Nemko Test Report:	52047RUS1
Applicant:	Communication Components, Inc. 89 Leuning Street 2nd Floor Hackensack, NJ 07606
Equipment Under Test: (E.U.T.)	DAC-850-125
In Accordance With:	**FCC Part 22, Subpart H** 850 MHz Cellular Band Amplifier
Tested By:	Nemko USA, Inc. 802 N. Kealy Lewisville, TX 75057-3136
Authorized By:	 Tom Tidwell, Frontline Group Manager
Date:	25 November, 2005

Table of Contents

Section 1. Summary of Test Results

Manufacturer:	Communication Components, Inc.
Model No.:	DAC-850-125
Serial No.:	A006936

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)	Input/Output	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	NA

Footnotes :

(1) Device does not demodulate input RF. The device is a power amplifier unit designed to integrate into a BTS.

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

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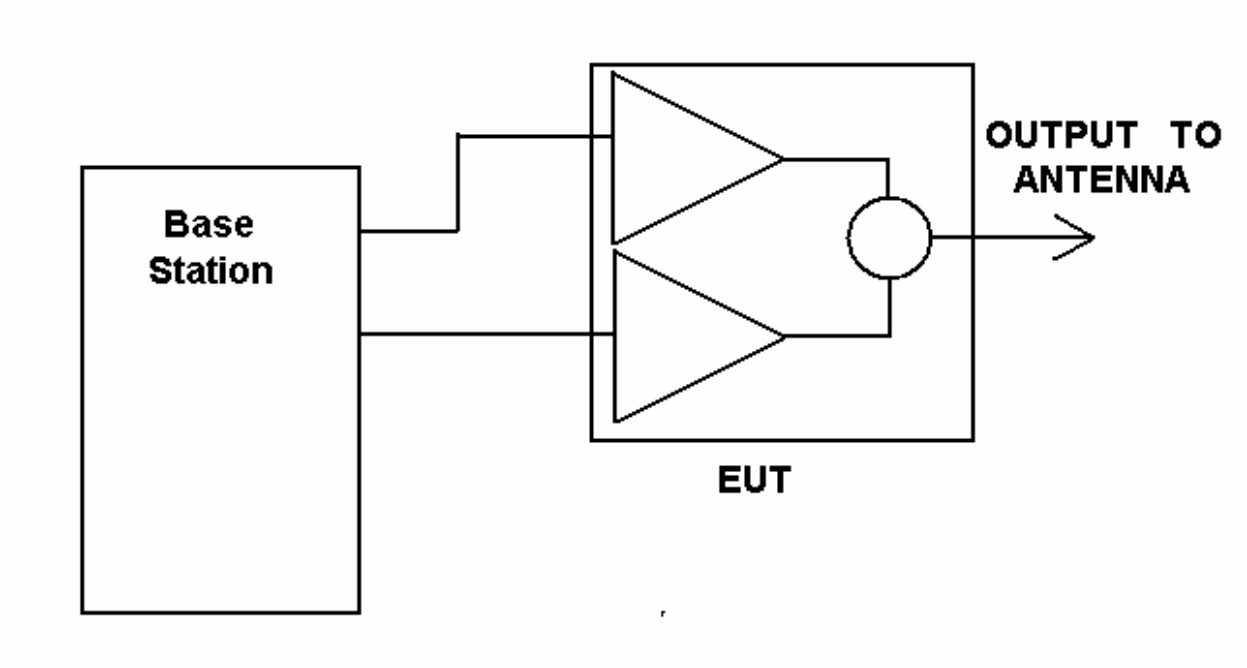
Section 2. General Equipment Specification

Supply Voltage Input:	24 Vdc					
Frequency Range:	869.2 to 893.8 MHz **Note: At the highest and lowest channels, the power output must be reduced to 3 Watts for GSM and 5.8 Watts for EDGE modulations to achieve bandedge compliance.**					
Type of Modulation and Designator:	**CDMA (F9W)** ☐	**GSM (G7W)** ☒	**NADC (DXW)** ☐	**EDGE (G7W)** ☒	**AMPS (F8W, F1D)** ☐	
Output Impedance:	50 ohms					
RF Output (Rated):	**Downlink:**	Per Channel:	62.5	W		
		Total:	125	W		
	Uplink:	Per Channel:	NA	W		
		Total:	NA	W		
Frequency Translation: The device is simply an amplifier and does not translate the frequency.	**F1-F1** ☐	**F1-F2** ☐	**N/A** ☒			
Band Selection:	**Software** ☐	**Duplexer Change** ☐	**Fullband Coverage** ☒			

Description of Operation

The device is a base station amplifier operating in the 850 MHz cellular 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. Operation on the lowest and highest defined channels requires a reduction in rf power output to 3 watts GSM and 5 watts for EDGE modulation.

System Diagram



Section 3. RF Power Output

NAME OF TEST: RF Power Output	PARA. NO.: 2.1046
TESTED BY: David Light	DATE: 26 October 2005

Test Results: Complies.

Test Data:

Modulation Type	Per Channel Power Output (dBm)	Composite Power Output (dBm)	Per Channel Power Output (Watts)	Composite Power Output (Watts)
GSM	47.96	50.96	62.5	125
EDGE	47.96	50.96	62.5	125
GSM (Reduced)	34.8	-	3.0	-
EDGE (Reduced)	37.6	-	5.8	-

Note: RF power output must be reduced at 869.2 and 893.8 MHz (center of lowest and highest channels) to 3 Watts for GSM and 5.8 Watts for EDGE modulations to adhere to bandedge requirements.

Equipment Used: 1036-1053-1054-1064-1067-1060

Measurement Uncertainty: +/- 1.7 dB

Temperature: 20 °C

Relative Humidity: 30 %

Section 4. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 26 October 2005

Test Results: Complies.

