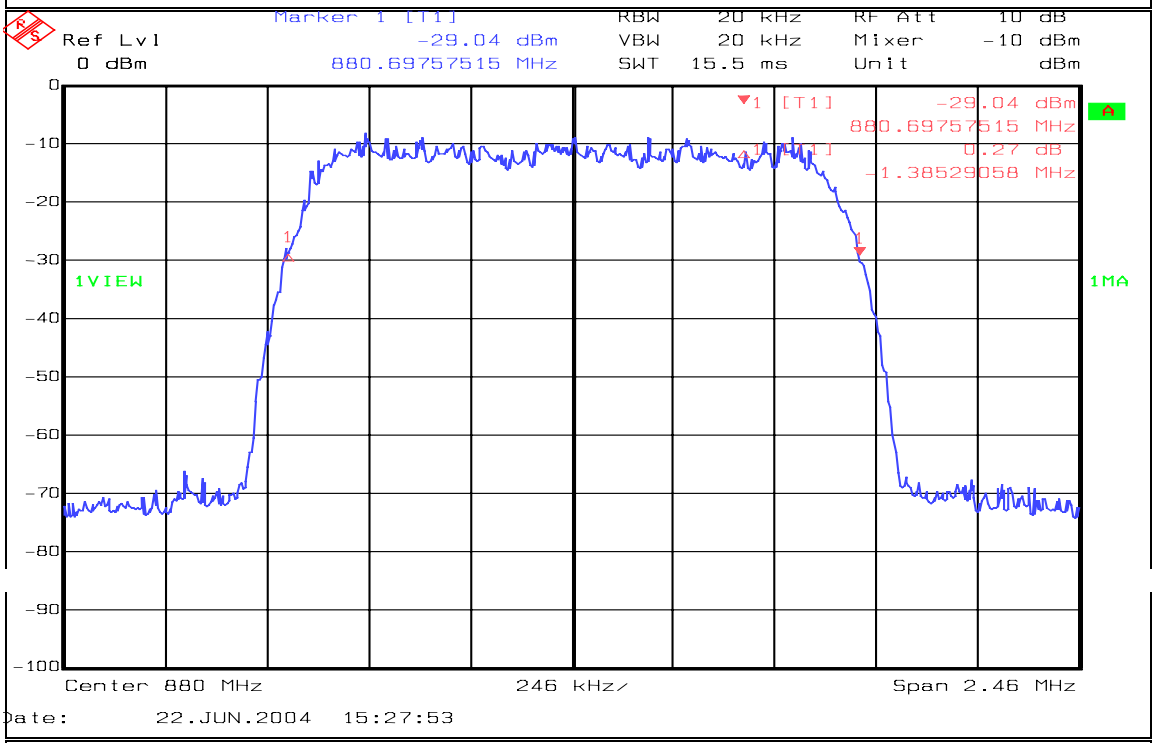
Test Plot: **Occupied Bandwidth**

Page 5 of 5

Job No.:	4L0347	Date:	6/22/2004
Specification:	PT 22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMPLIFIER		
Configuration:	Input plots		



Notes: **CDMA**
Input

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 5/26/04

Test Results: Complies.

Note: Spurious emission testing was performed on three channels (high, mid and low). The data presented for mid channel is representative of all measurements as no emissions were detected above the noise floor.

Test Data: See attached plots

Measurement Uncertainty: +/- 1.6 dB

Test Data – Spurious Emissions at Antenna Terminals

Dallas Headquarters:
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Data Plot **Spurious Emissions at Antenna Terminals**

Page 1 of 3 Complete X

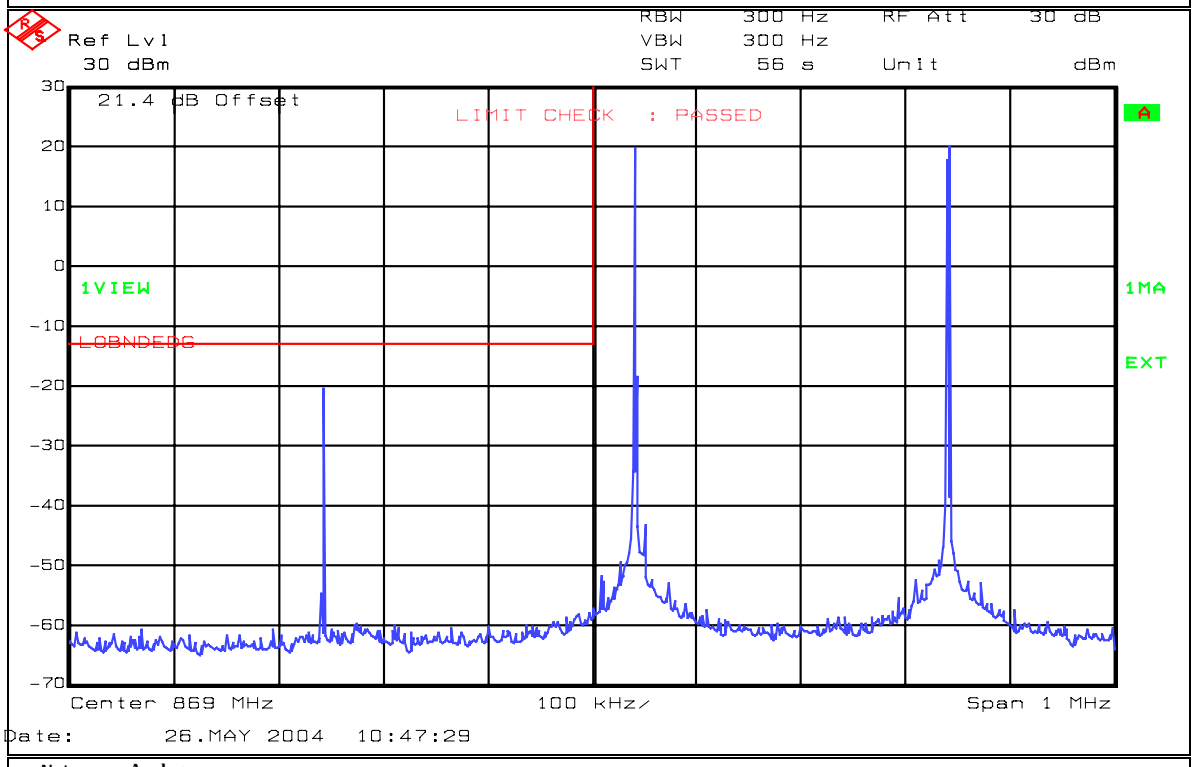
Job No.:	4L0347	Date:	5/26/2004	Preliminary:	
Specification:	PT22	Temperature(°C):	22		
Tested By:	David Light	Relative Humidity(%)	40		
E.U.T.:	800/1900 MHz AMP				
Configuration:	TX FULL POWER				
Sample Number:	1				
Location:	Lab 1	RBW:	Refer to plots	Measurement	
Detector Type:	Peak	VBW:	Refer to plots	Distance:	NA m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	#N/A
Filter:		Cable #2:	
Receiver:	1036	Cable #3:	
Attenuator #1	1064	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB



Notes: **Analog**
Tx 869.04 and 869.34 MHz
20 dBm per carrier - 23 dBm composite

Test Data – Spurious Emissions at Antenna Terminals

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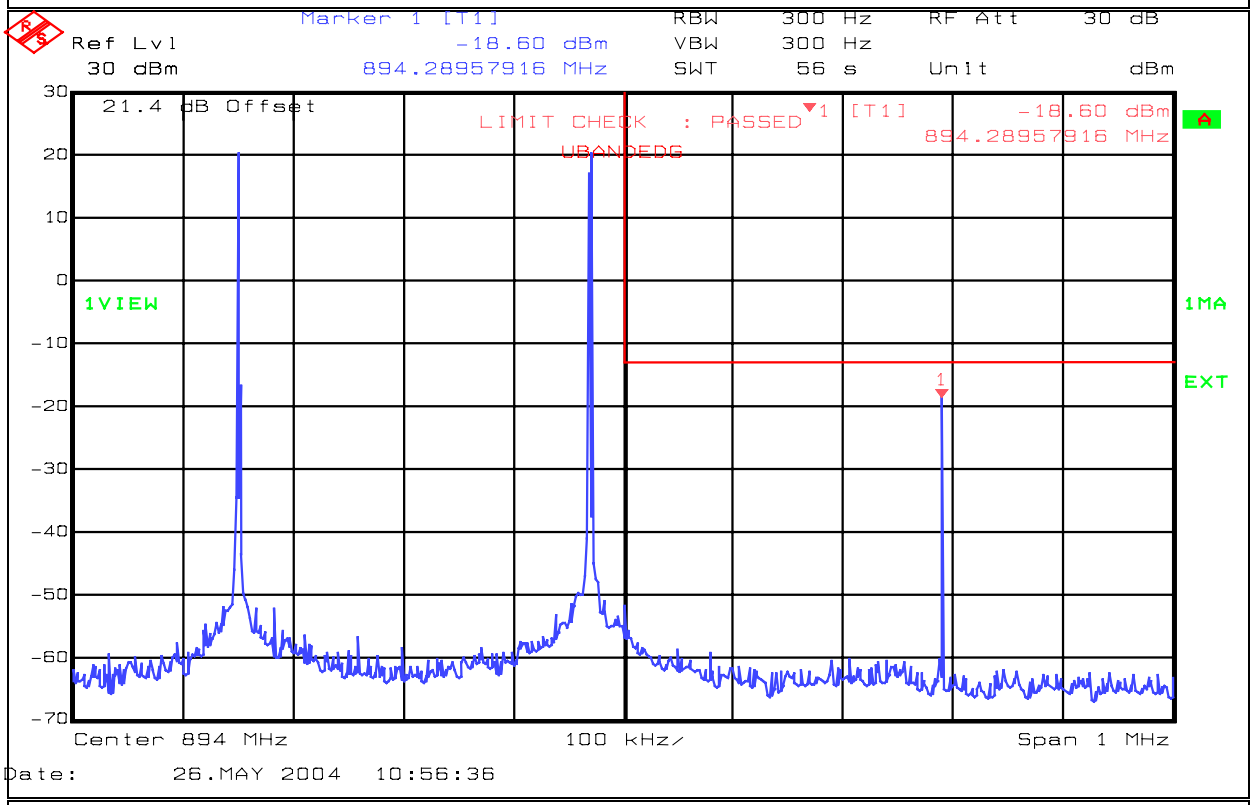
Data Plot **Spurious Emissions at Antenna Terminals**

