

Nemko Test Report No.:

4L0134RUS1

Applicant:

Communication Components, Inc.
89 Leuning Street
Second Floor
Hackensack, NJ 07606

Equipment Under Test:

DAB-1819-125

In Accordance With:

FCC Part 24, Subpart E
Broadband PCS Amplifiers

Tested By:

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



Authorized By:

Tom Tidwell, Frontline Group Manager

Date:

3/22/04

Total Number of Pages:

37

Table of Contents

Section 1. Summary of Test Results3

Section 2. General Equipment Specification5

Section 3. RF Power Output.....7

Section 4. Occupied Bandwidth8

Section 5. Spurious Emissions at Antenna Terminals13

Section 6. Field Strength of Spurious24

Section 7. Test Equipment List.....27

ANNEX A - TEST DETAILS28

ANNEX B - TEST DIAGRAMS.....34

EQUIPMENT: DAB-1819-125

Section 1. Summary of Test Results

Manufacturer: Communication Components

Model No.: DAB-1819-125

Serial No.: E005730

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.

- | | | | |
|-------------------------------------|----------------------------|-------------------------------------|---------------------|
| <input checked="" type="checkbox"/> | New Submission | <input checked="" type="checkbox"/> | Production Unit |
| <input type="checkbox"/> | Class II Permissive Change | <input type="checkbox"/> | 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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EQUIPMENT: DAB-1819-125**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

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

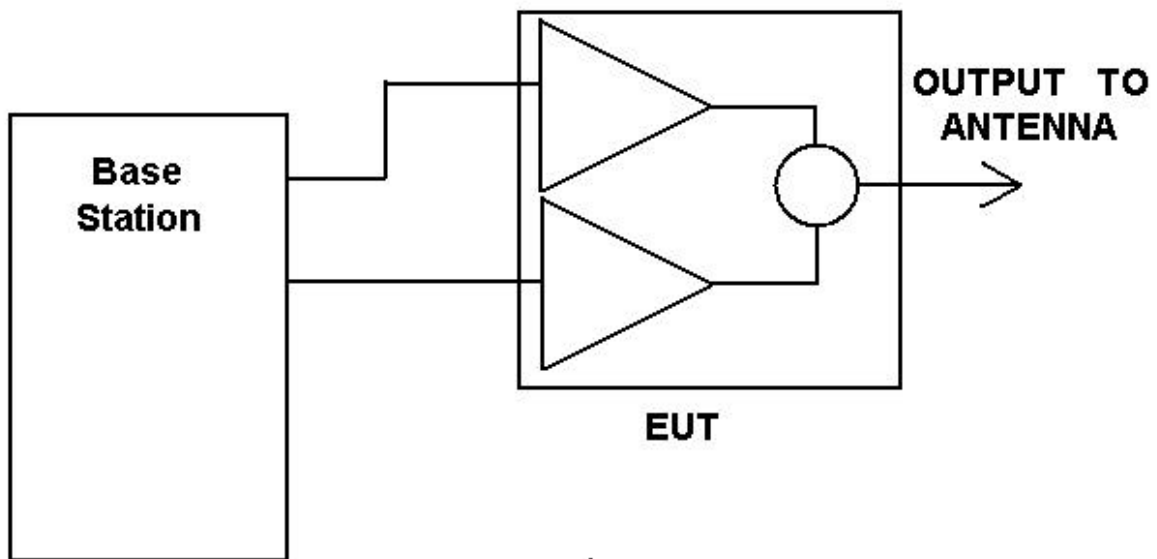
Section 2. General Equipment Specification

Supply Voltage Input:		120 VAC						
Frequency Bands:	Downlink:	<input checked="" type="checkbox"/> Block A: 1930 – 1945 MHz <input checked="" type="checkbox"/> Block D: 1945 – 1950 MHz <input checked="" type="checkbox"/> Block B: 1950 – 1965 MHz <input checked="" type="checkbox"/> Block E: 1965 – 1970 MHz <input checked="" type="checkbox"/> Block F : 1970 – 1975 MHz <input checked="" type="checkbox"/> Block C: 1975 – 1990 MHz						
Frequency Bands:	Uplink:	<input type="checkbox"/> Block A: 1850 – 1865 MHz <input type="checkbox"/> Block B: 1865 – 1870 MHz <input type="checkbox"/> Block C: 1870 – 1885 MHz <input type="checkbox"/> Block D: 1885 – 1890 MHz <input type="checkbox"/> Block E: 1890 – 1895 MHz <input type="checkbox"/> Block F : 1895 – 1910 MHz						
Type of Modulation and Designator:		<table border="0"> <tr> <td>CDMA (F9W)</td> <td>GSM (GXW)</td> <td>EDGE (G7W)</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	CDMA (F9W)	GSM (GXW)	EDGE (G7W)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
CDMA (F9W)	GSM (GXW)	EDGE (G7W)						
<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>						
Output Impedance:		50 ohms						
RF Output (Rated):	Uplink	Per channel: NA W Total: NA W						
RF Output (Rated):	Downlink	Per channel: 62.5 W Total: 125 W						
<p>Power output needs to be lowered to 33.2 dBm at 1930.2 and 1989.8 MHz (Bandedges) to achieve compliance when using GSM or EDGE modulation.</p>								
Frequency Translation:		<table border="0"> <tr> <td>F1-F1</td> <td>F1-F2</td> <td>N/A</td> </tr> <tr> <td><input checked="" type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> </tr> </table>	F1-F1	F1-F2	N/A	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
F1-F1	F1-F2	N/A						
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>						
Band Selection:		<table border="0"> <tr> <td>Software</td> <td>Duplexer</td> <td>Fullband</td> </tr> <tr> <td><input type="checkbox"/></td> <td><input type="checkbox"/></td> <td><input checked="" type="checkbox"/></td> </tr> </table>	Software	Duplexer	Fullband	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Software	Duplexer	Fullband						
<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>						

Description of EUT

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

System Diagram



EQUIPMENT: DAB-1819-125

Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 3/12/04

Test Results: Complies.

Measurement Data:

	Modulation Type	Per Channel Output Power (dBm)	Composite Output Power (dBm)
Uplink	GSM	NA	NA
Downlink	GSM	62.5	125
Uplink	GSM EDGE	NA	NA
Downlink	GSM EDGE	62.5	125

Note – The device was tested at 125 Watts max power to compensate for any insertion loss prior to antenna input.

Reduced Power measurements at Band Edges

	Modulation Type	Single Channel Output Power (1930.2MHz)	Single Channel Output Power (1989.8MHz)	
Downlink	EDGE	33.2dBm	33.2dBm	
Downlink	GSM	33.2dBm	33.2dBm	

Equipment Used: 1464-1064-1055-1626

Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 ?C

Relative Humidity: 40%

EQUIPMENT: **DAB-1819-125**

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049
TESTED BY: David Light	DATE:3/12/04

Test Results: Complies.

Test Data: See attached plot(s).

EQUIPMENT: DAB-1819-125

Test Data – Occupied Bandwidth



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

Nemko Dallas, Inc.

Data Plot	Occupied Bandwidth
Page 1 of 4	Complete <u> X </u>
Job No.: 3L0075R	Date: <u> 3/12/2004 </u>
Specification: PT 24	Temperature(°C): <u> 22 </u>
Tested By: <u> David Light </u>	Relative Humidity(%): <u> 40 </u>
E.U.T.: <u> DAC-1819-125 </u>	
Configuration: <u> TX FULL POWER </u>	
Sample Number: <u> 1 </u>	
Location: <u> Lab 2 </u>	RBW: <u> 3 kHz </u>
Detector Type: <u> Peak </u>	VBW: <u> 3 kHz </u>
	Measurement Distance: <u> NA </u> m
Test Equipment Used	
Antenna: <u> </u>	Directional Coupler: <u> 1055 </u>
Pre-Amp: <u> </u>	Cable #1: <u> 1626 </u>
Filter: <u> </u>	Cable #2: <u> </u>
Receiver: <u> 1464 </u>	Cable #3: <u> </u>
Attenuator #1: <u> 1064 </u>	Cable #4: <u> </u>
Attenuator #2: <u> </u>	Mixer: <u> </u>
Additional equipment used: <u> </u>	
Measurement Uncertainty: <u> ±1.7 dB </u>	
<p style="font-family: monospace; font-size: small;"> ATTEN 30dB RL 60.3dBm 10dB/ CENTER 1.989700GHz SPAN 2.000MHz *RBW 3.0kHz VBW 3.0kHz SWP 560ms </p>	
Notes: <u> OUTPUT, GSM EDGE, 62.5 watts </u>	