Test Data: See attached plots

Equipment Used: 1036-1053-1054-1064-1067-1060

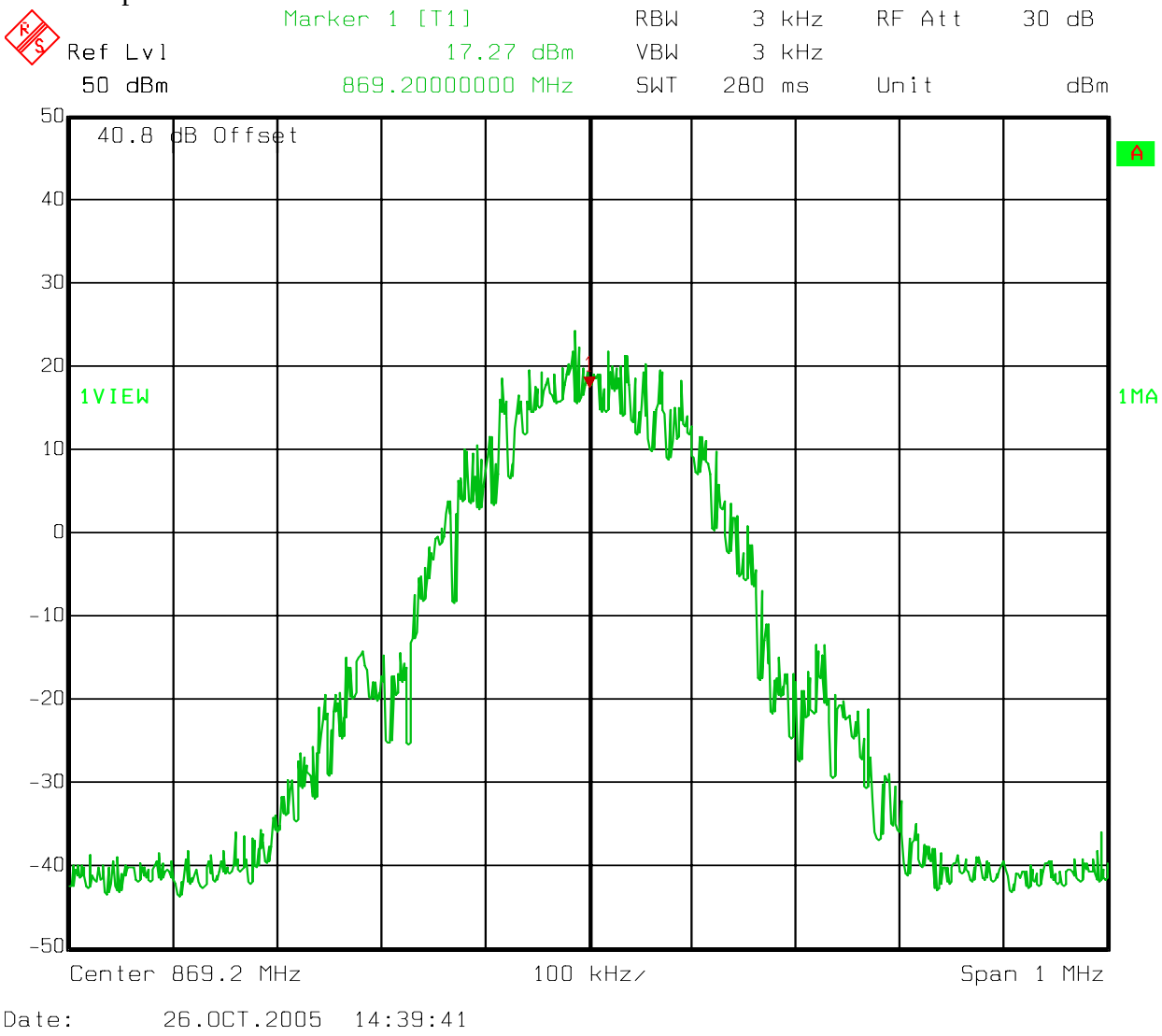
Measurement Uncertainty: +/- 1.7 dB

Temperature: 20 °C

Relative Humidity: 30 %

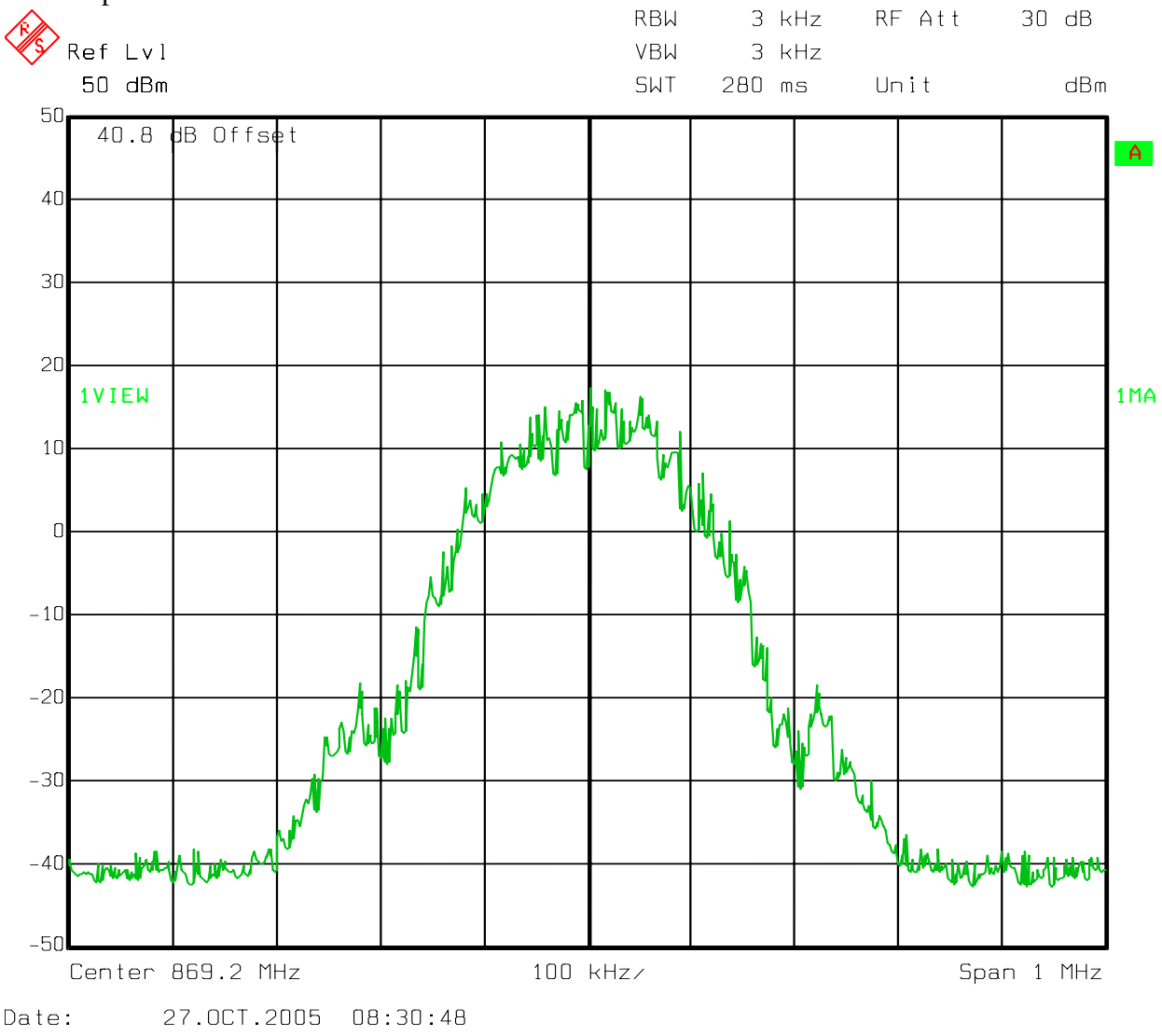
Test Data – Occupied Bandwidth

GSM Output



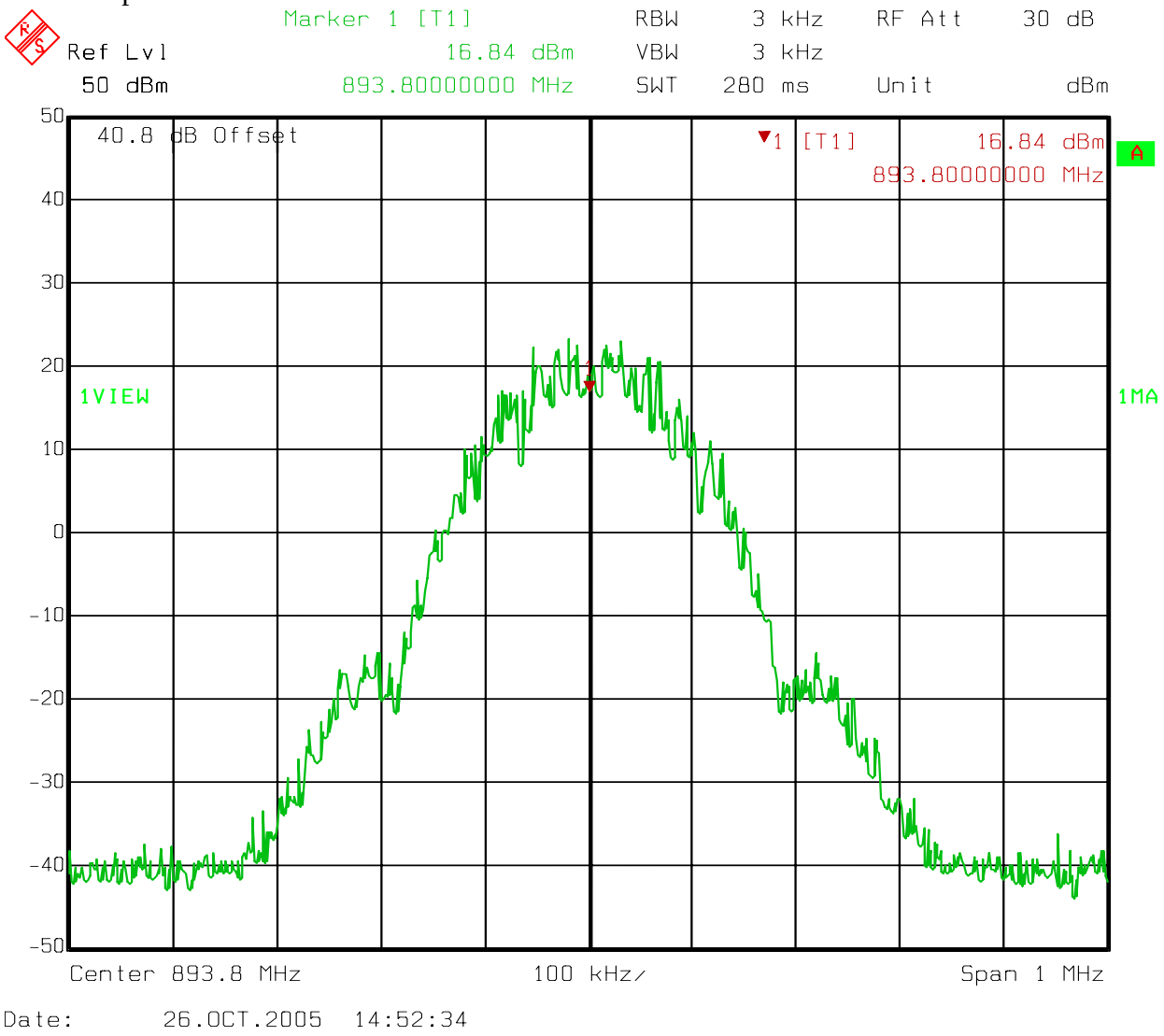
Test Data – Occupied Bandwidth

GSM Input



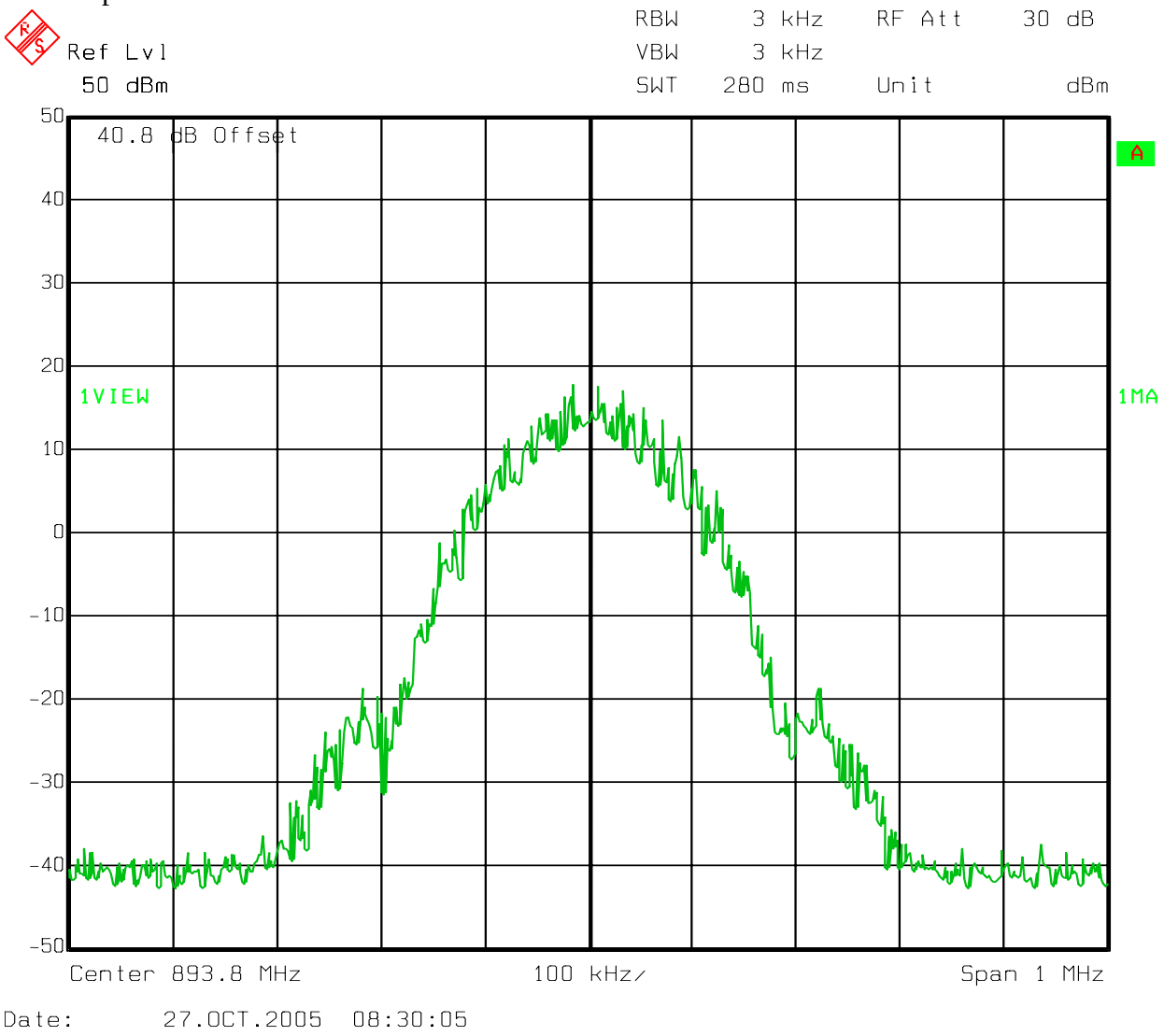
Test Data – Occupied Bandwidth

GSM Output



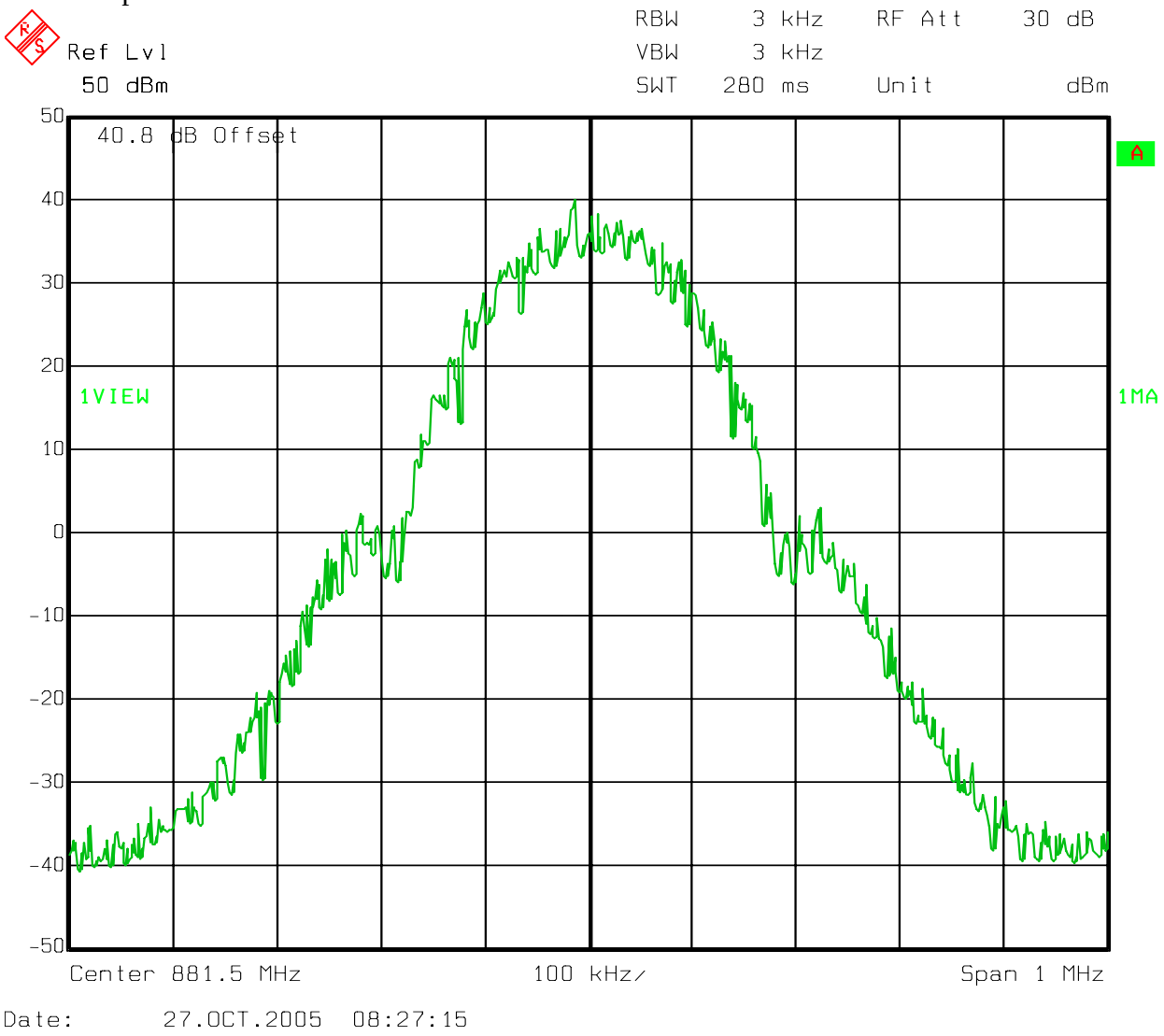
Test Data – Occupied Bandwidth

GSM Input



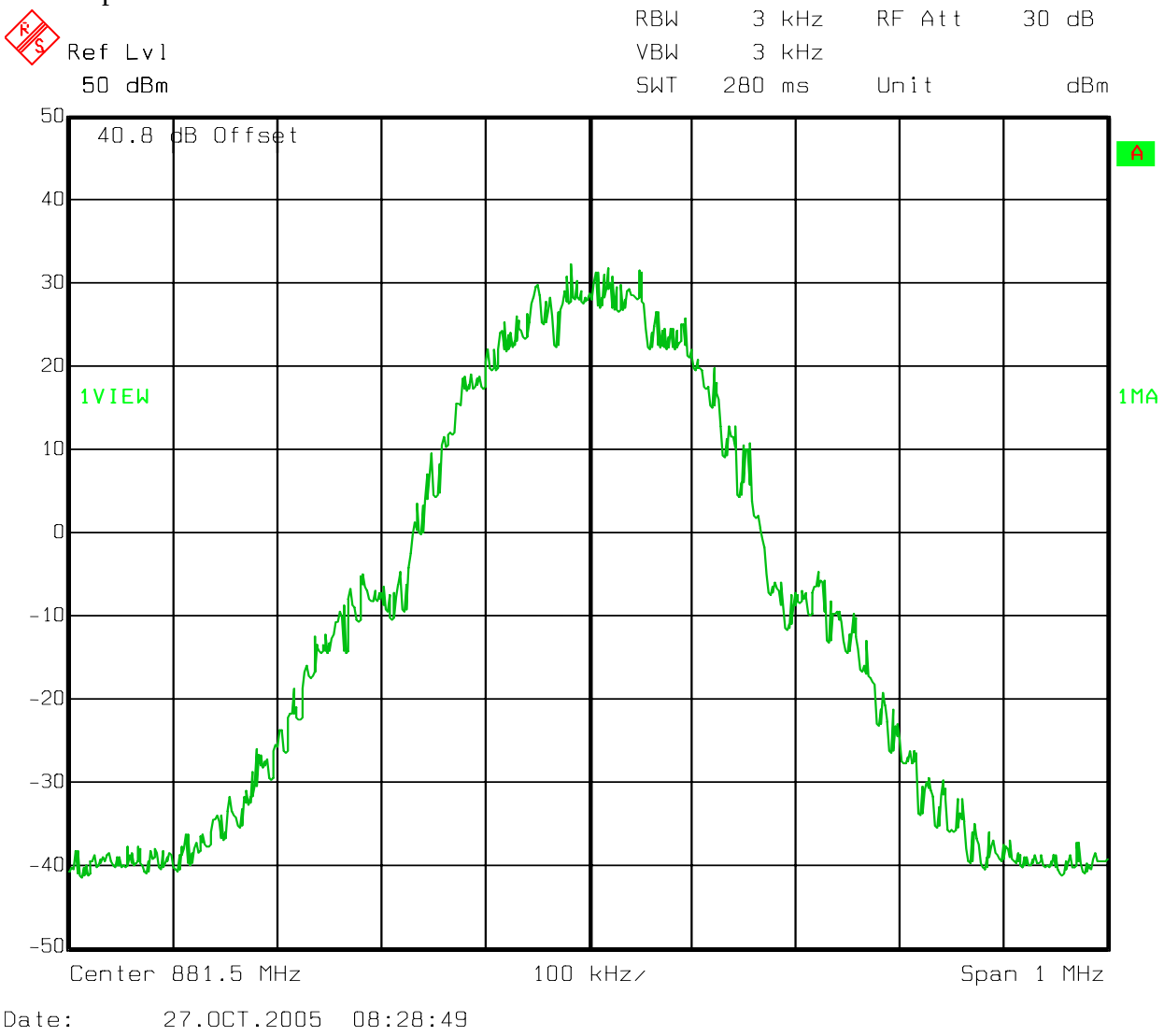
