

Nemko Test Report No.:

4L0459RUS1

Applicant:

Andrew Corporation

Equipment Under Test:

MR1903PP

In Accordance With:

FCC Part 24, Subpart E
Broadband PCS Repeaters

Tested By:

Nemko Dallas Inc.
802 N. Kealy
Lewisville, Texas 75057-3136

Authorized By:

Tom Tidwell, Frontline Group Manager

Date:

2 August, 2004

Total Number of Pages:

66

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Section 1. Summary of Test Results

Manufacturer: Andrew Corporation

Model No.: MR1903PP

Serial No.: 11

General: **All measurements are traceable to national standards.**

These tests were conducted on a sample of the equipment for the purpose of demonstrating compliance with FCC Part 24, Subpart E.



New Submission



Production Unit



Class II Permissive Change



Pre-Production Unit

THIS TEST REPORT RELATES ONLY TO THE ITEM(S) TESTED.

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

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Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	24.232	100W	Complies
Occupied Bandwidth	24.238	Input/Output	Complies
Spurious Emissions at Antenna Terminals	24.238(a)	-13 dBm	Complies
Field Strength of Spurious Emissions	24.238(a)	-13 dBm E.I.R.P.	Complies
Frequency Stability	24.235		NA

Footnotes:

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

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

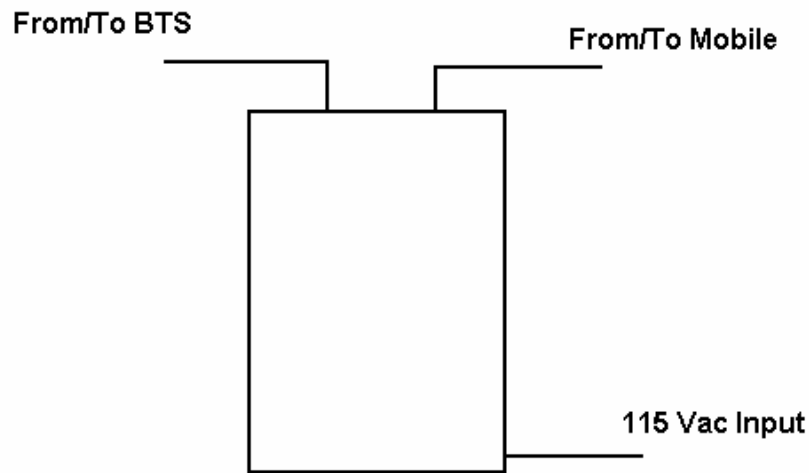
Section 2. General Equipment Specification

Supply Voltage Input:		115 Vac			
Frequency Bands:	Downlink:	☒ Block A :	1930 – 1945 MHz		
		☒ Block D :	1945 – 1950 MHz		
		☒ Block B :	1950 – 1965 MHz		
		☒ Block E :	1965 – 1970 MHz		
		☒ Block F :	1970 – 1975 MHz		
		☒ Block C :	1975 – 1990 MHz		
Frequency Bands:	Uplink:	☒ Block A :	1850 – 1865 MHz		
		☒ Block B :	1865 – 1870 MHz		
		☒ Block C :	1870 – 1885 MHz		
		☒ Block D :	1885 – 1890 MHz		
		☒ Block E :	1890 – 1895 MHz		
		☒ Block F :	1895 – 1910 MHz		
Type of Modulation and Designator:		CDMA (G7W) ☒	GSM (GXW) ☒	NADC (DXW) ☒	EDGE (GXW) ☒
Output Impedance:		50 ohms			
RF Output (Rated):	Downlink:	Modulation	1 Carrier	2 Carriers	4 Carriers
		CDMA	28	22	19
		GSM	34	24	21
		EDGE	30.5	22.5	19.5
		TDMA	31.5	23	20
	Uplink:	Modulation	1 Carrier	2 Carriers	4 Carriers
		CDMA	28	22	19
		GSM	34	24	21
		EDGE	30.5	22.5	19.5
		TDMA	31.5	23	20
Frequency Translation:		F1-F1 ☒	F1-F2 ☐	N/A ☐	
Band Selection:		Software ☒	Duplexer ☒	Fullband ☐	

Description of Operation

This is a booster operating in the PCS 1900 band using two 15 MHz variable bandwidth modules for uplink and downlink.

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 7/28/04

Test Results: Complies.**Measurement Data:**

	Modulation Type	Per Channel Output Power (dBm)	Composite Output Power (dBm)
Uplink	CDMA	22	25
Downlink	CDMA	22	25
Uplink	GSM	24	27
Downlink	GSM	24	27
Uplink	NADC	22.5	25.5
Downlink	NADC	22.5	25.5
Uplink	EDGE	23	26
Downlink	EDGE	23	26

Equipment Used: 1036-1064-1626-1627**Measurement Uncertainty:** +/- 1.6 dB**Temperature:** 22 °C**Relative Humidity:** 44 %

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 7/27/04

Test Results: Complies.

Test Data: See attached plot(s).

Test Data – Occupied Bandwidth



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

Data Plot		Occupied Bandwidth	
Page 1 of 4		Complete <u>X</u>	
Job No.:	4L0459R	Date:	7/27/2004
Specification:	PT24	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%):	40
E.U.T.:	PCS REPEATER		
Configuration:	TX		
Sample Number:	1		
Location:	Lab 1	RBW:	Refer to plots
Detector Type:	Peak	VBW:	Refer to plots
		Measurement	Distance: <u>NA</u> m
Test Equipment Used			
Antenna:		Directional Coupler:	
Pre-Amp:		Cable #1:	1627
Filter:		Cable #2:	1628
Receiver:	1036	Cable #3:	
Attenuator #1:	1064	Cable #4:	
Attenuator #2:	1065	Mixer:	
Additional equipment used:			
Measurement Uncertainty: <u>+/-1.7 dB</u>			
Date: 27.JUL.2004 12:37:26			
Notes: <u>EDGE</u>			

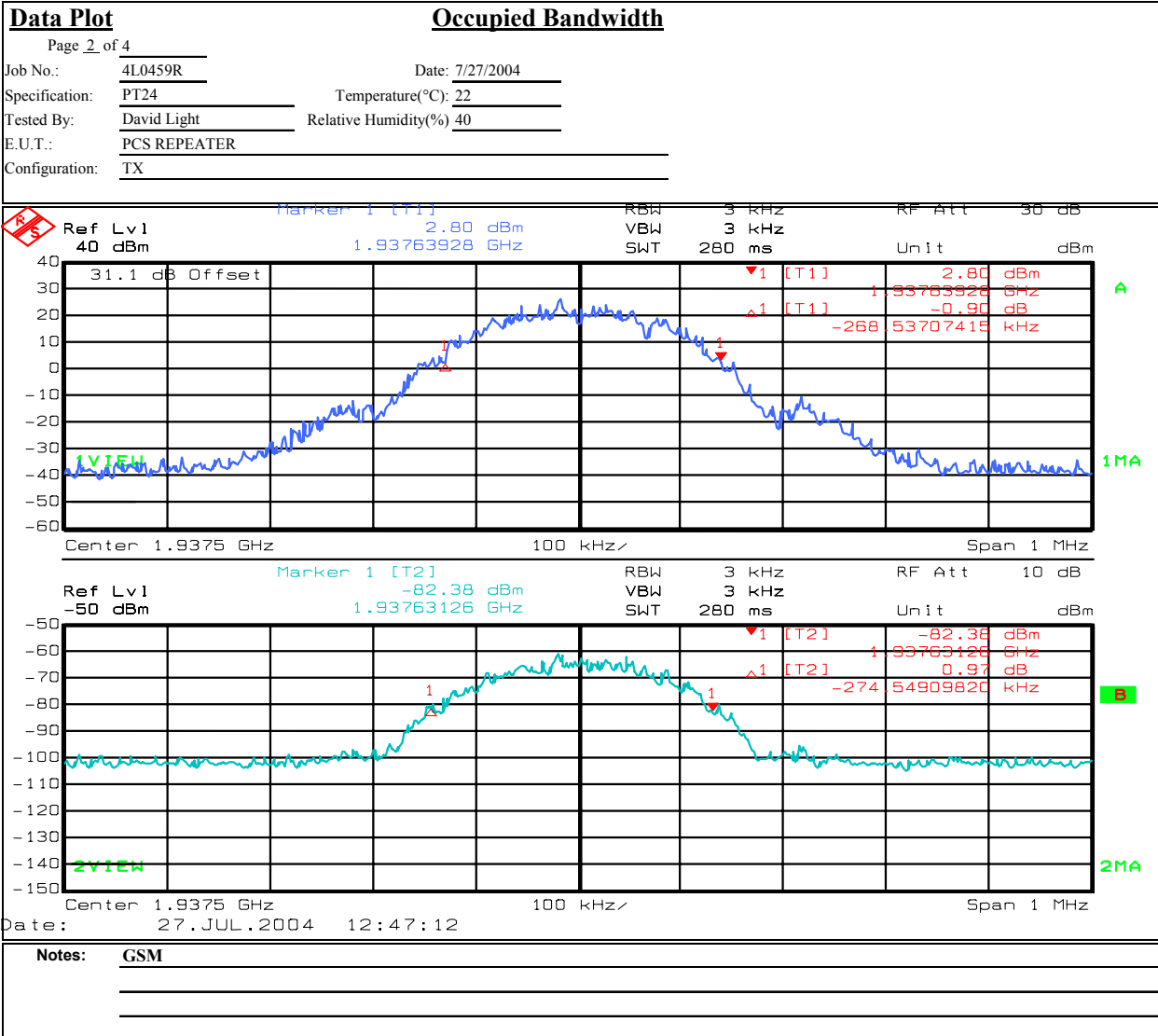
Test Data – Occupied Bandwidth



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Test Data – Occupied Bandwidth



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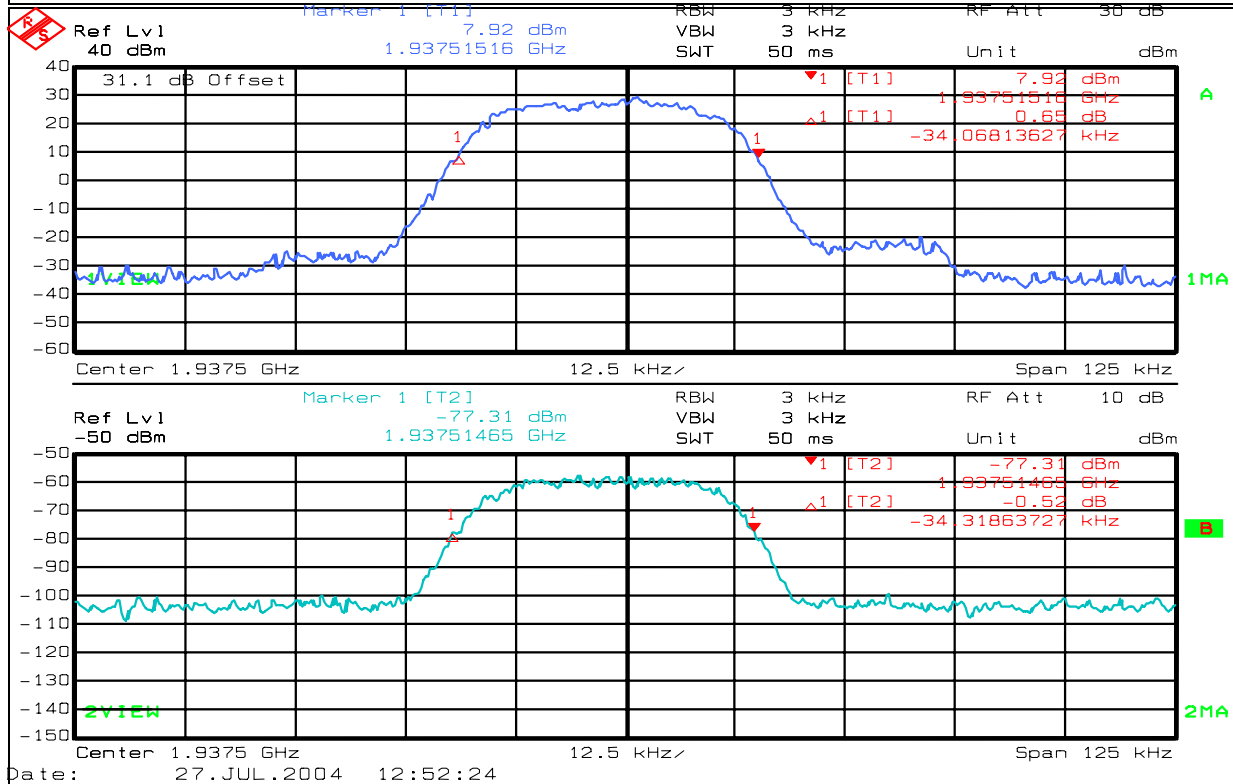
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Data Plot

Page 3 of 4

Job No.:	4L0459R	Date:	7/27/2004
Specification:	PT24	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	PCS REPEATER		
Configuration:	TX		

Occupied Bandwidth



Notes: TDMA

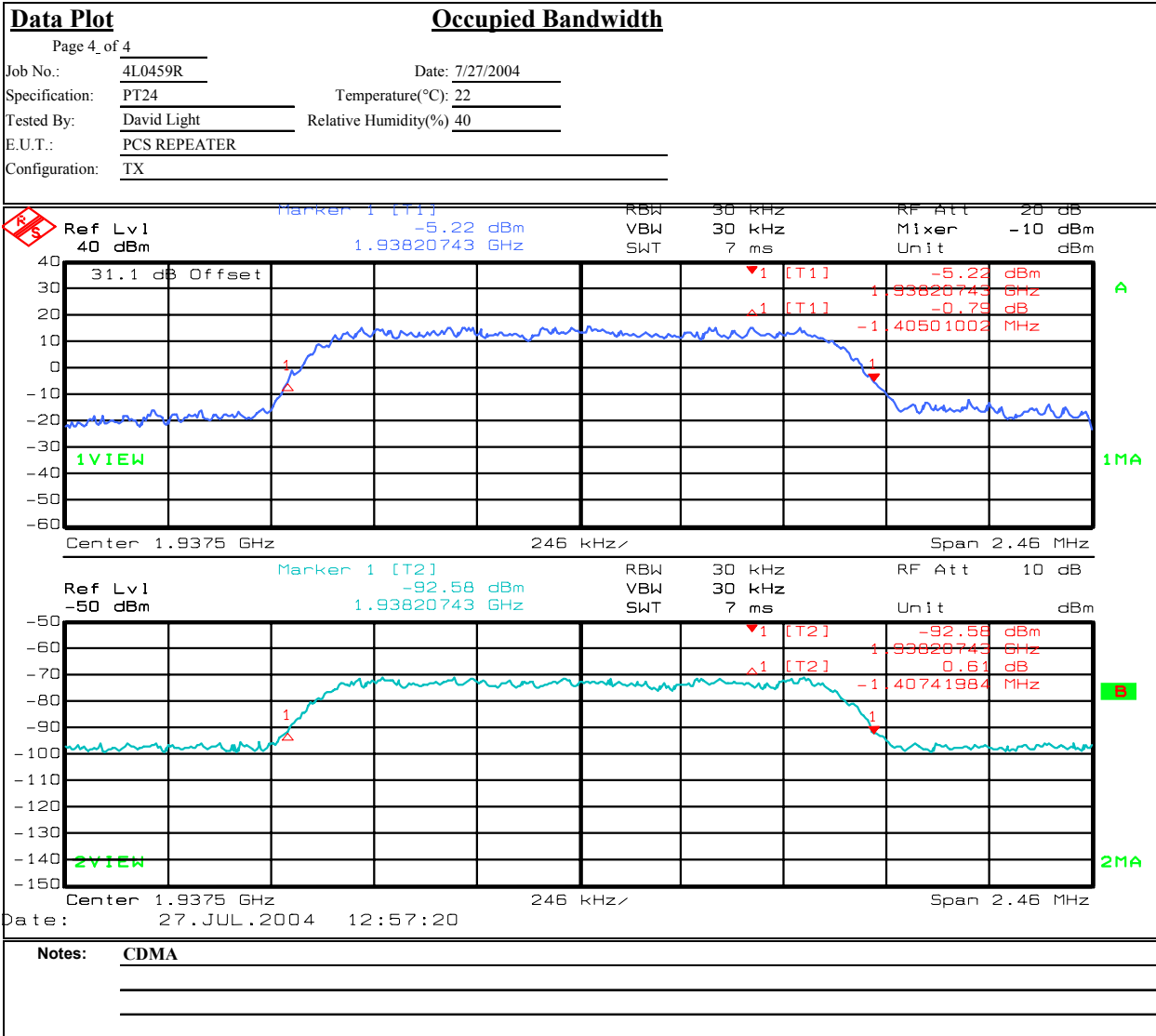
Test Data – Occupied Bandwidth



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Test Data – Occupied Bandwidth



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Data Plot		Occupied Bandwidth	
Page 1 of 4			
Job No.: 4L0459R	Date: 7/27/2004	Complete: ☒	Preliminary: ☐
Specification: PT24	Temperature(°C): 22		
Tested By: David Light	Relative Humidity(%): 40		
E.U.T.: PCS REPEATER			
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: 1064	Cable #4:		
Attenuator #2: 1065	Mixer:		
Additional equipment used:			
Measurement Uncertainty: +/-1.7 dB			
Marker 1 [T1]			
Ref Lvl 30 dBm	0.21 dBm	RBW 3 kHz	RF Att 10 dB
30.1 dB Offset	1.85763527 GHz	VBW 3 kHz	Mixer -10 dBm
		SWT 280 ms	Unit dBm
Marker 1 [T2]			
Ref Lvl -50 dBm	-83.29 dBm	RBW 3 kHz	RF Att 10 dB
	1.85763527 GHz	VBW 3 kHz	Mixer -10 dBm
		SWT 280 ms	Unit dBm
Center 1.8575 GHz 100 kHz Span 1 MHz			
Date: 27.JUL.2004 07:27:25			
Notes: EDGE			