EQUIPMENT: DAB-1819-125

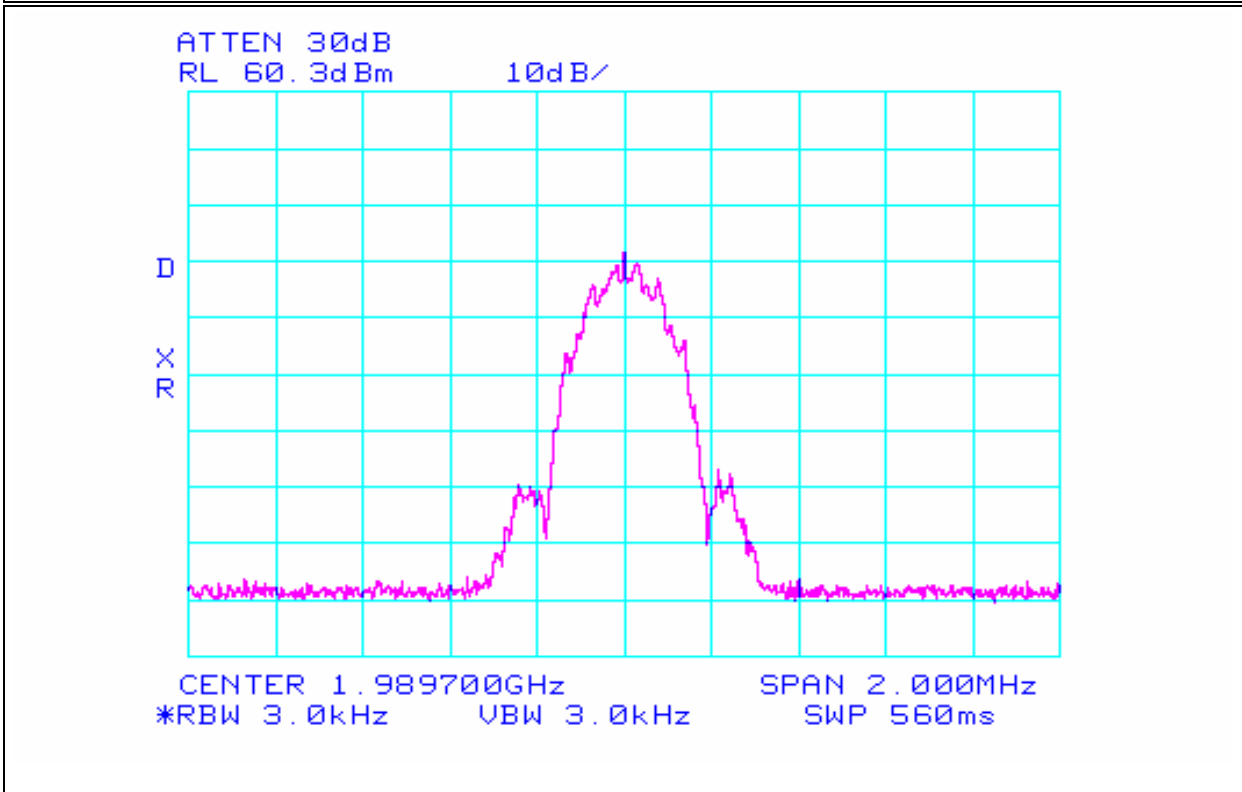
Test Data – Occupied Bandwidth



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Data Plot	Occupied Bandwidth	
Page 2 of 4		
Job No.: 3L0075R	Date: 3/12/2004	
Specification: PT 24	Temperature(°C): 22	
Tested By: David Light	Relative Humidity(%) 40	
E.U.T.: DAC-1819-125		
Configuration: TX FULL POWER		



Notes: INPUT, GSM EDGE

EQUIPMENT: DAB-1819-125

Test Data – Occupied Bandwidth



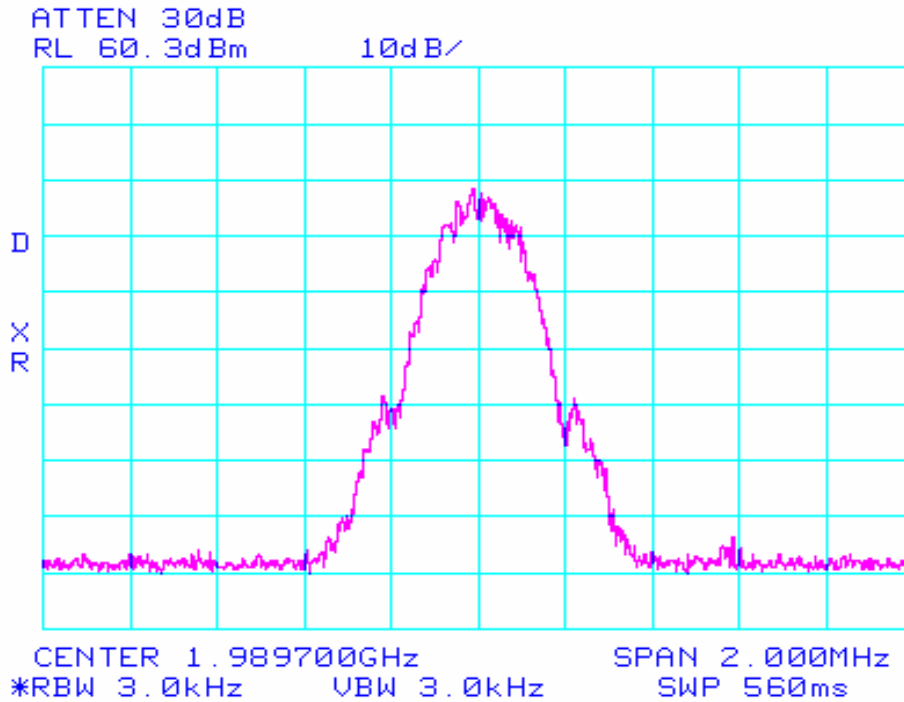
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Data Plot **Occupied Bandwidth**

Page 3 of 4

Job No.: 310075R Date: 3/12/2004
Specification: PT 24 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 40
E.U.T.: DAC-1819-125
Configuration: TX FULL POWER