Page 2 of 3

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMP		
Configuration:	TX FULL POWER		



Notes: **Analog**
Tx 893.97 and 893.65 MHz
20 dBm per carrier - 23 dBm composite

Test Data – Spurious Emissions at Antenna Terminals

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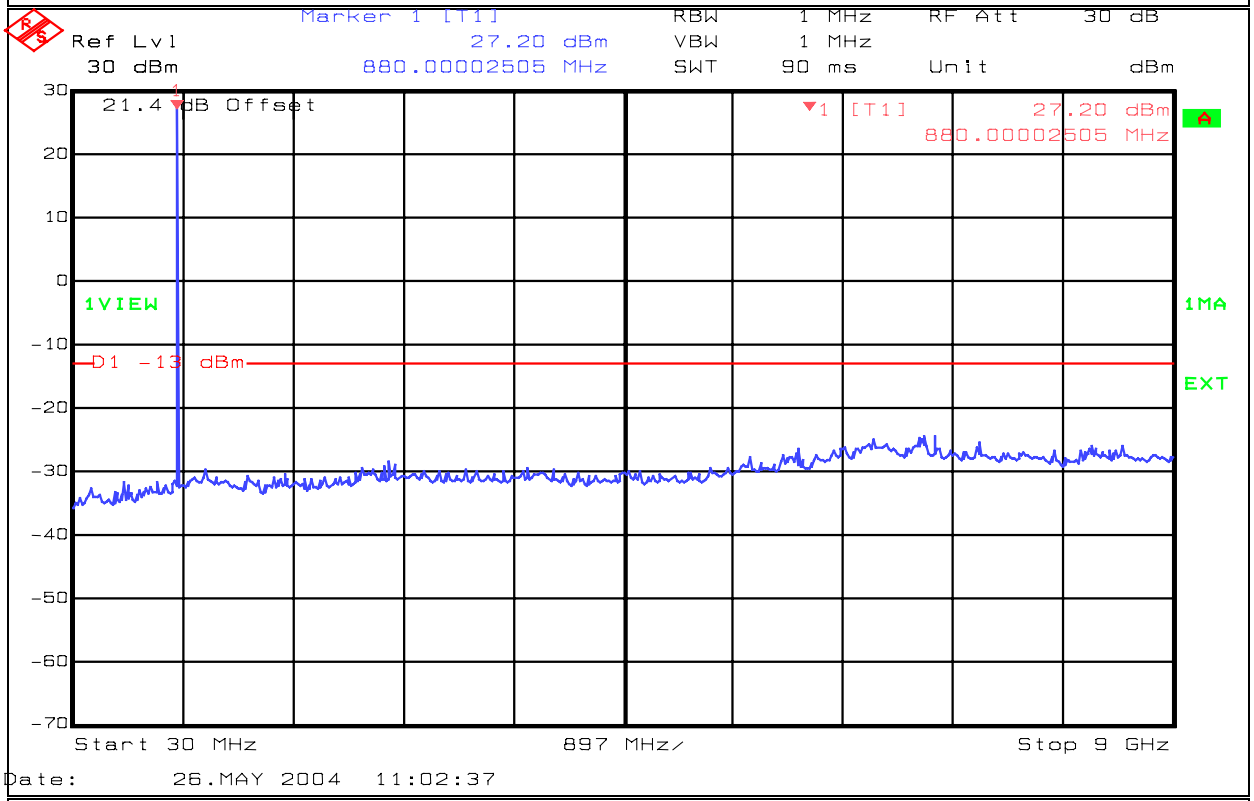
Data Plot **Spurious Emissions at Antenna Terminals**

Page 3 of 3

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMP		
Configuration:	TX FULL POWER		



Notes: **Analog**
Single carrier 27 dBm

Test Data – Spurious Emissions at Antenna Terminals

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Data Plot **Spurious Emissions at Antenna Terminals**

Page 1 of 3 Complete X

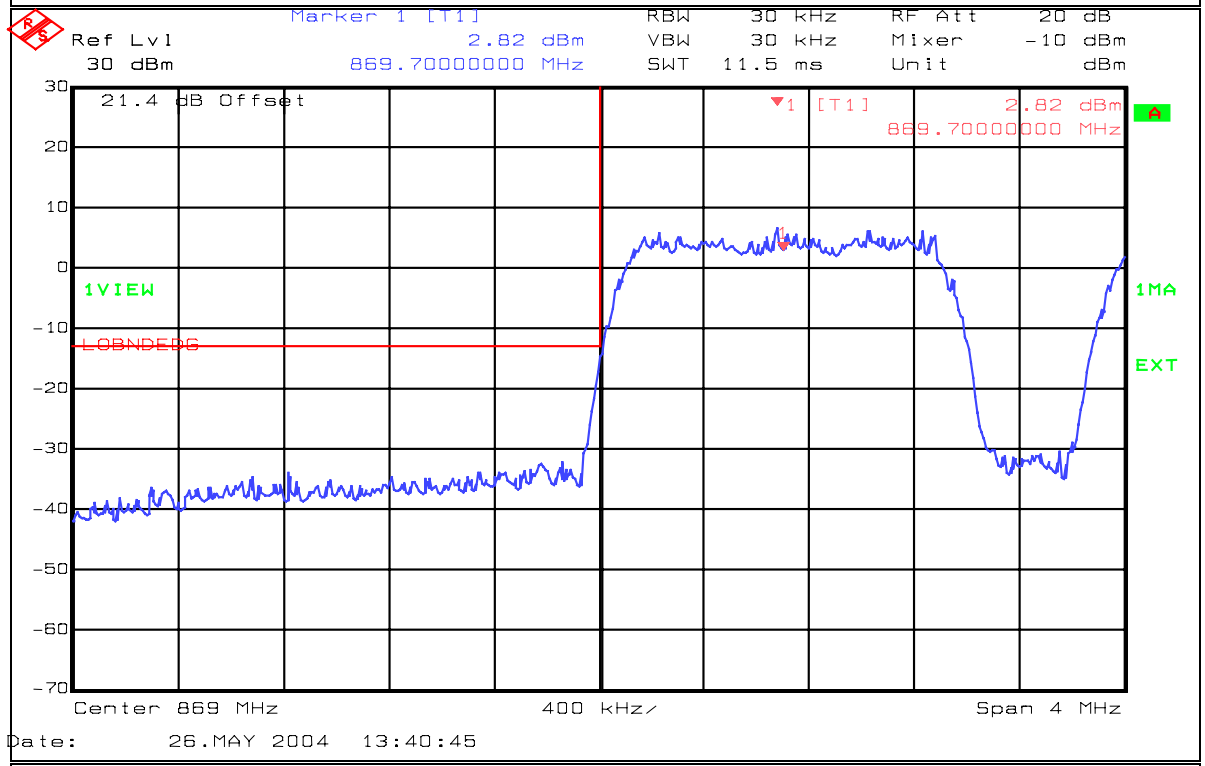
Job No.:	4L0347	Date:	5/26/2004	Preliminary:	
Specification:	PT22	Temperature(°C):	22		
Tested By:	David Light	Relative Humidity(%)	40		
E.U.T.:	800/1900 MHz AMP				
Configuration:	TX FULL POWER				
Sample Number:	1				
Location:	Lab 1	RBW:	Refer to plots	Measurement	
Detector Type:	Peak	VBW:	Refer to plots	Distance:	NA m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	#N/A
Filter:		Cable #2:	
Receiver:	1036	Cable #3:	
Attenuator #1	1064	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB



Notes:	**CDMA**
	Tx 869.7 and 871.07 MHz
	17 dBm per carrier - 20 dBm composite

Test Data – Spurious Emissions at Antenna Terminals

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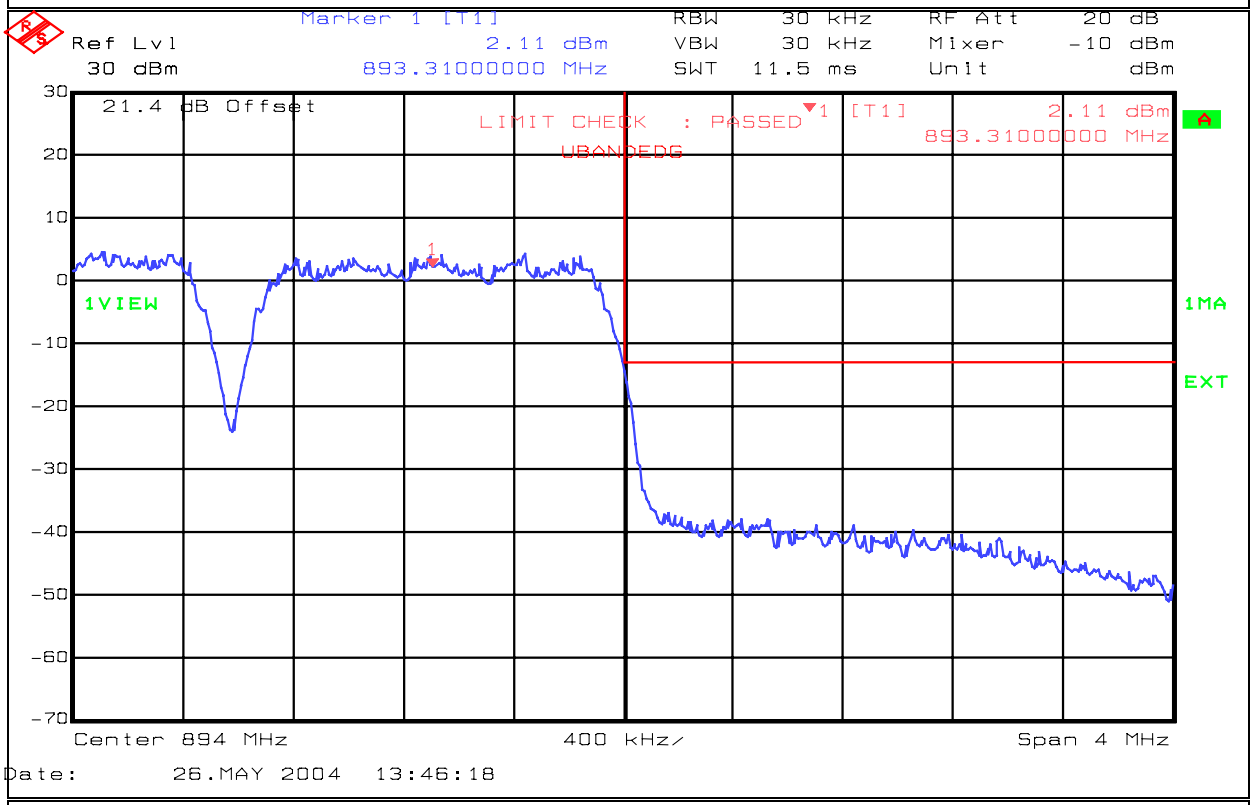
Data Plot **Spurious Emissions at Antenna Terminals**