Test Data – Occupied Bandwidth

GSM Output



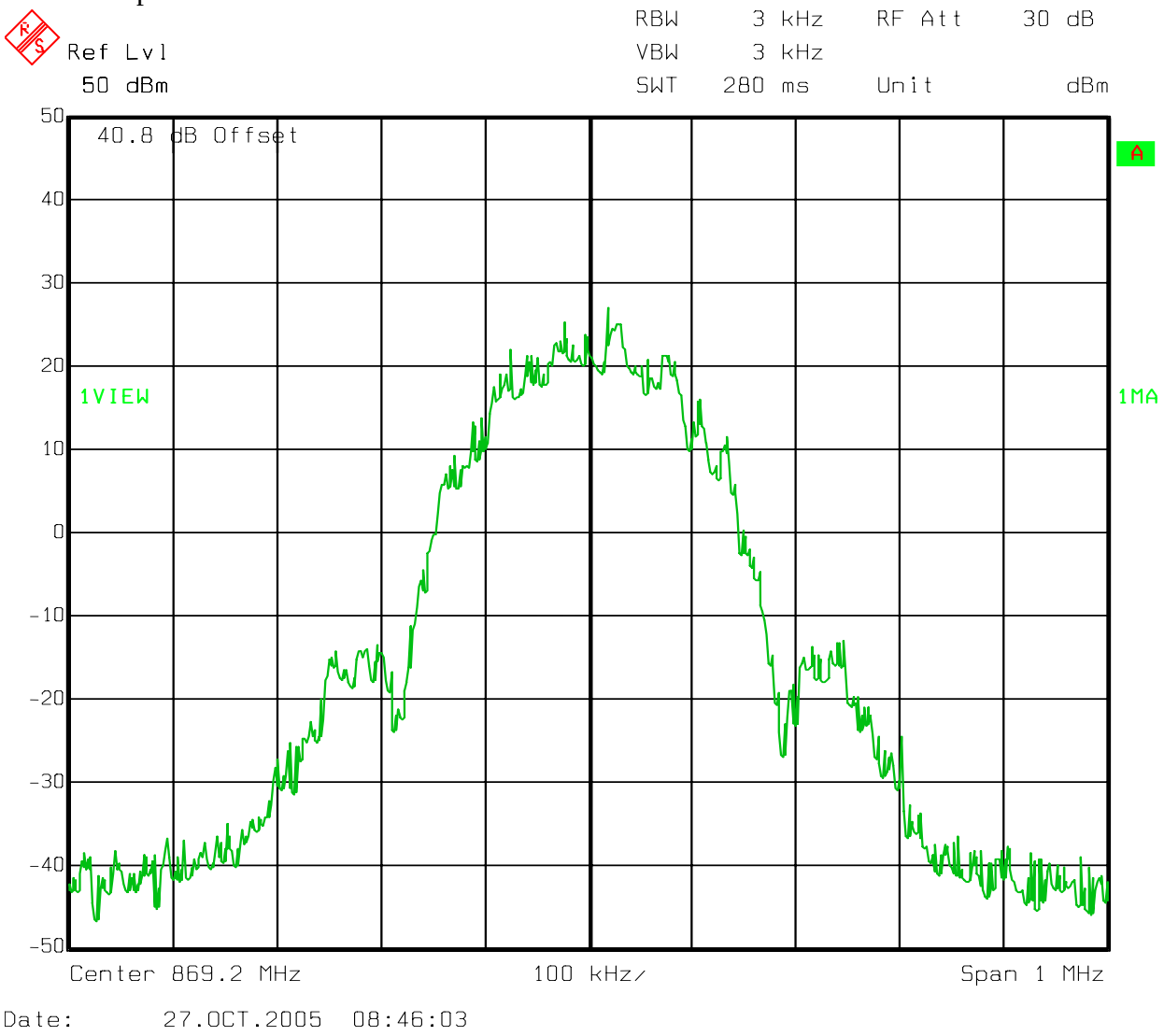
Test Data – Occupied Bandwidth

GSM Input



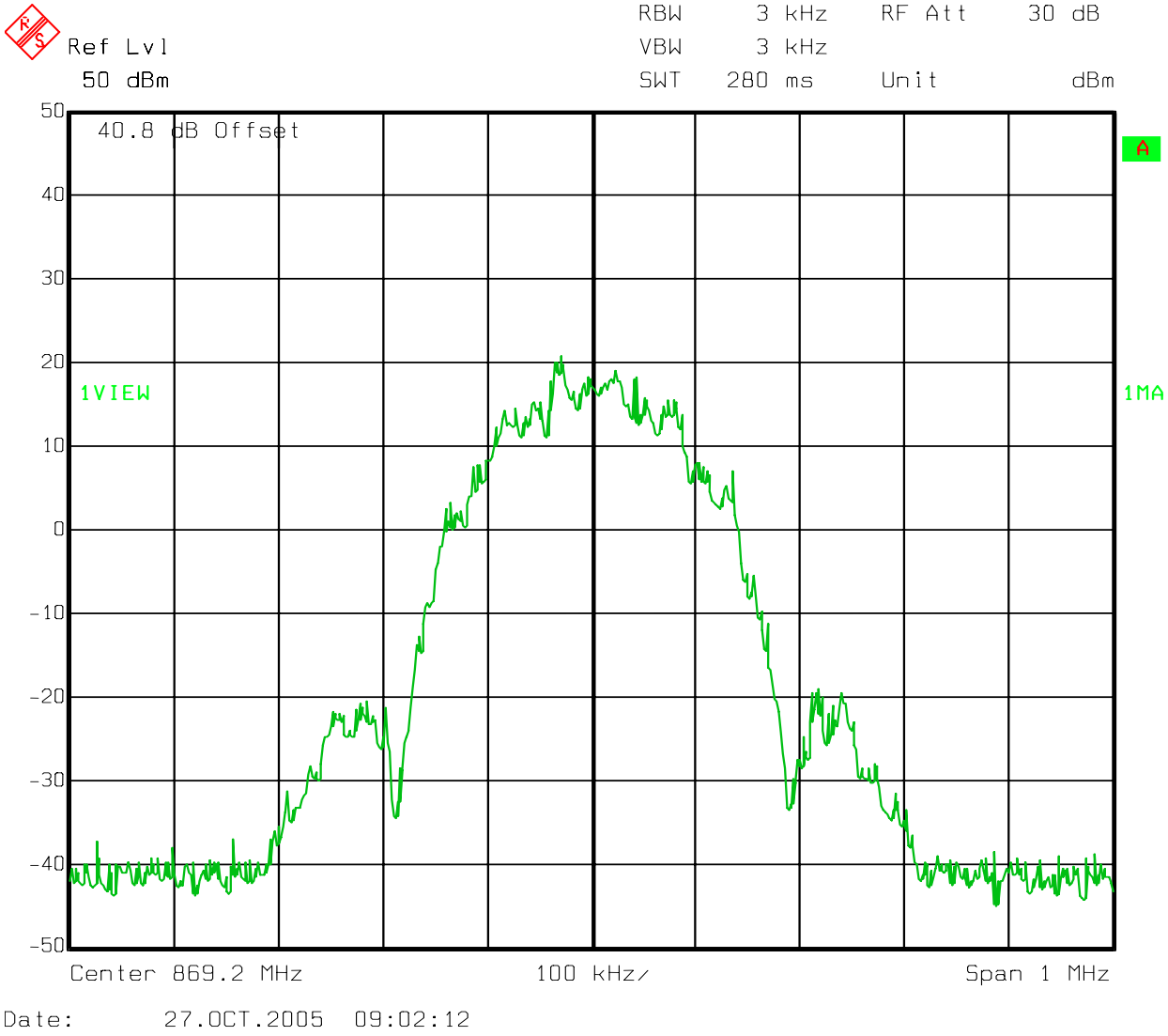
Test Data – Occupied Bandwidth

EDGE Output



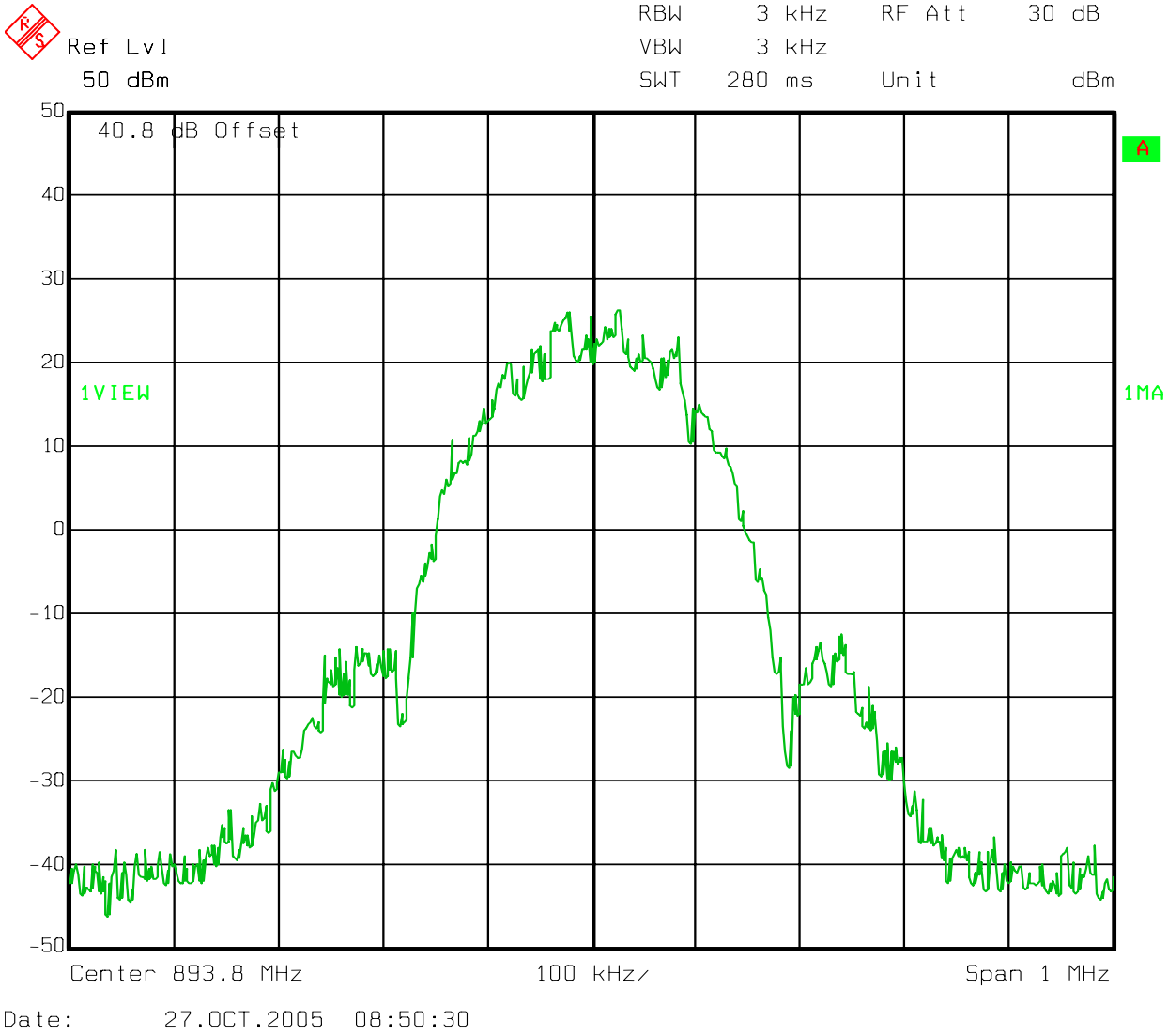
Test Data – Occupied Bandwidth

EDGE Input



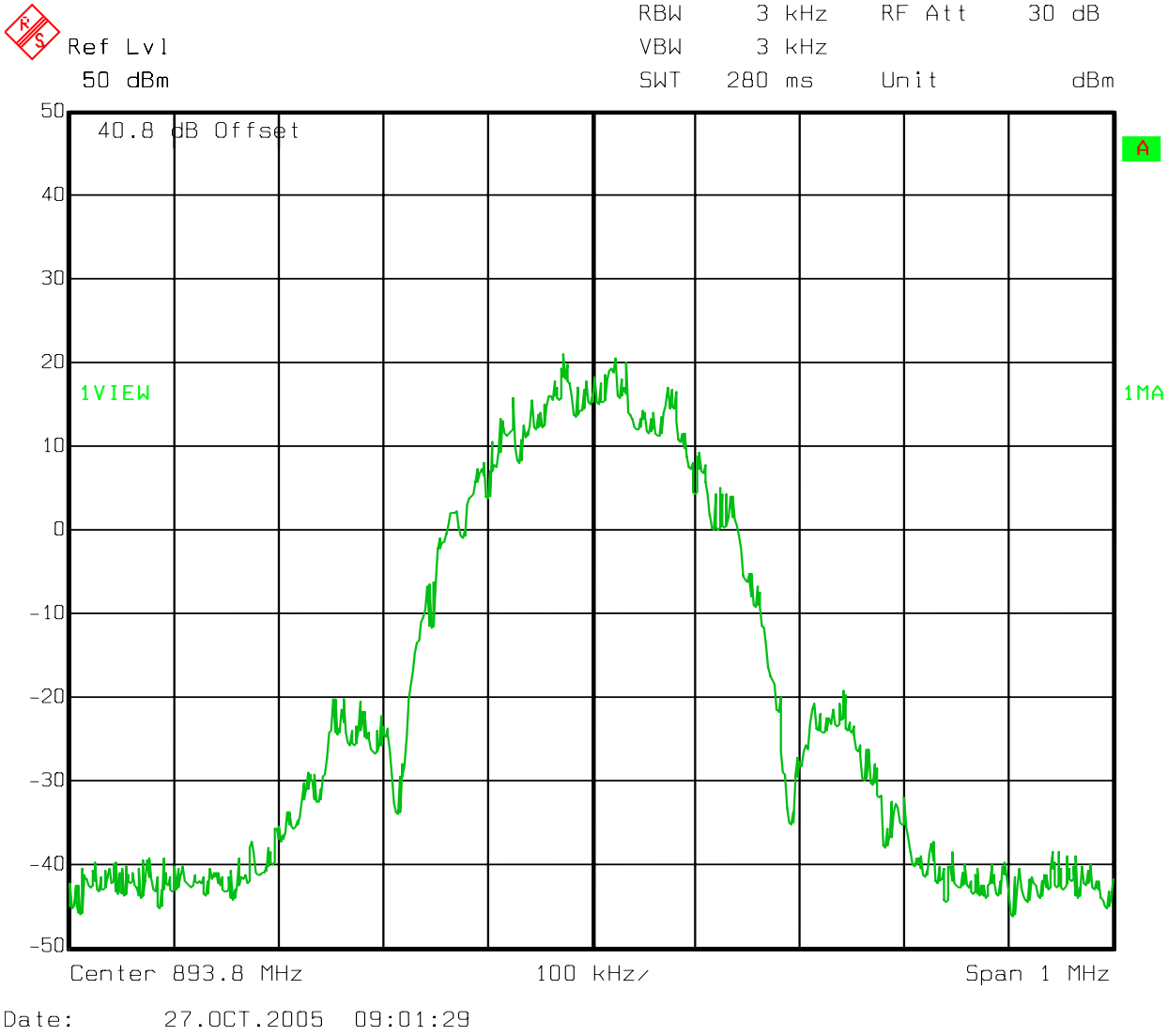
Test Data – Occupied Bandwidth

EDGE Output



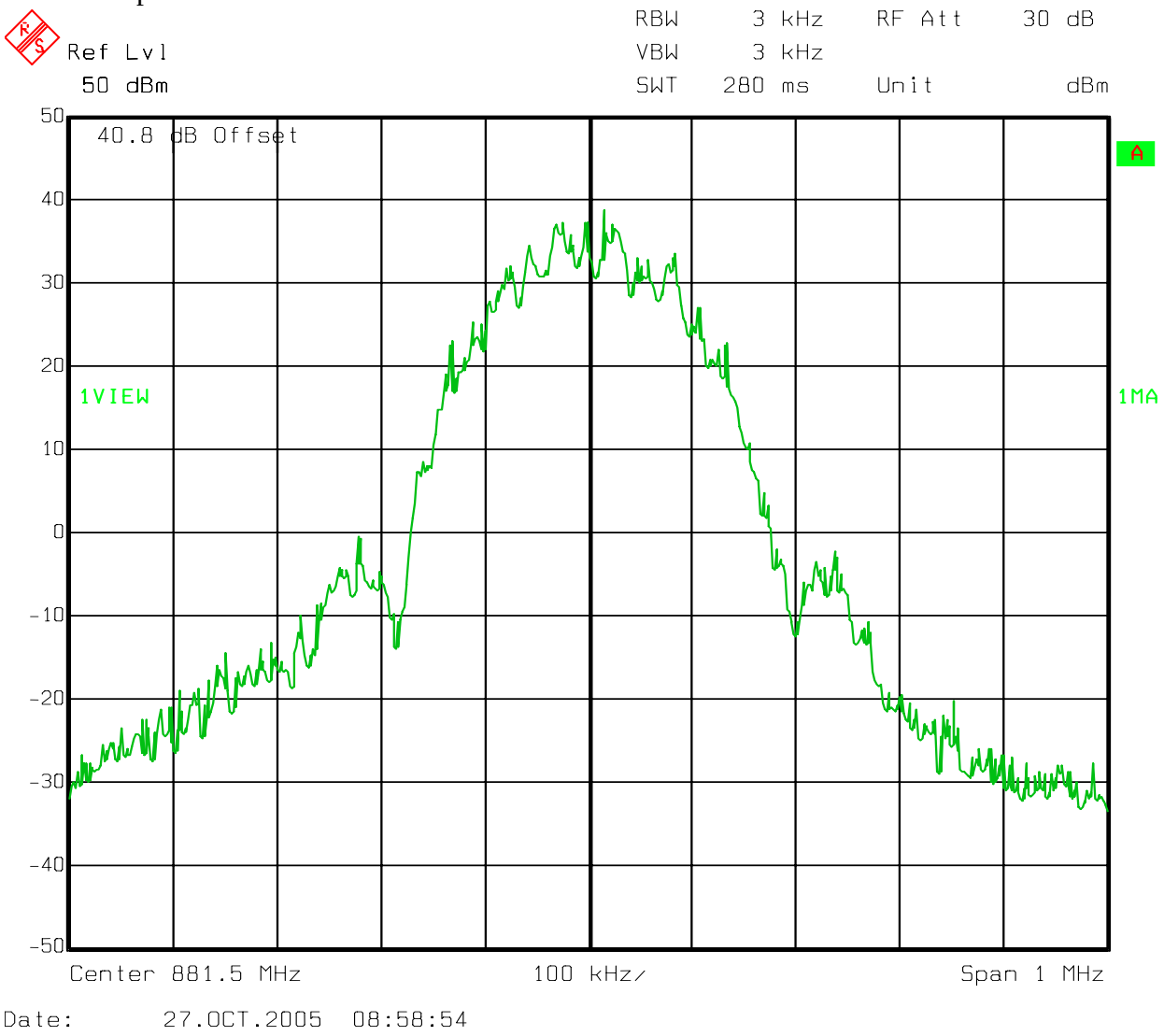
Test Data – Occupied Bandwidth

EDGE Input



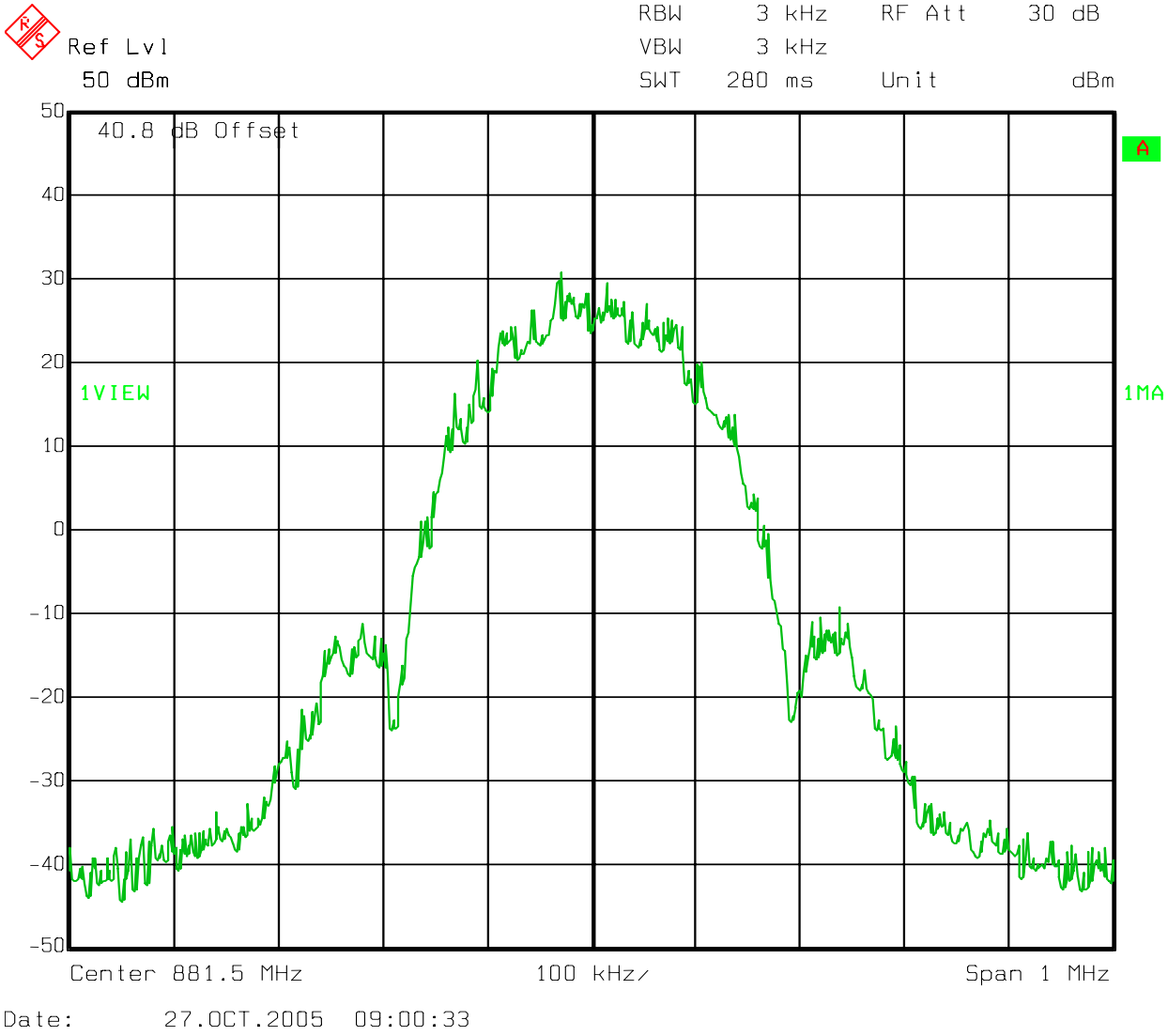
Test Data – Occupied Bandwidth

EDGE Output



Test Data – Occupied Bandwidth