Notes: OUTPUT, GSM, 62.5 watts

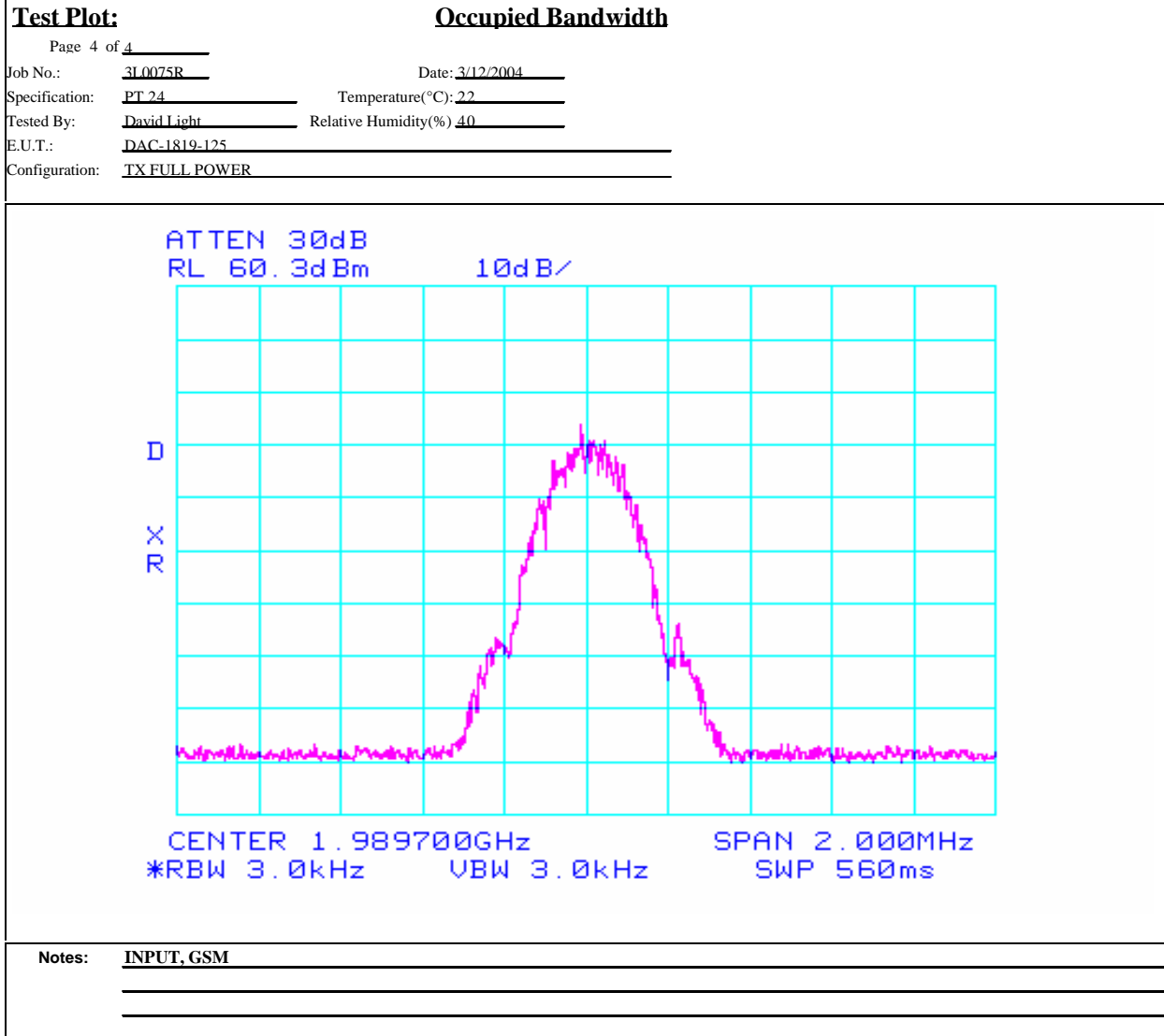
EQUIPMENT: DAB-1819-125

Test Data – Occupied Bandwidth



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EQUIPMENT: **DAB-1819-125**

Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 3/12/04

Test Results: Complies.

Test Data: See attached plot(s).

EQUIPMENT: DAB-1819-125

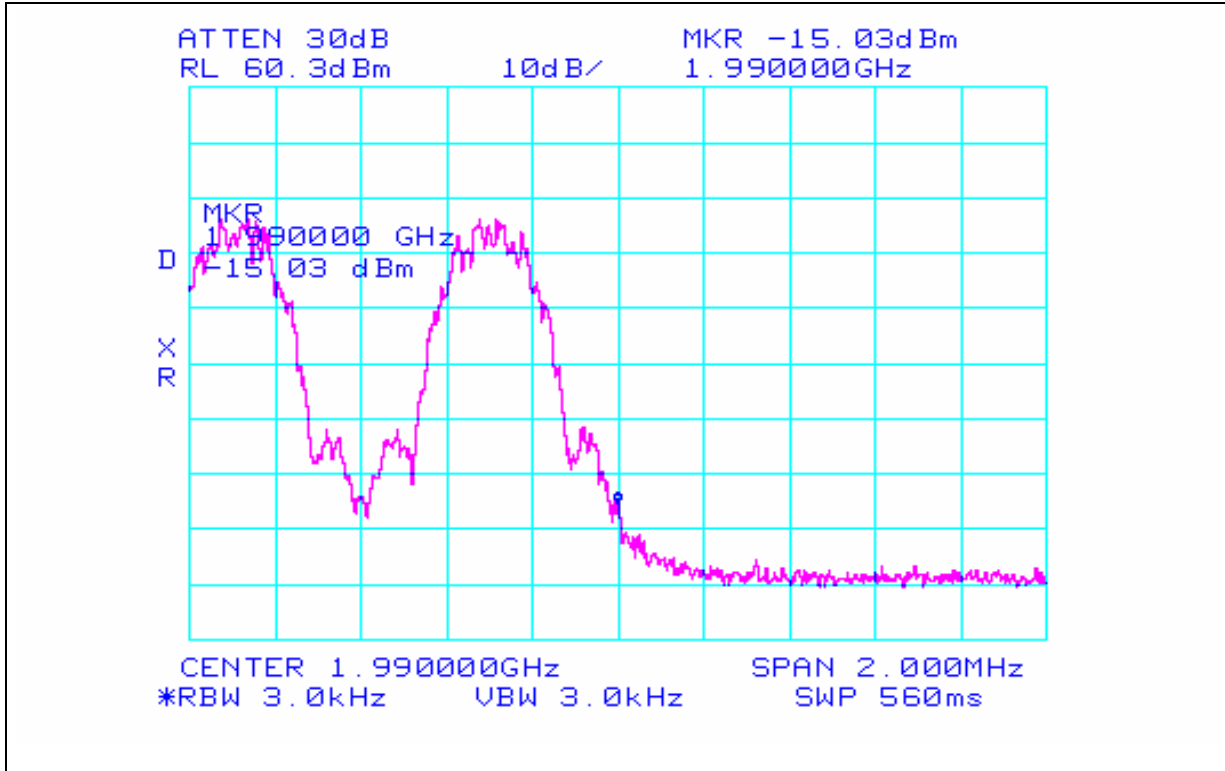
Test Data – Spurious Emissions at Antenna Terminals



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Data Plot		Spurious Emissions at Antenna Terminals		Complete
Page 1 of 3		Date:	3/12/2004	<input checked="" type="checkbox"/>
Job No.:	3L0075R	Temperature(°C):	22	Preliminary:
Specification:	PT 24	Relative Humidity(%):	40	
Tested By:	David Light			
E.U.T.:	DAC-1819-125			
Configuration:	TX FULL POWER			
Sample Number:	1	RBW:	3 kHz	Measurement
Location:	Lab 2	VBW:	3 kHz	Distance: NA m
Detector Type:	Peak			
Test Equipment Used				
Antenna:		Directional Coupler:	1055	
Pre-Amp:		Cable #1:	1626	
Filter:		Cable #2:		
Receiver:	1464	Cable #3:		
Attenuator #1:	1064	Cable #4:		
Attenuator #2:		Mixer:		
Additional equipment used:				
Measurement Uncertainty:	±1.7 dB			



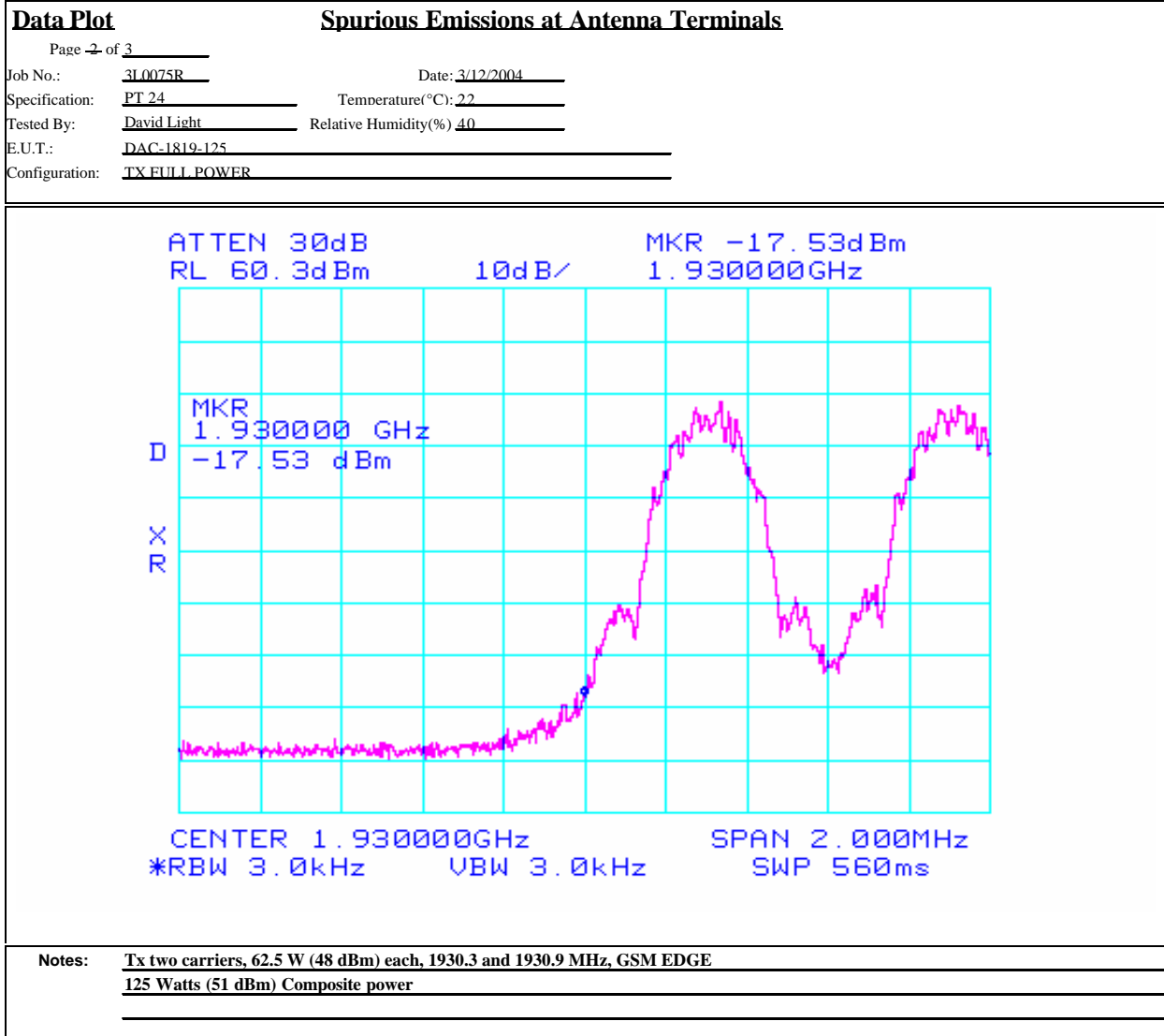
Notes: Tx two carriers, 62.5 W (48 dBm) each, 1989.7 and 1989.1 MHz, GSM EDGE
 125 Watts (51 dBm) Composite power