Page 2 of 3

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMP		
Configuration:	TX FULL POWER		



Notes:
CDMA
Tx 893.31 and 891.83 MHz
17 dBm per carrier - 20 dBm composite

Test Data – Spurious Emissions at Antenna Terminals

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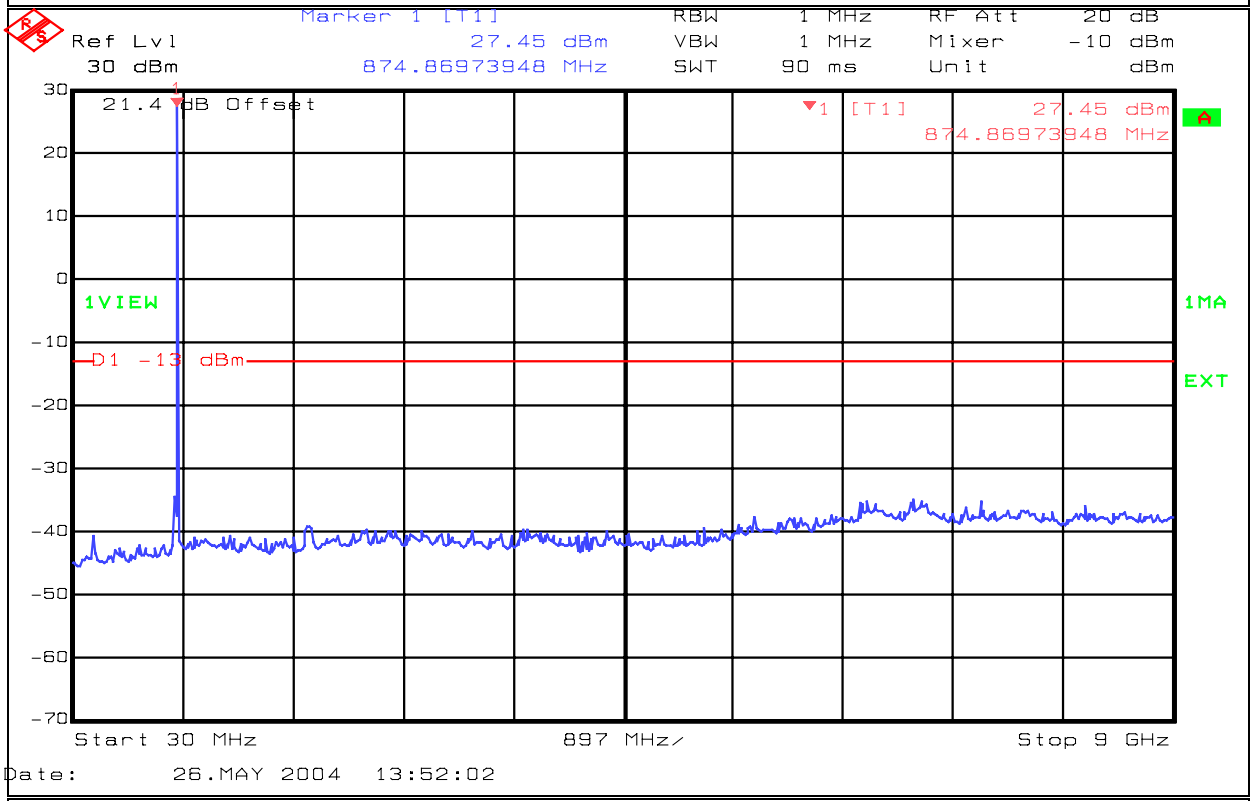
Data Plot **Spurious Emissions at Antenna Terminals**

Page 3 of 3

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMP		
Configuration:	TX FULL POWER		



Notes: **Single channel at 21 dBm output**

Test Data – Spurious Emissions at Antenna Terminals

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Data Plot **Spurious Emissions at Antenna Terminals**

Page 1 of 3 Complete X

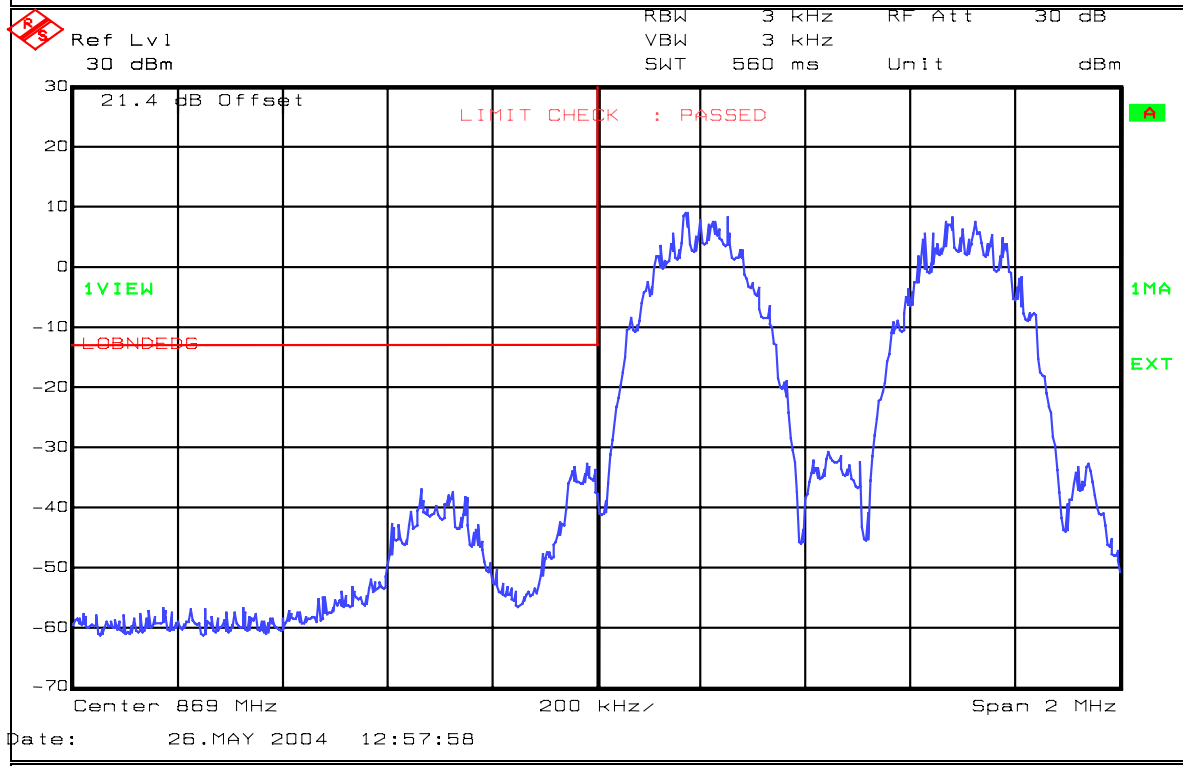
Job No.:	4L0347	Date:	5/26/2004	Preliminary:	
Specification:	PT22	Temperature(°C):	22		
Tested By:	David Light	Relative Humidity(%)	40		
E.U.T.:	800/1900 MHz AMP				
Configuration:	TX FULL POWER				
Sample Number:	1				
Location:	Lab 1	RBW:	Refer to plots	Measurement	
Detector Type:	Peak	VBW:	Refer to plots	Distance:	NA m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	#N/A
Filter:		Cable #2:	
Receiver:	1036	Cable #3:	
Attenuator #1	1064	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB



Notes: **EDGE**
Tx 869.2 and 869.7 MHz
18 dBm per carrier - 21 dBm composite

Test Data – Spurious Emissions at Antenna Terminals

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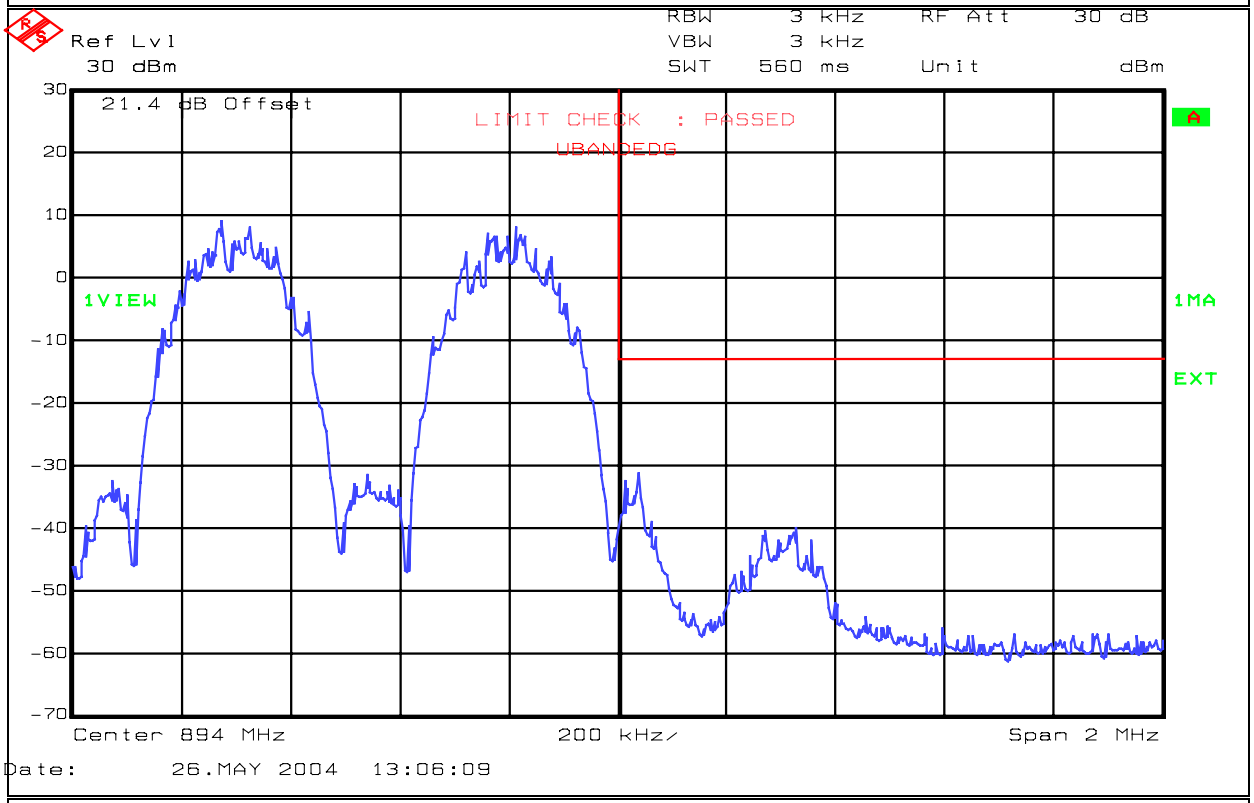
Data Plot **Spurious Emissions at Antenna Terminals**