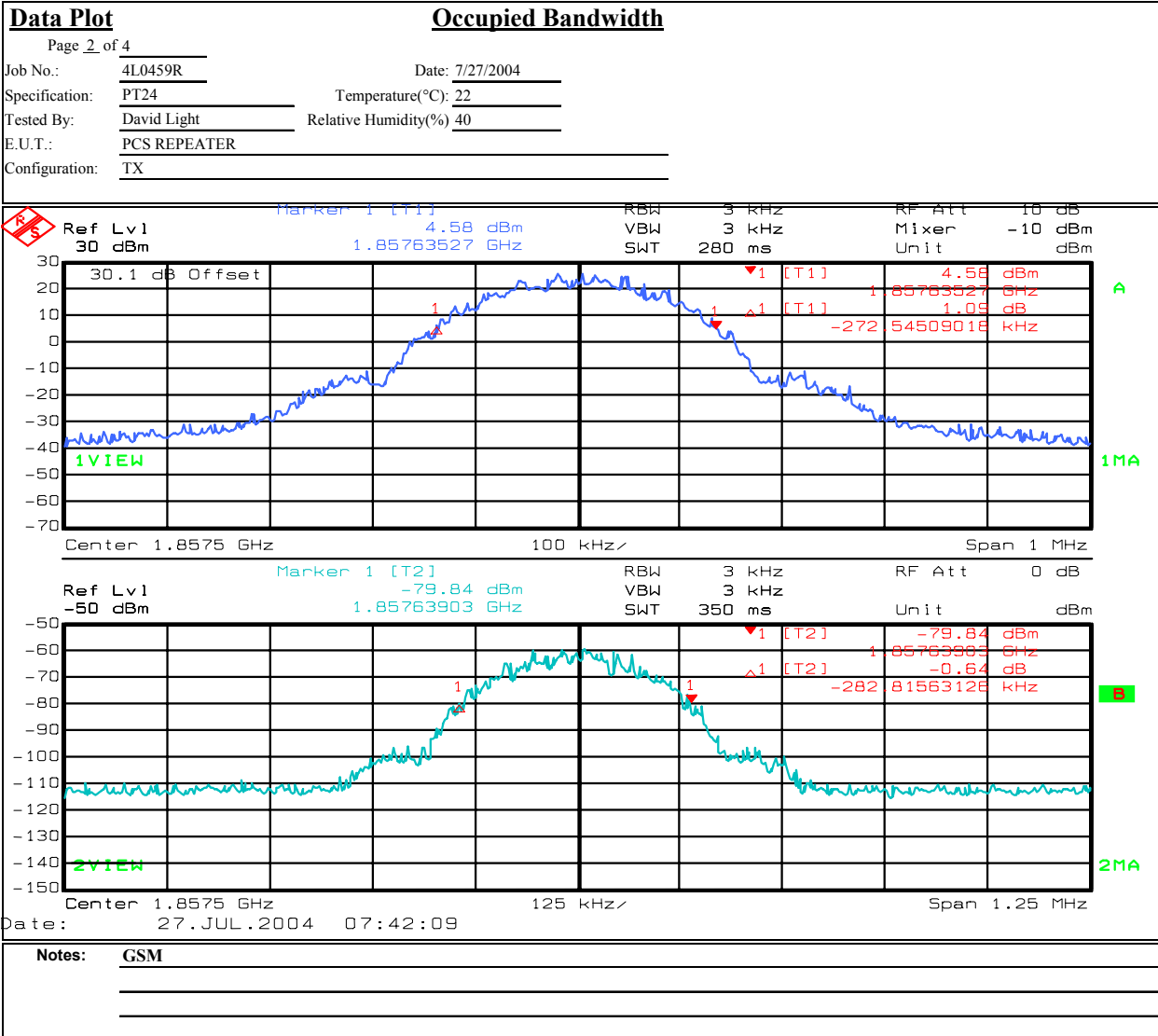
Test Data – Occupied Bandwidth



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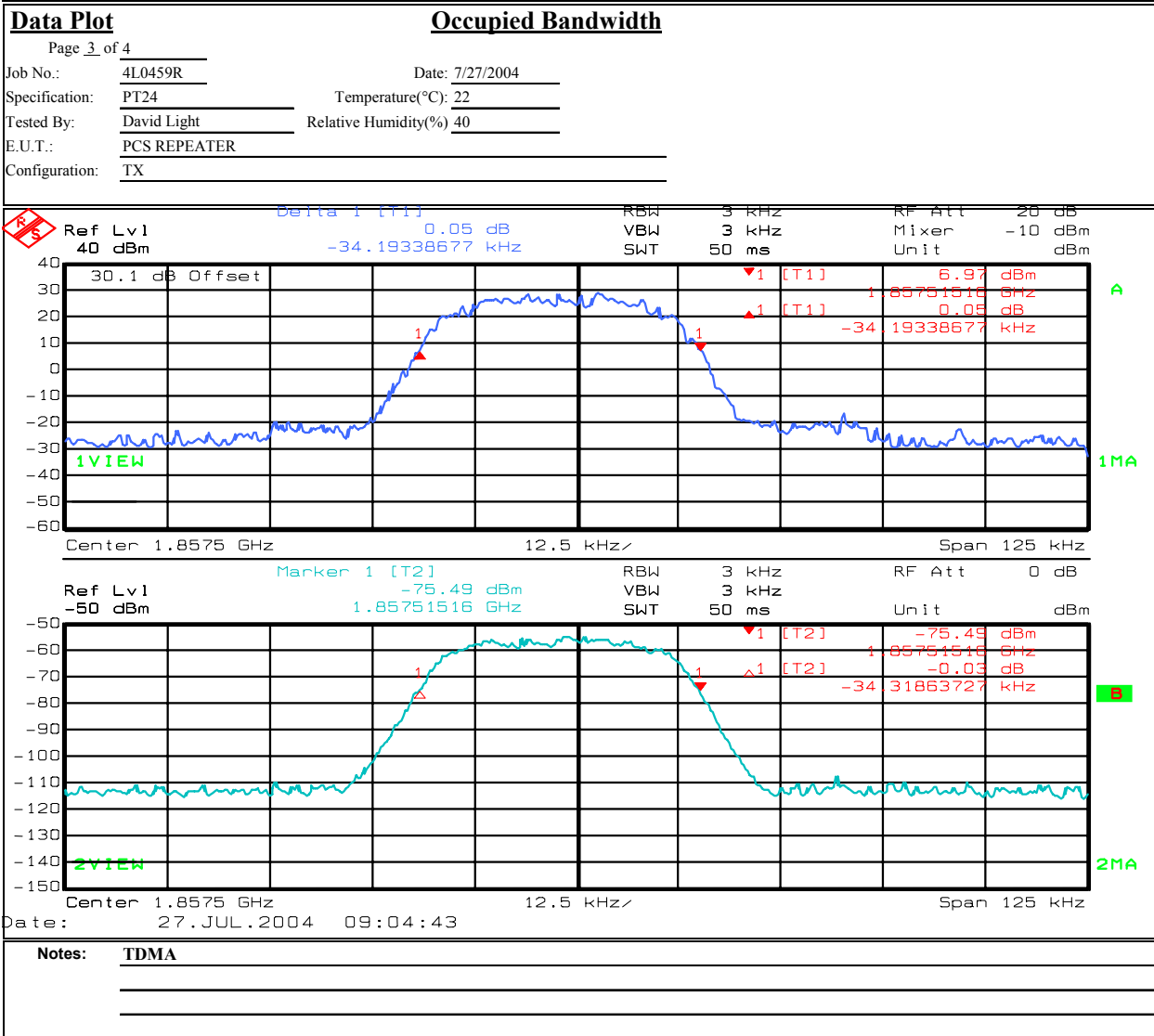
Test Data – Occupied Bandwidth



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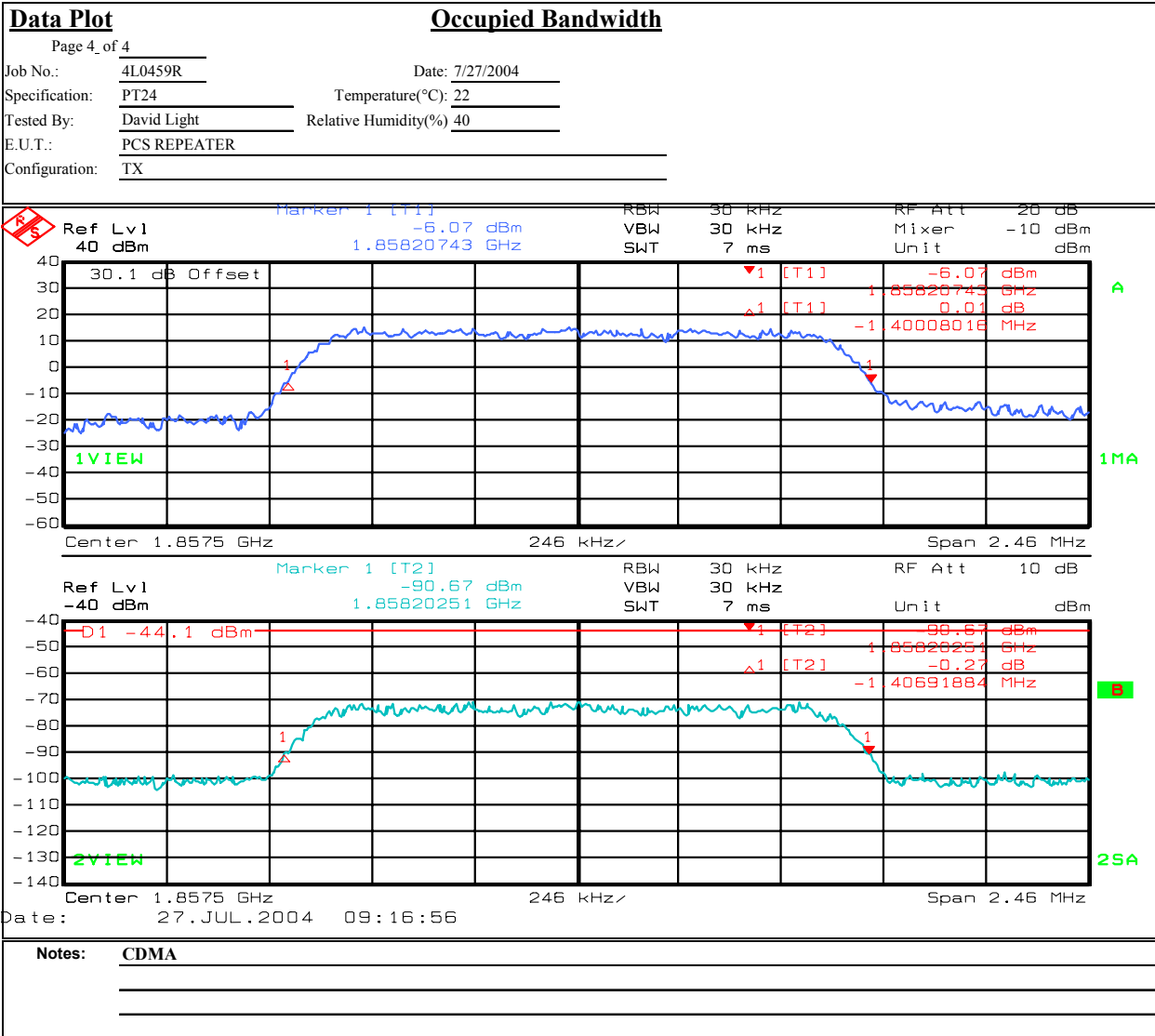
Test Data – Occupied Bandwidth



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Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 7/27/04

Test Results: Complies.

Test Data: See attached plot(s).

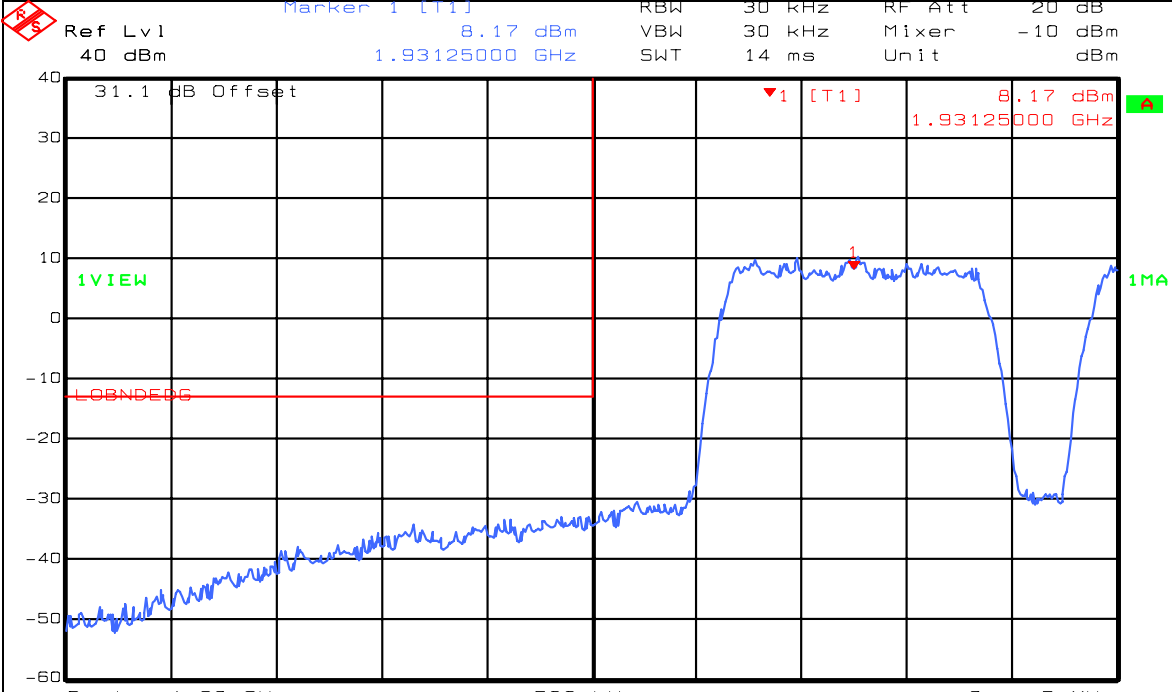
Test Data – Spurious Emissions at Antenna Terminals



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Data Plot		Spurious Emissions at Antenna Terminals	
Page 1 of 4			
Job No.: 4L0459R	Date: 7/27/2004	Complete: X	
Specification: PT24	Temperature(°C): 22	Preliminary:	
Tested By: David Light	Relative Humidity(%): 40		
E.U.T.: PCS REPEATER			
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: 1628		
Filter:	Cable #2: 1627		
Receiver: 1036	Cable #3:		
Attenuator #1: 1064	Cable #4:		
Attenuator #2: 1065	Mixer:		
Additional equipment used:			
Measurement Uncertainty: +/-1.7 dB			
			
Date: 27.JUL.2004 10:16:00			
Notes: 2 CHANNEL INTERMOD			
22 dBm/Carrier			
CDMA			

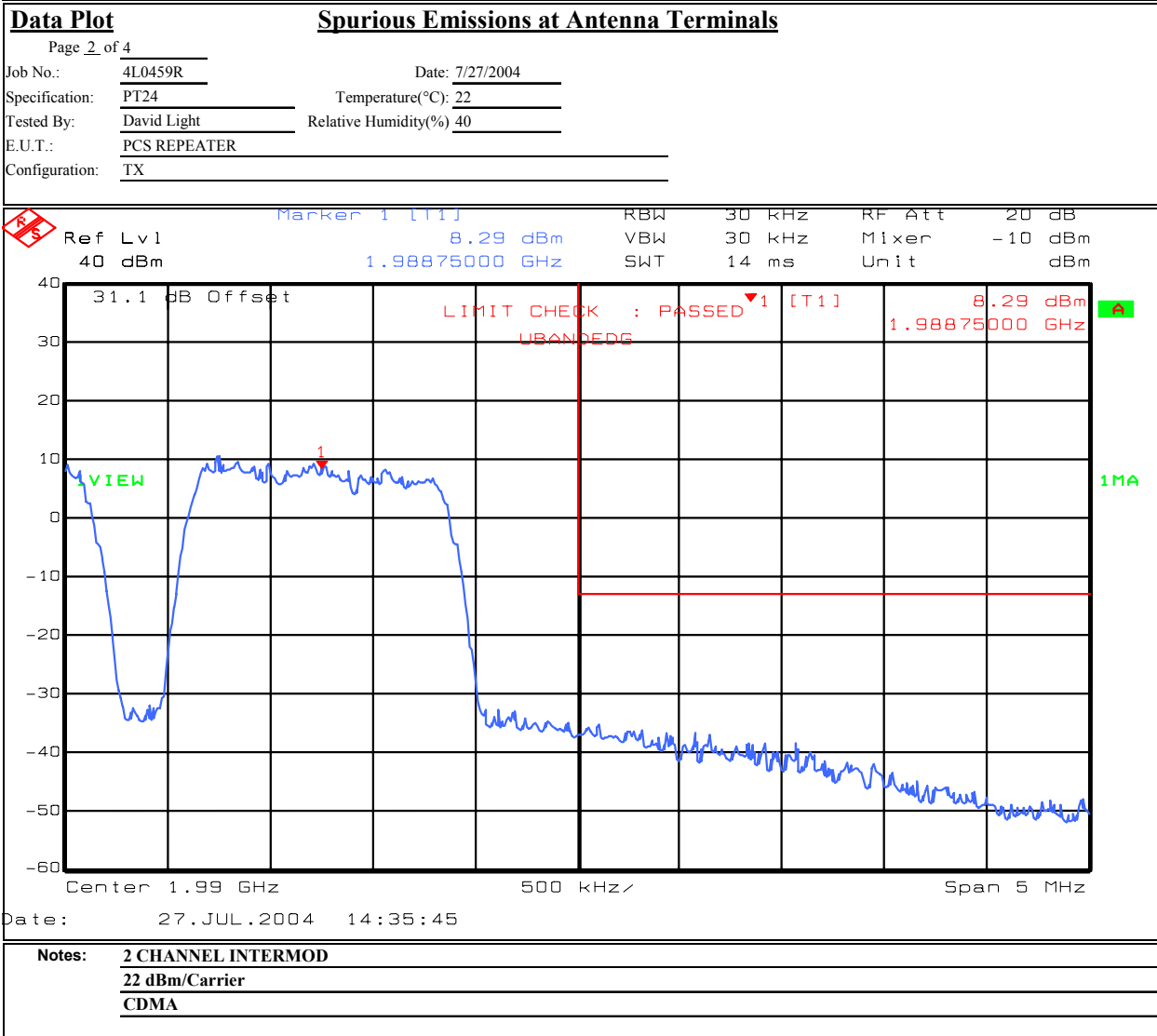
Test Data – Spurious Emissions at Antenna Terminals



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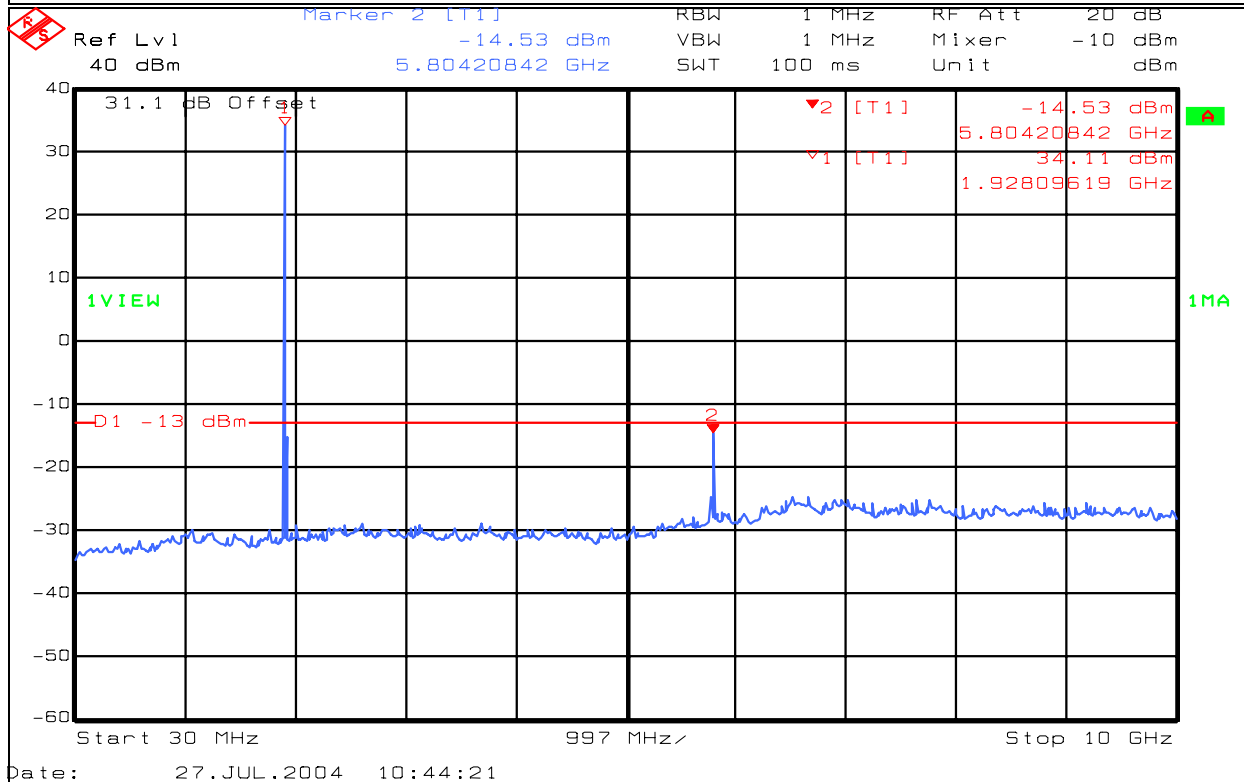
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Data Plot

Page 3 of 4

Job No.:	4L0459R	Date:	7/27/2004
Specification:	PT24	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%)	40
E.U.T.:	PCS REPEATER		
Configuration:	TX		

Spurious Emissions at Antenna Terminals



Notes: CDMA
SINGLE CARRIER AT 28 dBm OUTPUT

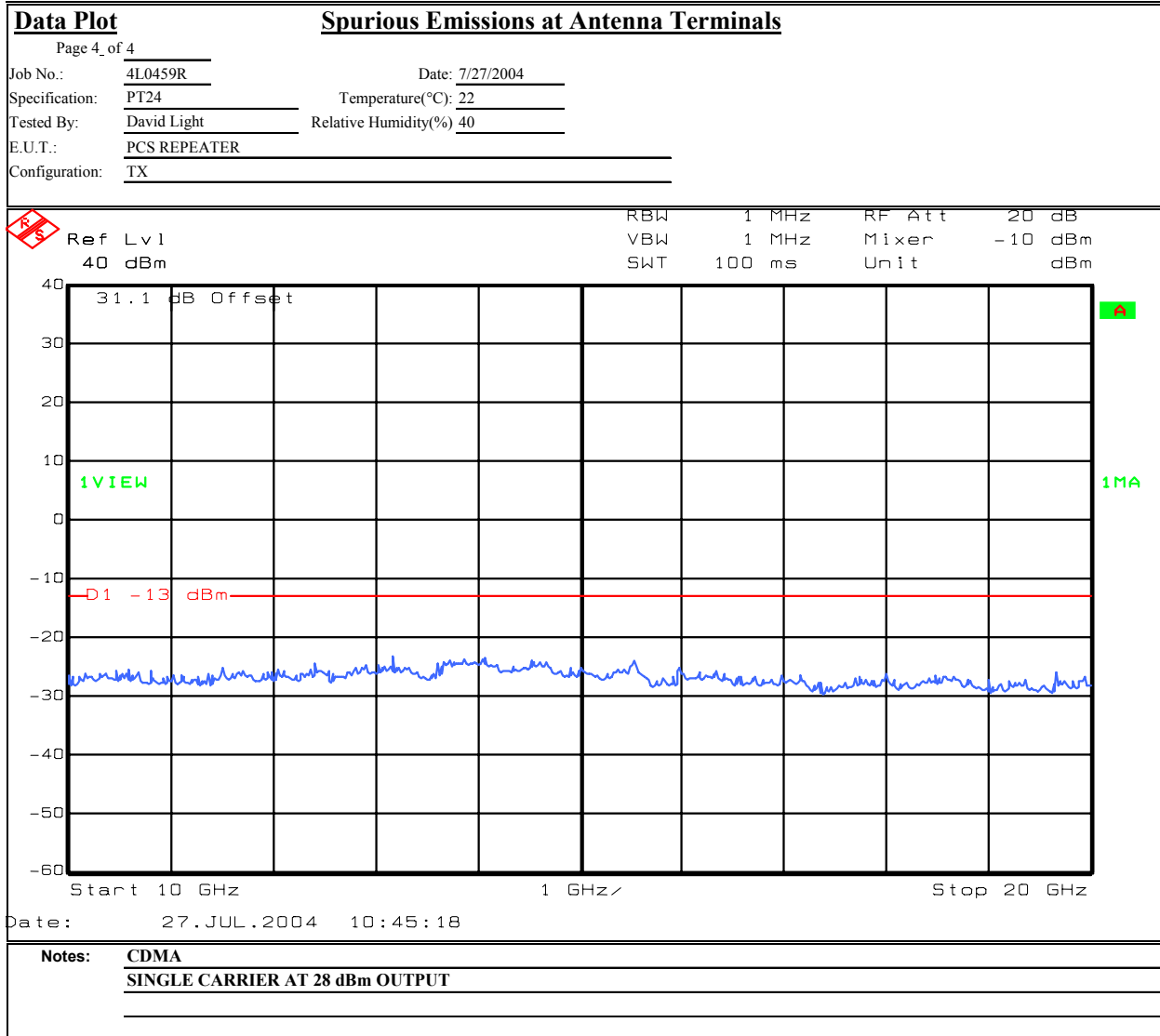
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The spectrum was searched in detail on three channels. These plots are indicative of all channels tested.