Test Data – Spurious Emissions at Antenna Terminals



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Test Data – Spurious Emissions at Antenna Terminals



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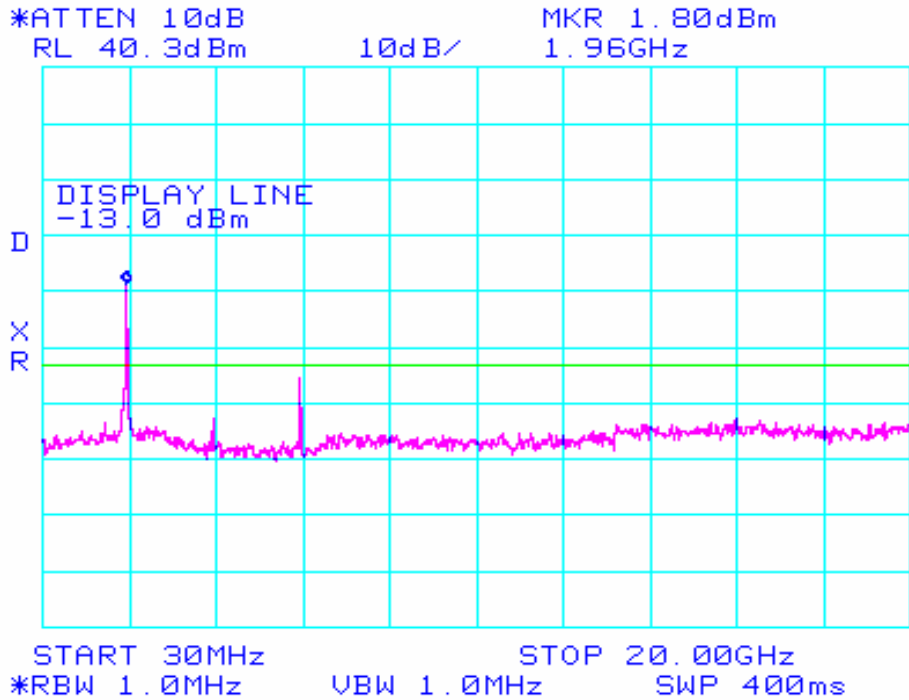
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Data Plot Spurious Emissions at Antenna Terminals

Page 3 of 3

Job No.: 3L0075R Date: 3/12/2004
Specification: PT 24 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 40
E.U.T.: DAC-1819-125
Configuration: TX FULL POWER



Notes: Transmit two carriers at 62.5 W each, 125 W composite, GSM EDGE
Marker indicates carriers (NOTCHED)

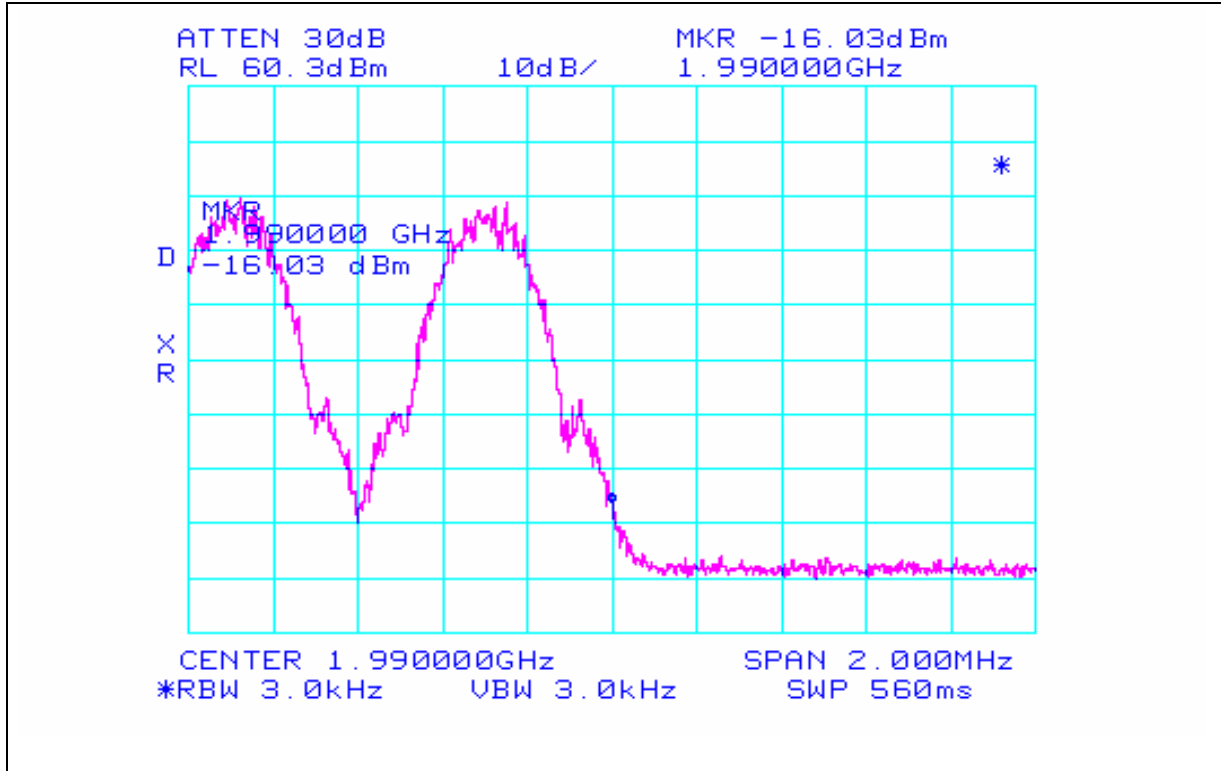
Test Data – Spurious Emissions at Antenna Terminals



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Data Plot		Spurious Emissions at Antenna Terminals	
Page 1 of 4		Complete _____	
Job No.:	3L0075R	Date:	3/12/2004
Specification:	PT24	Temperature(°C):	22
Tested By:	David Light	Relative Humidity(%):	40
E.U.T.:	DAC-1819-125		
Configuration:	TX FULL POWER		
Sample Number:	1		
Location:	Lab 2	RBW:	3 kHz
Detector Type:	Peak	VBW:	3 kHz
		Measurement Distance:	NA m
Test Equipment Used			
Antenna:	_____	Directional Coupler:	1055
Pre-Amp:	_____	Cable #1:	1626
Filter:	_____	Cable #2:	_____
Receiver:	1464	Cable #3:	_____
Attenuator #1:	1064	Cable #4:	_____
Attenuator #2:	_____	Mixer:	_____
Additional equipment used:	_____		
Measurement Uncertainty:	±1.7 dB		