Page 2 of 3

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMP		
Configuration:	TX FULL POWER		



Notes: **EDGE**
Tx 893.8 and 893.3 MHz
18 dBm ber carrier - 21 dBm composite

Test Data – Spurious Emissions at Antenna Terminals

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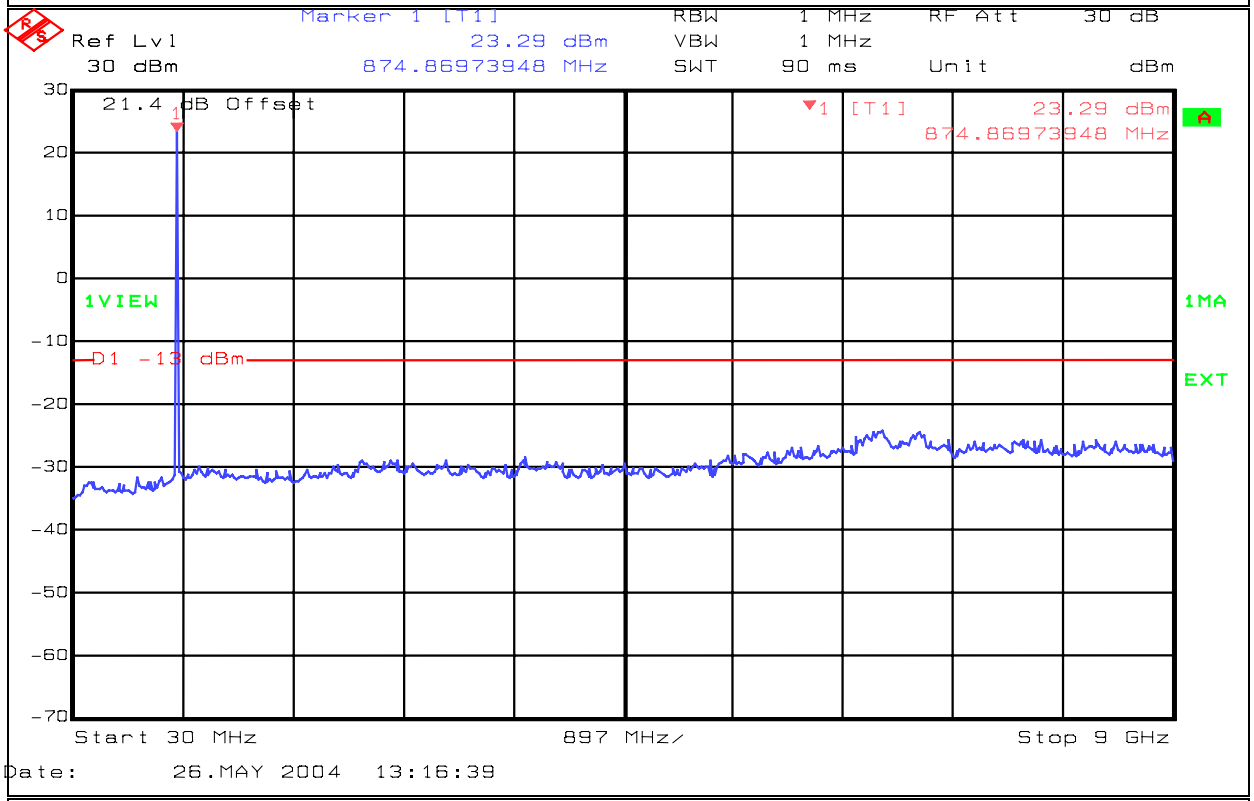
Data Plot **Spurious Emissions at Antenna Terminals**

Page 3 of 3

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMP		
Configuration:	TX FULL POWER		



Notes: **EDGE**
Tx single carrier at 23 dBm

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 1 of 3 Complete X

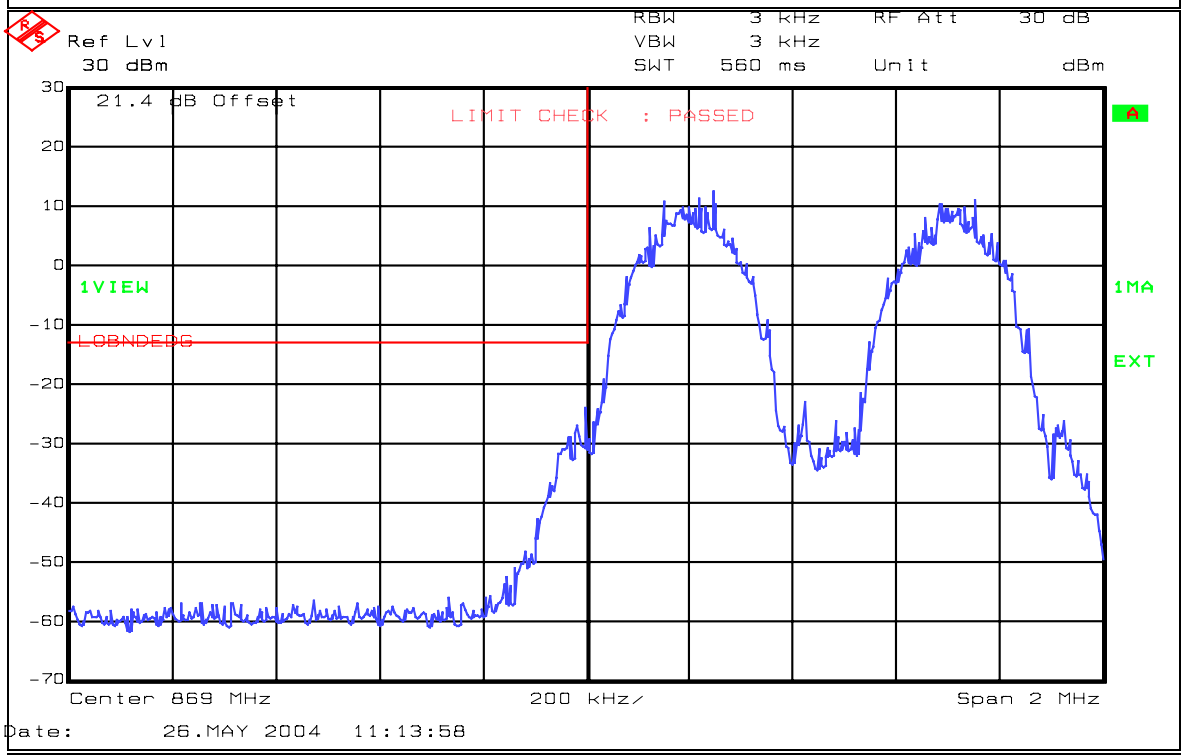
Job No.:	4L0347	Date:	5/26/2004	Preliminary:	
Specification:	PT22	Temperature(°C):	22		
Tested By:	David Light	Relative Humidity(%)	40		
E.U.T.:	800/1900 MHz AMP				
Configuration:	TX FULL POWER				
Sample Number:	1				
Location:	Lab 1	RBW:	Refer to plots	Measurement	
Detector Type:	Peak	VBW:	Refer to plots	Distance:	NA m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	#N/A
Filter:		Cable #2:	
Receiver:	1036	Cable #3:	
Attenuator #1	1064	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB



Notes: **GSM**
Tx 869.2 and 869.7 MHz
20 dBm per carrier - 23 dBm composite

Test Data – Spurious Emissions at Antenna Terminals

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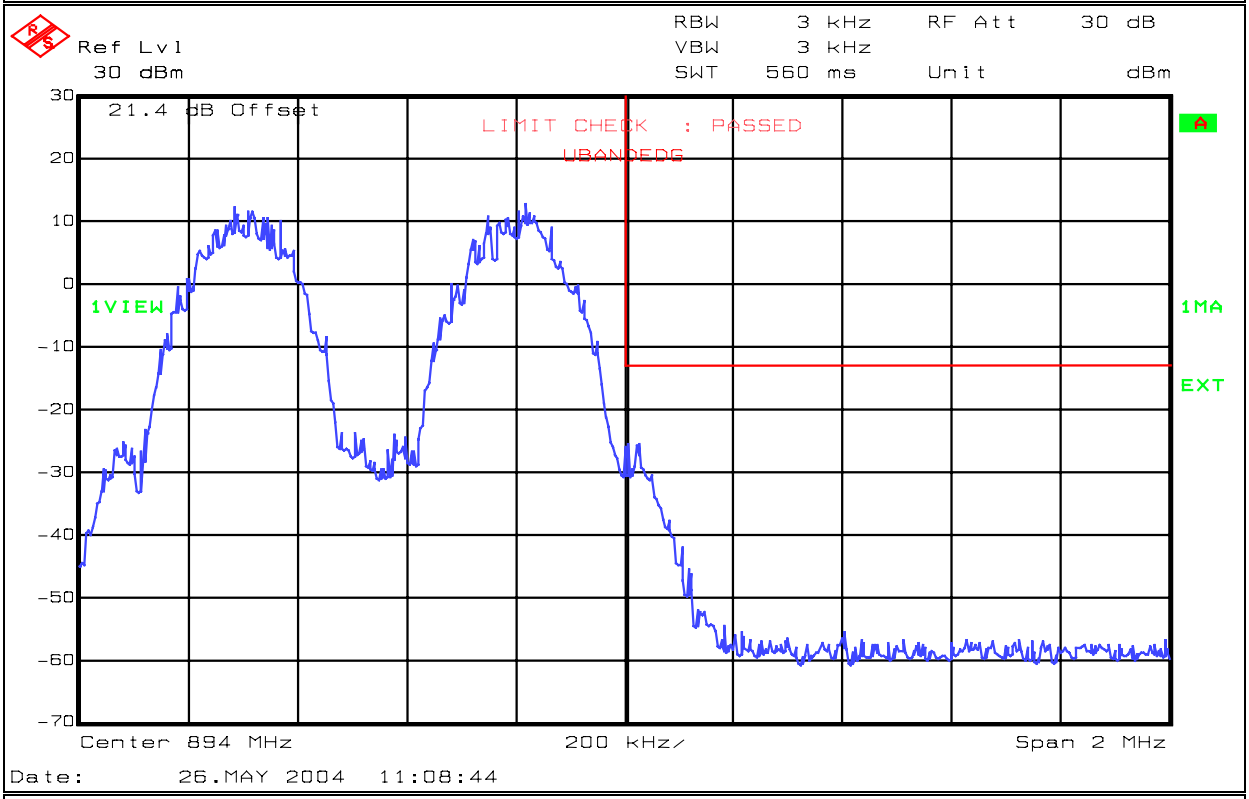
Data Plot **Spurious Emissions at Antenna Terminals**