Test Data – Spurious Emissions at Antenna Terminals



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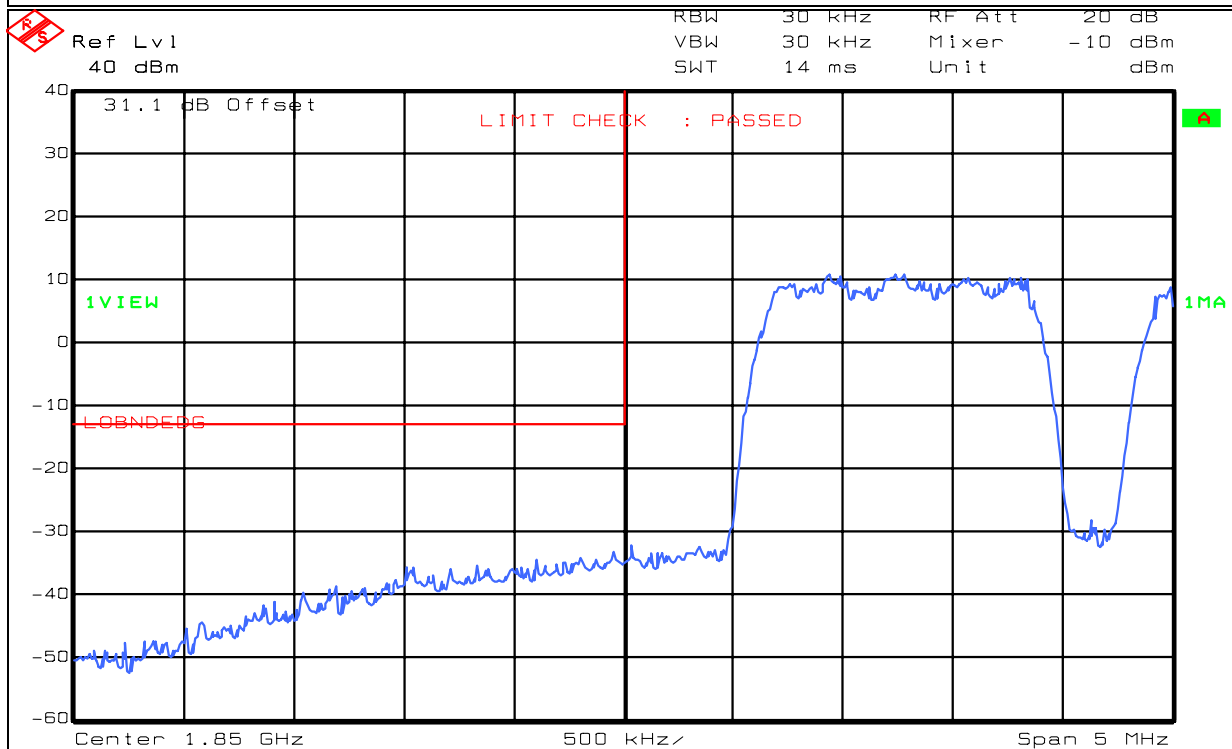
Spurious Emissions at Antenna Terminals

Page 1 of 4

Job No.: 4L0459R Date: 7/27/2004 Complete X
Specification: PT24 Temperature(°C): 22 Preliminary: _____
Tested By: David Light Relative Humidity(%): 40
E.U.T.: PCS REPEATER
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: 1064 Cable #4: _____
Attenuator #2: 1065 Mixer: _____
Additional equipment used: _____
Measurement Uncertainty: +/-1.7 dB



Date: 27.JUL.2004 06:24:28

Notes: 2 CHANNEL INTERMOD
22 dBm/Carrier
CDMA

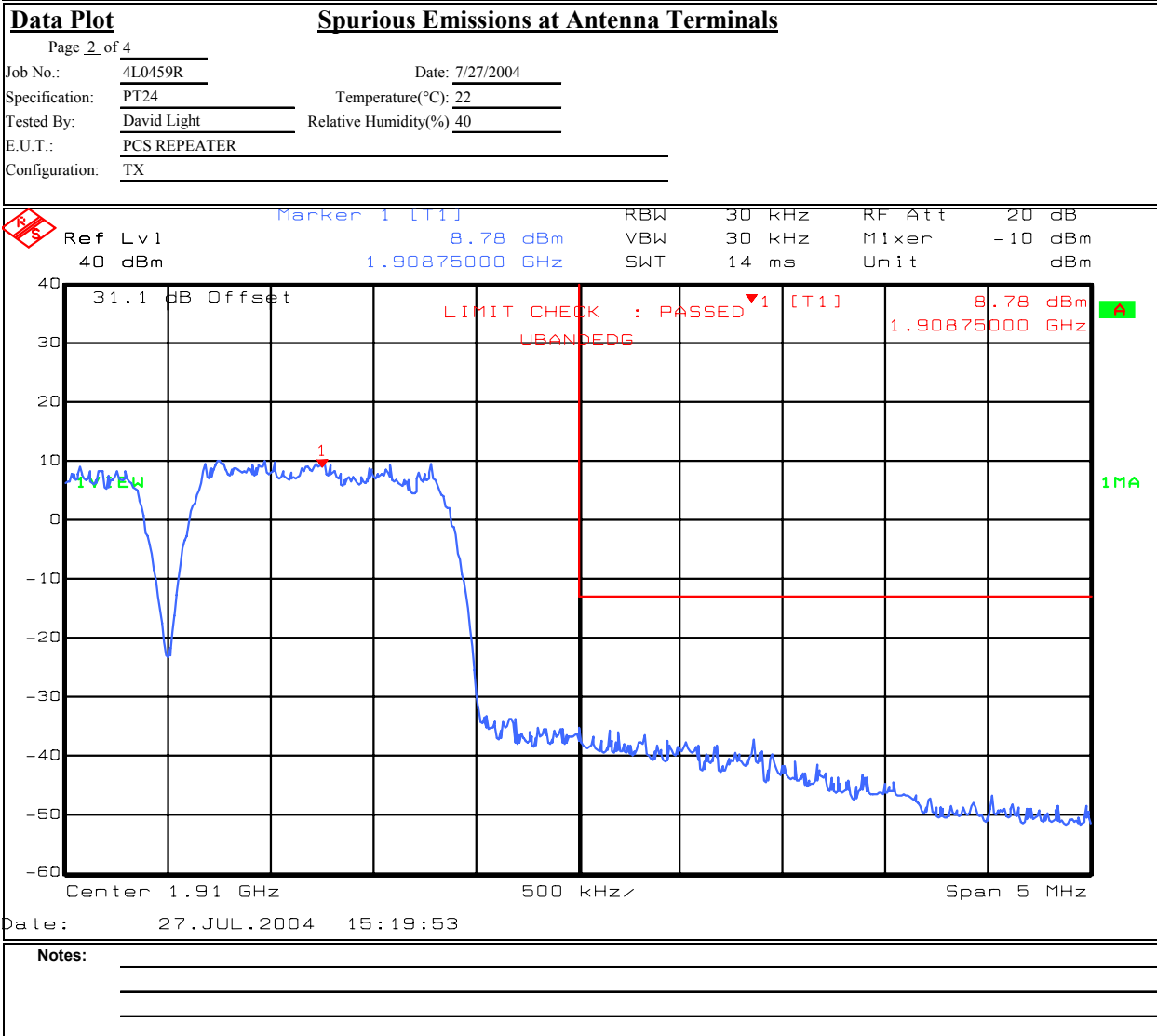
Test Data – Spurious Emissions at Antenna Terminals



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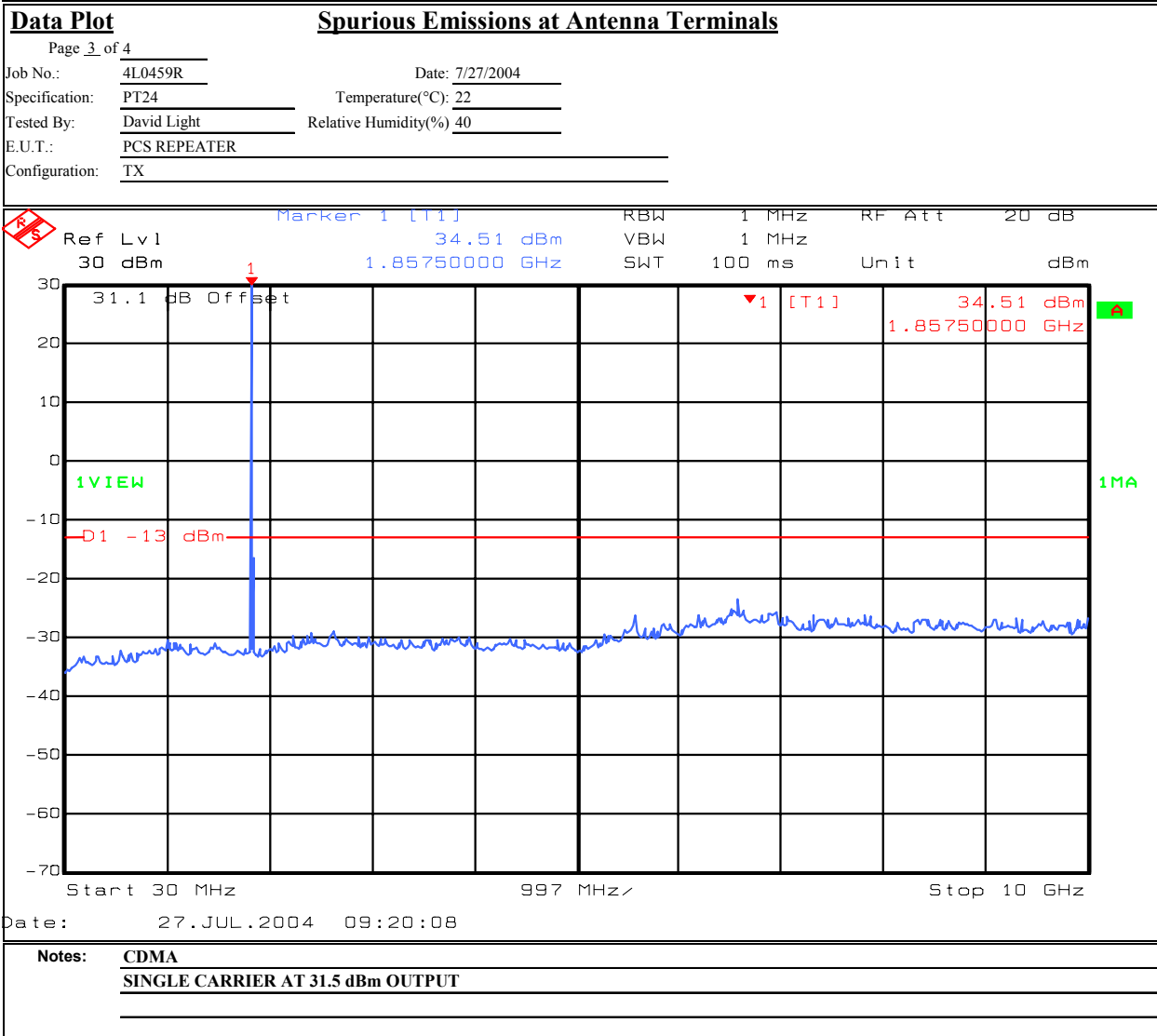
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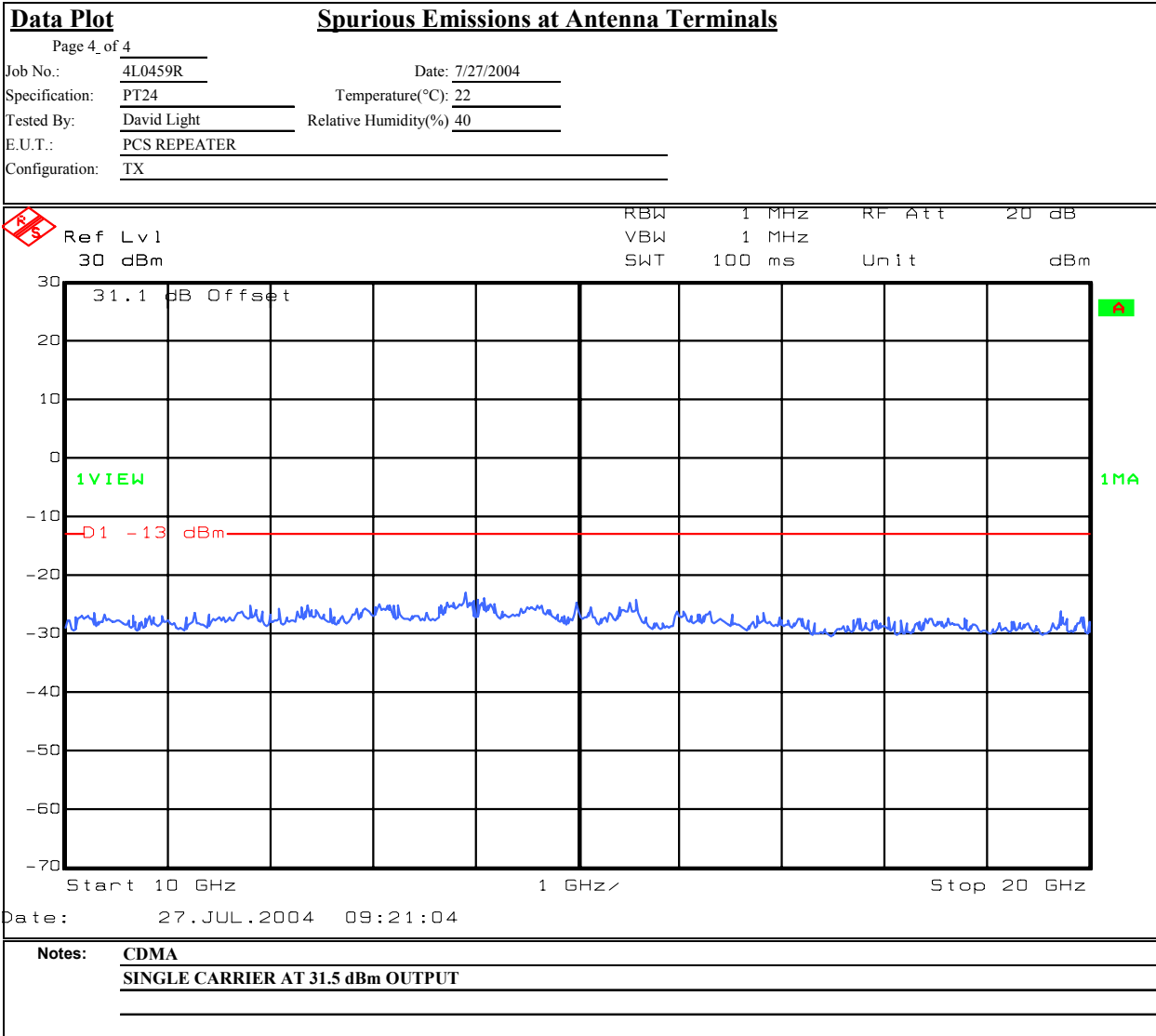
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EQUIPMENT:MR1903PP

Test Data – Spurious Emissions at Antenna Terminals



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Data Plot

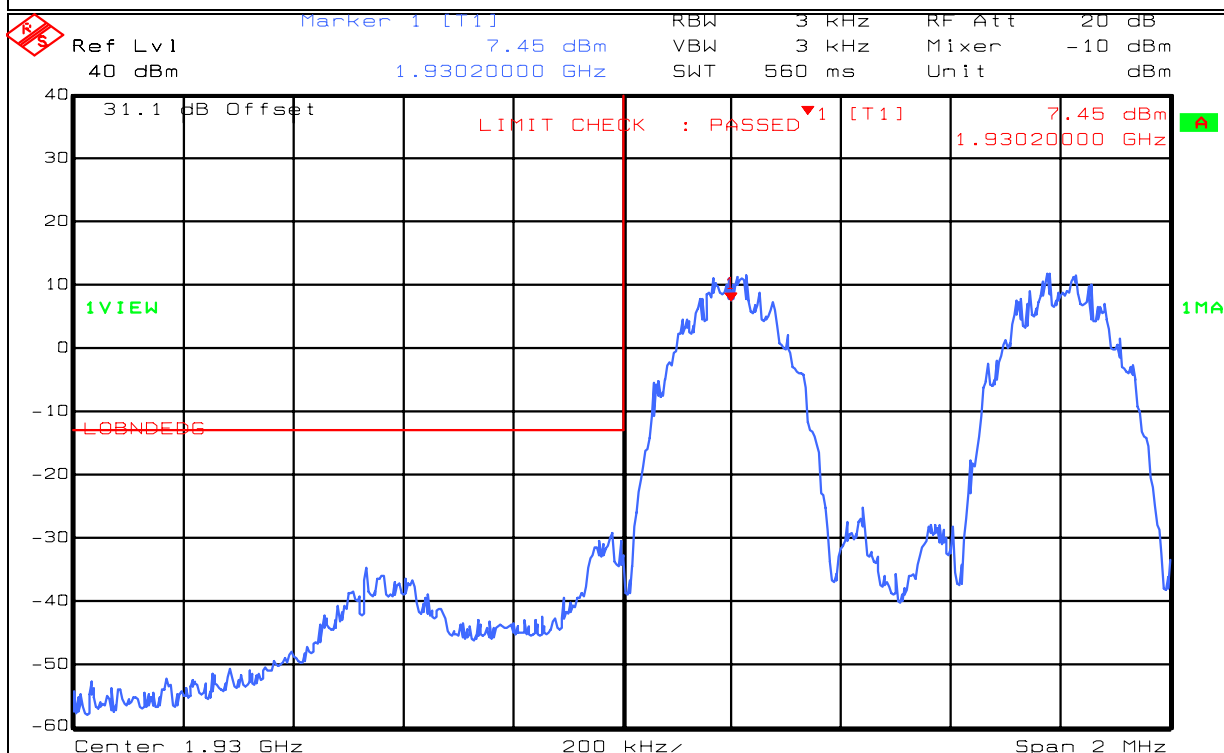
Spurious Emissions at Antenna Terminals

Page 1 of 4

Job No.: 4L0459R Date: 7/27/2004 Complete X
Specification: PT24 Temperature(°C): 22 Preliminary: _____
Tested By: David Light Relative Humidity(%): 40
E.U.T.: PCS REPEATER
Configuration: TX
Sample Number: 1
Location: A-OATS 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: 1064 Cable #4: _____
Attenuator #2: 1065 Mixer: _____
Additional equipment used: _____
Measurement Uncertainty: +/-1.7 dB