EDGE Input



Section 5. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 2.1051
TESTED BY: David Light	DATE: 26 October 2005

Test Results: Complies.

Test Data: See attached plots

Equipment Used: 1036-1053-1054-1064-1067-1060

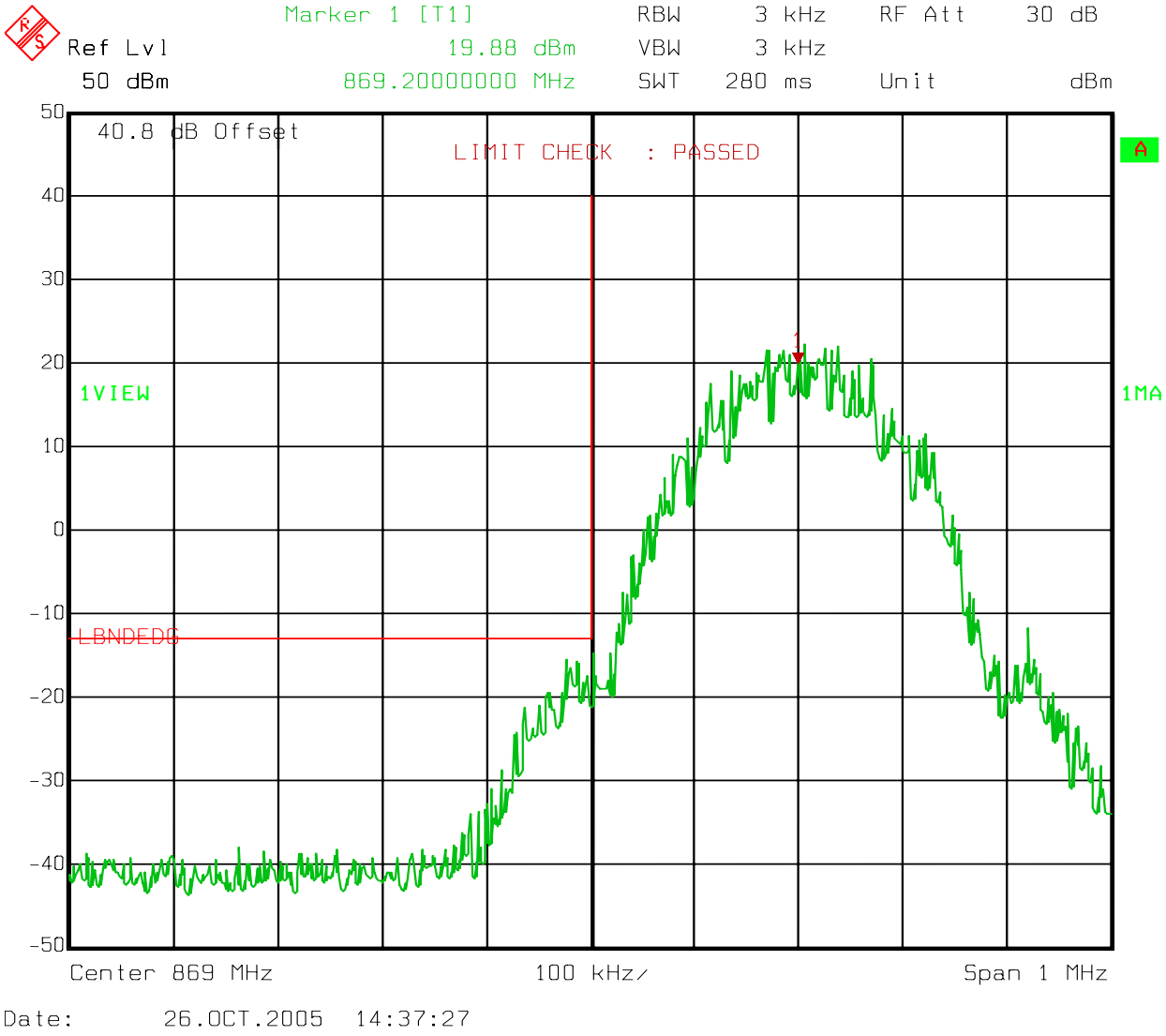
Measurement Uncertainty: +/- 1.7 dB

Temperature: 20 °C

Relative Humidity: 30 %

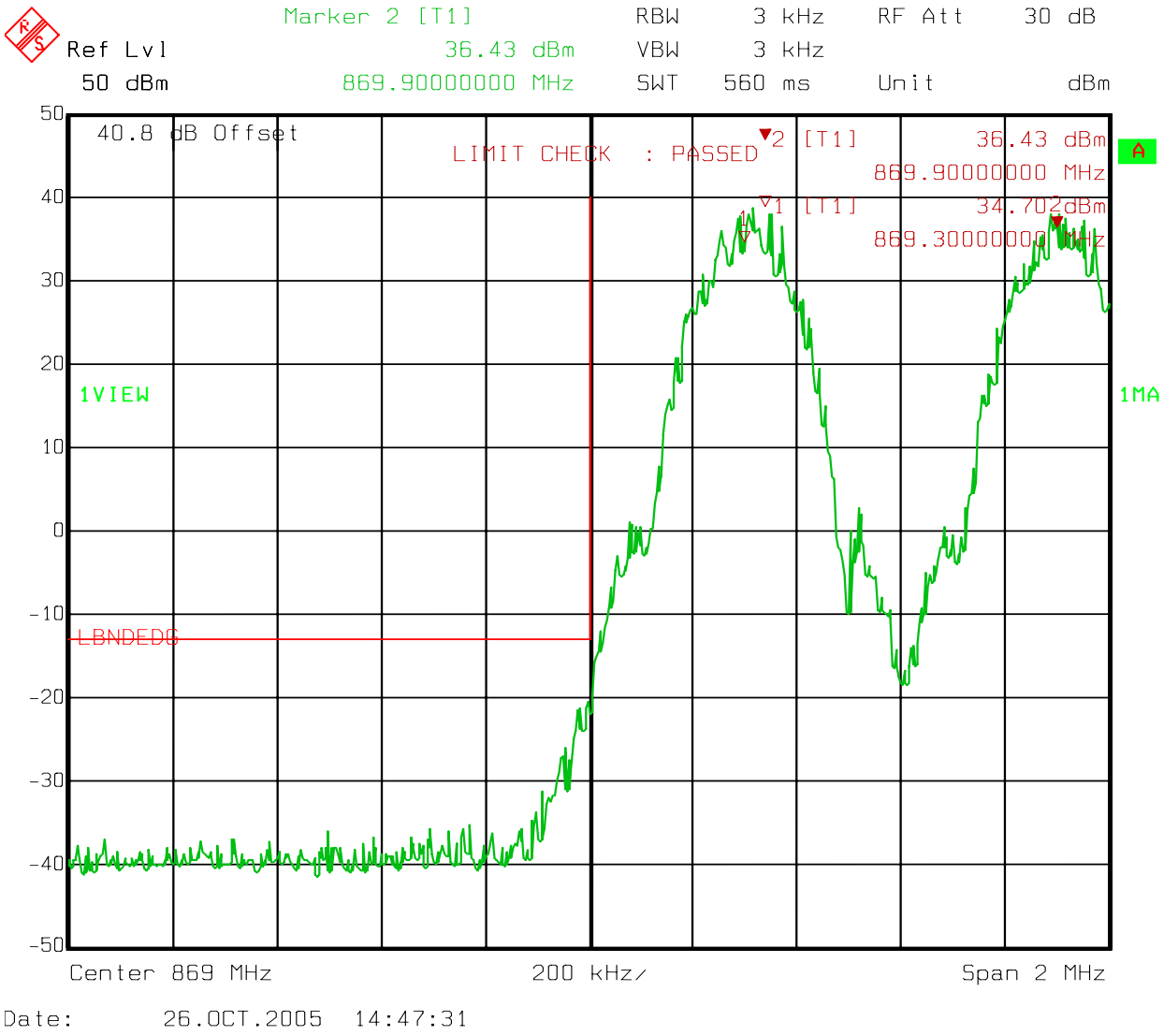
Test Data – Spurious Emissions at Antenna Terminals

Low band edge – 869.2 MHz @ 3 watts
GSM



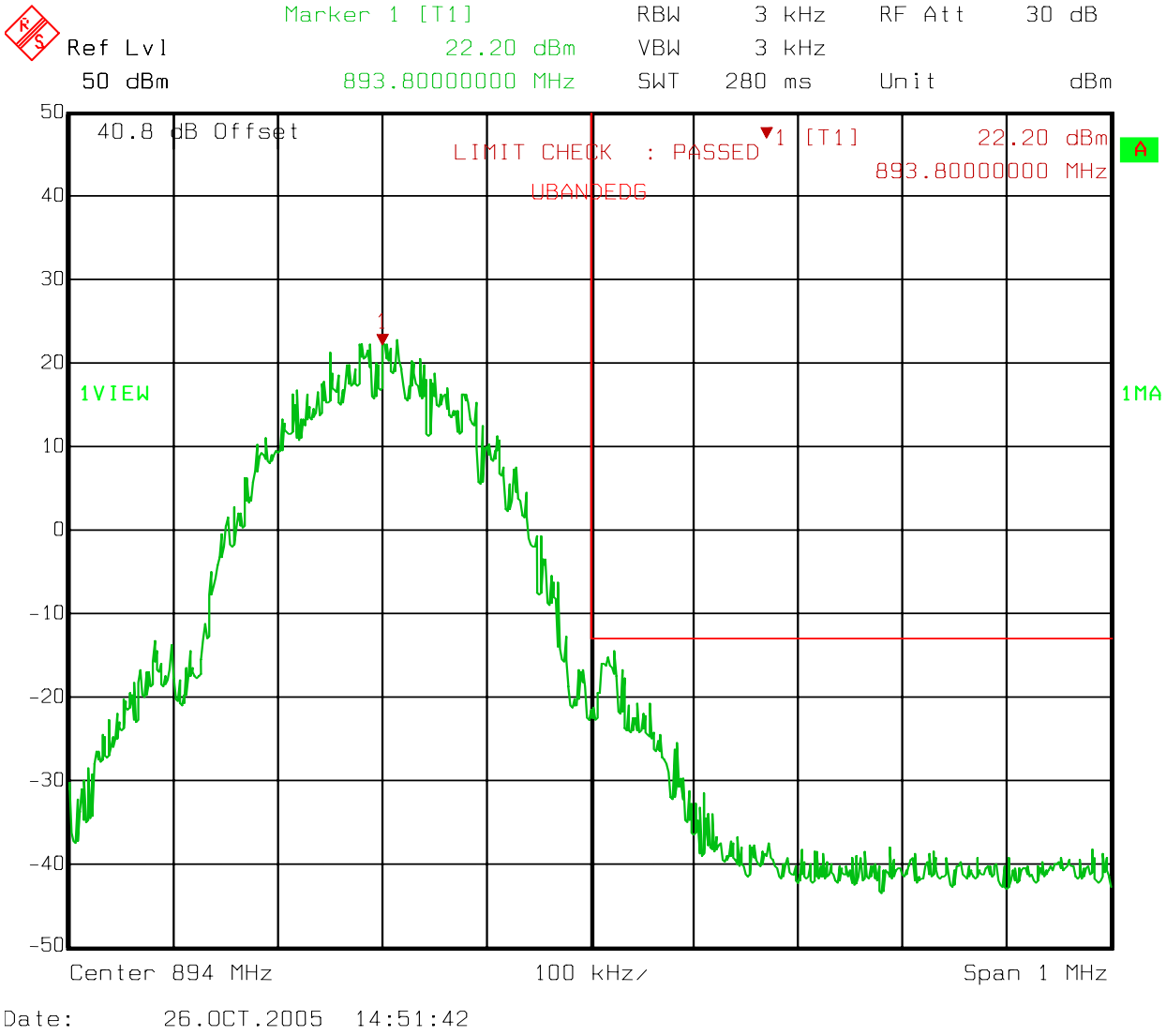
Test Data – Spurious Emissions at Antenna Terminals