Page 2 of 3

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMP		
Configuration:	TX FULL POWER		



Notes: **GSM**
Tx 893.8 and 893.3 MHz
20 dBm per carrier - 23 dBm Composite

Test Data – Spurious Emissions at Antenna Terminals

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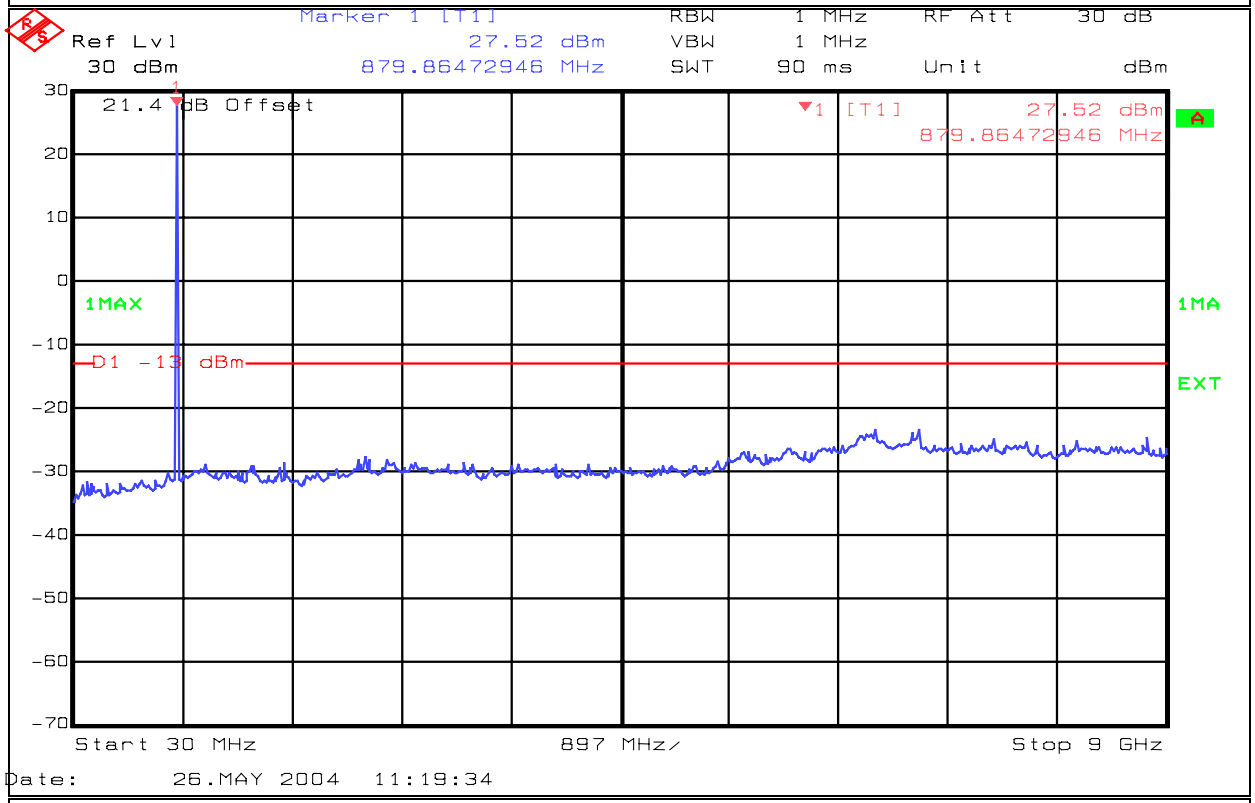
Data Plot **Spurious Emissions at Antenna Terminals**

Page 3 of 3

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMP		
Configuration:	TX FULL POWER		



Notes: **GSM**
Single 27 dBm carrier

Test Data – Spurious Emissions at Antenna Terminals

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Data Plot **Spurious Emissions at Antenna Terminals**

Page 1 of 3 Complete X

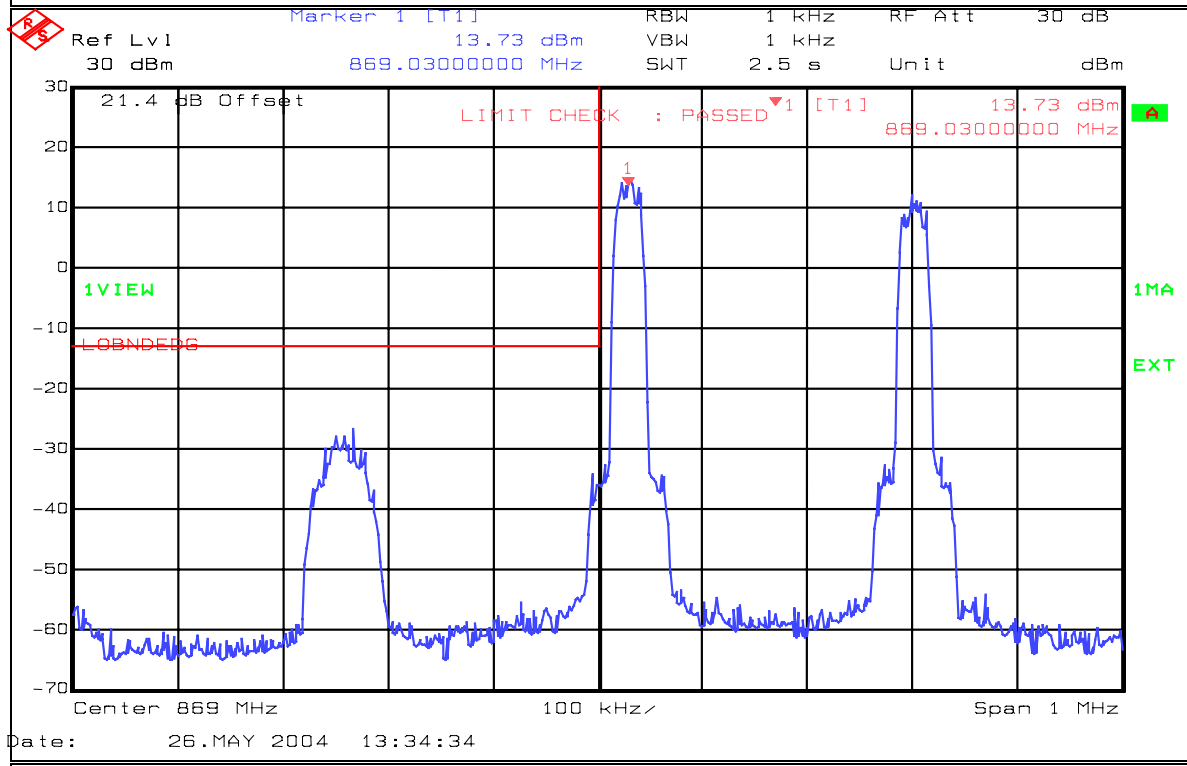
Job No.:	4L0347	Date:	5/26/2004	Preliminary:	
Specification:	PT22	Temperature(°C):	22		
Tested By:	David Light	Relative Humidity(%)	40		
E.U.T.:	800/1900 MHz AMP				
Configuration:	TX FULL POWER				
Sample Number:	1				
Location:	Lab 1	RBW:	Refer to plots	Measurement	
Detector Type:	Peak	VBW:	Refer to plots	Distance:	NA m

Test Equipment Used

Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	#N/A
Filter:		Cable #2:	
Receiver:	1036	Cable #3:	
Attenuator #1	1064	Cable #4:	
Attenuator #2:		Mixer:	

Additional equipment used:

Measurement Uncertainty: +/-1.7 dB



Notes: **TDMA**
Tx 869.03 and 869.30 MHz
18.5 dBm carrier power per channel - 21.5 dBm composite

Test Data – Spurious Emissions at Antenna Terminals

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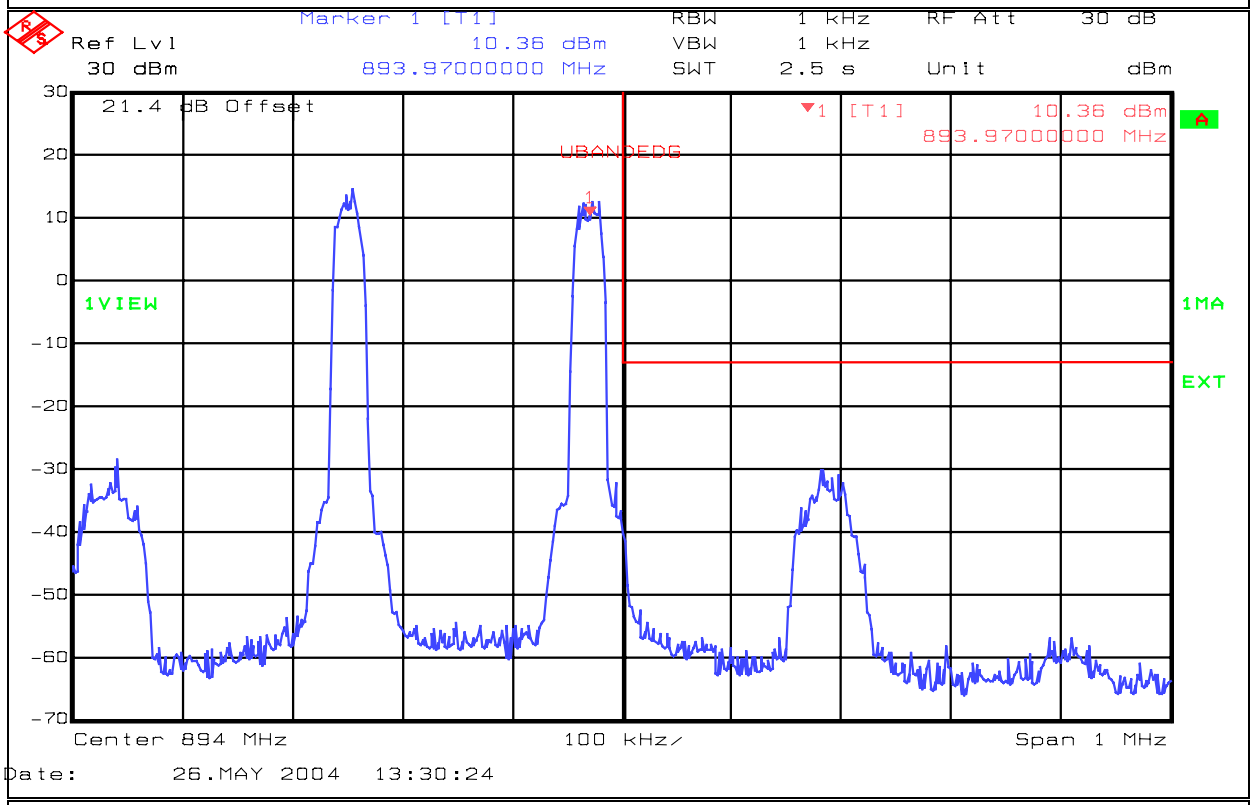
Data Plot **Spurious Emissions at Antenna Terminals**