Date: 27.JUL.2004 11:07:10

Notes: 2 CHANNEL INTERMOD
22.5 dBm/Carrier
EDGE

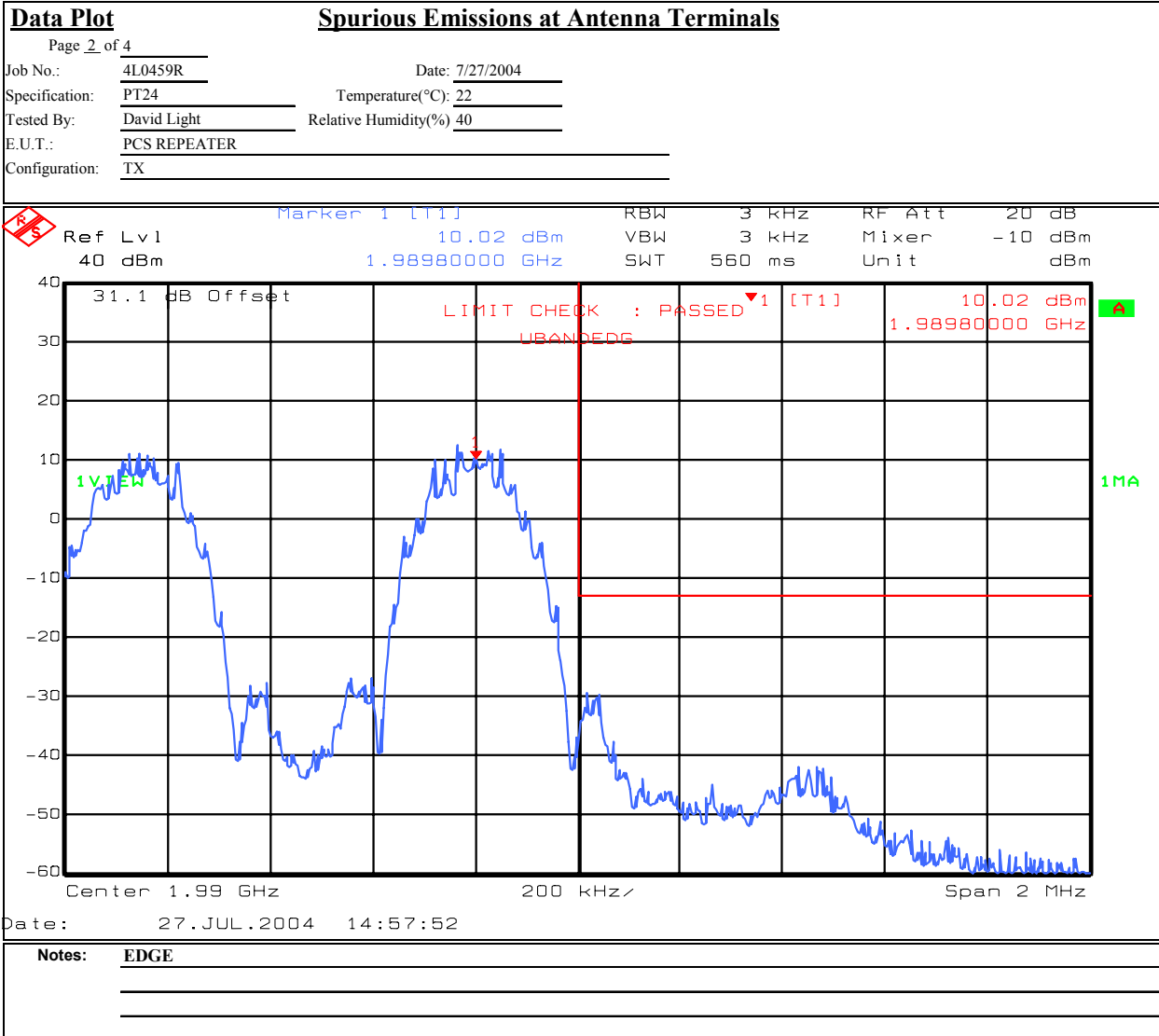
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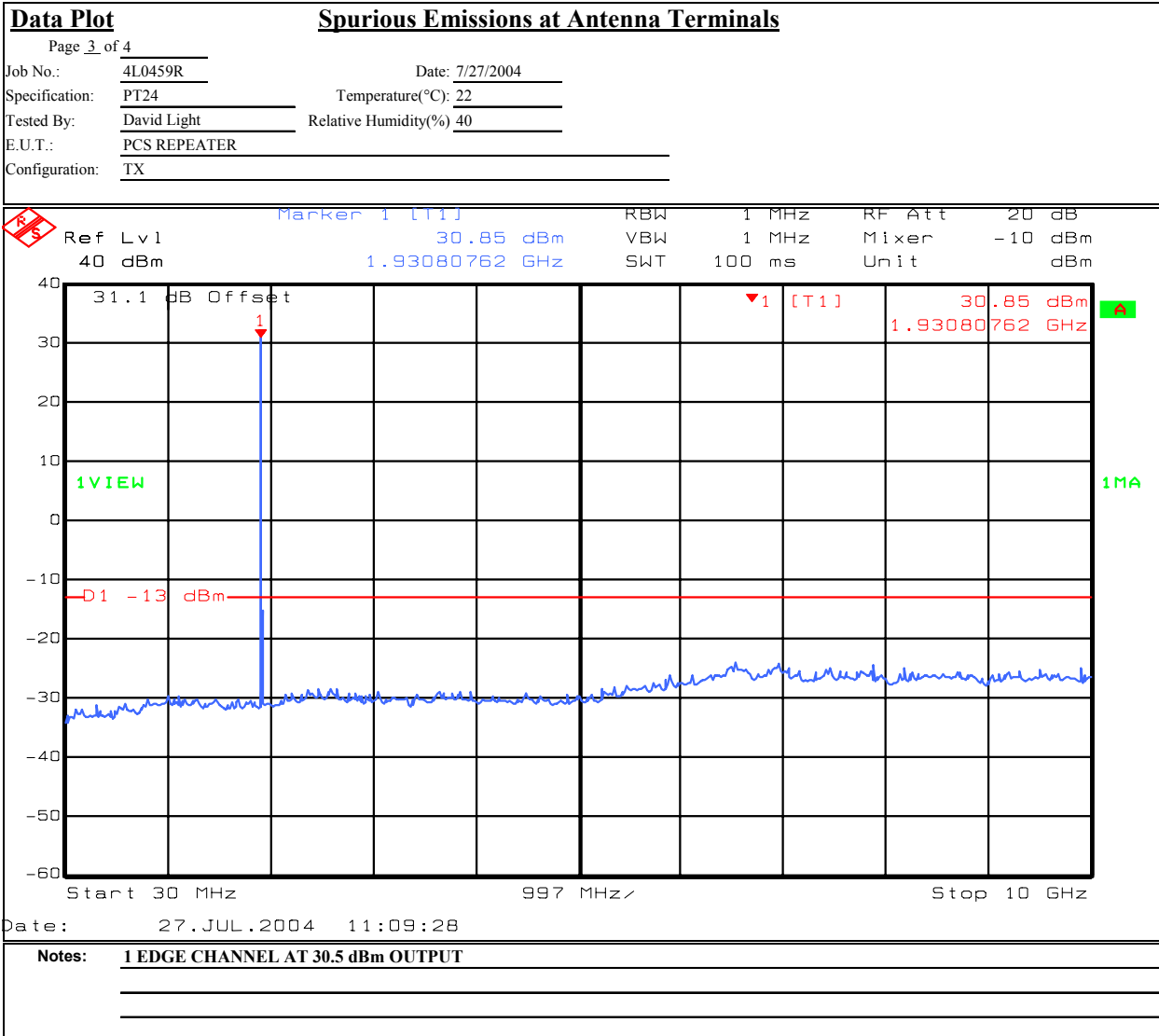
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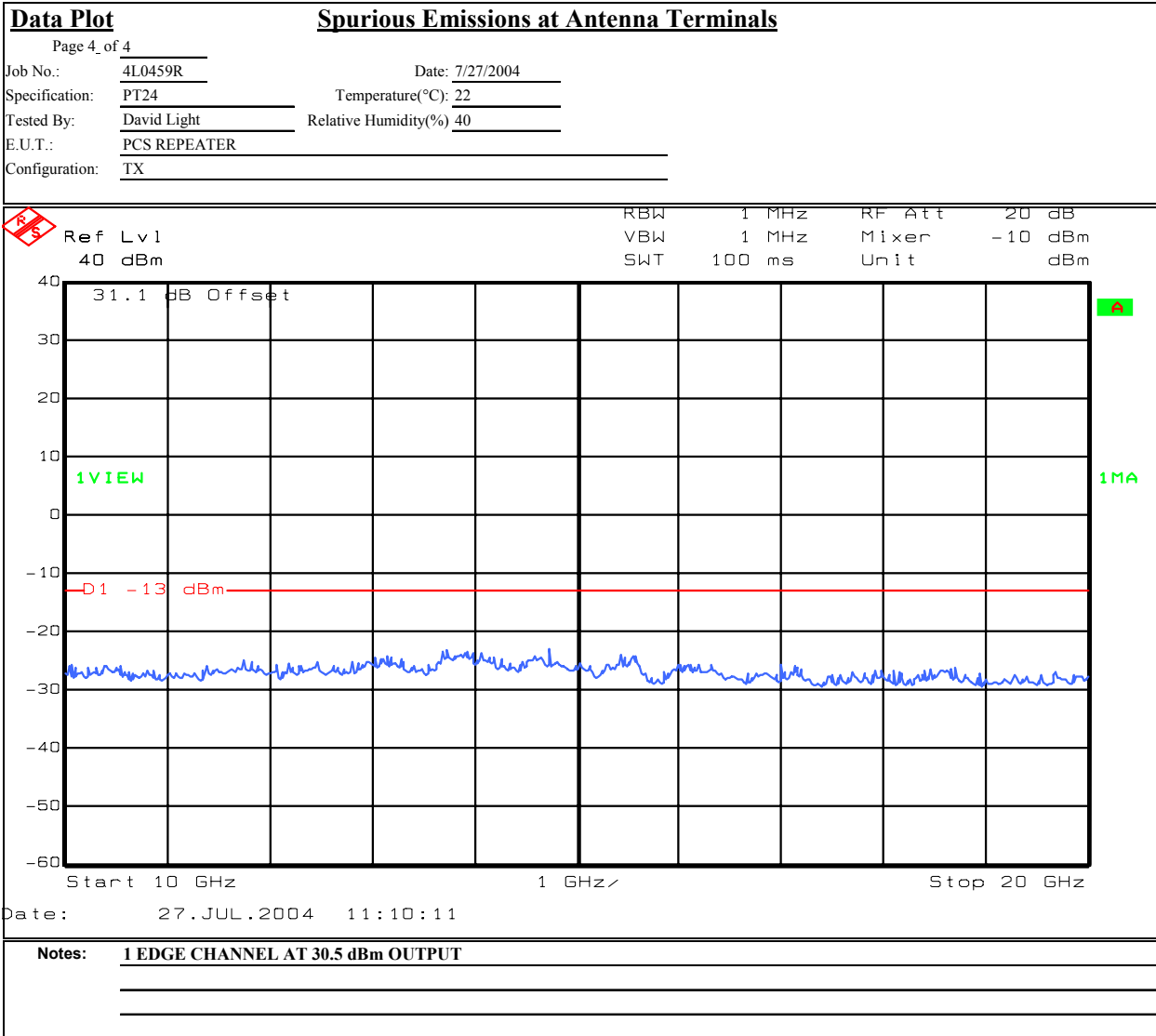
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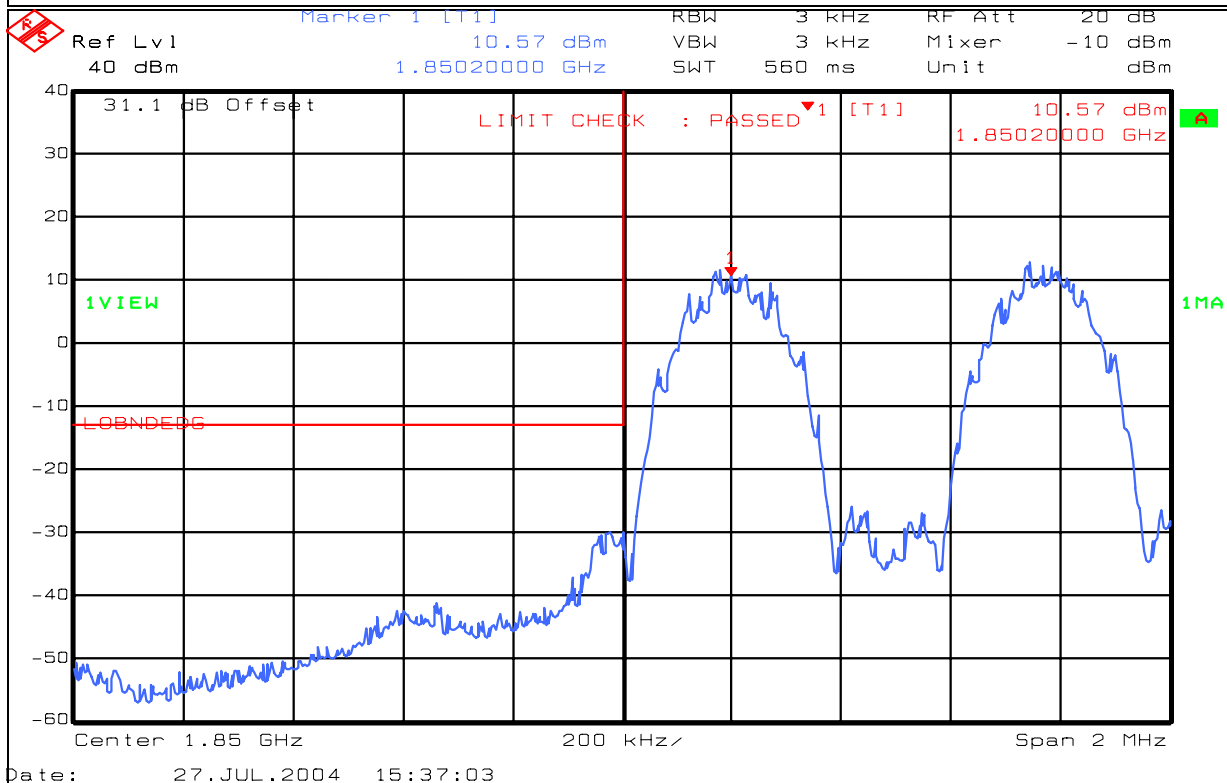
Data Plot

Spurious Emissions at Antenna Terminals

Page 1 of 4
 Job No.: 4L0459R Date: 7/27/2004 Complete X
 Specification: PT24 Temperature(°C): 22 Preliminary: _____
 Tested By: David Light Relative Humidity(%): 40
 E.U.T.: PCS REPEATER
 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: 1064 Cable #4: _____
 Attenuator #2: 1065 Mixer: _____
 Additional equipment used: _____
 Measurement Uncertainty: +/-1.7 dB



Notes: 2 CHANNEL INTERMOD
 22.5 dBm/Carrier
 EDGE

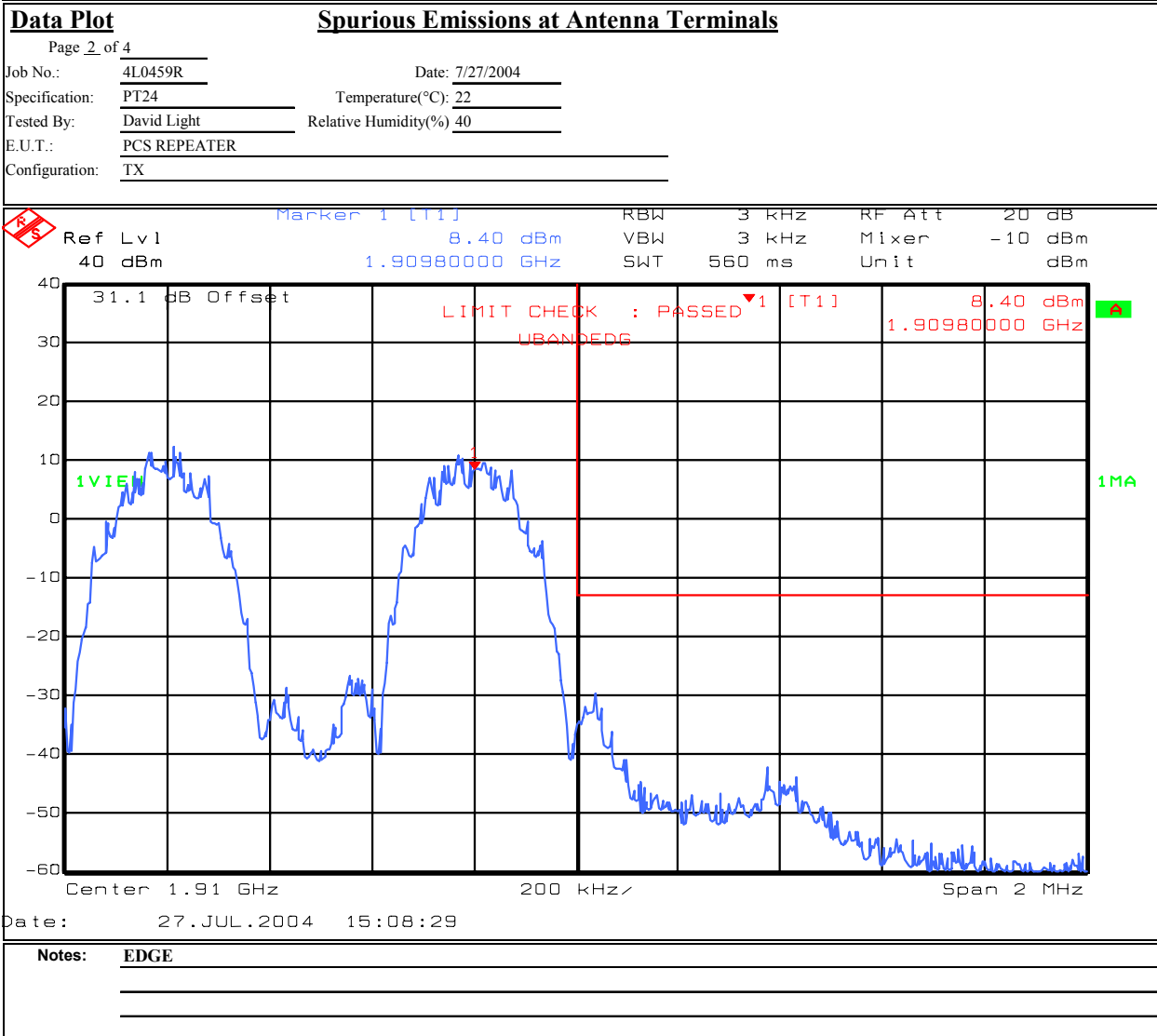
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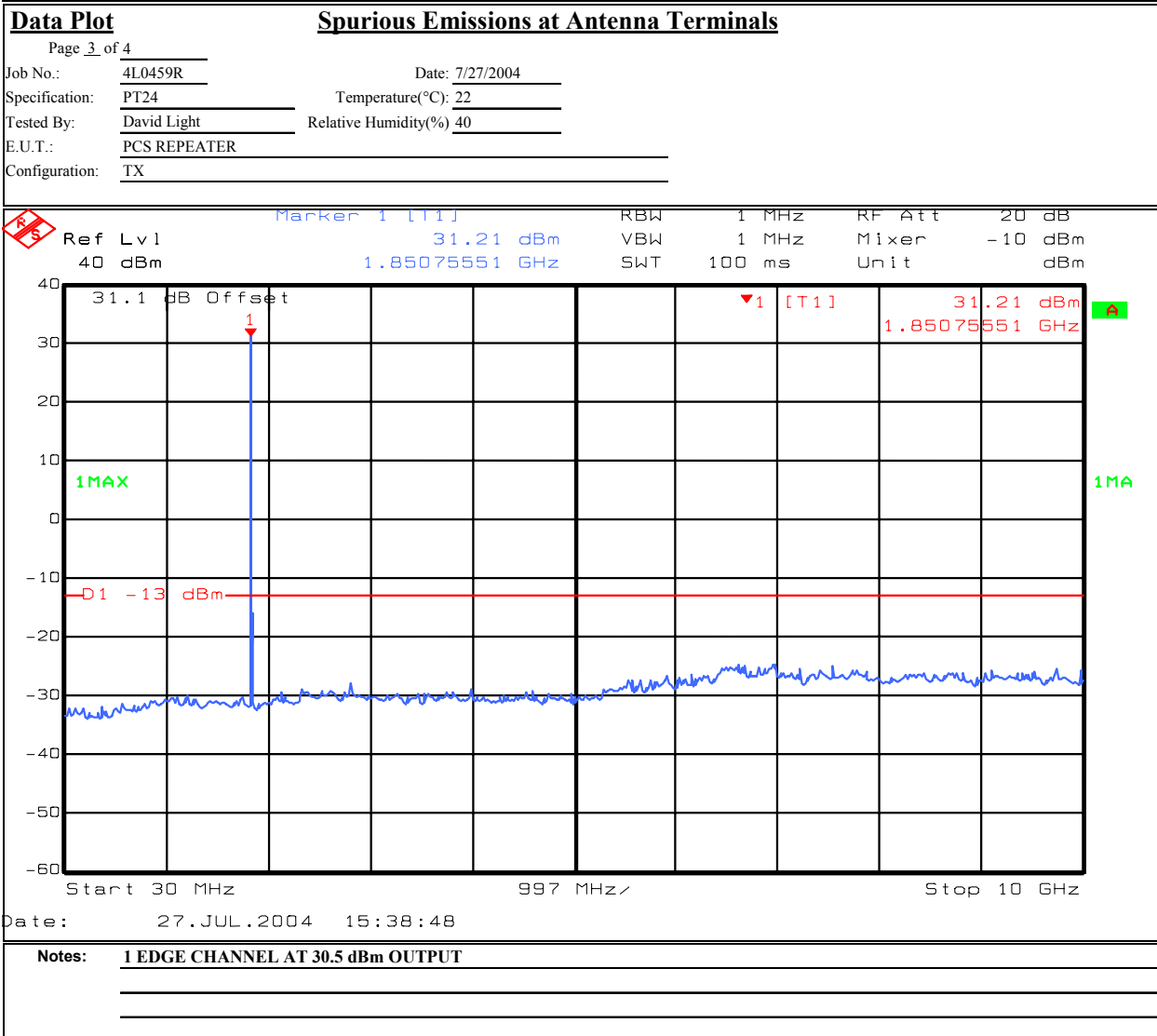
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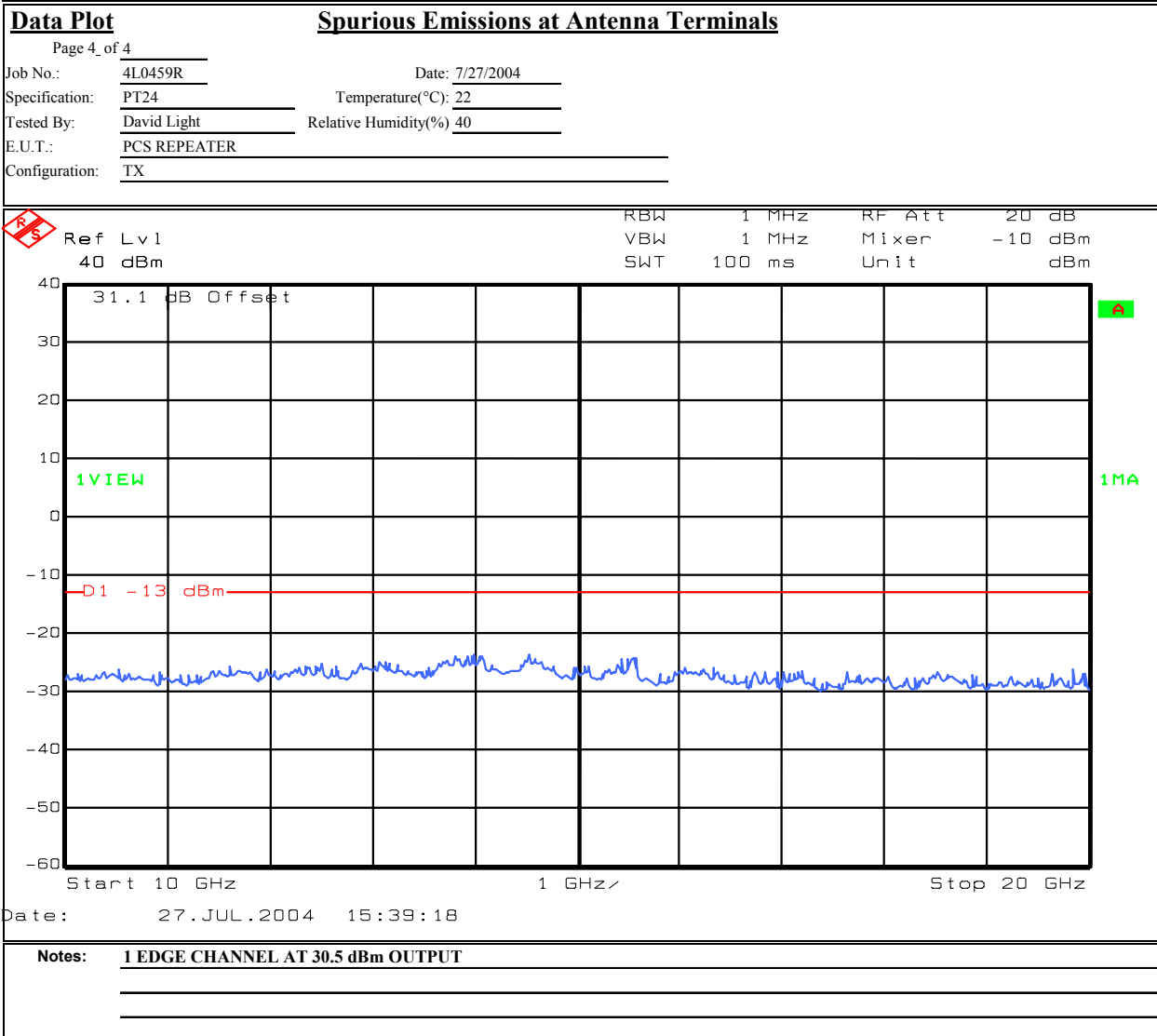
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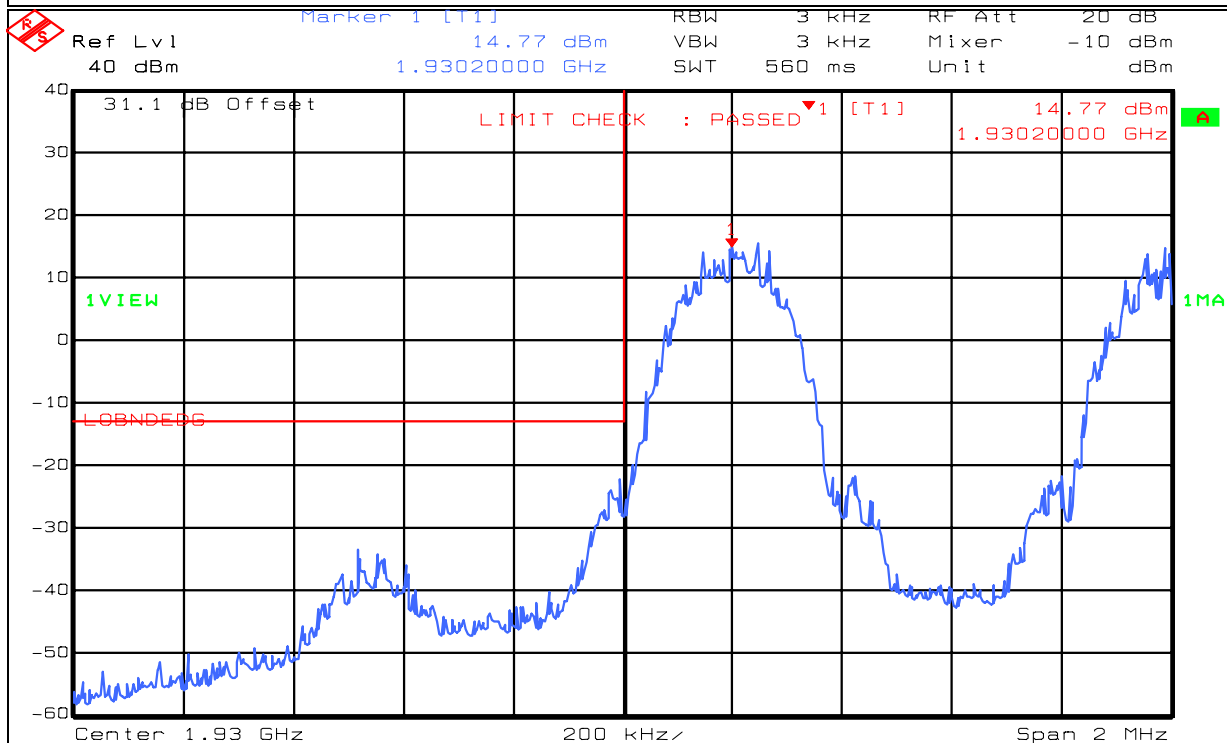
Data Plot