Lower band edge IM – Two carriers at 62.5 watts each
GSM



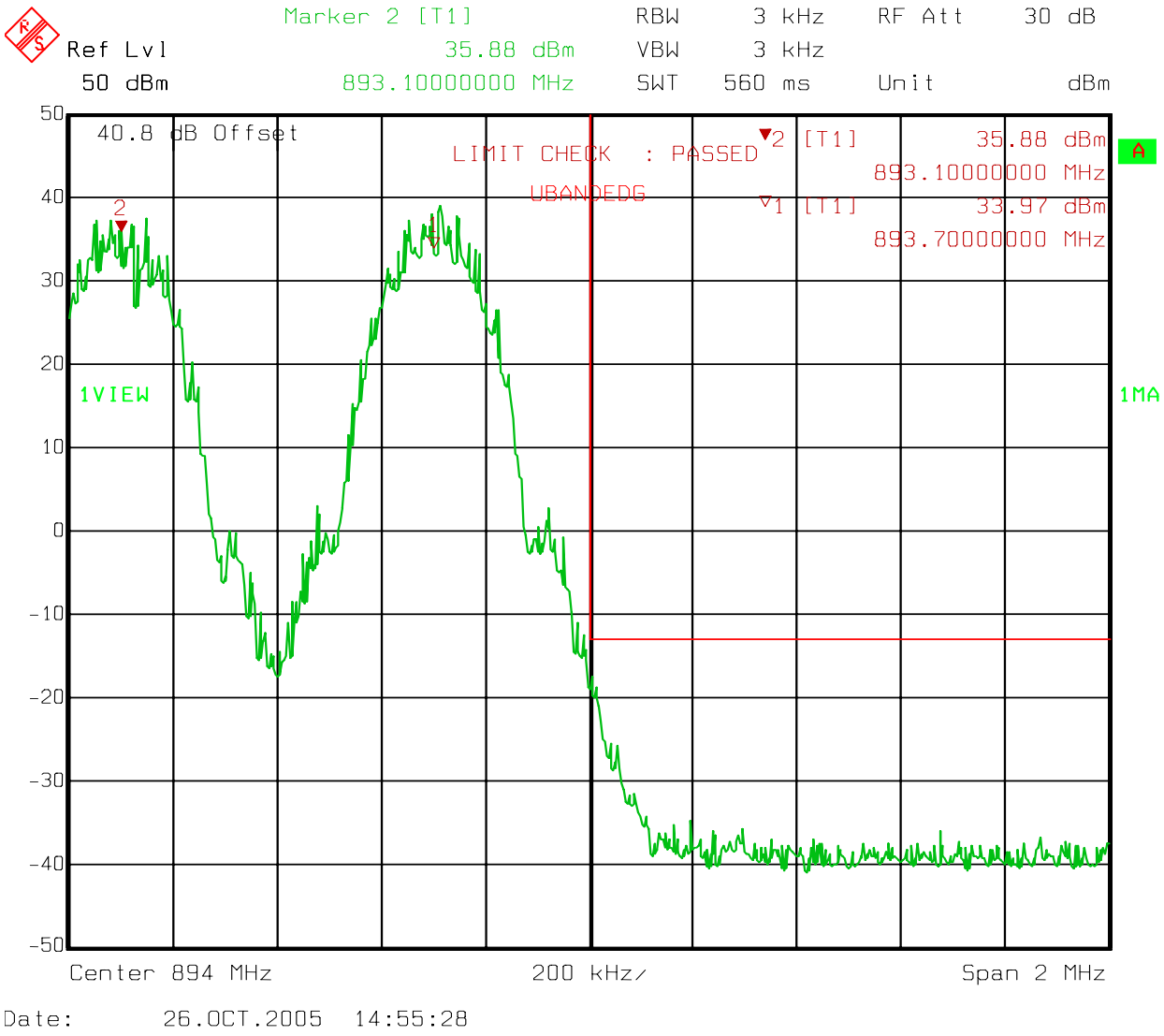
Test Data – Spurious Emissions at Antenna Terminals

893.8 MHz at 3 watts output
GSM



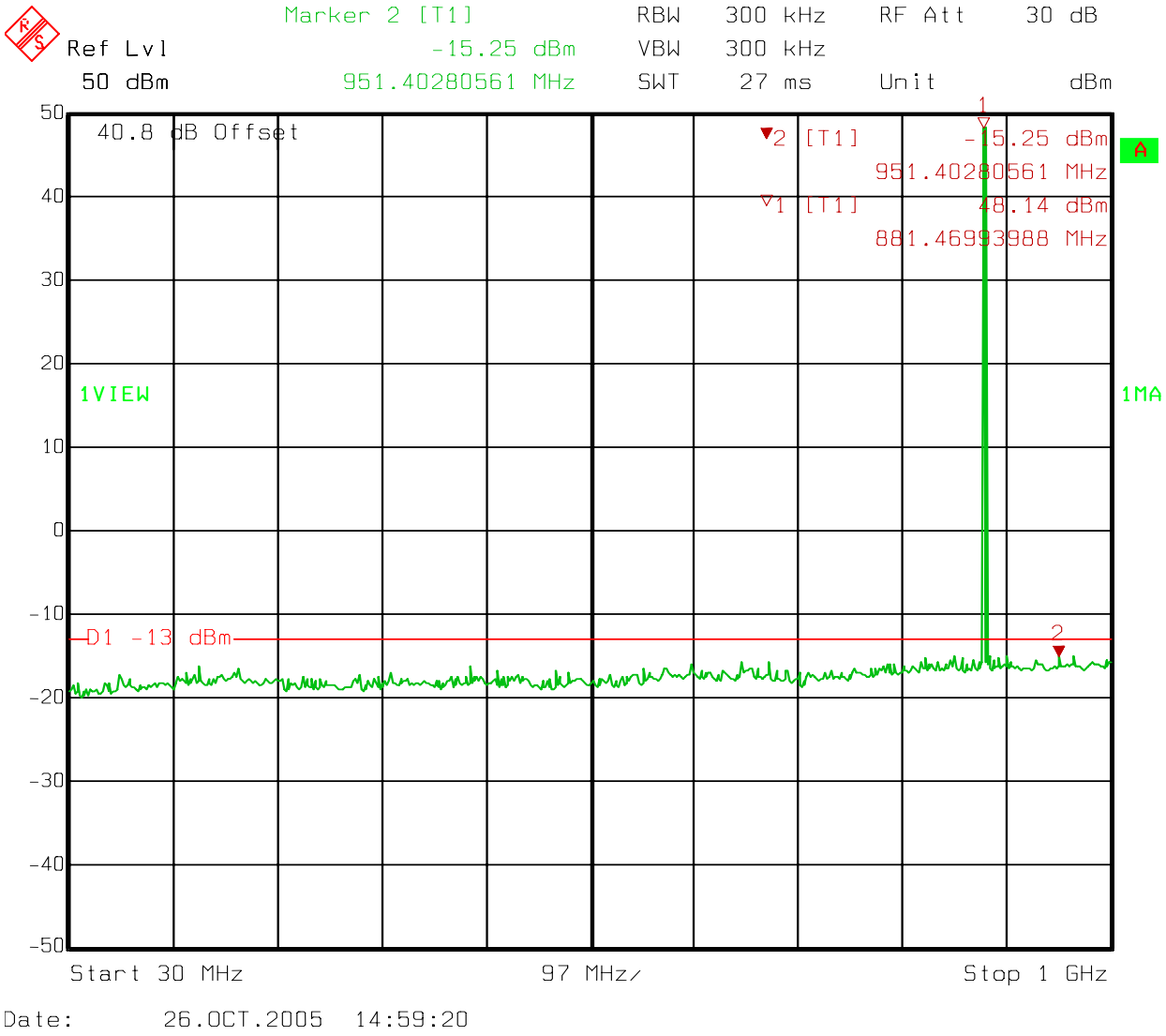
Test Data – Spurious Emissions at Antenna Terminals

Lower band edge IM – Two channels at 62.5 watts each
GSM



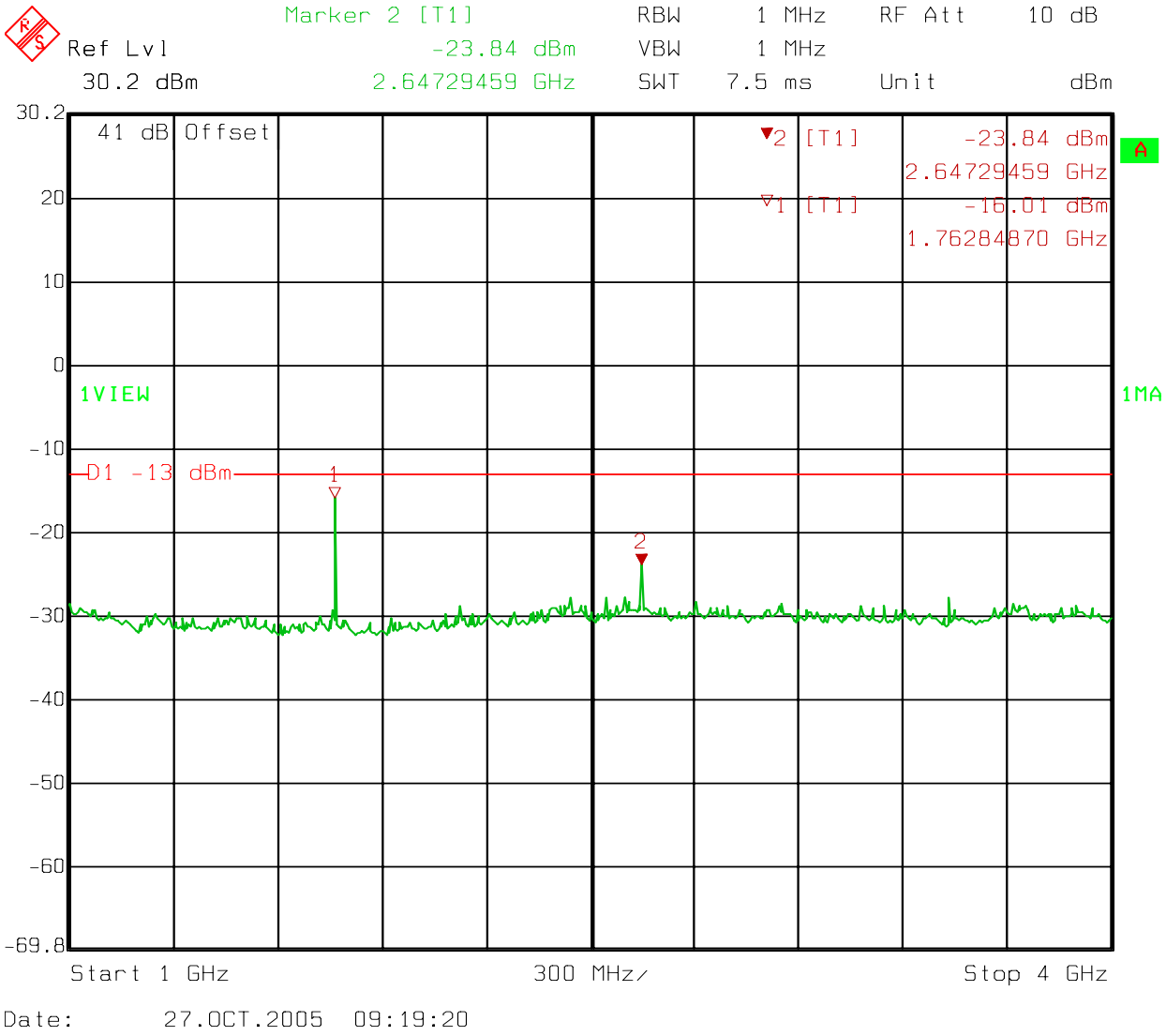
Test Data – Spurious Emissions at Antenna Terminals

GSM



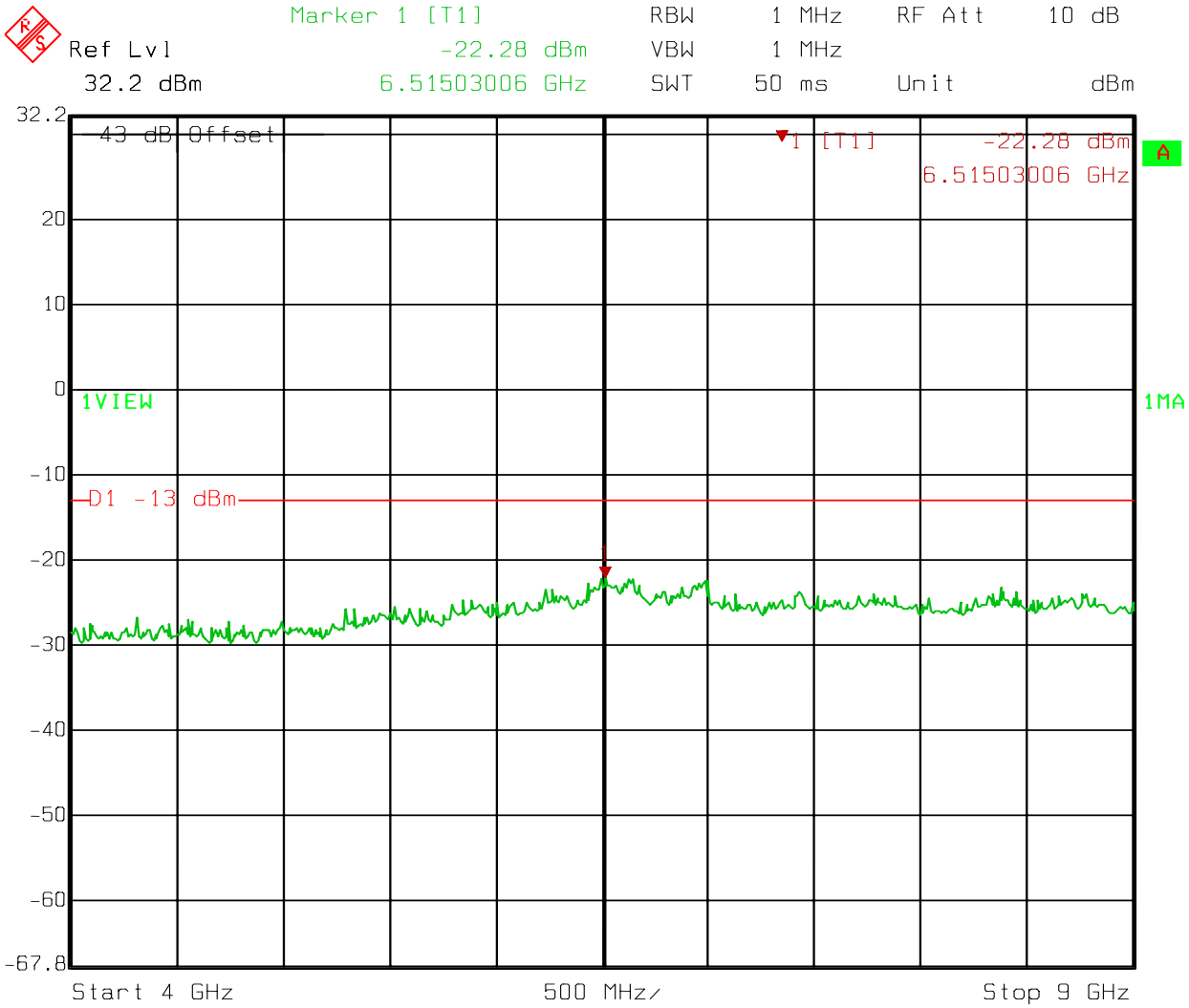
Test Data – Spurious Emissions at Antenna Terminals