Page 2 of 3

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMP		
Configuration:	TX FULL POWER		



Notes:
TDMA
Tx 893.97 and 893.75 MHz
18.5 dBm carrier power per carrier - 21.5 dBm composite

Test Data – Spurious Emissions at Antenna Terminals

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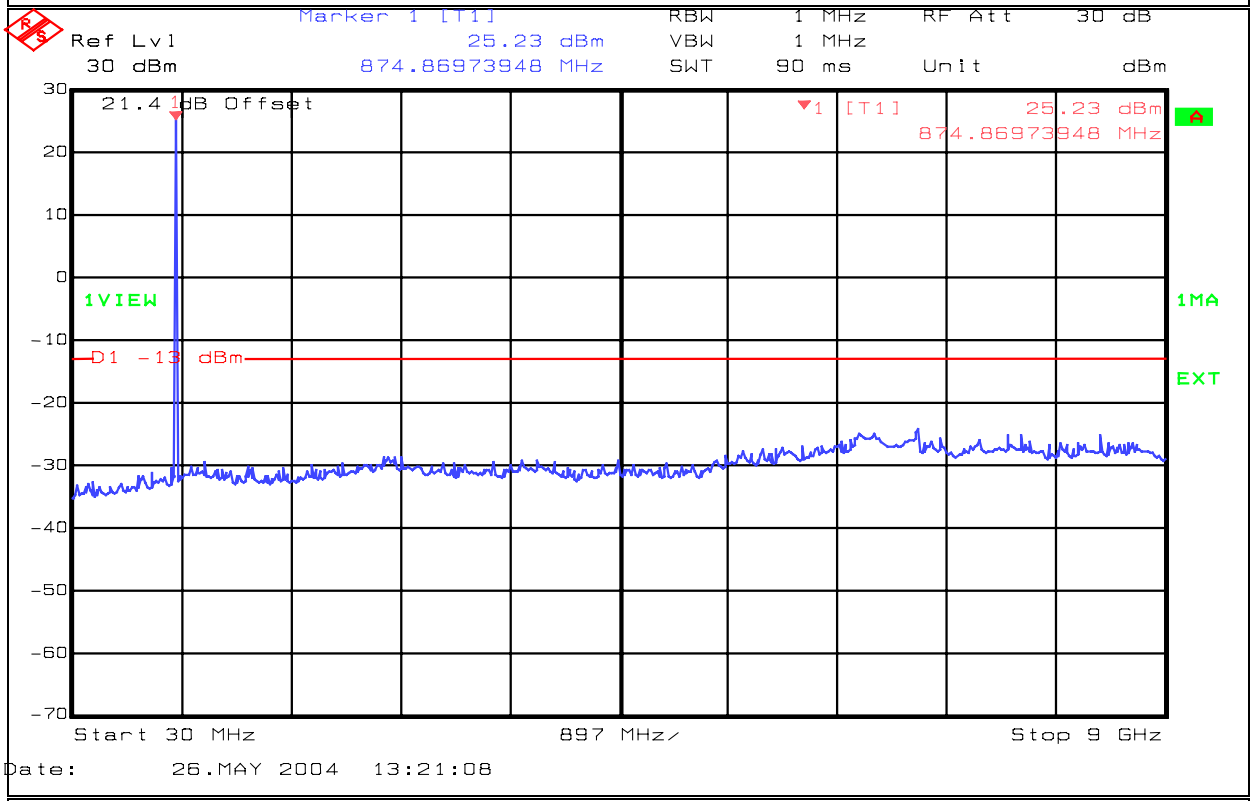
Nemko Dallas, Inc.

Data Plot **Spurious Emissions at Antenna Terminals**

Page 3 of 3

Job No.:	4L0347	Date:	5/26/2004
Specification:	PT22	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	800/1900 MHz AMP		
Configuration:	TX FULL POWER		



Notes: **TDMA**
Tx single carrier at 24 dBm channel power

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious	PARA. NO.: 2.1053
TESTED BY: David Light	DATE:5/27/04

Test Results: Complies.

Test Data: There were no emissions detected above the noise floor, which was more than 20 dB below the specification limit of -13 dBm.

The device was tested at 3 frequencies, Low, Mid and High

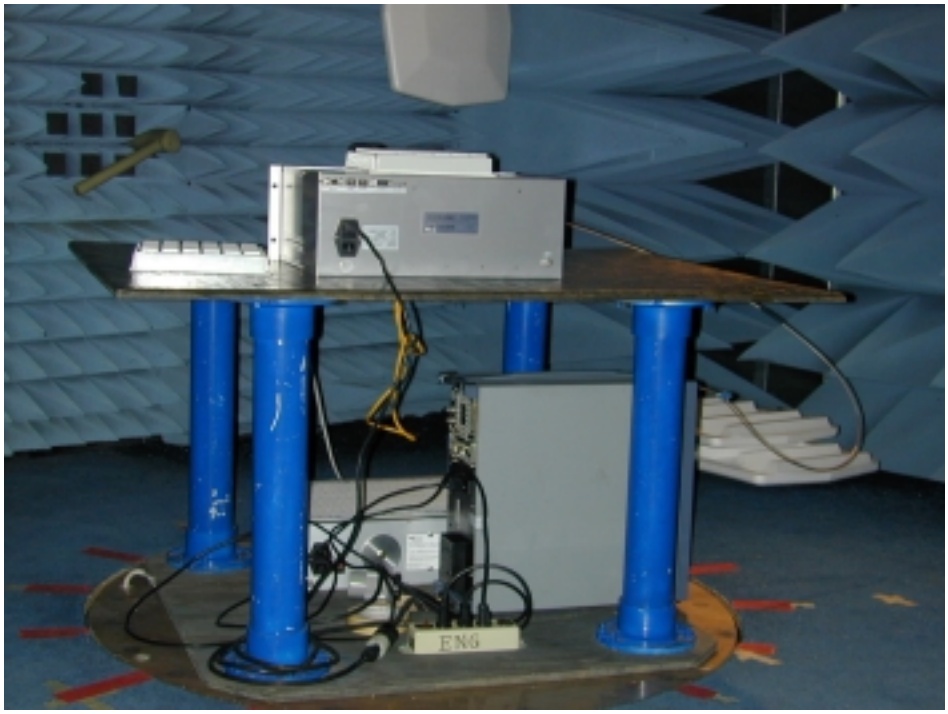
Equipment Used: 1464-1304-1016-1484-1485

Measurement Uncertainty: +/- 1.7 dB

Temperature: 25 °C

Relative Humidity: 50 %

Test Setup – Field Strength of Spurious Emissions



Section 7. Frequency Stability

NAME OF TEST: Frequency Stability	PARA. NO.: 2.1055
TESTED BY: David Light	DATE:5/27/04

Test Results: Complies.

Test Data: See attached table.

Standard Test Frequency: 880 MHz

Standard Test Voltage: -48 Vdc

Measurement Uncertainty: +/- 1×10^{-17} ppm

Test Data – Frequency Stability

Nemko Dallas, Inc.

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

Frequency Stability

Page 1 of 1

Job No.: 4L0347 Date: 5/27/2004
Specification: PT22 Temperature(°C): 20
Tested By: David Light Relative Humidity(%) 45
E.U.T.: 800/1900 MHz AMP
Configuration: TX CENTER BAND
Sample Number: 1

Test Equipment Used

Antenna: Directional Coupler:
Pre-Amp: Cable #1: 1042
Filter: Cable #2:
Receiver: 1026
Attenuator #1 1064
Attenuator #2:

Measurement Uncertainty: $1x10^{-17}$ppm **Standard Test Frequency 880.000000 MHz**

Temp (°C)	Measured Frequency (MHz)	Rho	Test Voltage	Freqeuncy Error (Hz)	Limit (+/-Hz)	Error (ppm)	Comment
20	880.000000		-48	0	1320.0	0.0	
20	880.000000		-56.2	0	1320.0	0.0	
20	880.000000		-40.8	0	1320.0	0.0	
50	880.000000		-48	0	1320.0	0.0	
40	880.000000		-48	0	1320.0	0.0	
30	880.000000		-48	0	1320.0	0.0	
10	880.000000		-48	0	1320.0	0.0	
0	880.000000		-48	0	1320.0	0.0	
-10	880.000000		-48	0	1320.0	0.0	
-20	880.000000		-48	0	1320.0	0.0	
-30	880.000000		-48	0	1320.0	0.0	
Notes:							

Section 8. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/26/04	03/26/05
1042	CABLE, 4M	STORM PR90-010-144	N/A	09/02/03	09/01/04
1064	ATTENUATOR	NARDA 776B-20	NONE	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
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	10/27/03	10/26/04
283	Environmental Chamber with controller # 1189006	ENVIROTRONICS SH27 & 2030-22844	129010083	05/06/04	05/06/05

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. Power output is measured with the maximum rated input level.