Spurious Emissions at Antenna Terminals

Page 1 of 4
Job No.: 4L0459R Date: 7/27/2004 Complete X
Specification: PT24 Temperature(°C): 22 Preliminary: _____
Tested By: David Light Relative Humidity(%): 40
E.U.T.: PCS REPEATER
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: 1064 Cable #4: _____
Attenuator #2: 1065 Mixer: _____
Additional equipment used: _____
Measurement Uncertainty: +/-1.7 dB



Date: 27.JUL.2004 10:58:20

Notes: 2 CHANNEL INTERMOD
24 dBm/Carrier
GSM

Test Data – Spurious Emissions at Antenna Terminals



Dallas Headquarters:

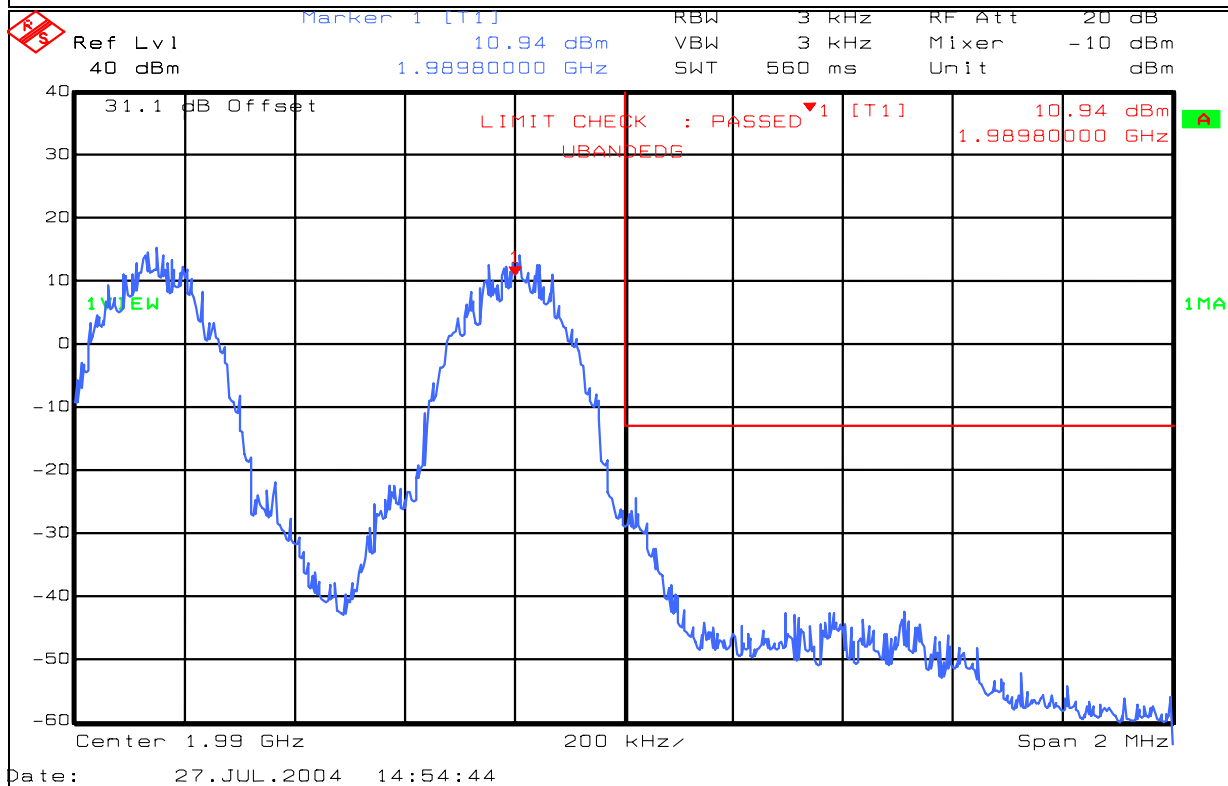
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Data Plot **Spurious Emissions at Antenna Terminals**

Page 2 of 4

Job No.: 4L0459R Date: 7/27/2004
Specification: PT24 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 40
E.U.T.: PCS REPEATER
Configuration: TX



Notes:

GSM

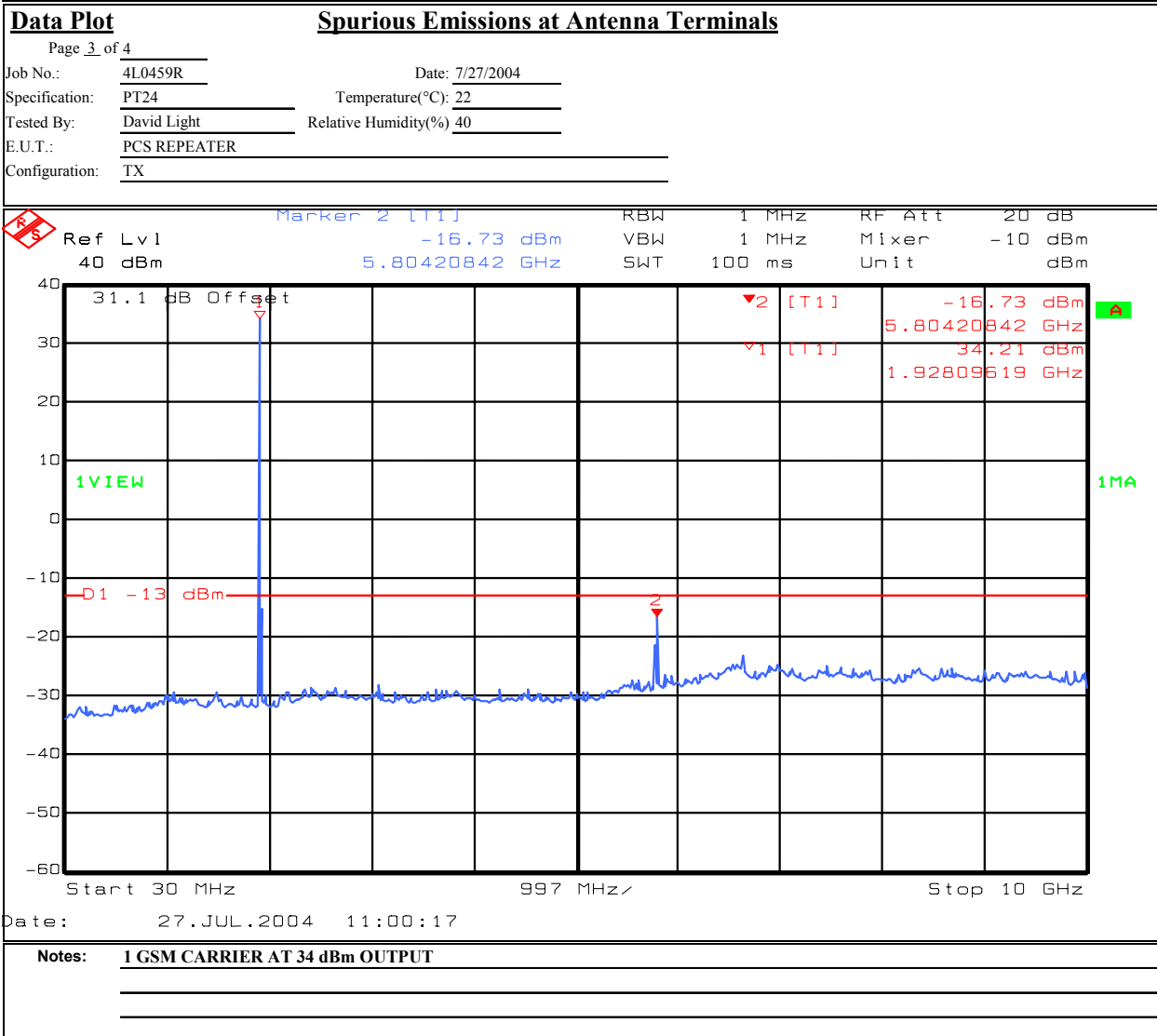
Test Data – Spurious Emissions at Antenna Terminals



Dallas Headquarters:

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

Nemko Dallas, Inc.



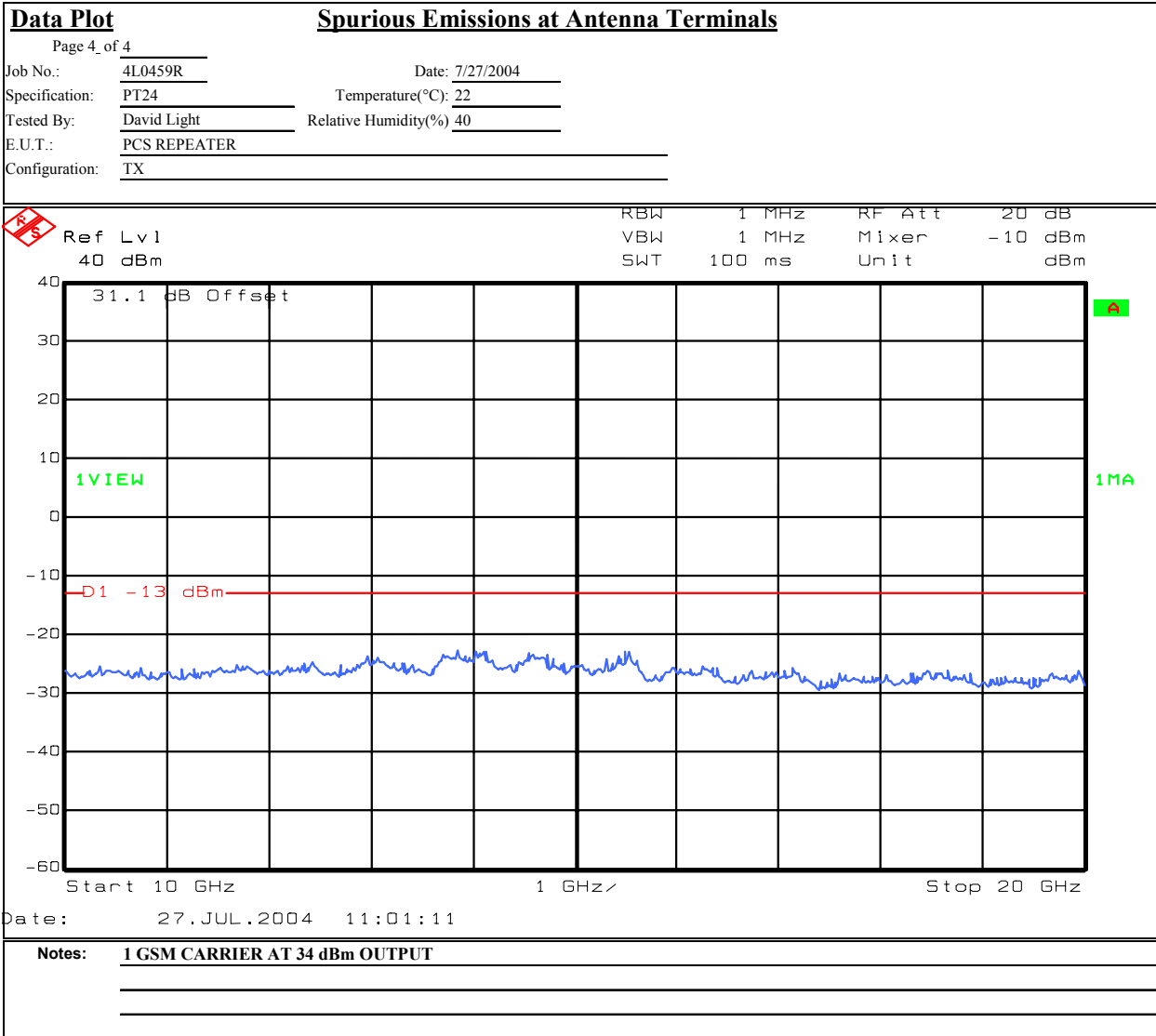
Test Data – Spurious Emissions at Antenna Terminals



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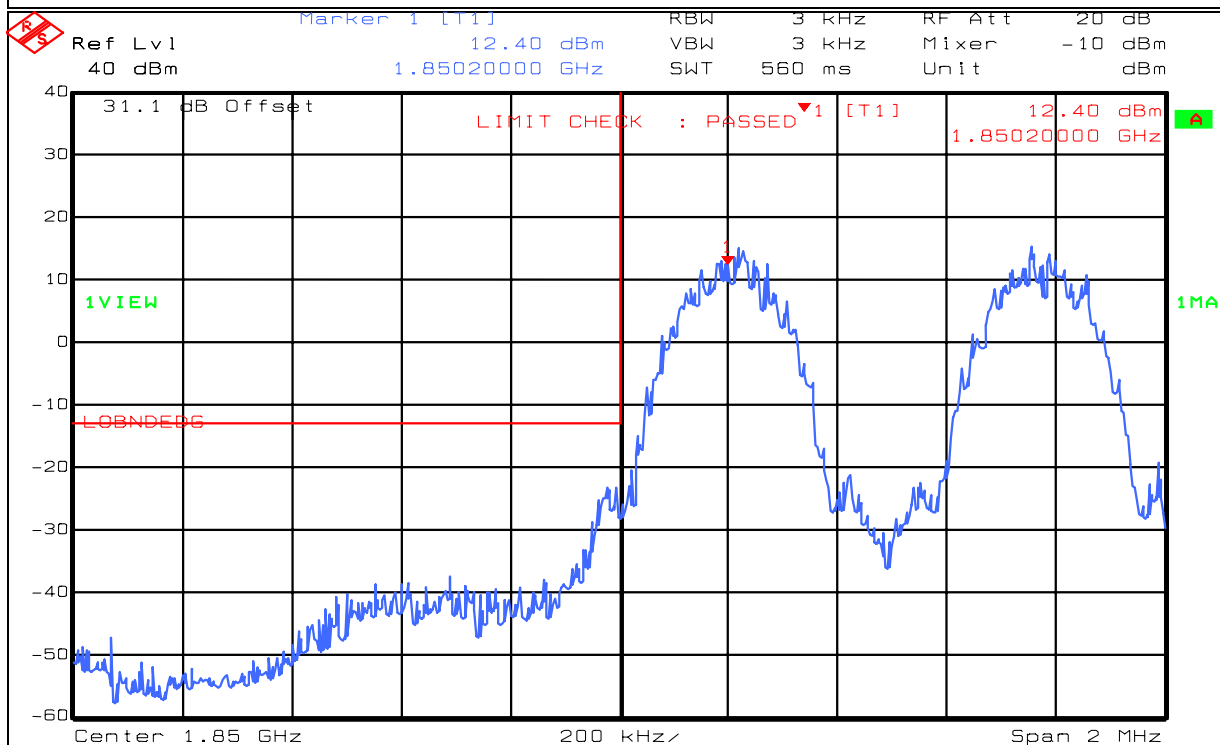
Data Plot

Spurious Emissions at Antenna Terminals

Page 1 of 4
Job No.: 4L0459R Date: 7/27/2004 Complete X
Specification: PT24 Temperature(°C): 22 Preliminary: _____
Tested By: David Light Relative Humidity(%): 40
E.U.T.: PCS REPEATER
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: 1064 Cable #4: _____
Attenuator #2: 1065 Mixer: _____
Additional equipment used: _____
Measurement Uncertainty: +/-1.7 dB