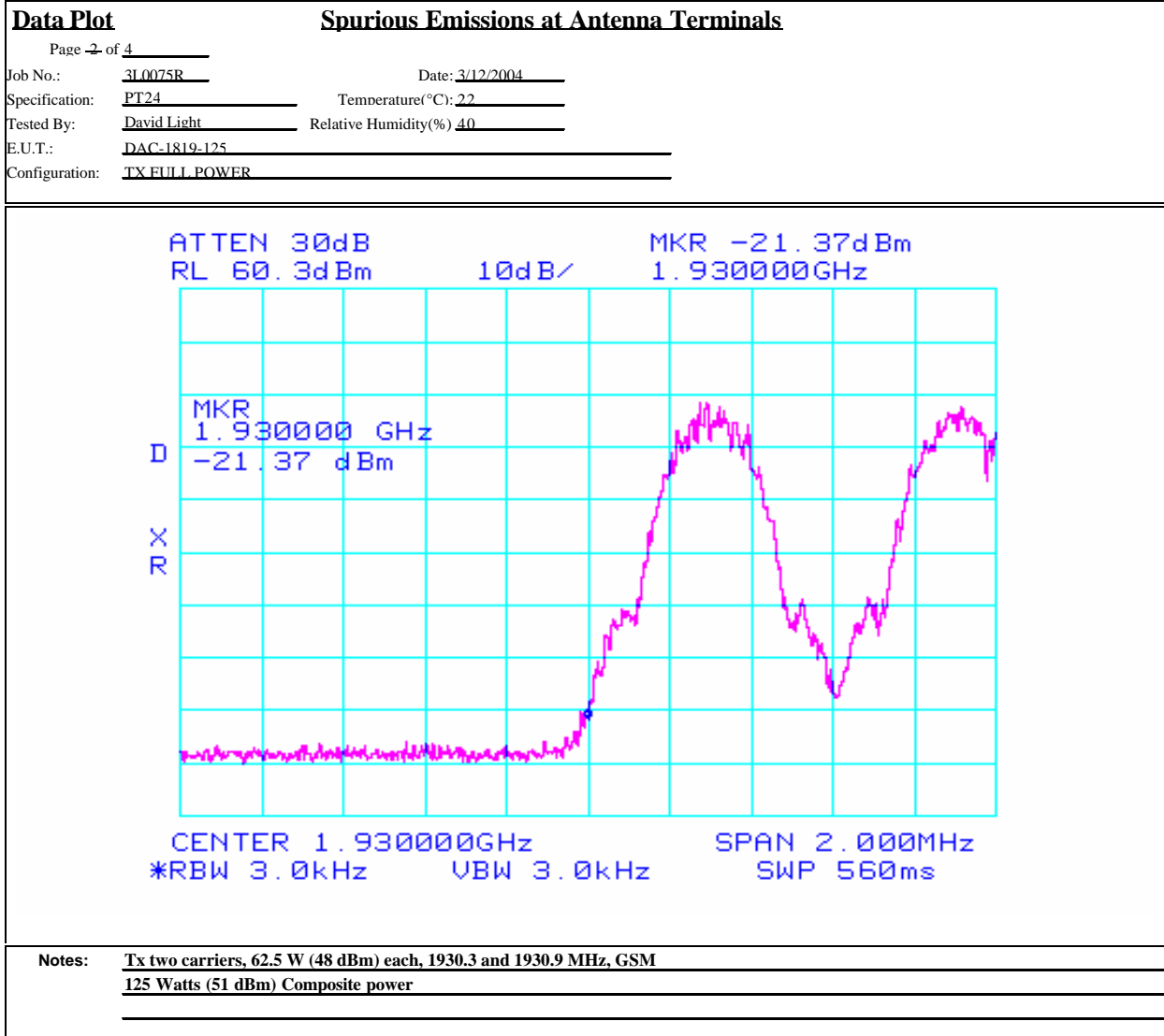
Notes: Tx two carriers, 62.5 W (48 dBm) each, 1989.7 and 1989.1 MHz, GSM
 125 Watts (51 dBm) Composite power

Test Data – Spurious Emissions at Antenna Terminals



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Test Data – Spurious Emissions at Antenna Terminals



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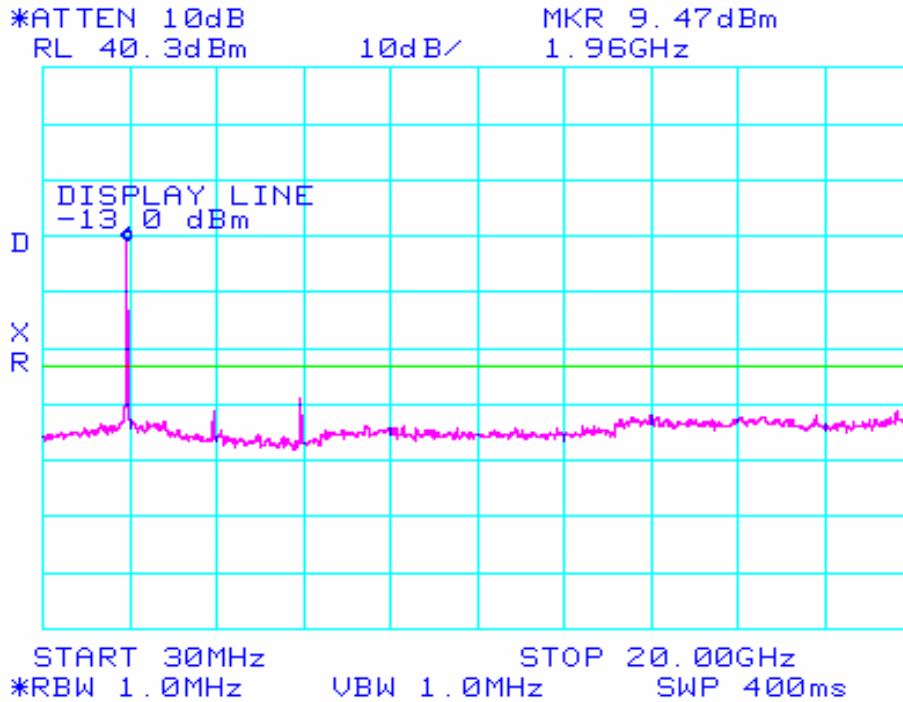
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Data Plot Spurious Emissions at Antenna Terminals

Page 3 of 4

Job No.: 3L0075R Date: 3/12/2004
Specification: PT24 Temperature(°C): 22
Tested By: David Light Relative Humidity(%) 40
E.U.T.: DAC-1819-125
Configuration: TX FULL POWER



Notes: Transmit two carriers at 62.5 W each, 125 W composite, GSM
Marker indicates carriers (NOTCHED)

EQUIPMENT: DAB-1819-125

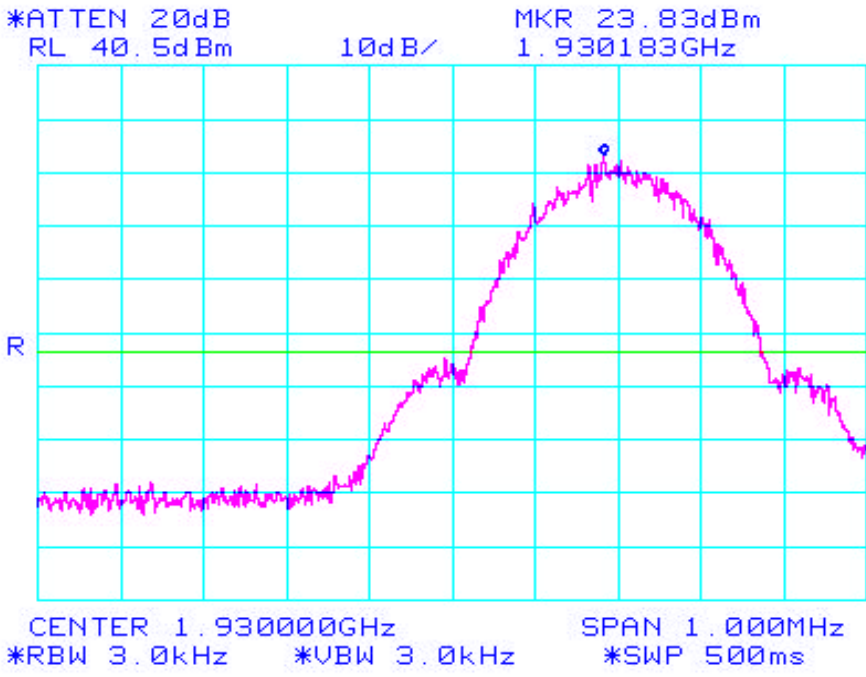
Test Data – Band Edge at 1930.2, reduced power - GSM



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Data Plot		Spurious Emissions at Antenna Terminals			
Page 1 of 4				Complete	<u>X</u>
Job No.:	3L0075R	Date:	3/19/2004	Preliminary:	
Specification:	PT 24	Temperature(°C):	22		
Tested By:	Dustin Oaks	Relative Humidity(%):	40		
E.U.T.:	CE-1819-100MC 100 WATT AMPLIFIER				
Configuration:	TX FULL POWER				
Sample Number:	1				
Location:	Lab 2	RBW:	3 kHz	Measurement	
Detector Type:	Peak	VBW:	3 kHz	Distance:	NA m
Test Equipment Used					
Antenna:		Directional Coupler:	1055		
Pre-Amp:		Cable #1:	1626		
Filter:		Cable #2:	1987		
Receiver:	1464	Cable #3:			
Attenuator #1:	1064	Cable #4:			
Attenuator #2:		Mixer:			
Additional equipment used:					
Measurement Uncertainty:	+/-1.7 dB				