Integral Antenna:
If the antenna is not detachable from the circuit then the Peak Power Output is derived from the peak radiated field strength of the fundamental emission by using the plane wave relation $GP/4\pi R^2 = E^2/120\pi$ and proceeding as follows:

$$P = \frac{E^2 R^2}{30G} = \frac{E^2 3^2}{30G}$$

where,

P = the equivalent isotropic radiated power in watts
E = the maximum measured field strength in V/m
R = the measurement range (3 meters)
G = the numeric gain of the transmit antenna in relation to an isotropic radiator

NAME OF TEST: Occupied Bandwidth (Voice & SAT) PARA. NO.: 2.1049

Minimum Standard: 22.917(c) The mean power of any emission removed from the carrier frequency by a displacement frequency (f_d in kHz) must be attenuated below the mean power of the unmodulated carrier (P) as follows:

(i) On any frequency removed from the carrier frequency by more than 12 kHz but not more than 20 kHz:

at least 117 log (f_d/12)

(ii) On any frequency removed from the carrier frequency by more than 20 kHz, up to the first multiple of the carrier frequency:

at least 100 log (f_d/11) dB or 43 + 10 log (P) dB, whichever is the lesser attenuation.

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: 22.917(c) The mean power of any emission removed from the carrier frequency by a displacement frequency (f_d in kHz) must be attenuated below the mean power of the unmodulated carrier (P) as follows:

(1) On any frequency removed from the carrier frequency by more than 20 kHz but not more than 45 kHz:

at least 26 dB

(2) On any frequency removed from the carrier frequency by more than 45 kHz but not more than 90 kHz:

at least 45 dB

(3) On any frequency removed from the carrier frequency by more than 90 kHz, up to the first multiple of the carrier frequency:

at least 60 dB or 43 + 10 log (P) dB, whichever is the lesser attenuation.

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: 22.917(c) The mean power of any emission removed from the carrier frequency by a displacement frequency (f_d in kHz) must be attenuated below the mean power of the unmodulated carrier (P) as follows:

(1) On any frequency removed from the carrier frequency by more than 20 kHz but not more than 45 kHz:

at least 26 dB

(2) On any frequency removed from the carrier frequency by more than 45 kHz but not more than 90 kHz:

at least 45 dB

(3) On any frequency removed from the carrier frequency by more than 90 kHz, up to the first multiple of the carrier frequency:

at least 60 dB or 43 + 10 log (P) dB, whichever is the lesser attenuation.

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(e). The mean power of emissions must be attenuated below the mean power of the unmodulated carrier on any frequency twice or more than twice the fundamental emission by at least 43 + 10 log P. 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(e). The mean power of emissions must be attenuated below the mean power of the unmodulated carrier on any frequency twice or more than twice the fundamental emission by at least 43 + 10 log P. 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

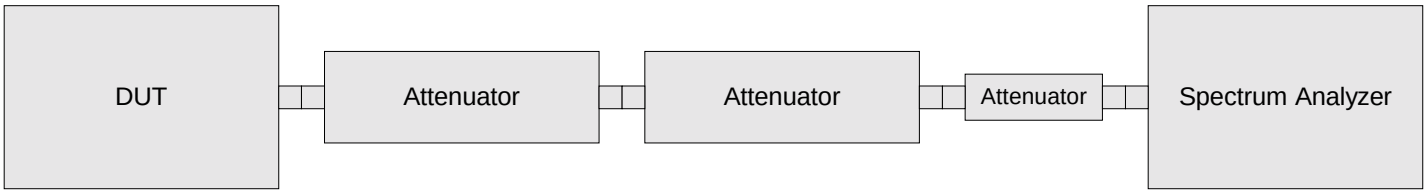
Method Of Measurement:

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.

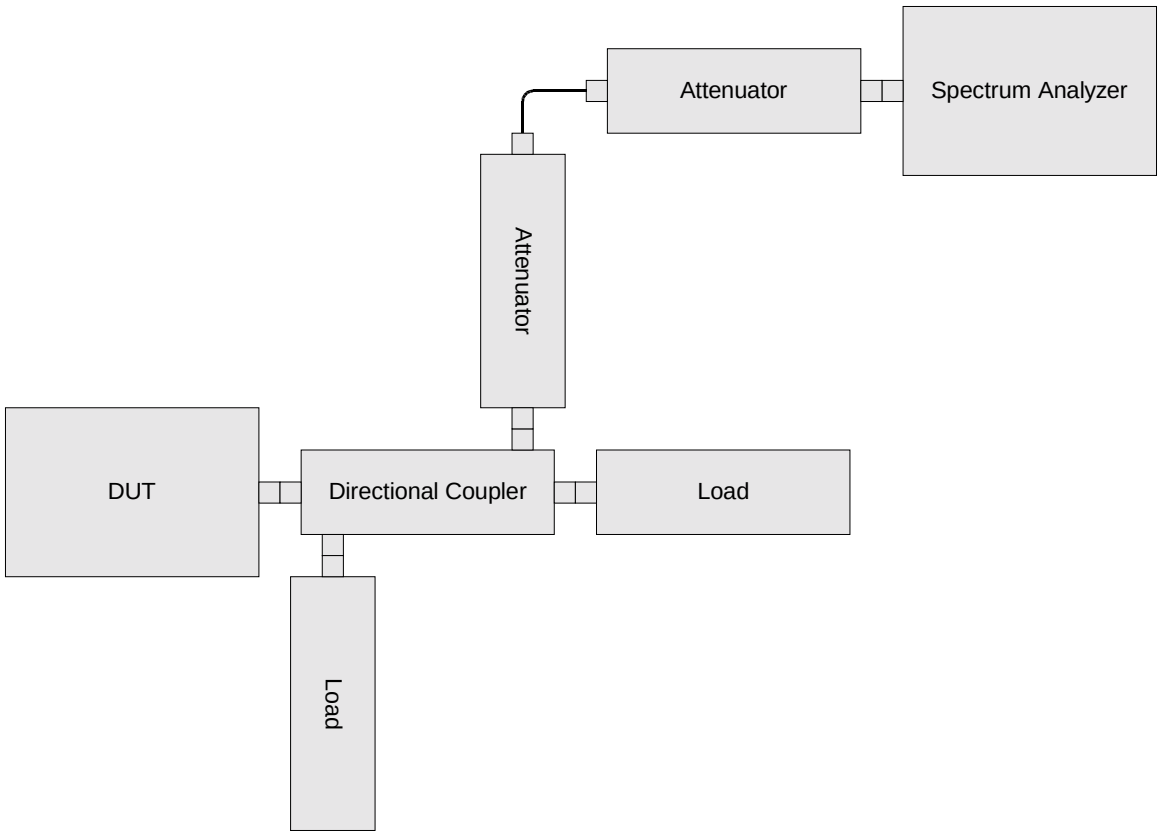
Frequency Stability With Temperature Variation:
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30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