Date: 27.JUL.2004 15:32:17

Notes: 2 CHANNEL INTERMOD
24 dBm/Carrier
GSM

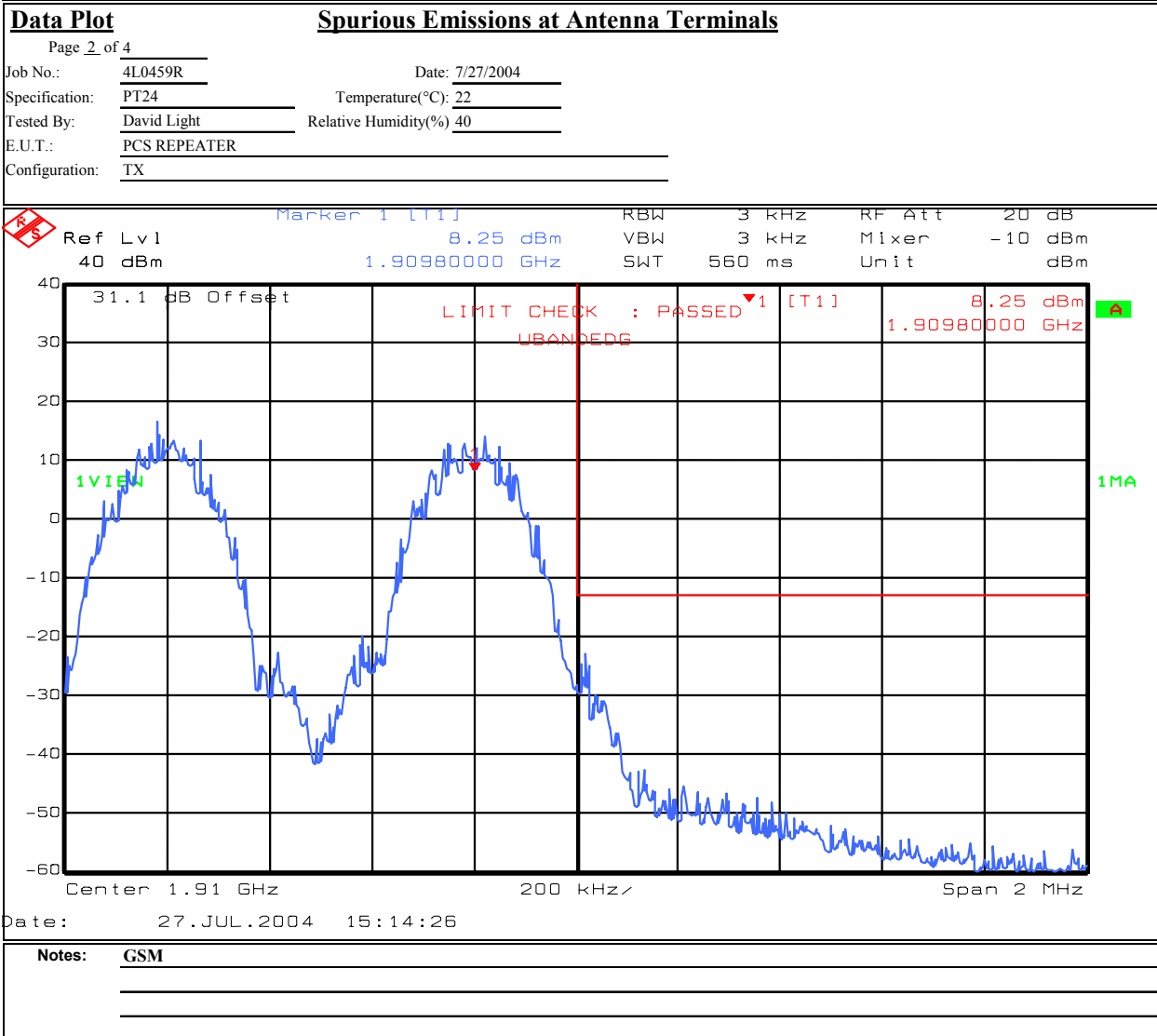
Test Data – Spurious Emissions at Antenna Terminals



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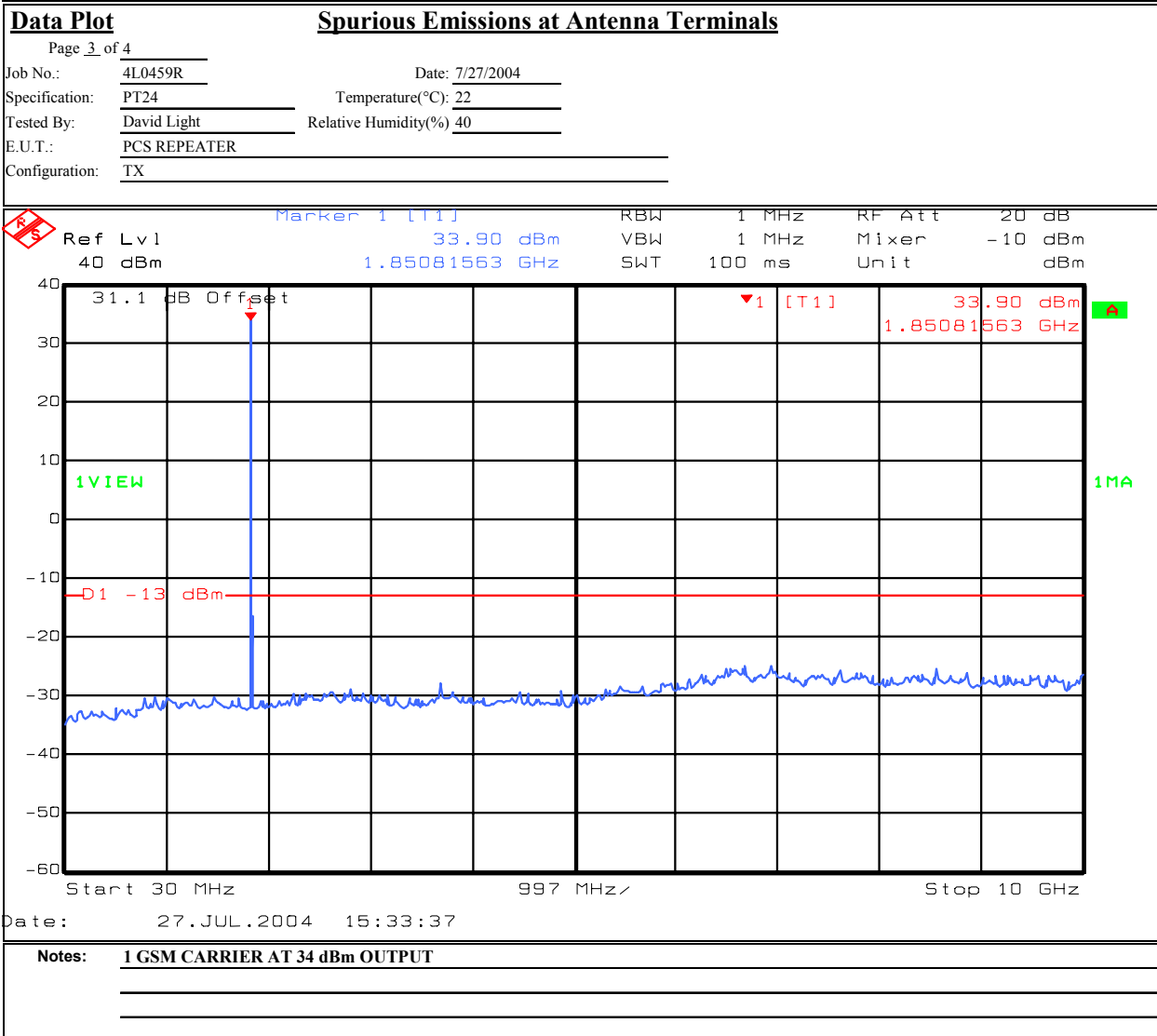
Test Data – Spurious Emissions at Antenna Terminals



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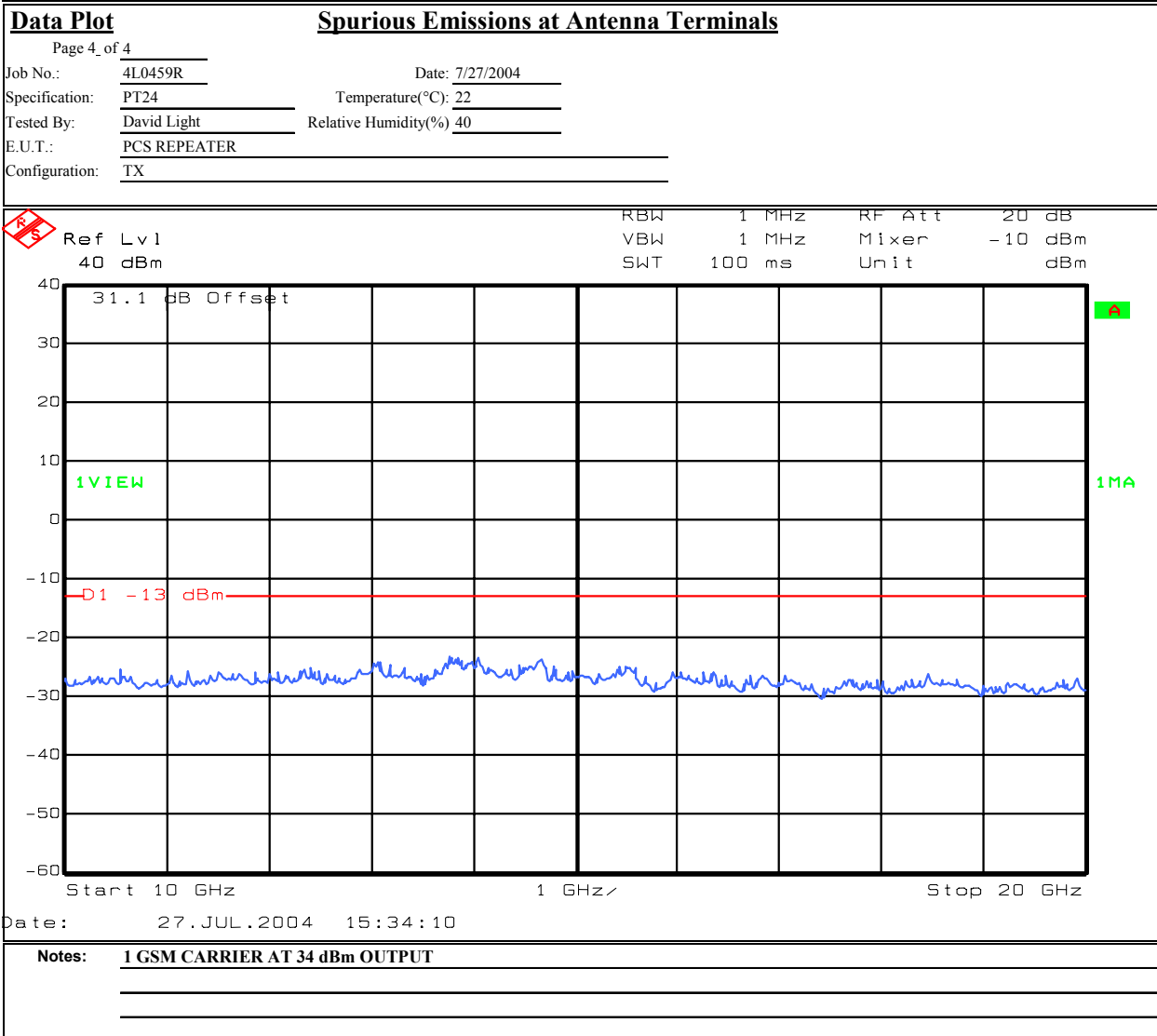
Test Data – Spurious Emissions at Antenna Terminals



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Data Plot

Page 1 of 4

Job No.: 4L0459R

Date: 7/27/2004

Complete X

Specification: PT24

Temperature(°C): 22

Preliminary: _____

Tested By: David Light

Relative Humidity(%): 40

E.U.T.: PCS REPEATER

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: 1064

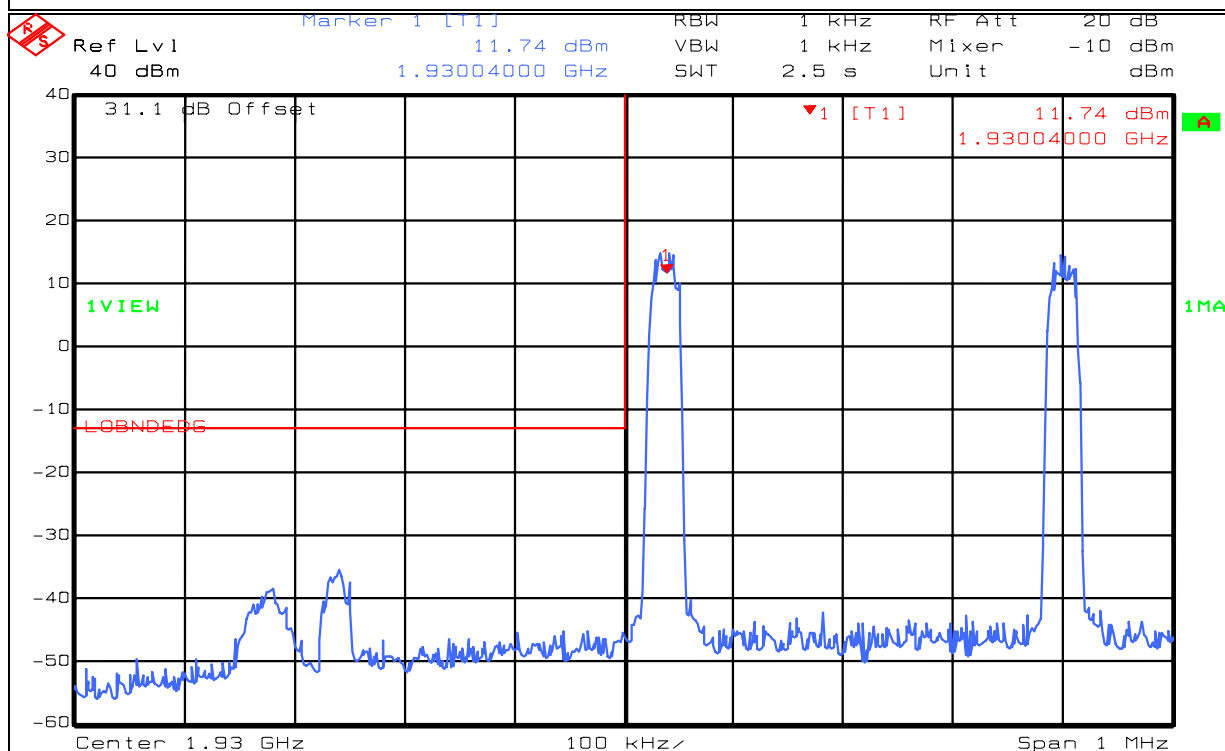
Cable #4: _____

Attenuator #2: 1065

Mixer: _____

Additional equipment used: _____

Measurement Uncertainty: +/-1.7 dB



Date: 27.JUL.2004 10:51:38

Notes: 2 CHANNEL INTERMOD

23 dBm/Carrier

TDMA

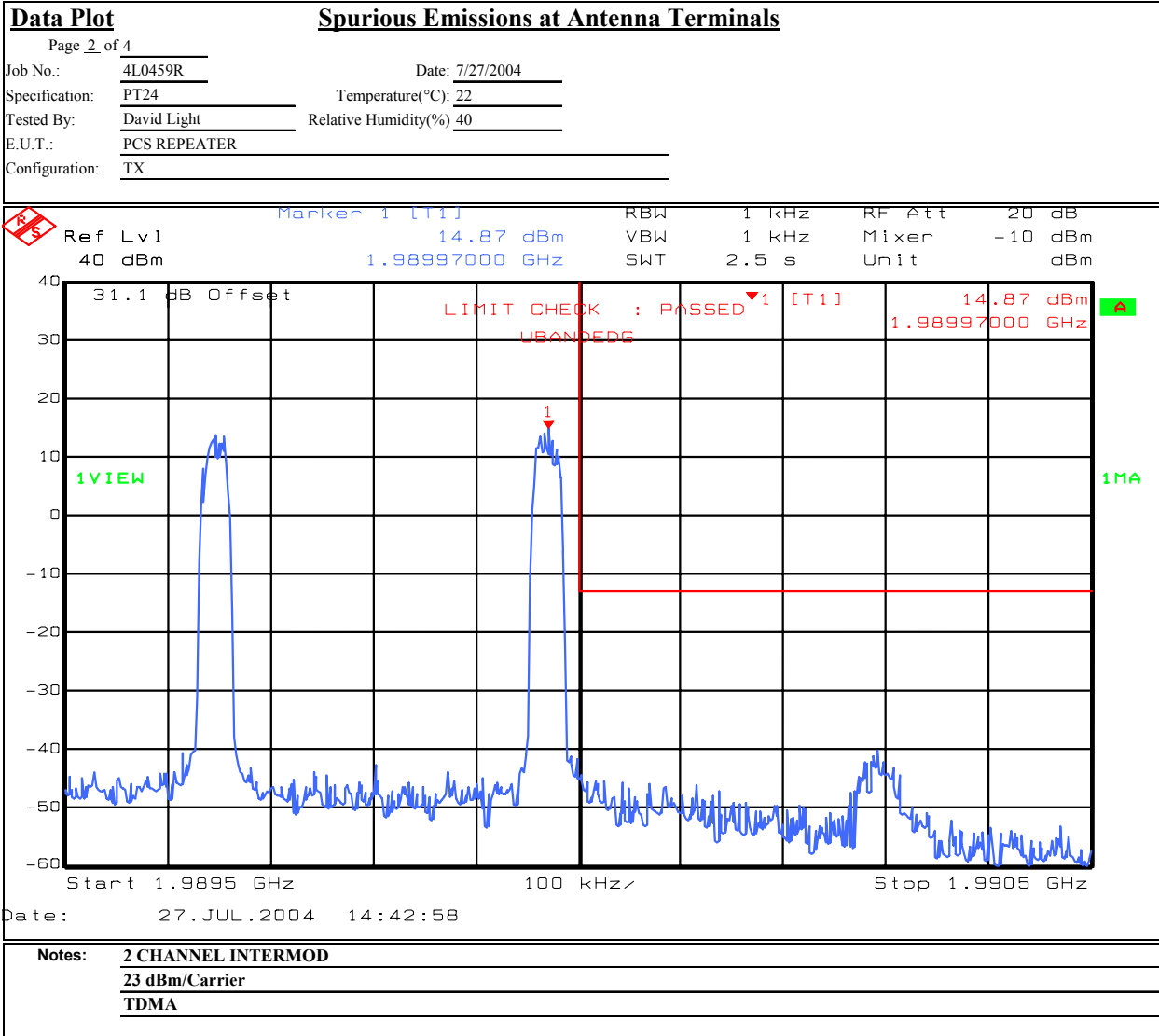
Test Data – Spurious Emissions at Antenna Terminals



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Nemko Dallas, Inc.