Notes: GSM-Tx single carrier 1930.2 MHz Power Reduced to comply with bandedge

EQUIPMENT: DAB-1819-125

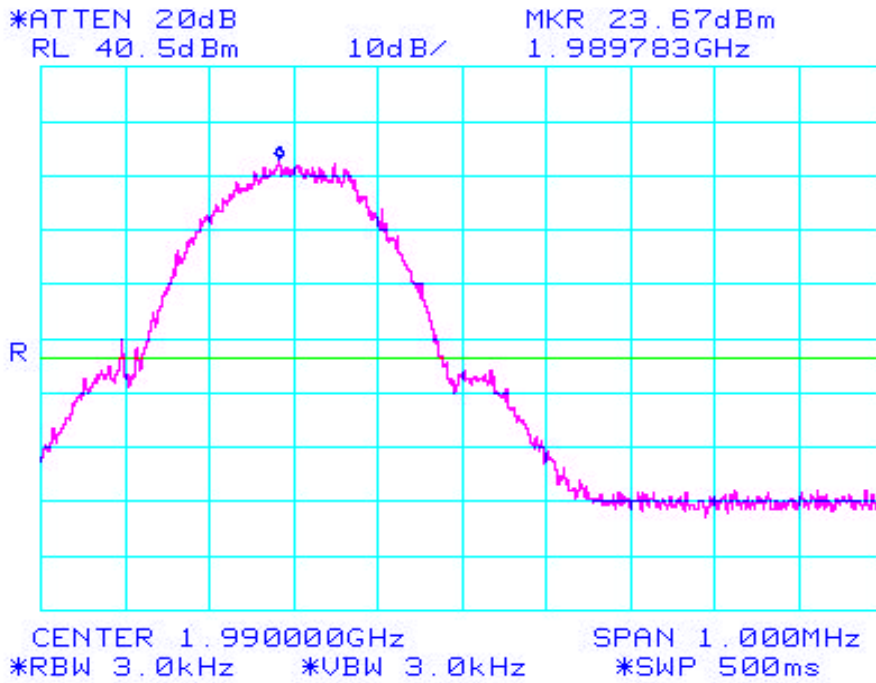
Test Data – Band Edge at 1989.8, reduced power – GSM



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Data Plot	Spurious Emissions at Antenna Terminals
Page 2 of 4	
Job No.: 3L0075R	Date: 3/19/2004
Specification: PT 24	Temperature(°C): 22
Tested By: Dustin Oaks	Relative Humidity(%) 40
E.U.T.: CE-1819-100MC 100 WATT AMPLIFIER	
Configuration: TX FULL POWER	



Notes: GSM-Tx single carrier 1989.8 MHz Power Reduced to comply with bandedge

EQUIPMENT: DAB-1819-125

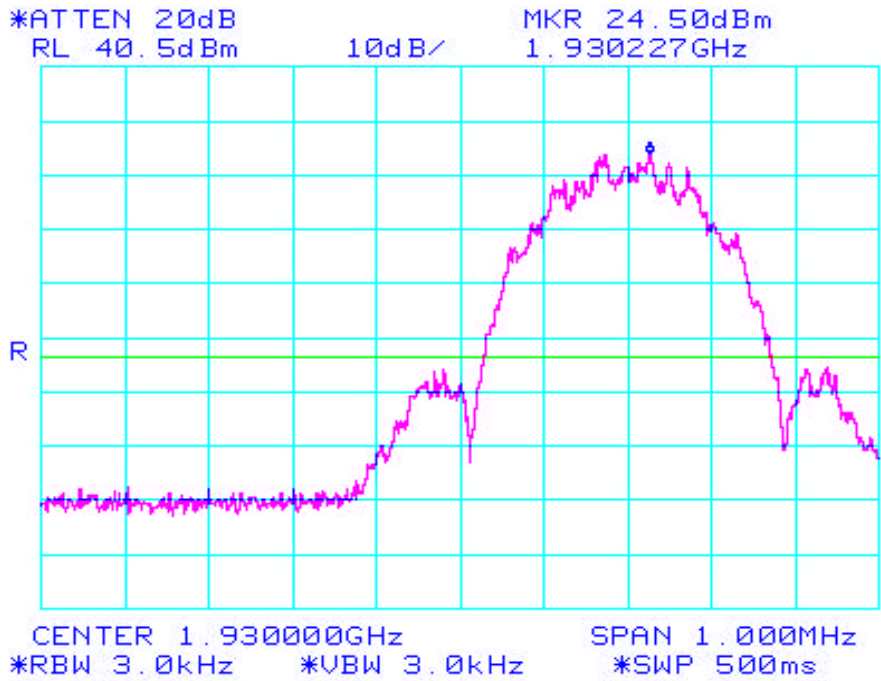
Test Data – Band Edge at 1930.2, reduced power - EDGE



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Data Plot	Spurious Emissions at Antenna Terminals
Page 3 of 4	
Job No.: 3L0075R	Date: 3/19/2004
Specification: PT 24	Temperature(°C): 22
Tested By: Dustin Oaks	Relative Humidity(%) 40
E.U.T.: CE-1819-100MC 100 WATT AMPLIFIER	
Configuration: TX FULL POWER	



Notes: EDGE-Tx single carrier 1930.2MHz Power Reduced to comply with bandedge

EQUIPMENT: DAB-1819-125

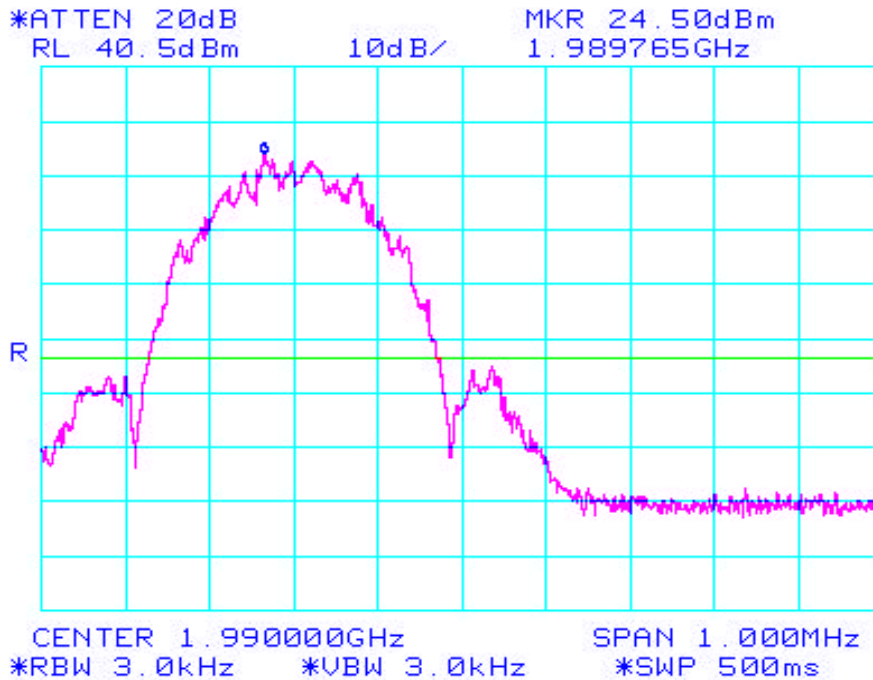
Test Data – Band Edge at 1989.8, reduced power – EDGE



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Test Plot:	Spurious Emissions at Antenna Terminals		
Page 4 of 4			
Job No.: 3L0075R		Date: 3/19/2004	
Specification: PT 24		Temperature(°C): 22	
Tested By: Dustin Oaks		Relative Humidity(%) 40	
E.U.T.: CE-1819-100MC 100 WATT AMPLIFIER			
Configuration: TX FULL POWER			



Notes: EDGE-Tx single carrier 1989.8 MHz Power Reduced to comply with bandedge

EQUIPMENT: **DAB-1819-125**

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious Emissions	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 3/12/04

Test Results: Complies.

Test Data: See attached table.