GSM



Test Data – Spurious Emissions at Antenna Terminals

GSM

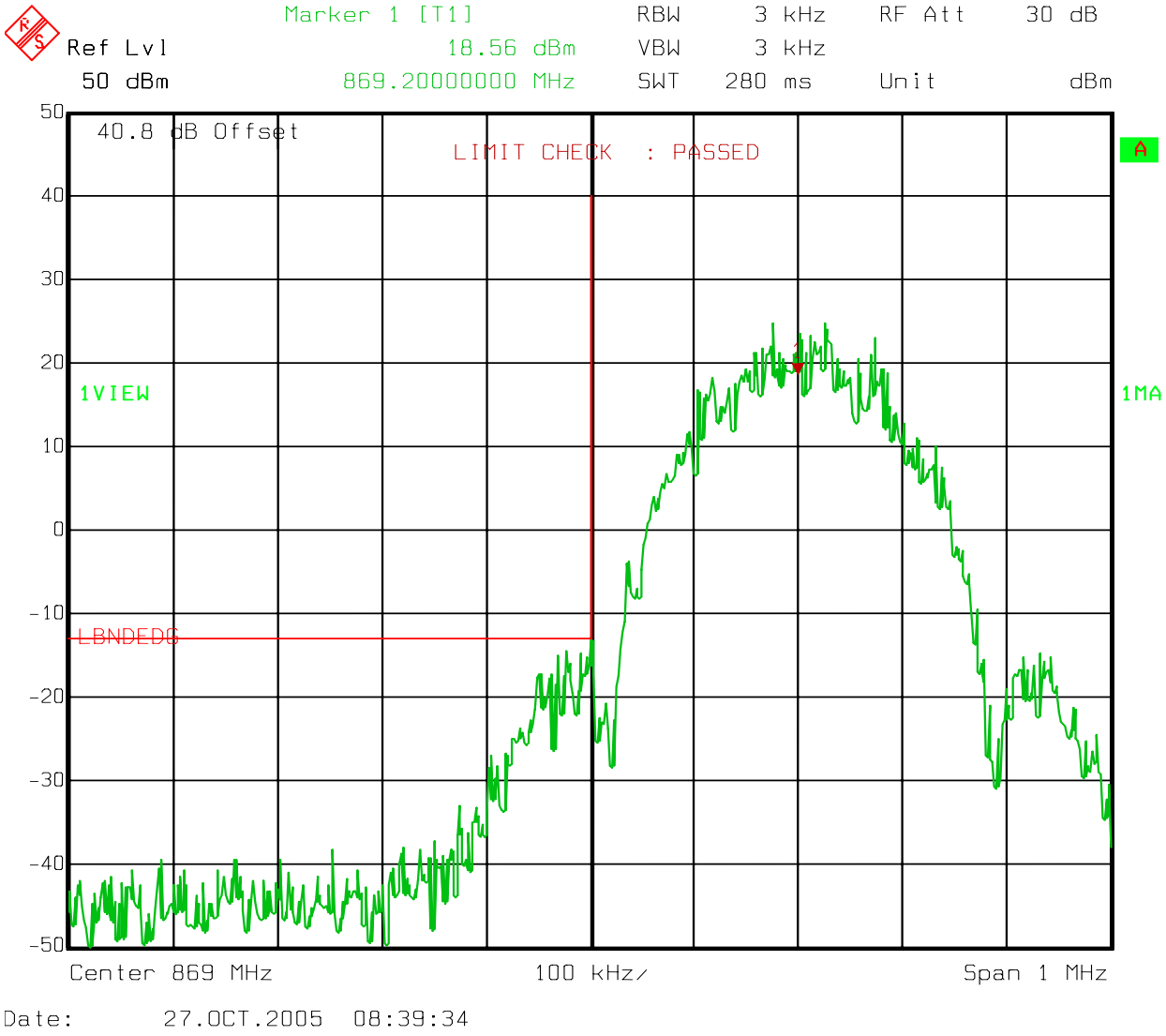


The spectrum was investigated on three channels. The data presented is representative of all channels tested.