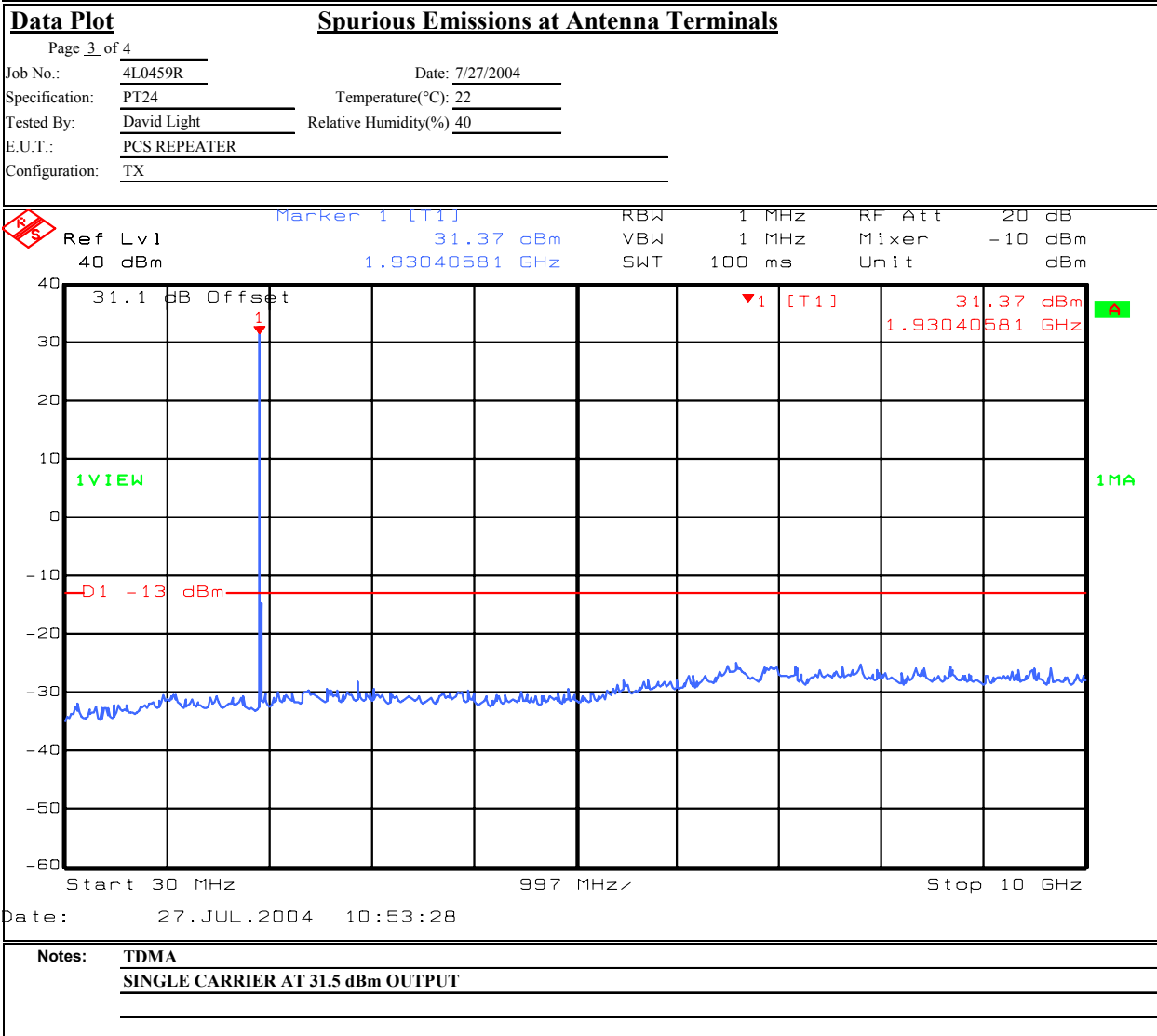
Test Data – Spurious Emissions at Antenna Terminals



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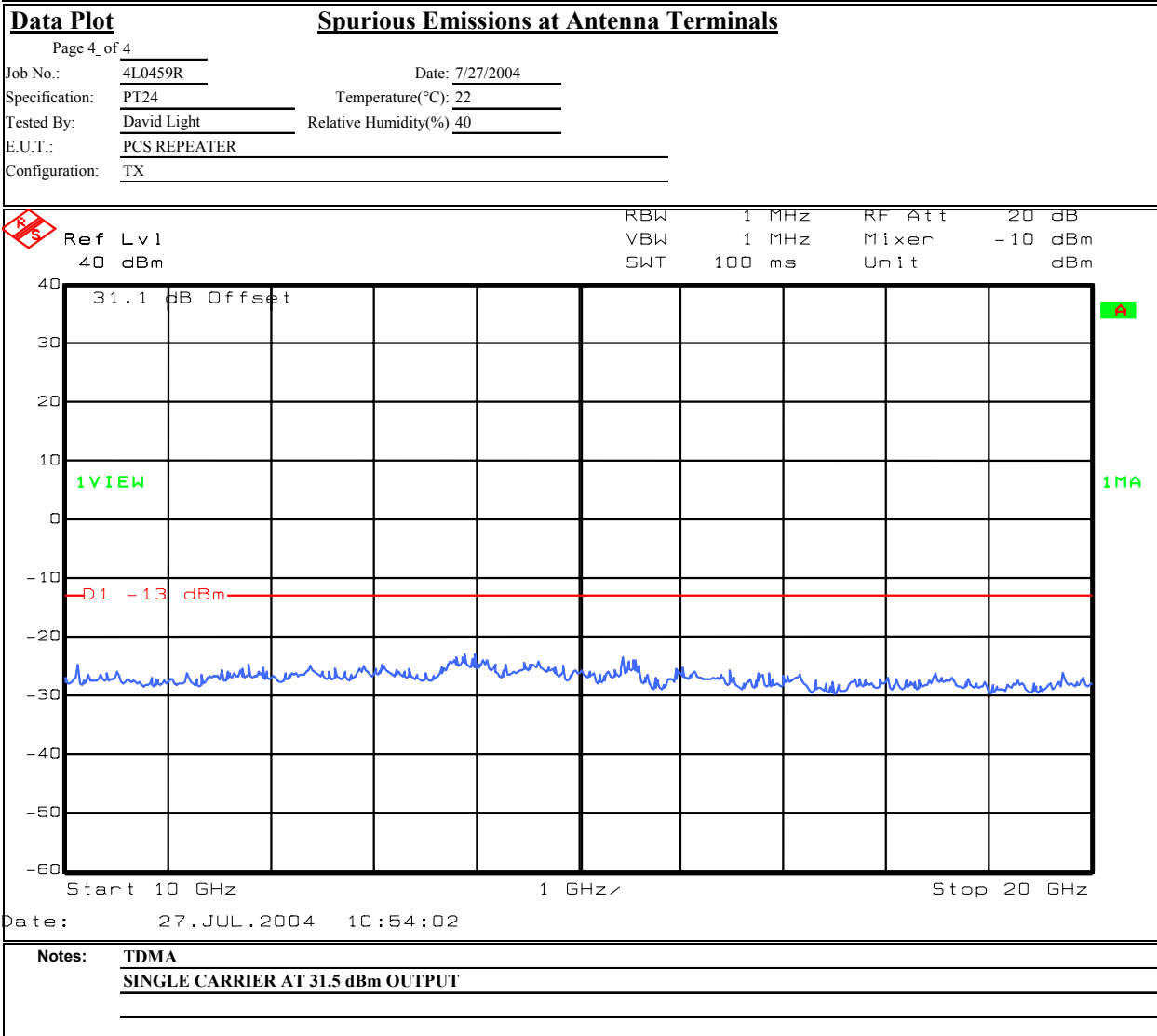
Test Data – Spurious Emissions at Antenna Terminals



Dallas Headquarters:

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Lewisville, TX 75057
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Test Data – Spurious Emissions at Antenna Terminals



Nemko Dallas, Inc.

Dallas Headquarters:

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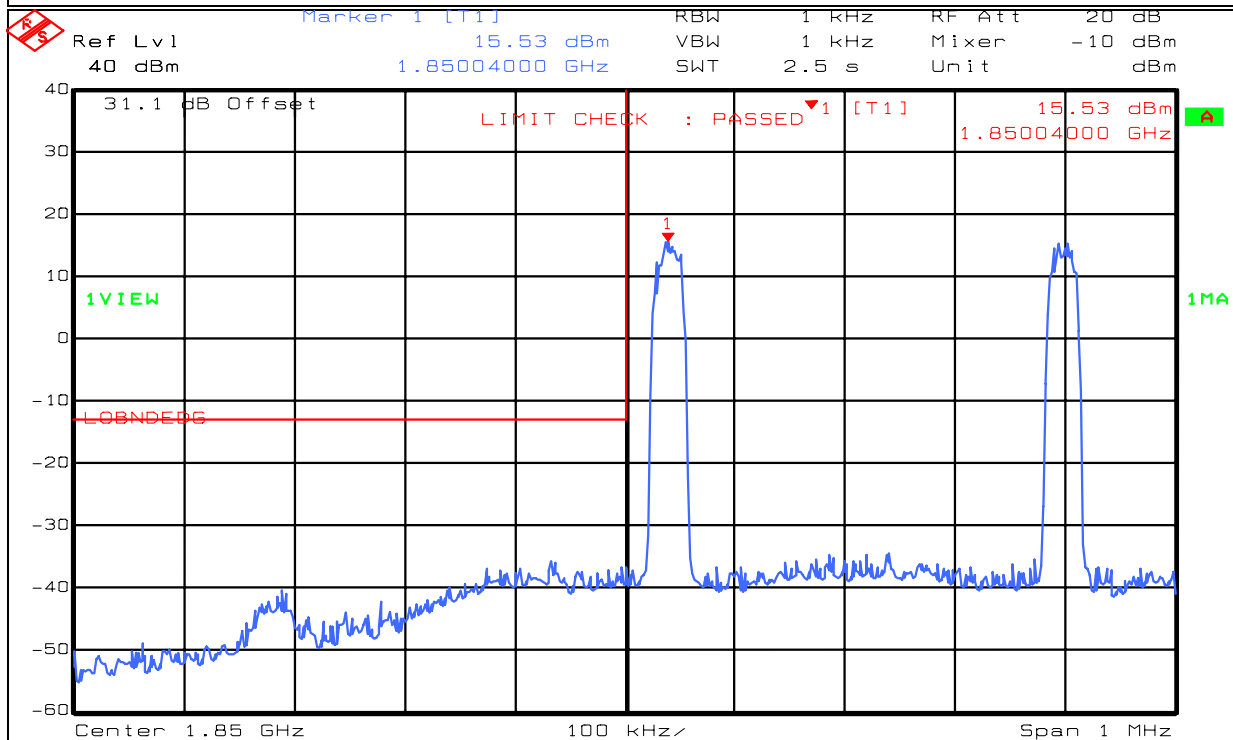
Data Plot

Spurious Emissions at Antenna Terminals

Page 1 of 4
 Job No.: 4L0459R Date: 7/27/2004 Complete X
 Specification: PT24 Temperature(°C): 22 Preliminary: _____
 Tested By: David Light Relative Humidity(%): 40
 E.U.T.: PCS REPEATER
 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: 1628
 Filter: _____ Cable #2: 1627
 Receiver: 1036 Cable #3: _____
 Attenuator #1: 1064 Cable #4: _____
 Attenuator #2: 1065 Mixer: _____
 Additional equipment used: _____
 Measurement Uncertainty: +/-1.7 dB



Date: 27.JUL.2004 07:00:26

Notes: 2 CHANNEL INTERMOD
 23 dBm/Carrier
 TDMA

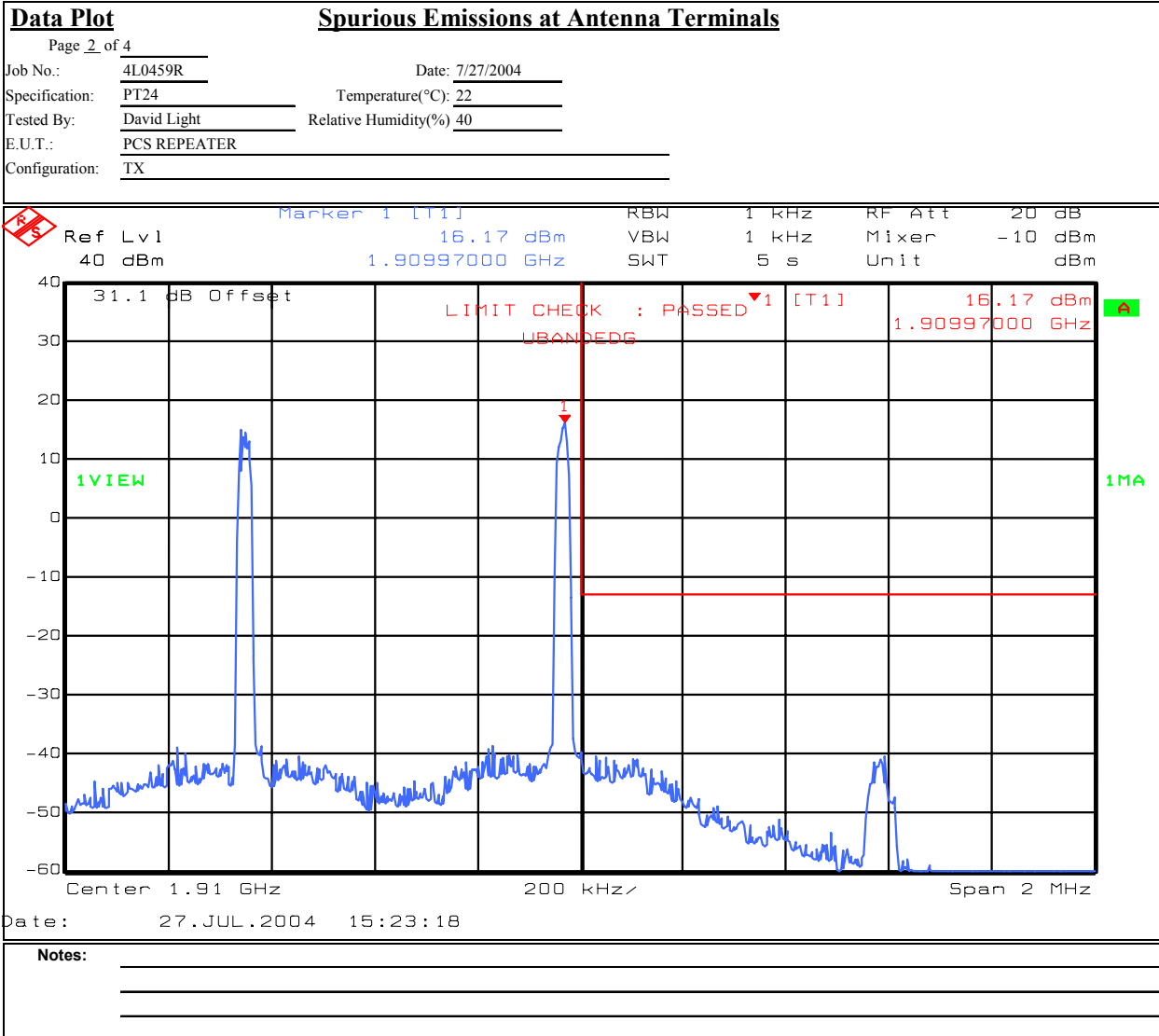
Test Data – Spurious Emissions at Antenna Terminals



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

Nemko Dallas, Inc.



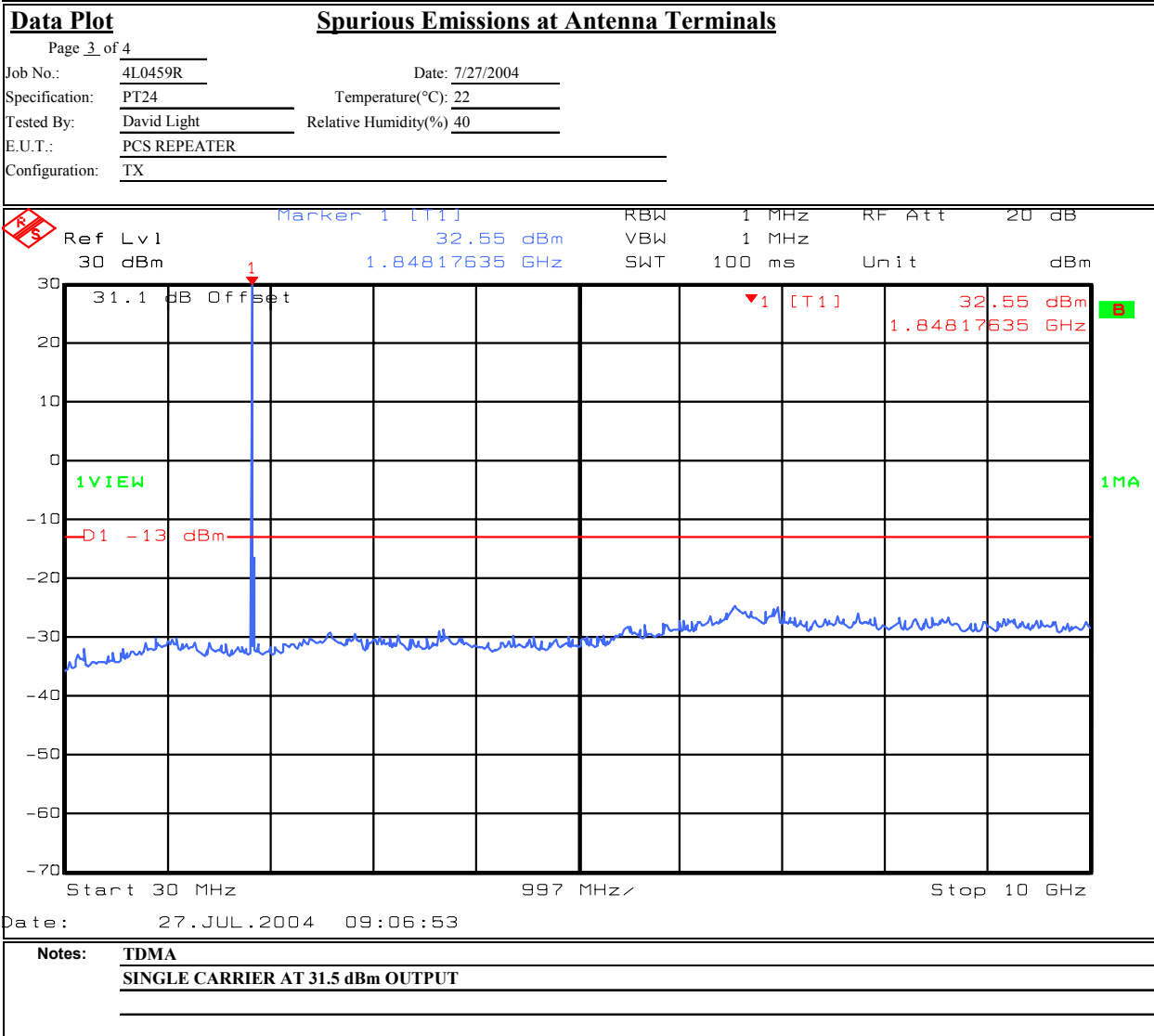
Test Data – Spurious Emissions at Antenna Terminals



Dallas Headquarters:

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Lewisville, TX 75057
Tel: (972) 436-9600
Fax: (972) 436-2667

Nemko Dallas, Inc.



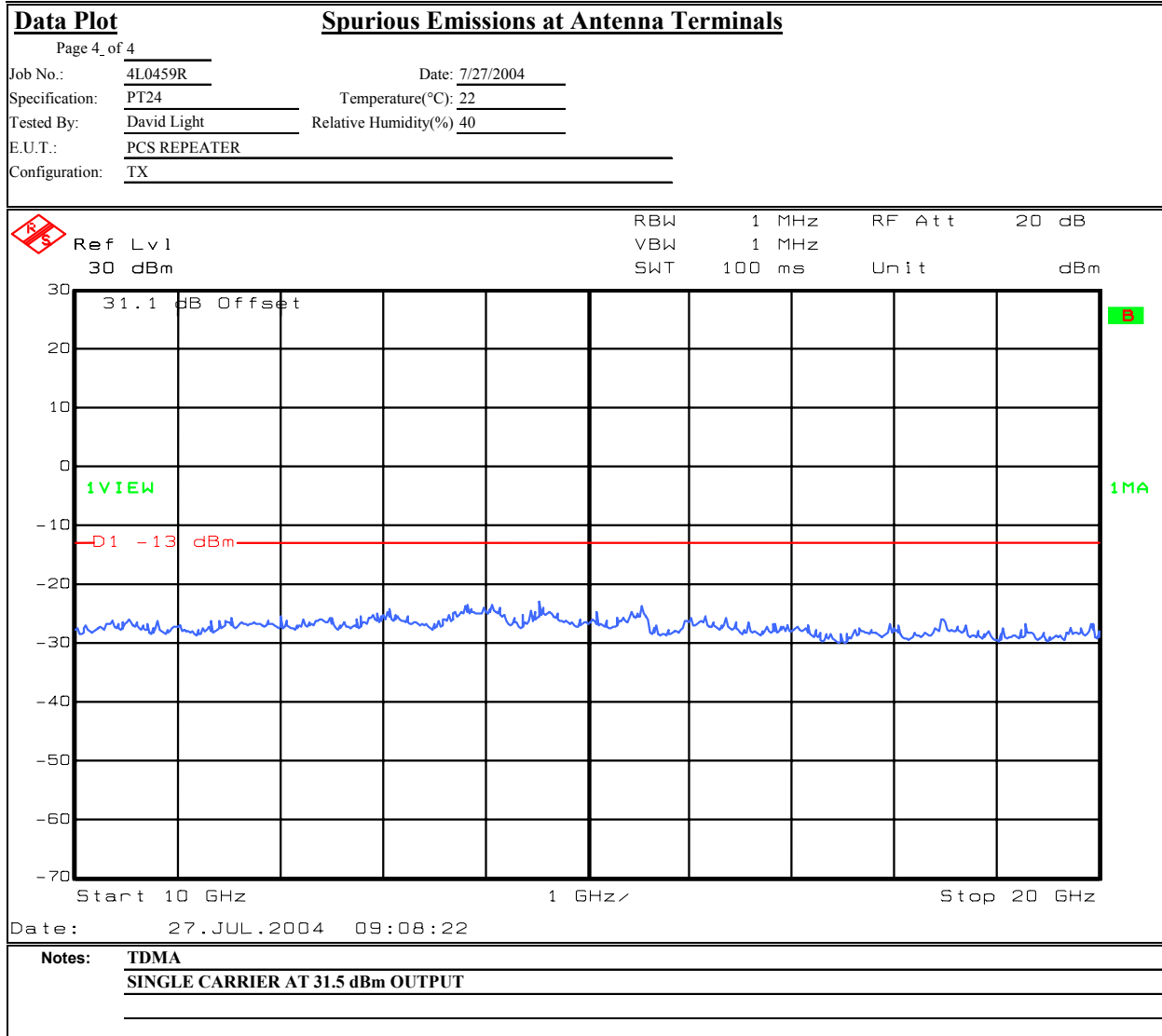
Test Data – Spurious Emissions at Antenna Terminals



Dallas Headquarters:

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

Nemko Dallas, Inc.



Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.1051
TESTED BY: Brian Boyea	DATE: 7/28/04

Test Results: Complies.