ANNEX B - TEST DIAGRAMS

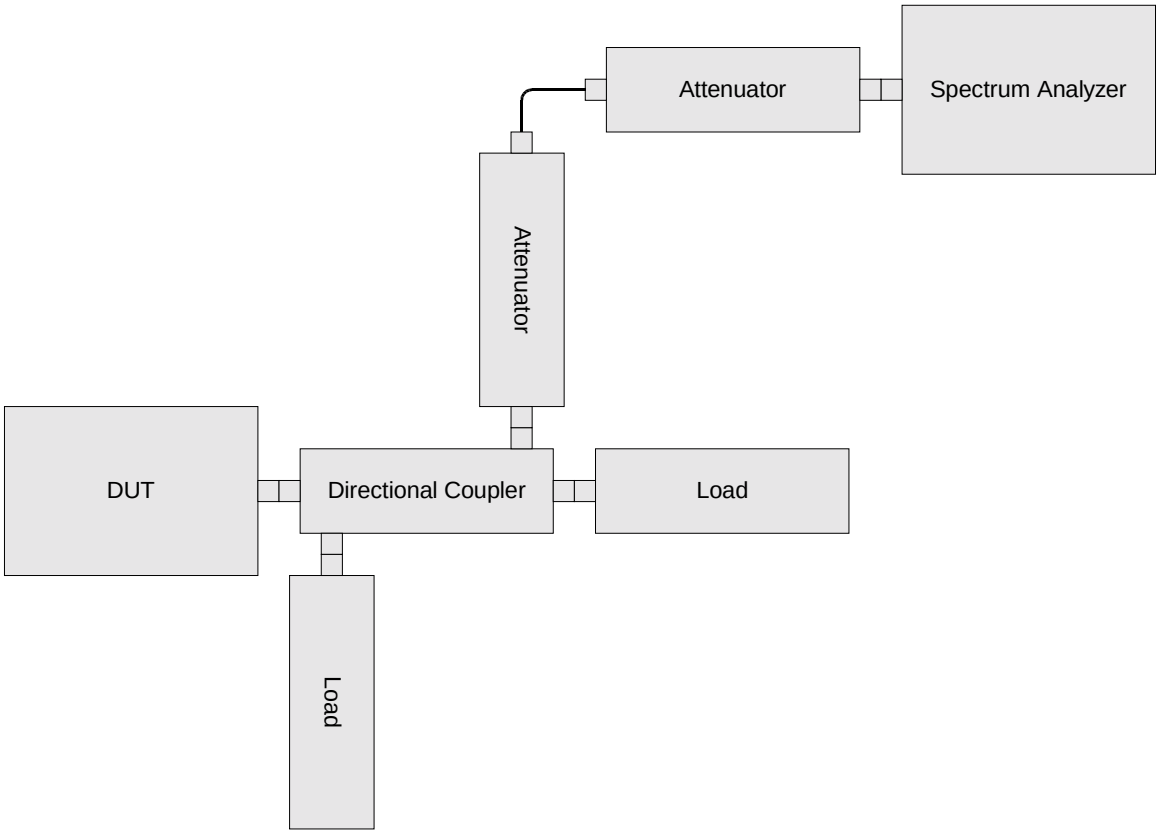
Para. No. 2.1046 - R.F. Power Output

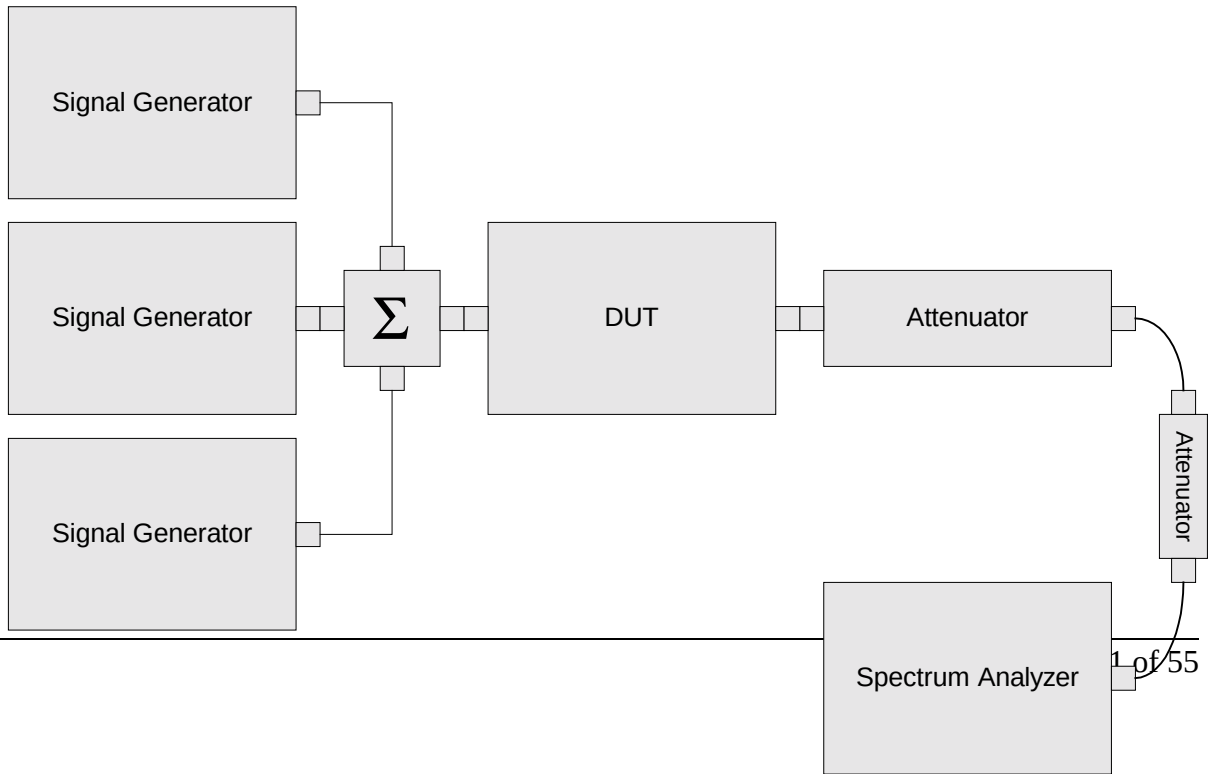


Para. No. 2.1049 - Occupied Bandwidth

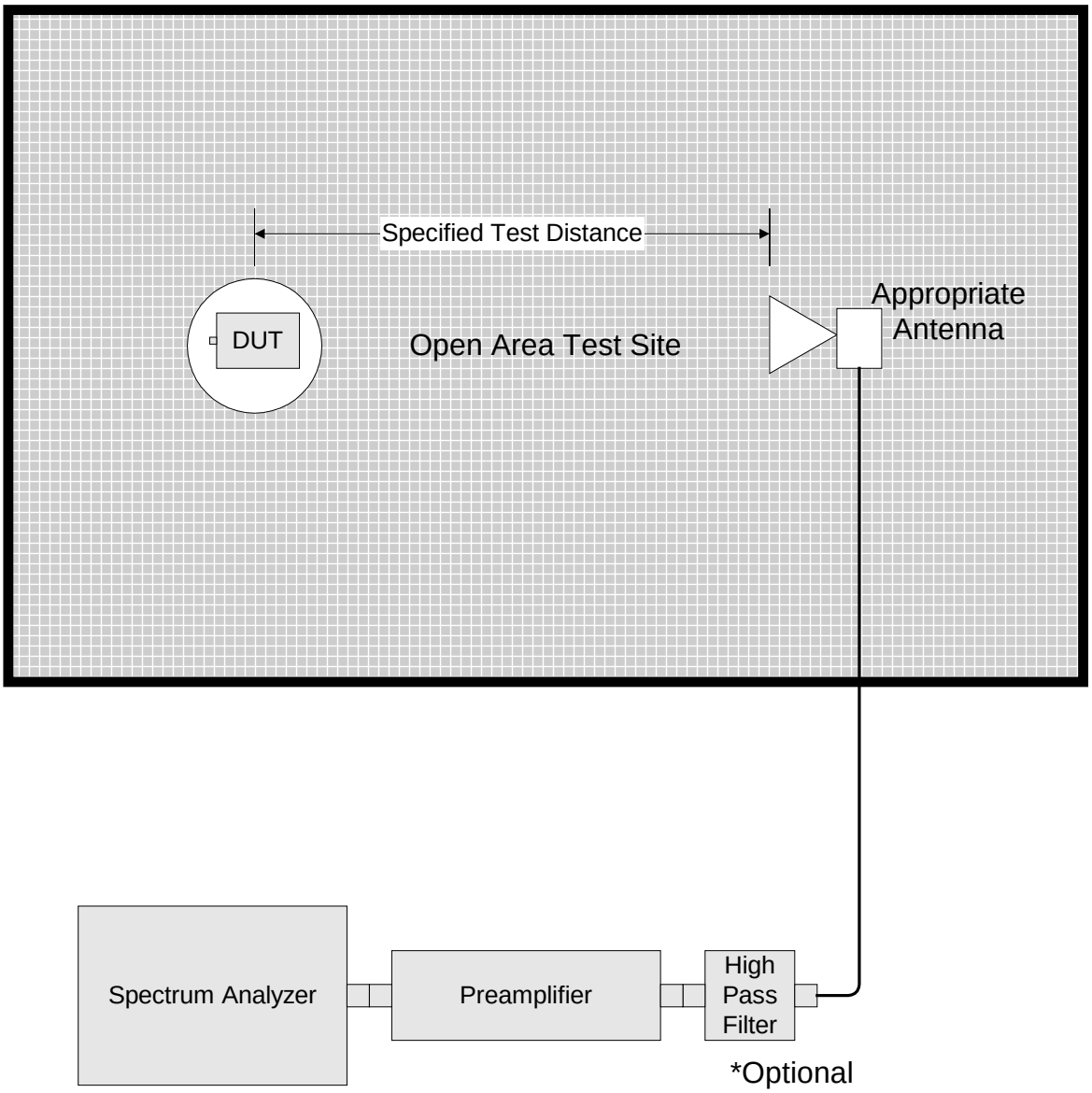


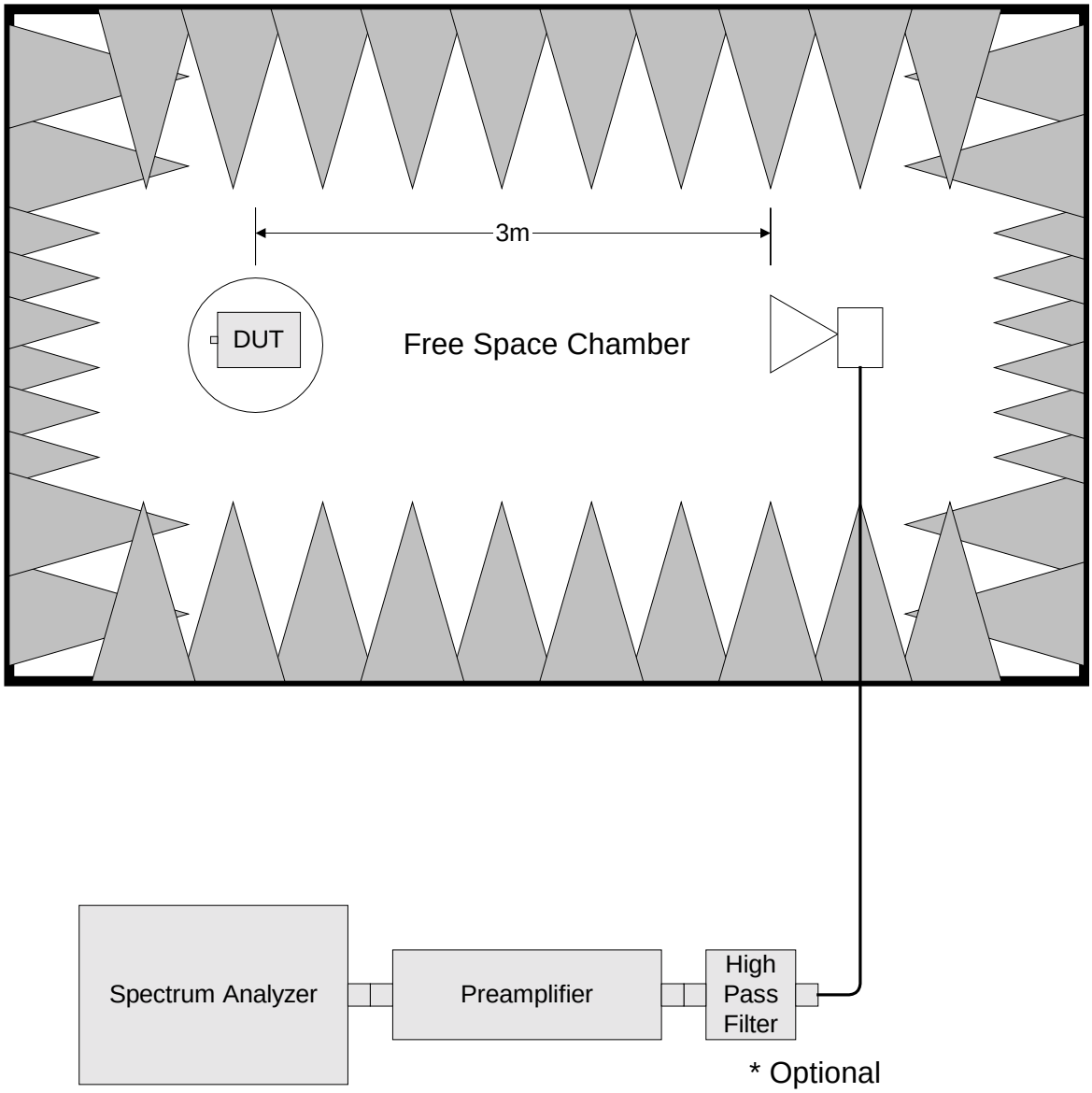
Para. No. 2.1051 Spurious Emissions at Antenna Terminals





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