Test Data – Spurious Emissions at Antenna Terminals

EDGE

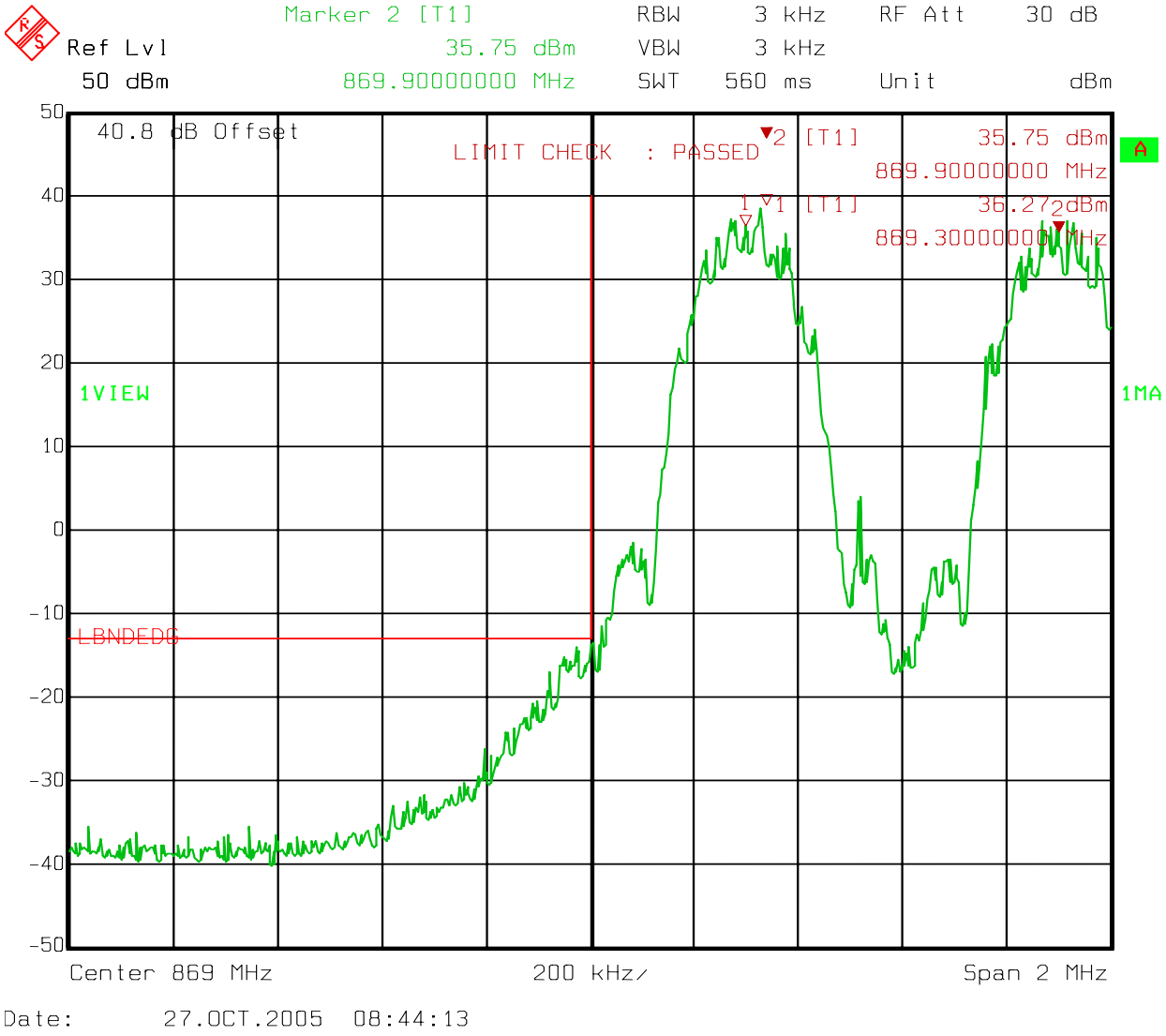
Lowest channel - 5.8 watts



Test Data – Spurious Emissions at Antenna Terminals

EDGE

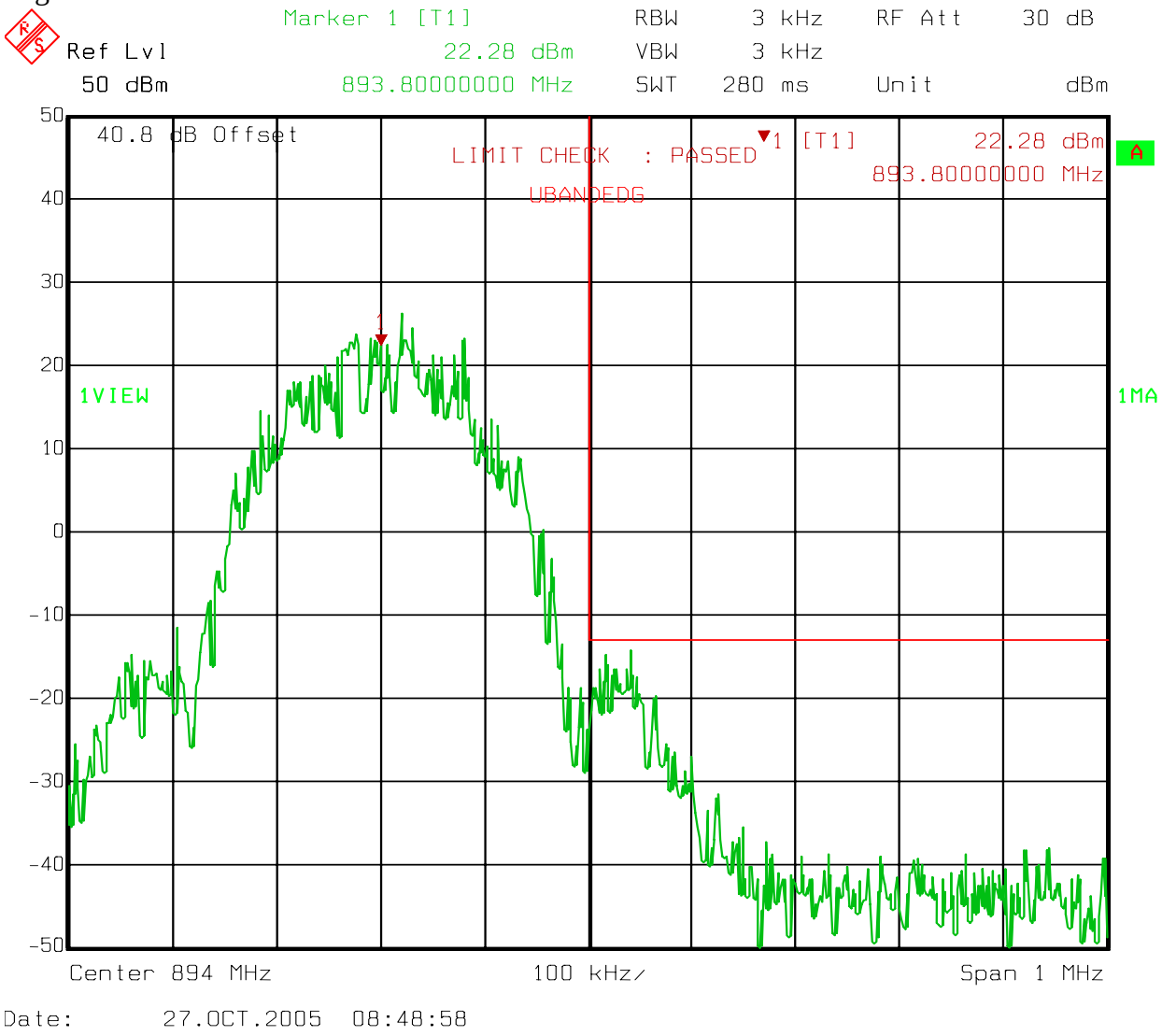
Two channels at 62.5 watts each



Test Data – Spurious Emissions at Antenna Terminals

EDGE

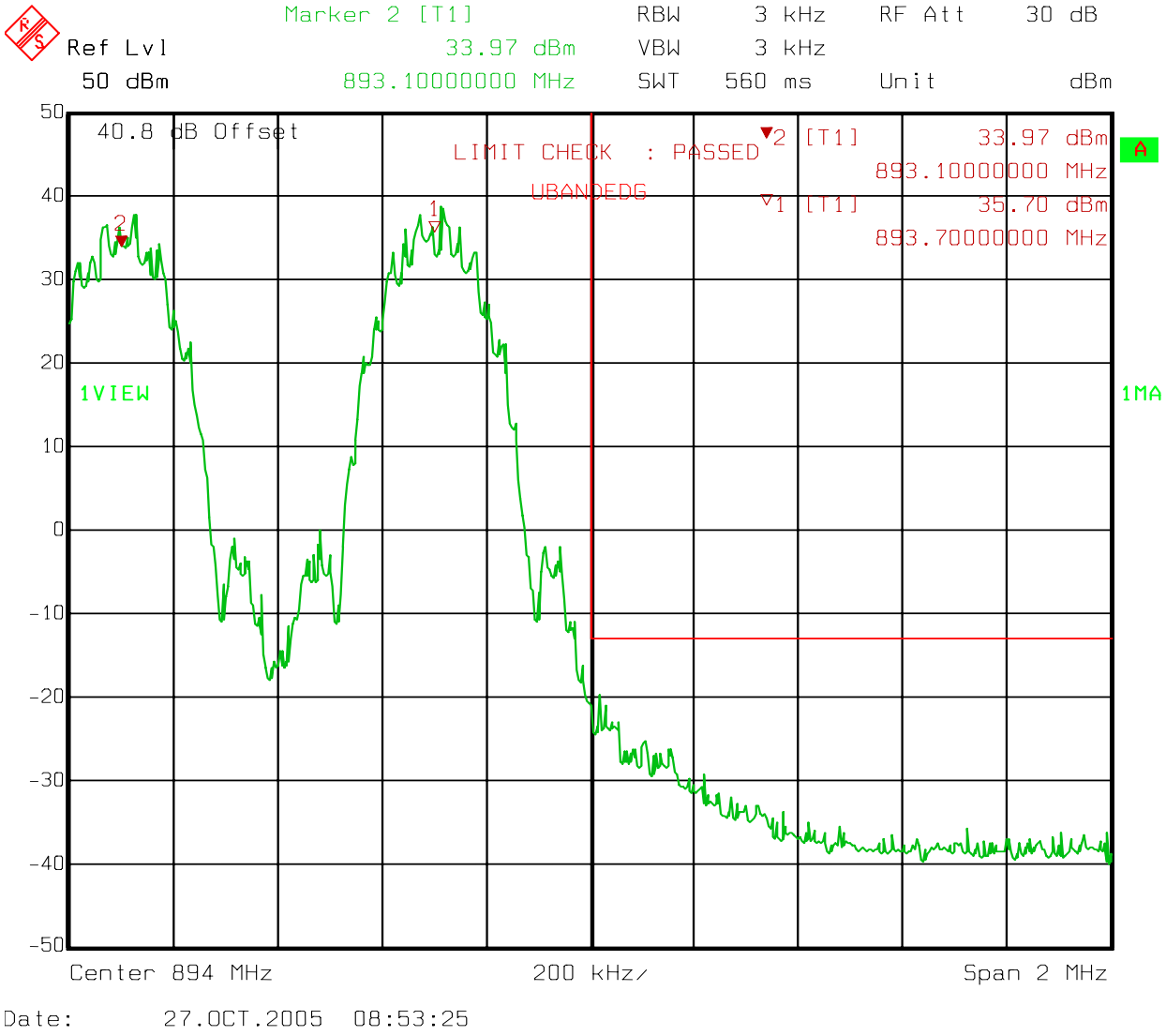
Highest channel – 5.8 watts



Test Data – Spurious Emissions at Antenna Terminals

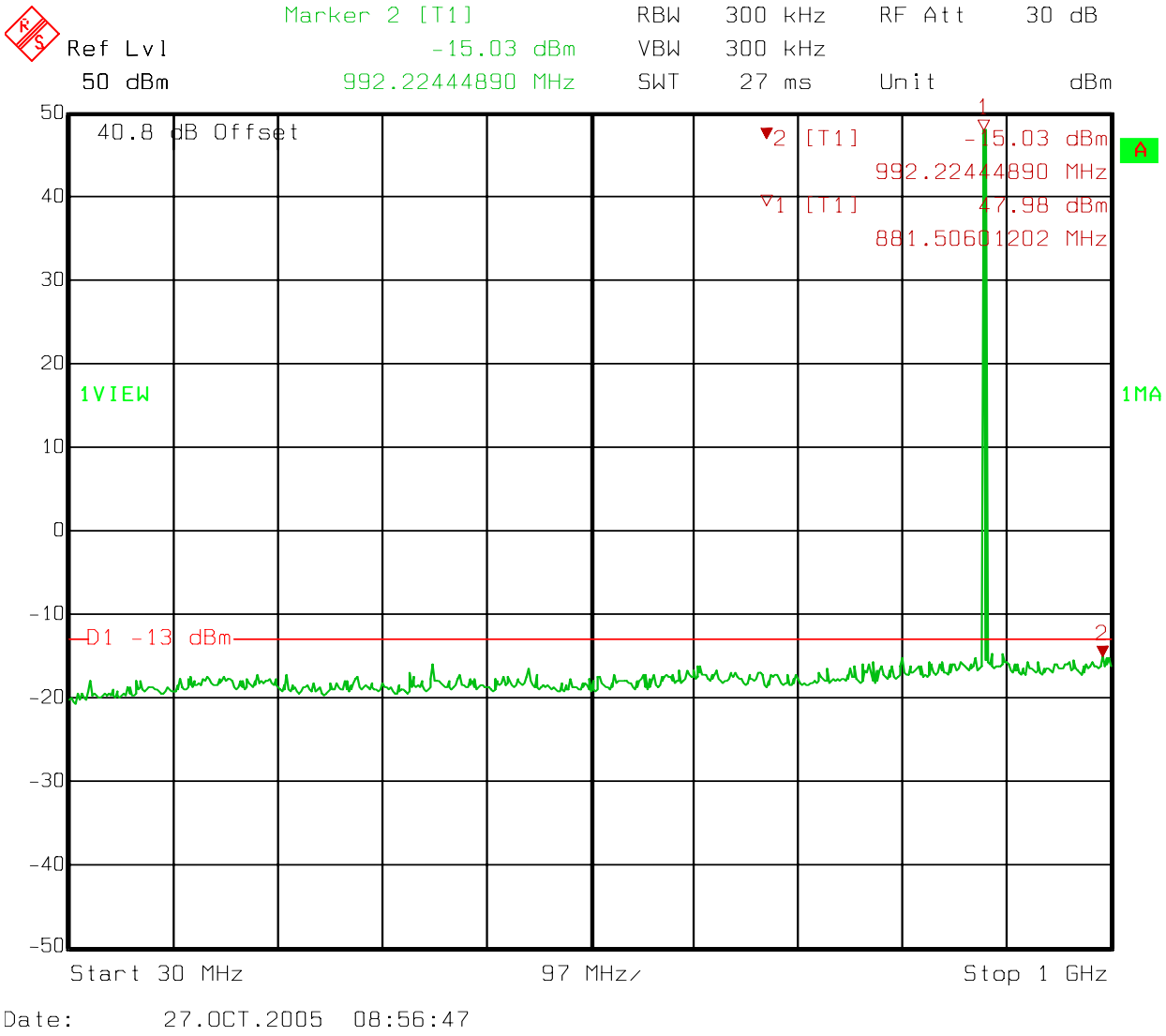
EDGE

Two channels – 62.5 watts each



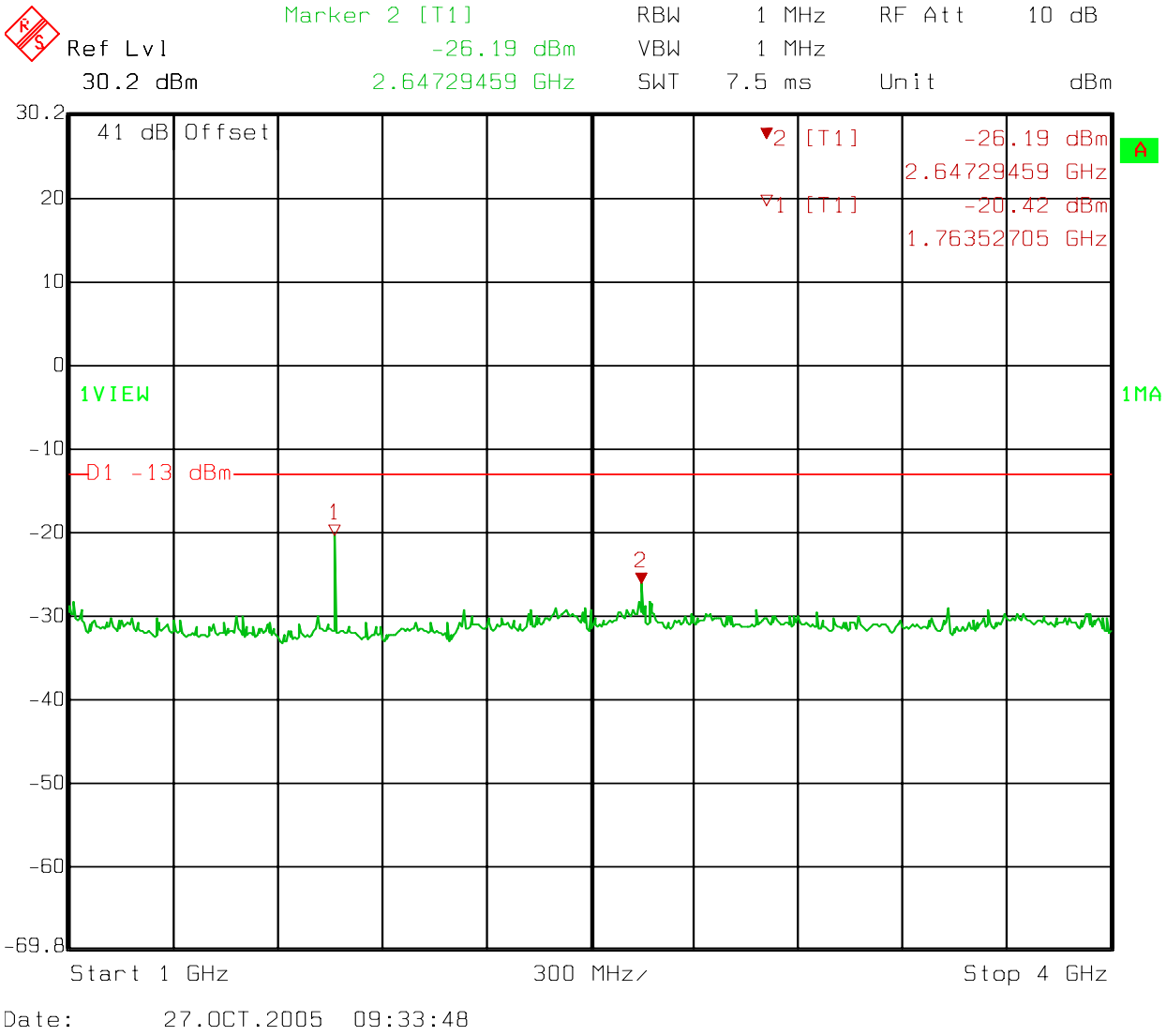
Test Data – Spurious Emissions at Antenna Terminals

EDGE



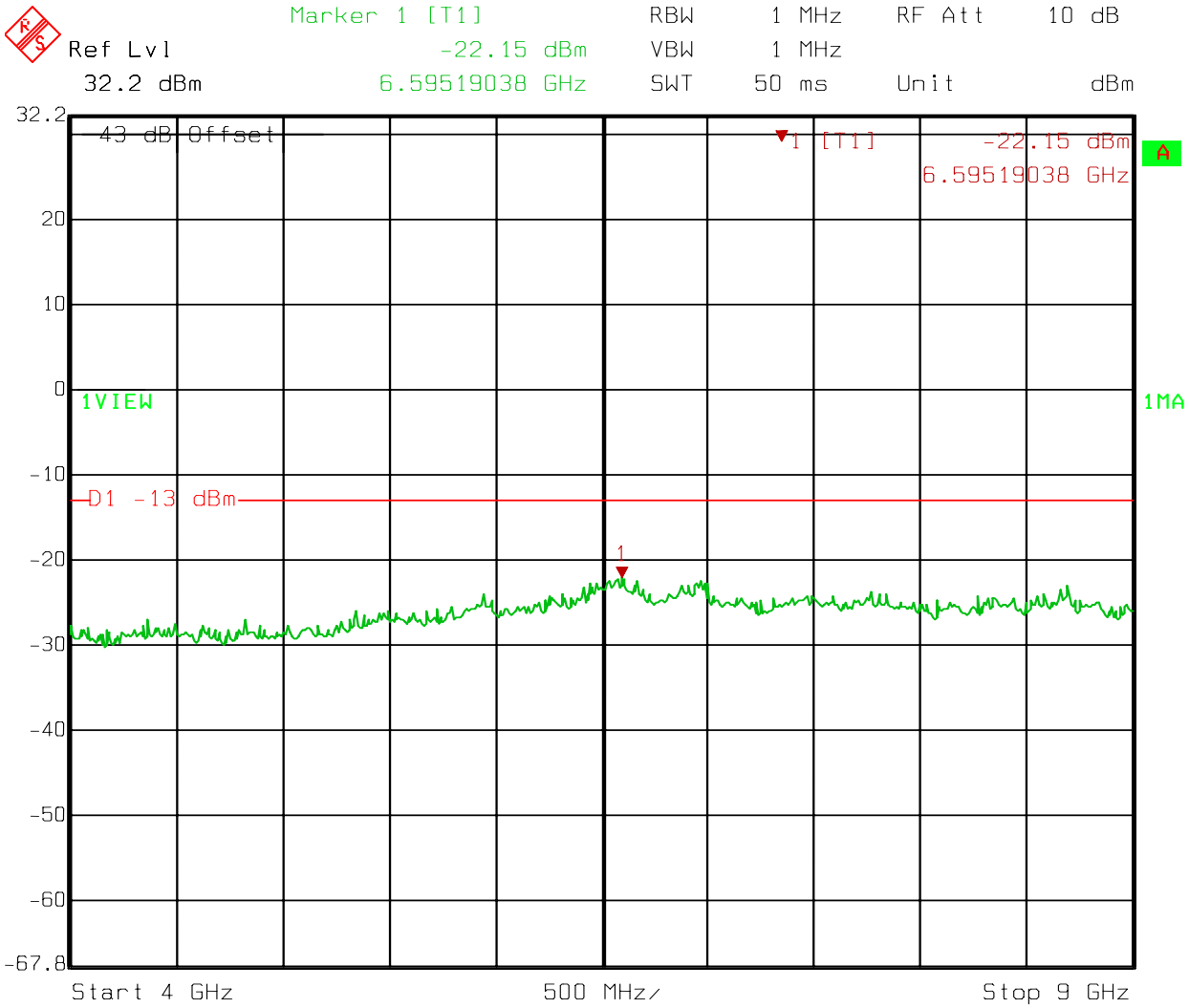
Test Data – Spurious Emissions at Antenna Terminals

EDGE



Test Data – Spurious Emissions at Antenna Terminals

EDGE



The spectrum was investigated on three channels. The data presented is representative of all channels tested.

Section 6. Field Strength of Spurious

NAME OF TEST: Field Strength of Spurious	PARA. NO.: 2.1053
TESTED BY: David Light	DATE:14 May 2004

Test Results: Complies.

Test Data: See attached table.

Test Data – Field Strength of Spurious Emissions

ERP Substitution Method

Page 1 of 1 Complete x
Job No.: 4L0360 Date: 5/14/2004 Preliminary
Specification: PT22 Temperature(°C): 20
Tested By: David Light Relative Humidity(%) 60
E.U.T.: DAC-850-125
Configuration: Tx full power into load
Sample No: 1
Location: AC 3 RBW: 1 MHz Measurement
Detector Type: Peak VBW: 1 MHz Distance: 3 m

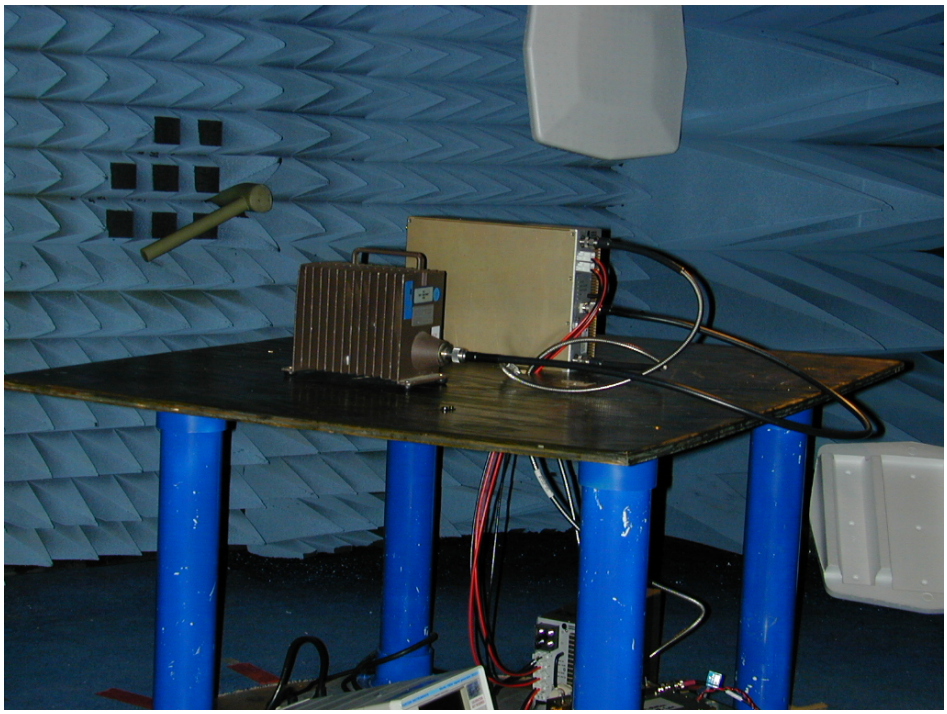
Test Equipment Used

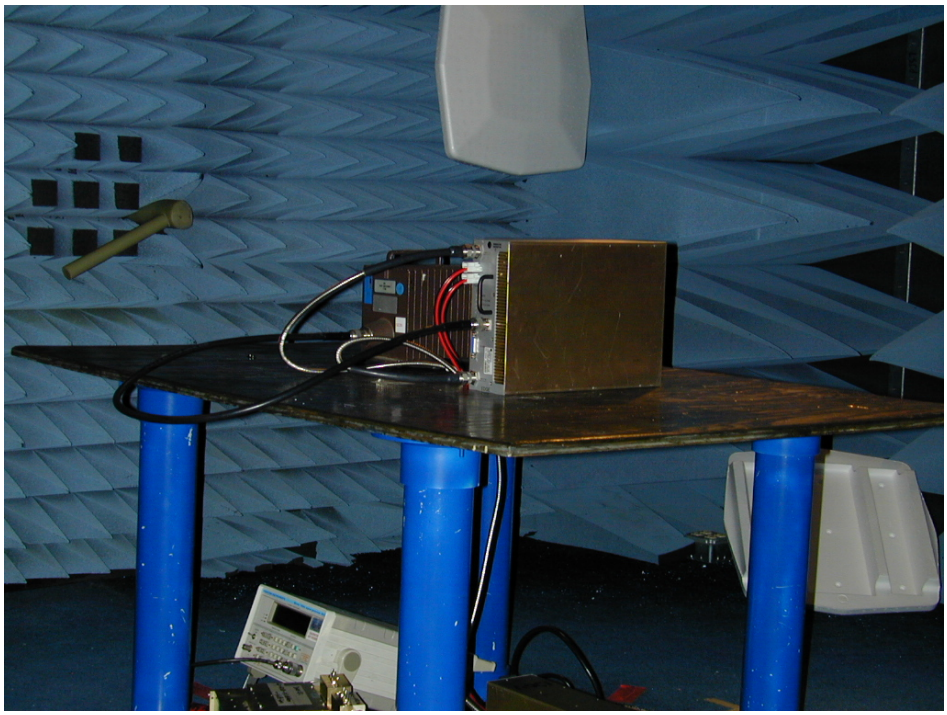
Antenna: 1304 Directional Coupler:
Pre-Amp: 1016 Cable #1: 1484
Filter: Cable #2: 1485
Receiver: 1464 Cable #3:
Attenuator #1 Cable #4:
Attenuator #2: Mixer:
Additional equipment used:
Measurement Uncertainty: +/-1.7 dB