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

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

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

Temperature: 22 °C

**Relative
Humidity:** 40 %

EQUIPMENT:MR1903PP

EIRP Substitution Method										
Page <u>1</u> of <u>1</u>							Complete <u>X</u>			
Job No.: 4L0459R		Date: 7/30/04					Preliminary _____			
Specification:		Temperature(°C): <u>23</u>								
Tested By: <u>Brian Boyea</u>		Relative Humidity(%) <u>43</u>								
E.U.T.: <u>MR703P-ADB</u>										
Configuration: <u>Uplink</u>										
Sample No: _____										
Location: <u>AC 3</u>		RBW: <u>1 MHz</u>		Measurement						
Detector Type: <u>Peak</u>		VBW: <u>1 MHz</u>		Distance: <u>3 m</u>						
Test Equipment Used										
Antenna: <u>1304</u>		Directional Coupler: _____								
Pre-Amp: <u>1016</u>		Cable #1: <u>1484</u>								
Filter: _____		Cable #2: <u>1485</u>								
Receiver: <u>795</u>		Cable #3: <u>1483</u>								
Attenuator #1: _____		Cable #4: _____								
Attenuator #2: _____		Mixer: _____								
Additional equipment used: _____										
Measurement Uncertainty: <u>+/-3.6 dB</u>										
Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)	Limit (dBm)	EIRP (dBm)	EIRP (mW)	Polarity	Comments
3716	-55.5	43.3		33	10.7	-13	-34.5	0.000358	V	Uplink 1858 Channel
5574	-65.5	39.8		33	11.4	-13	-47.3	0.000019	V	
7432	-65.8	40.8		32.5	10.9	-13	-46.6	0.000022	V	
9290	-64.8	41.3		34	11.7	-13	-45.8	0.00	V	
11148	-65.2	43.7		35.3	12.5	-13	-44.3	0.000037	V	
13006	-65.0	45.8		33.7	11.9	-13	-41.0	0.000080	V	
14864	-66.7	47.8		32.8	11.5	-13	-40.2	0.000096	V	
16722	-67.3	46.0		33.2	14.5	-13	-40.0	0.000100	V	
18580	-65.7	52.7		34.05	12.7	-13	-34.4	0.000364	V	
Notes: _____										

<u>EIRP Substitution Method</u>			
Page <u>1</u> of <u>1</u>		Complete <u>X</u>	
Job No.: 4L0459R	Date: 7/30/04	Preliminary _____	
Specification:	Temperature(°C): <u>23</u>		
Tested By: <u>Brian Boyea</u>	Relative Humidity(%): <u>43</u>		
E.U.T.: <u>MR703P-ADB</u>			
Configuration: <u>Uplink</u>			
Sample No: _____			
Location: <u>AC 3</u>	RBW: <u>1 MHz</u>	Measurement	
Detector Type: <u>Peak</u>	VBW: <u>1 MHz</u>	Distance: <u>3 m</u>	
<u>Test Equipment Used</u>			
Antenna: <u>1304</u>	Directional Coupler: _____		
Pre-Amp: <u>1016</u>	Cable #1: <u>1484</u>		
Filter: _____	Cable #2: <u>1485</u>		
Receiver: <u>795</u>	Cable #3: <u>1483</u>		
Attenuator #1: _____	Cable #4: _____		
Attenuator #2: _____	Mixer: _____		
Additional equipment used: _____			
Measurement Uncertainty: <u>+/-3.6 dB</u>			

Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)	Limit (dBm)	EIRP (dBm)	EIRP (mW)	Polarity	Comments
3716	-61.8	35.5		33	10.7	-13	-48.6	0.000014	H	Uplink 1858 Channel
5574	-64.3	37.8		33	11.4	-13	-48.1	0.000016	H	
7432	-65.5	40.3		32.5	10.9	-13	-46.8	0.000021	H	
9290	-64.2	42.3		34	11.7	-13	-44.2	0.00	H	
11148	-66.3	47.0		35.3	12.5	-13	-42.1	0.000062	H	
13006	-64.3	47.8		33.7	11.9	-13	-38.3	0.000149	H	
14864	-66.7	48.2		32.8	11.5	-13	-39.8	0.000104	H	
16722	-67.5	49.3		33.2	14.5	-13	-36.9	0.000206	H	
18580	-66.0	53.7		34.05	12.7	-13	-33.7	0.000428	H	

Notes: _____

EQUIPMENT:MR1903PP

EIRP Substitution Method										
Page <u>1</u> of <u>1</u>							Complete <u>X</u>			
Job No.: 4L0459R		Date: 7/30/04					Preliminary _____			
Specification:		Temperature(°C): <u>23</u>								
Tested By: <u>Brian Boyea</u>		Relative Humidity(%) <u>43</u>								
E.U.T.: <u>MR703P-ADB</u>										
Configuration: <u>Downlink</u>										
Sample No: _____										
Location: <u>AC 3</u>		RBW: <u>1 MHz</u>		Measurement						
Detector Type: <u>Peak</u>		VBW: <u>1 MHz</u>		Distance: <u>3</u> m						
Test Equipment Used										
Antenna: <u>1304</u>		Directional Coupler: _____								
Pre-Amp: <u>1016</u>		Cable #1: <u>1484</u>								
Filter: _____		Cable #2: <u>1485</u>								
Receiver: <u>795</u>		Cable #3: <u>1483</u>								
Attenuator #1: _____		Cable #4: _____								
Attenuator #2: _____		Mixer: _____								
Additional equipment used: _____										
Measurement Uncertainty: <u>+/-3.6 dB</u>										
Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)	Limit (dBm)	EIRP (dBm)	EIRP (mW)	Polarity	Comments
3876	-59.2	43.3		33	10.7	-13	-38.2	0.000153	V	Downlink 1938 Channe
5814	-51.3	39.8		31.9	11.4	-13	-32.0	0.000636	V	
7752	-65.8	41.8		32.9	11.3	-13	-45.6	0.000028	V	
9690	-64.7	41.8		34.5	12.4	-13	-45.0	0.00	V	
11628	-64.7	42.8		34.4	12.6	-13	-43.7	0.000043	V	
13566	-66.0	47.7		32.3	12.7	-13	-37.9	0.000161	V	
15504	-66.3	44.3		32.3	15.0	-13	-39.3	0.000118	V	
17442	-66.8	47.3		34.3	13.0	-13	-40.8	0.000084	V	
19380	-67.2	52.7		34.05	12.7	-13	-35.9	0.000258	V	
Notes: _____										

Page 1 of 1

Job No.: 4L0459R

Specification:

Tested By: Brian Boyea

E.U.T.: MR703P-ADB

Configuration: Downlink

Sample No:

Date: 7/30/04

Temperature(°C): 23

Relative Humidity(%) 43

Complete X

Preliminary

Location: AC 3

Detector Type: Peak

RBW: 1 MHz

VBW: 1 MHz

Measurement Distance: 3 m

Test Equipment Used

Antenna: 1304

Pre-Amp: 1016

Filter:

Receiver: 795

Attenuator #1

Attenuator #2:

Additional equipment used:

Measurement Uncertainty: +/-3.6 dB

Directional Coupler:

Cable #1: 1484

Cable #2: 1485

Cable #3: 1483

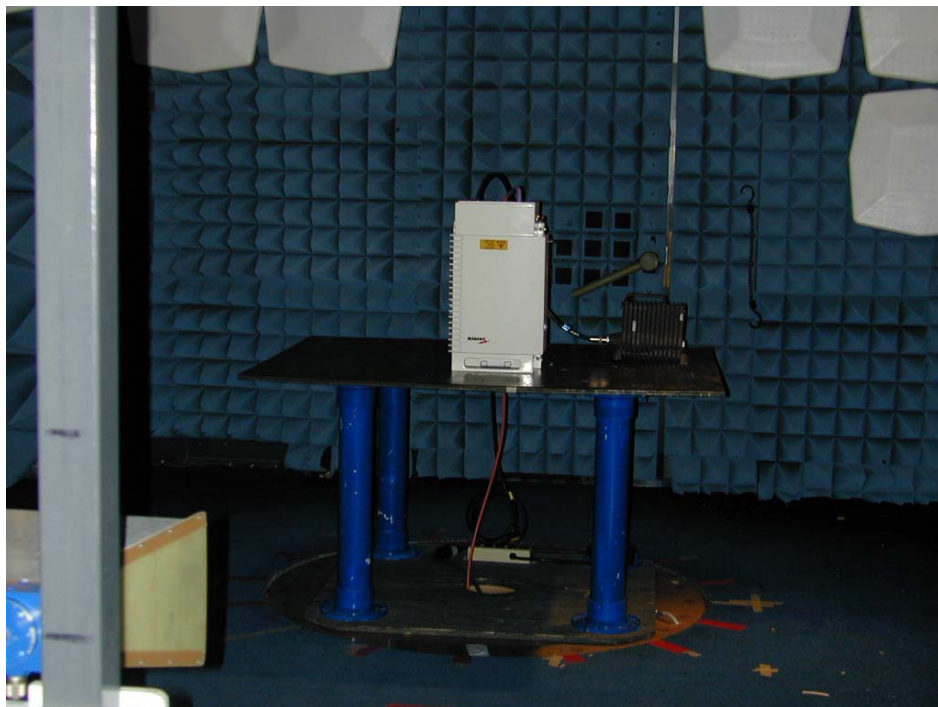
Cable #4:

Mixer:

Frequency (MHz)	Meter Reading (dBm)	Correction Factor (dB)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)	Limit (dBm)	EIRP (dBm)	EIRP (mW)	Polarity	Comments
3876	-59.5	35.5		33	10.7	-13	-46.3	0.000023	H	Downlink 1938 Channels
5814	-52.0	37.8		31.9	11.4	-13	-34.7	0.000341	H	
7752	-66.5	41.5		32.9	11.3	-13	-46.6	0.000022	H	
9690	-64.3	43.3		34.5	12.4	-13	-43.1	0.00	H	
11628	-65.7	47.0		34.4	12.6	-13	-40.5	0.000089	H	
13566	-66.3	47.7		32.3	12.7	-13	-38.2	0.000150	H	
15504	-65.7	45.5		32.3	15.0	-13	-37.5	0.000178	H	
17442	-66.2	52.3		34.3	13.0	-13	-35.2	0.000304	H	
19380	-67.3	53.7		34.05	12.7	-13	-35.0	0.000317	H	

Notes:

Photographs of Test Setup



Section 7. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1627	CABLE, 5 ft	MEGAPHASE 10312 1GVT4	N/A	07/29/03	07/28/04
1628	CABLE, 6 ft	MEGAPHASE TM26 S1S5 72	N/A	CBU	N/A
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	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	07/30/04	07/30/15
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	07/30/04	07/30/05
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
1064	ATTENUATOR	NARDA 776B-20	NONE	CBU	N/A
1065	ATTENUATOR	NARDA 776B-10	NONE	CBU	N/A

ANNEX A - TEST DETAILS

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

Minimum Standard: Para. No.24.232. Base stations are limited to 1640 watts peak E.I.R.P. with an antenna height up to 300 meters HAAT. In no case may the peak output power of a base station transmitter exceed 100 watts.

Method Of Measurement:Detachable Antenna:

The peak power at antenna terminals is measured using an in-line peak power meter. Power output is measured with the maximum rated input level.

Integral Antenna:

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**PARA. NO.: 2.1047**

Minimum Standard: Para. No. 24.238(b). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB.

Method Of Measurement:CDMA

Spectrum analyzer settings:

RBW: 30 kHz

VBW: $\geq$ RBW

Span: 5 MHz

Sweep: Auto

Mask: Set markers to -26 dB from peak of CW.

GSM

RBW: 3 kHz

VBW: $\geq$ RBW

Span: 2 MHz

Sweep: Auto

Mask: Set markers to -26 dB from peak of CW.

NADC

RBW: 1 kHz

VBW: $\geq$ RBW

Span: 1 MHz

Sweep: Auto

Mask: Set markers to -26 dB from peak of CW.

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

Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least $43 + 10 \log (P)$ dB.

Method Of Measurement:

Spectrum analyzer settings:

CDMA

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 30 kHz (< 1 MHz from Band Edge)
VBW: $\geq$ RBW
Sweep: Auto
Video Avg: 6 Sweeps

GSM

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 kHz (< 1 MHz from Band Edge)
VBW: $\geq$ RBW
Sweep: Auto
Video Avg: Disabled

NADC

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 3 kHz (< 1 MHz from Band Edge)
VBW: $\geq$ RBW
Sweep: Auto
Video Avg: Disabled

To demonstrate compliance at band edges the frequency of the input signal is set to the lowest and highest assigned channel and the center frequency of the spectrum analyzer is set to the upper and lower edges of the appropriate frequency block.

NAME OF TEST: Field Strength of Spurious Radiation

PARA. NO.: 2.1053

Minimum Standard: Para. No.24.238(a). On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power by at least $43 + 10 \log (P)$ dB.

Test Method: 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 an isotropic radiator. The substitution antenna is fed with a calibrated signal which is adjusted until the previously recorded value is repeated. The eirp of the spurious signal is the level required to repeat the previously measured level.

The spectrum is searched to 10 GHz.

NAME OF TEST: Frequency Stability**PARA. NO.: 2.1055**

Minimum Standard: Para. No. 24.235. The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

Method Of Measurement:

Frequency Stability With Voltage Variation

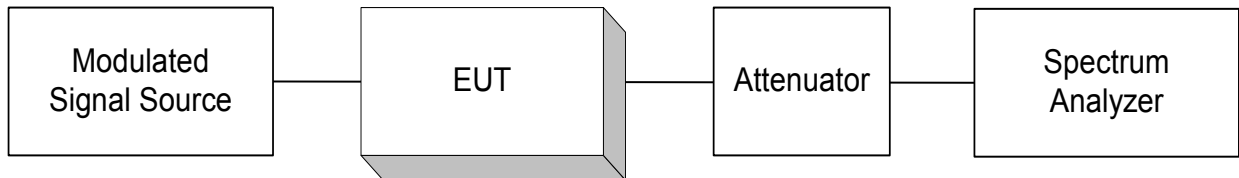
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10 MHz ref, in of the signal generator. With the voltage input to the E.U.T. set to 85% S.T.V., the frequency is measured in 30 second intervals for a period of 5 minutes. This procedure is repeated at 100% S.T.V. and 115% S.T.V.

Frequency Stability With Temperature Variation

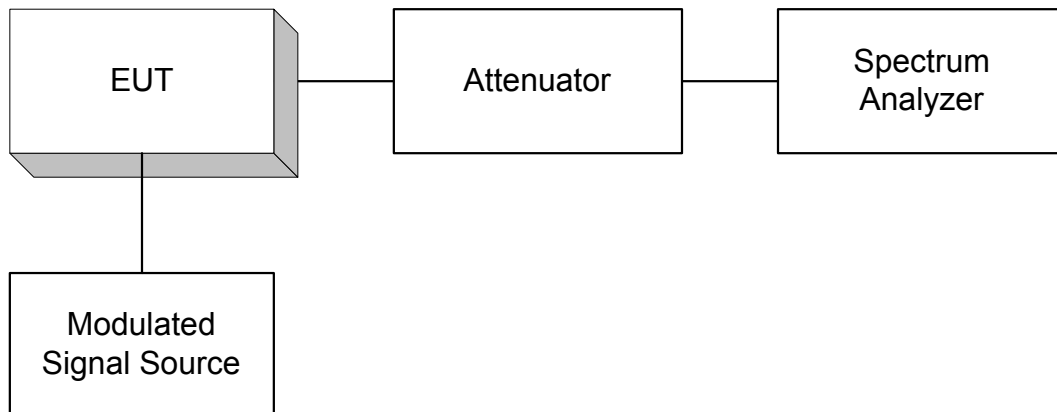
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

ANNEX B - TEST DIAGRAMS

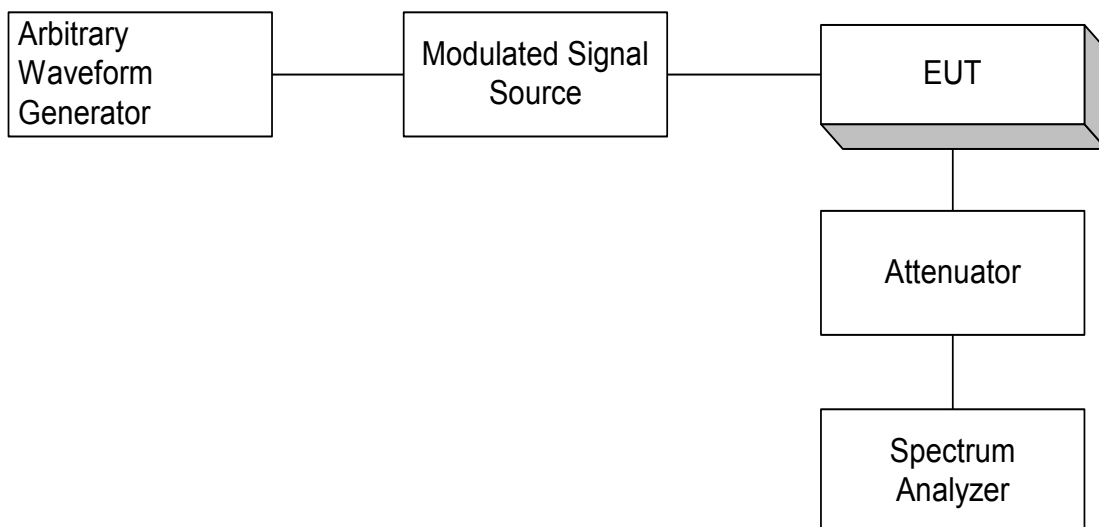
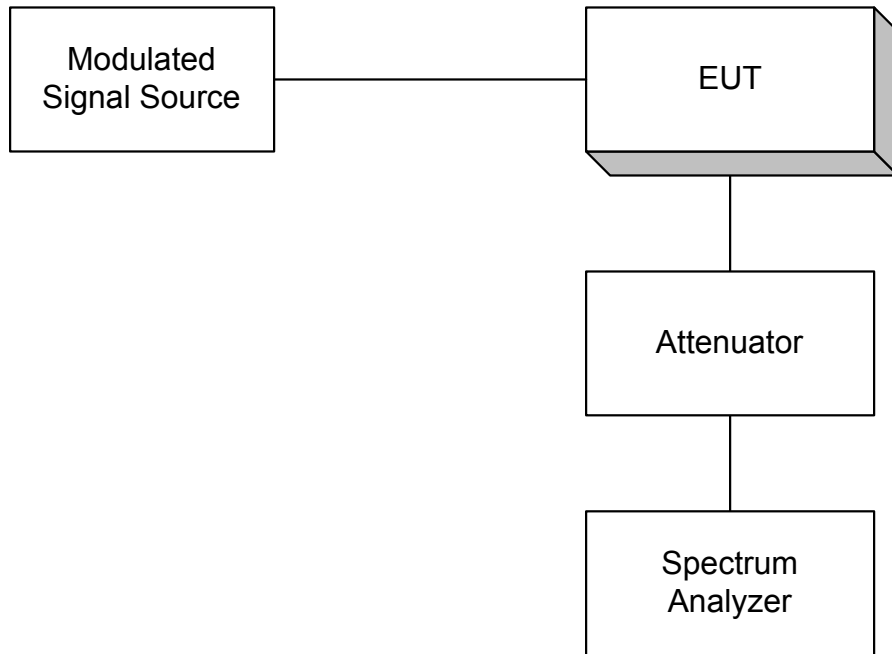
Para. No. 2.985 - R.F. Power Output



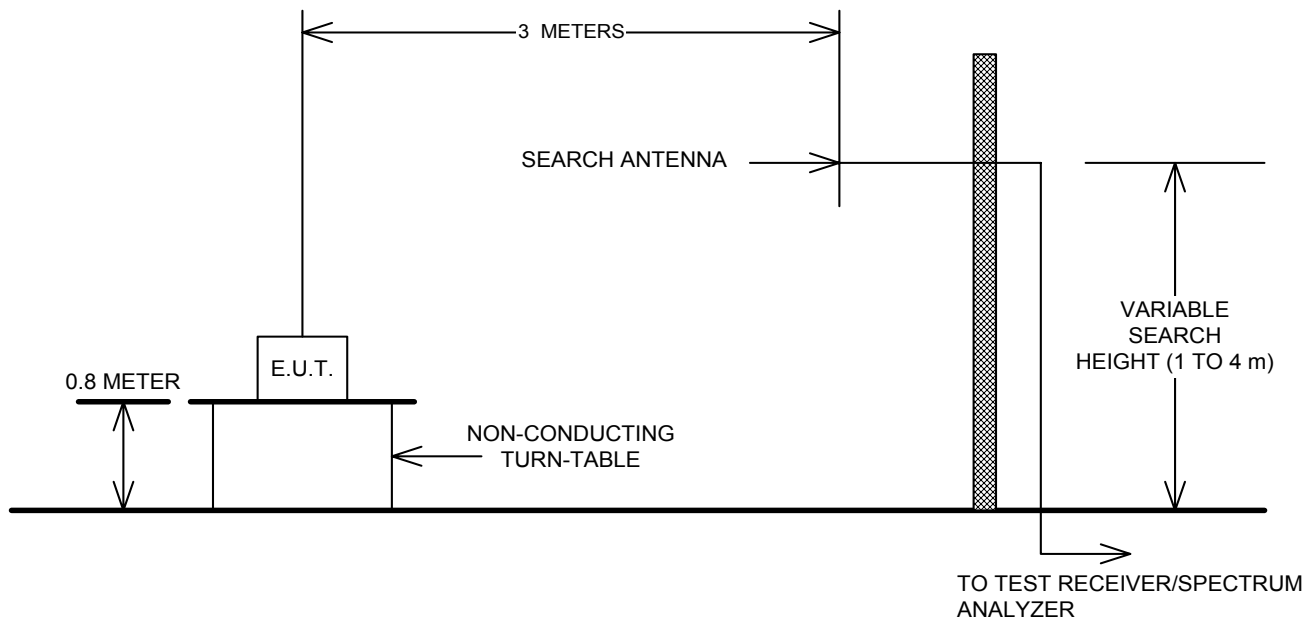
Para. No. 2.989 - Occupied Bandwidth



Para. No. 2.991 Spurious Emissions at Antenna Terminals



Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