EQUIPMENT: DAB-1819-125

Test Data - Radiated Spurious Emissions



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EIRP Substitution

Page 1 of 1

Job No.: 4L0134R Date: 3/12/04 Complete X
 Preliminary _____

Specification: PT24 Temperature(°C): 22

Tested By: David Light Relative Humidity(%) 40

E.U.T.: DAB-1819-125

Configuration: Tx FULL POWER CW INTO LOAD

Sample No: 1

Location: AC 3 RBW: 1 MHz Measurement
 Detector Type: Peak VBW: 1 MHz Distance: 3 m

Test Equipment Used

Antenna: 1304 Directional Coupler: _____

Pre-Amp: 1016 Cable #1: 1484

Filter: 1059 Cable #2: 1485

Receiver: 1464 Cable #3: _____

Attenuator #1: _____ Cable #4: _____

Attenuator #2: _____ Mixer: _____

Additional equipment used: _____

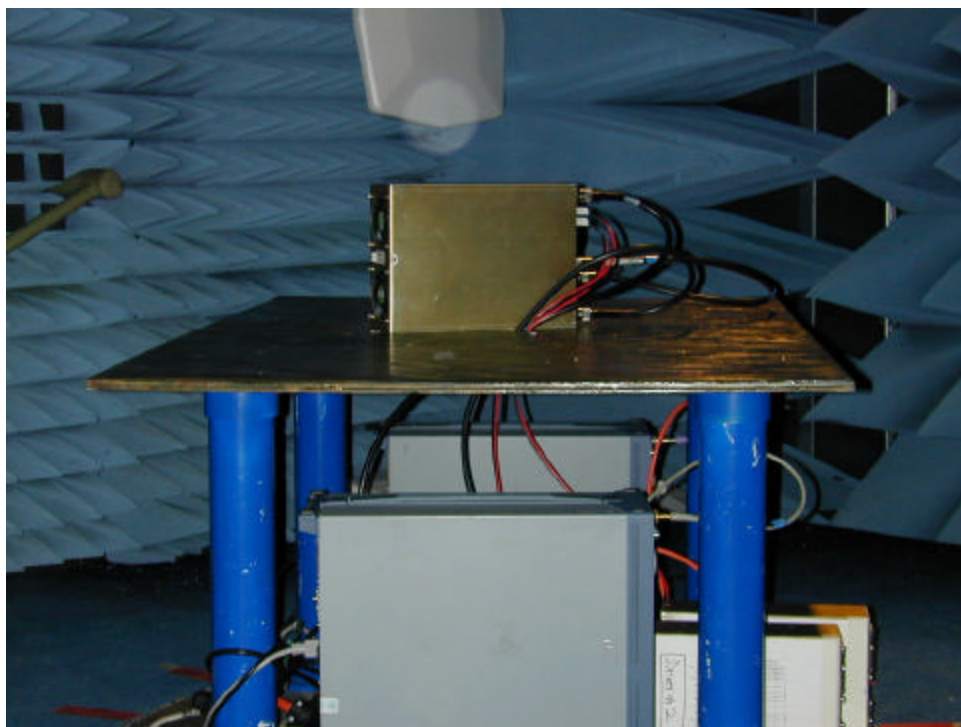
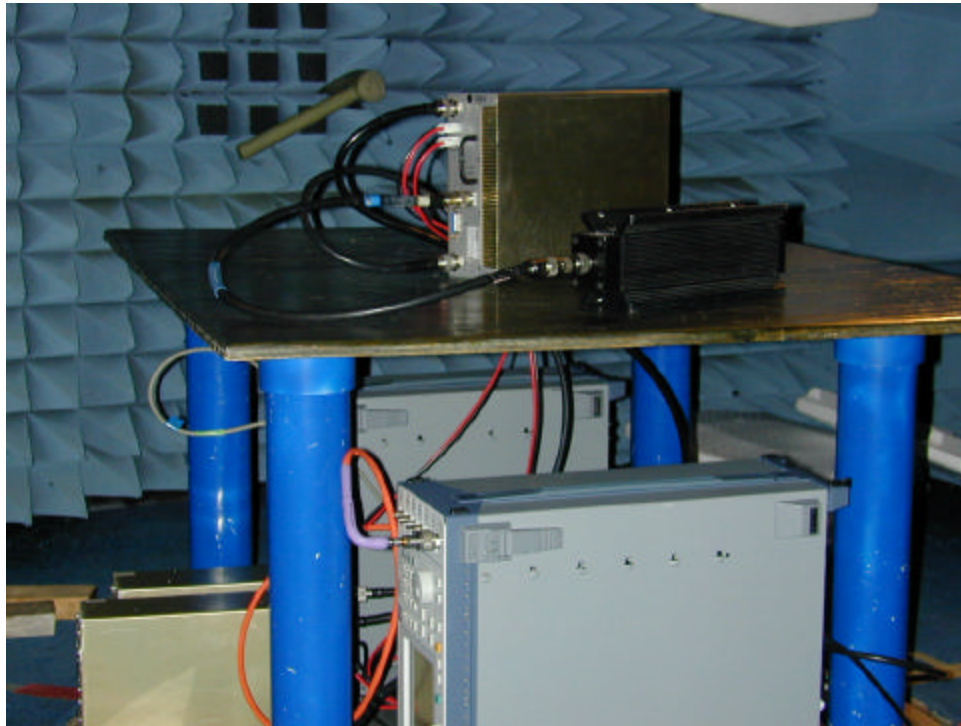
Measurement Uncertainty: +/-1.7 dB

Frequency (MHz)	Meter Reading (dBm)	Substitution Level (dBm)	Pre-Amp Gain (dB)	Substitution Antenna Gain (dBi)	EIRP (dBm)	Limit (dBm)	Margin (dB)	Polarity	Comments
5880	-33.0	-24.8	31.6	9.3	-24.8	-13.0	-11.7667	V	
7840	-42.7	-33.8	32.9	9.2	-33.8	-13.0	-20.7667	V	
9800	-56.3	-49.0	34.5	10.3	-49.0	-13.0	-35.9667	V	
5880	-38.7	-32.5	31.6	9.3	-32.5	-13.0	-19.4667	H	
7840	-39.3	-30.7	32.9	9.2	-30.7	-13.0	-17.7000	H	
9800	-57.8	-49.0	34.5	10.3	-49.0	-13.0	-35.9667	H	

Notes: Tx full power at 1960 and 1960.3 MHz
 No emissions were detected other than those reported. Noise floor was at least 20 dB below spec limit

EQUIPMENT: DAB-1819-125

Photographs of Test Setup



EQUIPMENT: DAB-1819-125

Section 7. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1464	Spectrum analyzer	Hewlett Packard 8563E	3551A04428	02/11/03	02/11/05
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	10/27/03	10/26/04
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
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
1055	DUAL DIRECTIONAL COUPLER	NARDA 3022	73393	CBU	N/A
1626	CABLE, 5 ft	MEGAPHASE 10311 1GVT4	N/A	CBU	N/A
1064	ATTENUATOR	NARDA 776B-20	NONE	CBU	N/A

ANNEX A - TEST DETAILS

EQUIPMENT: **DAB-1819-125**

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.

EQUIPMENT: DAB-1819-125

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: ? RBW

Span: 5 MHz

Sweep: Auto

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

GSM

RBW: 3 kHz

VBW: ? RBW

Span: 2 MHz

Sweep: Auto

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

NADC

RBW: 1 kHz

VBW: ? 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
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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 (< 1MHz from Band Edge)
 VBW: ? 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: ? RBW
 Sweep: Auto
 Video Avg: Disabled

NADC

RBW: 1 MHz (> 1 MHz from Band Edge)
 RBW: 3 kHz (< 1 MHz from Band Edge)
 VBW: ? 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.

EQUIPMENT: **DAB-1819-125**

NAME OF TEST: Field Strength of Spurious Radiation	PARA. NO.: 2.1053
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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 antenna substitution method was used. This method is described in EIA/TIA 603B.