Frequency (MHz)	Meter Reading (dBm)	Substitution Level (dBm)		Pre-Amp Gain (dB)	Substitution Antenna Gain (dBd)	ERP (dBm)	Limit (dBm)	Margin (dB)	Polarity	Comments
1763	-32.0	-33.8		32.9	6.2	-27.6	-13.0	-14.5700	V	
2644.5	-26.0	-22.1		33	7.1	-15.0	-13.0	-1.9600	V	
3526	-48.7	-38.8		32.6	8.0	-30.9	-13.0	-17.8500	V	
4407.5	-69.3	-55.9		32.4	7.9	-48.0	-13.0	-35.0200	V	
5289	-73.0	-63.3		32.3	8.5	-54.8	-13.0	-41.7900	V	
6170.5	-74.6	-66.0		31.6	9.1	-56.9	-13.0	-43.8700	V	
7052	-73.0	-64.3		32.1	9.5	-54.9	-13.0	-41.8500	V	
7933.5	-72.0	-63.3		32.9	9.0	-54.3	-13.0	-41.3400	V	
8815	-73.0	-65.7		33.9	9.6	-56.2	-13.0	-43.1500	V	
1763	-34.2	-33.6		32.9	6.2	-27.4	-13.0	-14.3700	H	
2644.5	-25.6	-25.0		33	7.1	-17.9	-13.0	-4.8600	H	
3526	-46.2	-44.9		32.6	8.0	-37.0	-13.0	-23.9500	H	
4407.5	-66.5	-64.0		32.4	7.9	-56.1	-13.0	-43.1200	H	
5289	-73.0	-67.2		32.3	8.5	-58.7	-13.0	-45.6900	H	
6170.5	-74.6	-68.8		31.6	9.1	-59.7	-13.0	-46.6700	H	
7052	-73.0	-65.7		32.1	9.5	-56.3	-13.0	-43.2500	H	
7933.5	-72.0	-64.5		32.9	9.0	-55.5	-13.0	-42.5400	H	
8815	-73.0	-65.5		33.9	9.6	-56.0	-13.0	-42.9500	H	

Notes:

Test Setup Photos





Section 7. Test Equipment List

Conducted Tests

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	03/22/04	03/23/06
1053	SIGNAL GENERATOR	ROHDE & SCHWARZ SMIQ 03	DE22081	06/10/03	06/11/06
1055	DUAL DIRECTIONAL COUPLER	NARDA 3022	73393	CBU	N/A
1054	DUAL DIRECTIONAL COUPLER	NARDA 3020A	34366	CBU	N/A
1058	DUAL DIRECTIONAL COUPLER	HEWLETT PACKARD 11692D	1212A03366	CBU	N/A
1064	ATTENUATOR	NARDA 776B-20	NONE	CBU	N/A
1067	Blue cable 4m	Storm PR90-010-144	0	CBU	N/A
1060	TUNABLE NOTCH FILTER	K&L 3TNF-500/1000-N/N	162	CBU	N/A

Radiated Tests

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1304	HORN ANTENNA	ELECTRO METRICS RGA-60	6151	09/22/03	09/22/05
1016	Pre-Amp	HEWLETT PACKARD 8449A	2749A00159	10/27/03	10/27/04
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	07/24/04
1485	Cable 2.0-18.0 Ghz	Storm PR90-010-216	N/A	07/24/03	07/24/05

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 or a spectrum analyzer with sufficient bandwidth. Power output is measured with the maximum rated input level.

Integral Antenna:

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: Occupied Bandwidth **PARA. NO.: 2.1049**

Minimum Standard: Not defined by FCC. Input vs. Output.

Method Of Measurement:

Spectrum Analyzer Settings:

RBW: 3 kHz
VBW: ≥ RBW
Span: 1 MHz
Sweep: Auto

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

Minimum Standard: Para. No. 22.917(a). Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. This is equivalent to -13 dBm absolute power.

Method Of Measurement:

Spectrum Analyzer Settings:
RBW: >100 kHz below 1000 MHz / 1 MHz above 1000 MHz
VBW: ≥ RBW
Start Frequency: 30 MHz
Stop Frequency: 9 GHz
Sweep: Auto

NAME OF TEST: Field Strength of Spurious Radiation PARA. NO.: 2.1053

Minimum Standard: Para. No. 22.917(a). Out of band emissions. The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB. 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

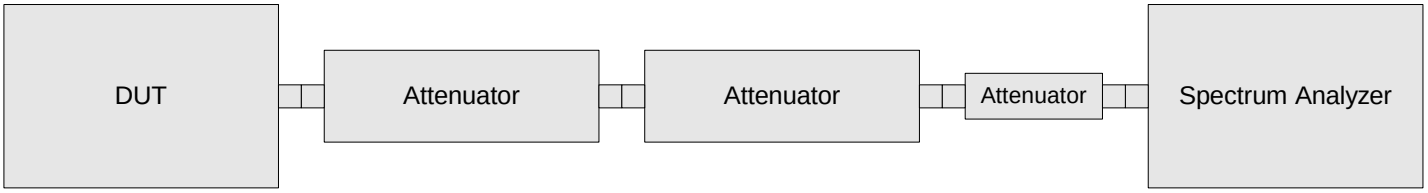
Method Of Measurement:

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.

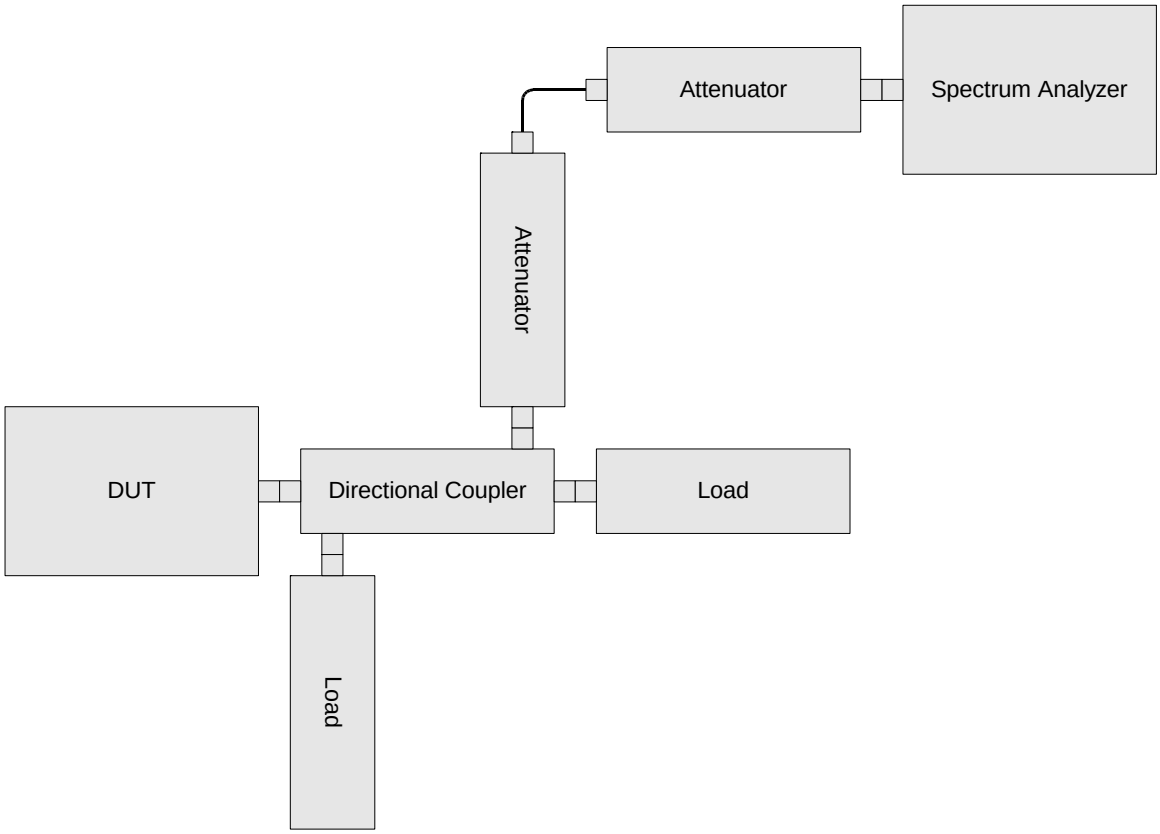
Frequency Stability With Temperature Variation:
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30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

ANNEX B - TEST DIAGRAMS

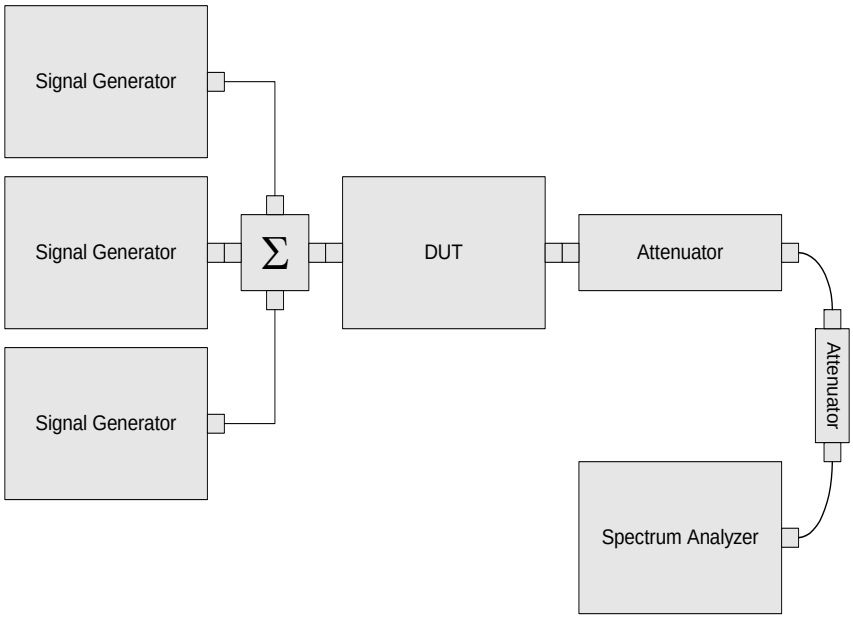
Para. No. 2.1046 - R.F. Power Output



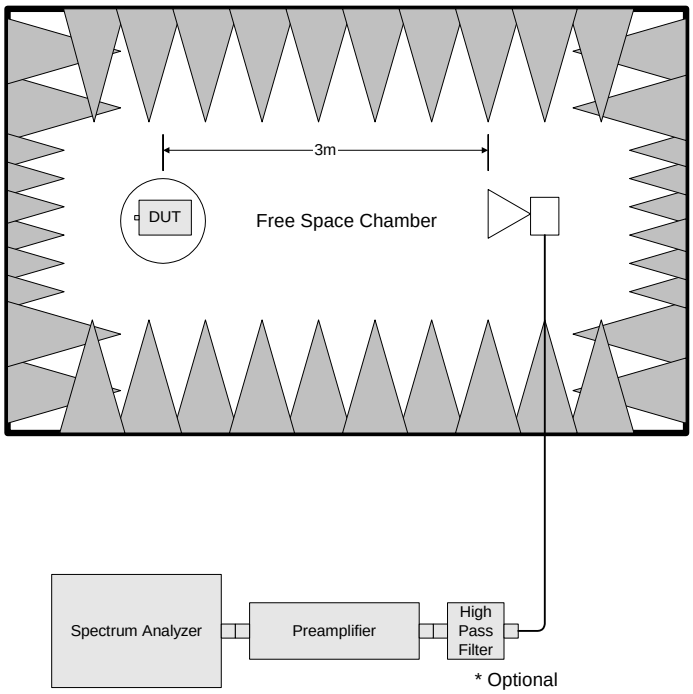
Para. No. 2.1049 - Occupied Bandwidth

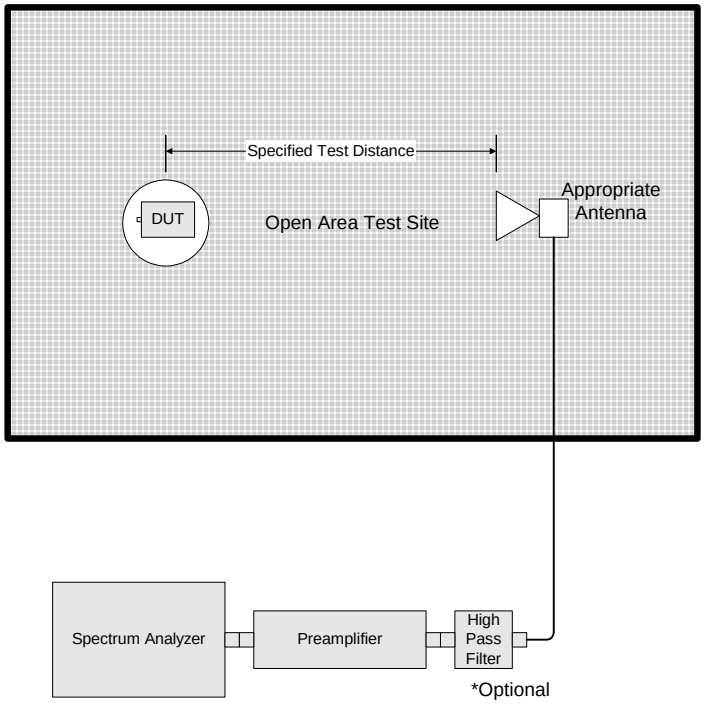


Para. No. 2.1051 Spurious Emissions at Antenna Terminals



Para. No. 2.1053 - Field Strength of Spurious Radiation





Para. No. 2.1055 - Frequency Stability