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

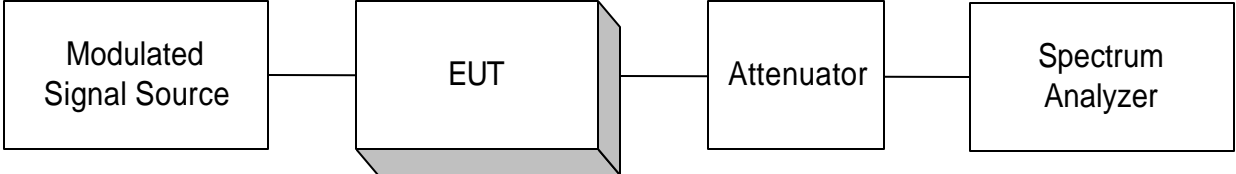
The E.U.T. is placed in an environmental chamber and allowed to stabilize at +20 degrees Celsius for at least 15 minutes. The frequency counter and signal generator are phase locked with the same 10 MHz reference frequency by connecting the 10 MHz ref. out of the counter to the 10 MHz ref, in of the 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

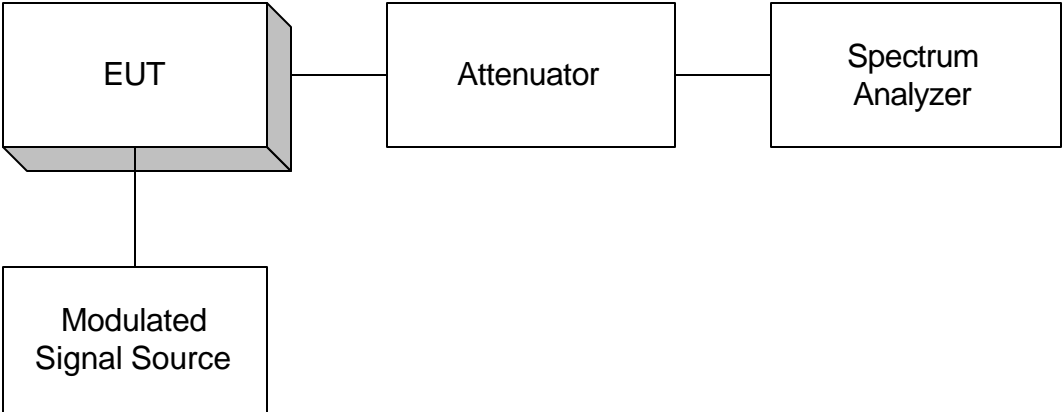
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30 second intervals for a period of 5 minutes.

ANNEX B - TEST DIAGRAMS

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

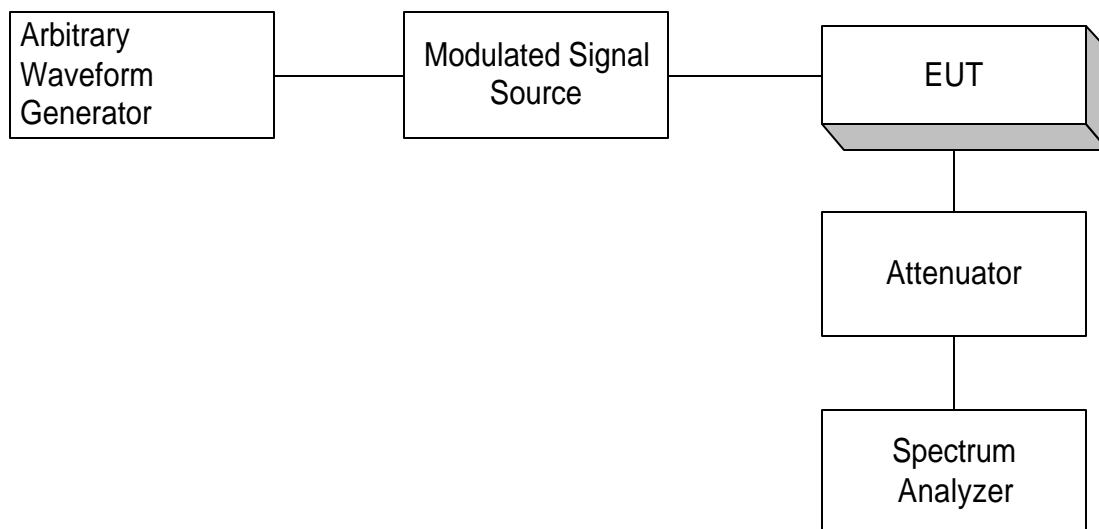
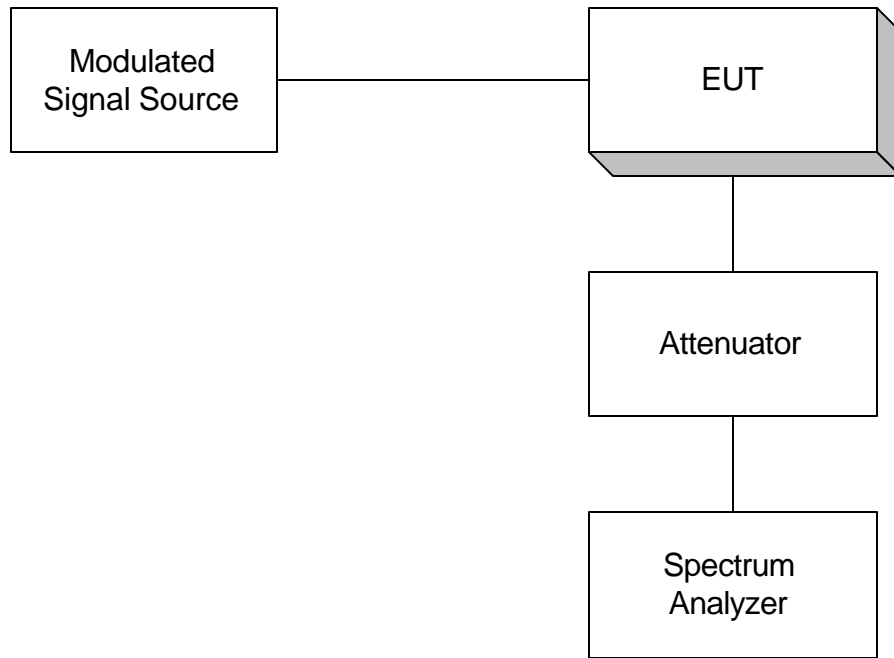


Para. No. 2.989 - Occupied Bandwidth



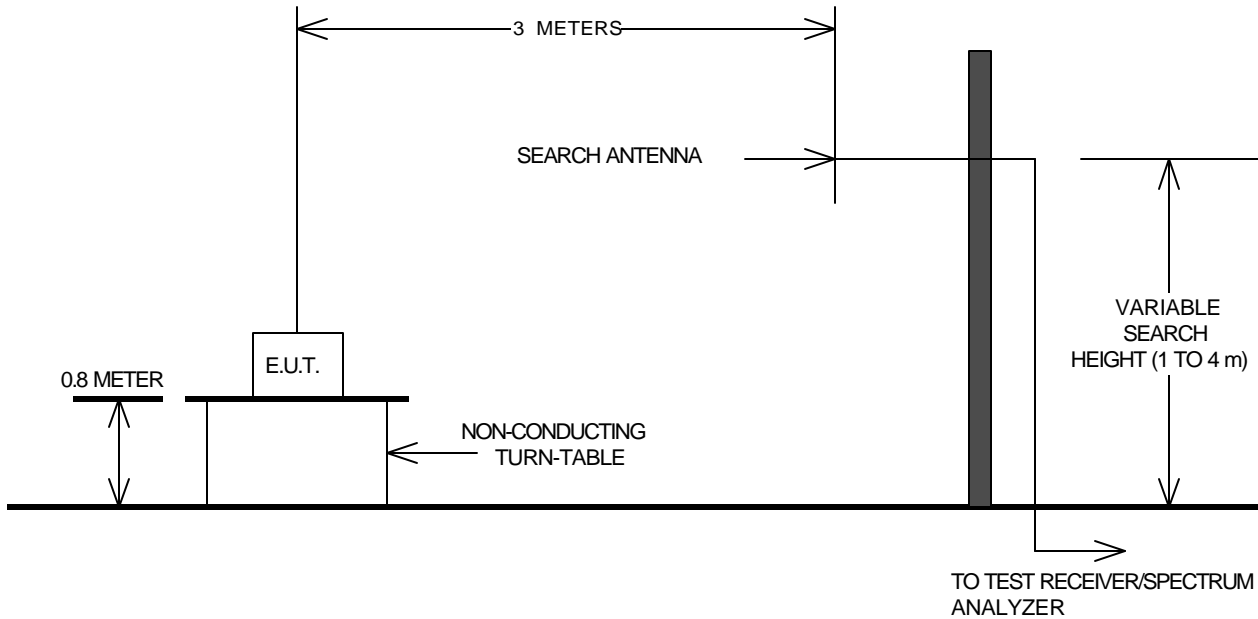
EQUIPMENT: DAB-1819-125

Para. No. 2.991 Spurious Emissions at Antenna Terminals



EQUIPMENT: DAB-1819-125

Para. No. 2.993 - Field Strength of Spurious Radiation



Para. No. 2.995 - Frequency Stability

