Nemko Test Report:	41241RUS1
Applicant:	Andrew Corporation 620 N. Greenfield Parkway Garner, NC 27529 USA
Equipment Under Test: (E.U.T.)	MR8518/8518/1918/1918
FCC Identifier:	BCR-881919
In Accordance With:	**CFR 47, Part 22, Subpart H** Cellular Band Repeaters
Tested By:	Nemko USA Inc. 802 N. Kealy Lewisville, TX 75057-3136

TESTED BY: _____ **DATE:** **08 February 2010**

David Light, Senior Wireless Engineer

APPROVED BY: _____ **DATE:** **15 February 2010**

Tom Tidwell, Telecom Direct

Number of Pages: 61

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Section 1. Summary of Test Results

Manufacturer: Andrew Corporation

Model No.: MR8518/8518/1918/1918

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 CFR 47, Part 22, Subpart H.

☐ New Submission ☒ Production Unit

☒ Class II Permissive Change ☐ Pre-Production Unit

Reason for Class II change: Gain has been increased from 70 dB to 78 dB. Output power remains at +18 dBm. The gain of the amplifier is increased by the removal of attenuation in the system. There was no degradation in the characteristics of the device.

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.
See " Summary of Test Data".

NVLAP®
LAB CODE: 100426-0

Summary Of Test Data

NAME OF TEST	PARA. NO.	SPEC.	RESULT
RF Power Output	22.913(a)	500W ERP	[1]Not tested
Occupied Bandwidth	Not defined	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.	[2]Not tested
Frequency Stability	22.355	1.5 ppm	[3]Not applicable

Footnotes:

[1] RF power output remains at +18 dBm. The gain of the system is changed by removing attenuation in the system.

[2] Field strength of spurious emissions test was not performed since the physical enclosure and rf power output has not been changed.

[3] Frequency stability testing is not applicable because the device uses a common oscillator to down-convert and up-convert the rf signal.

Rev1: Revised FCC ID number.

Section 2. General Equipment Specification

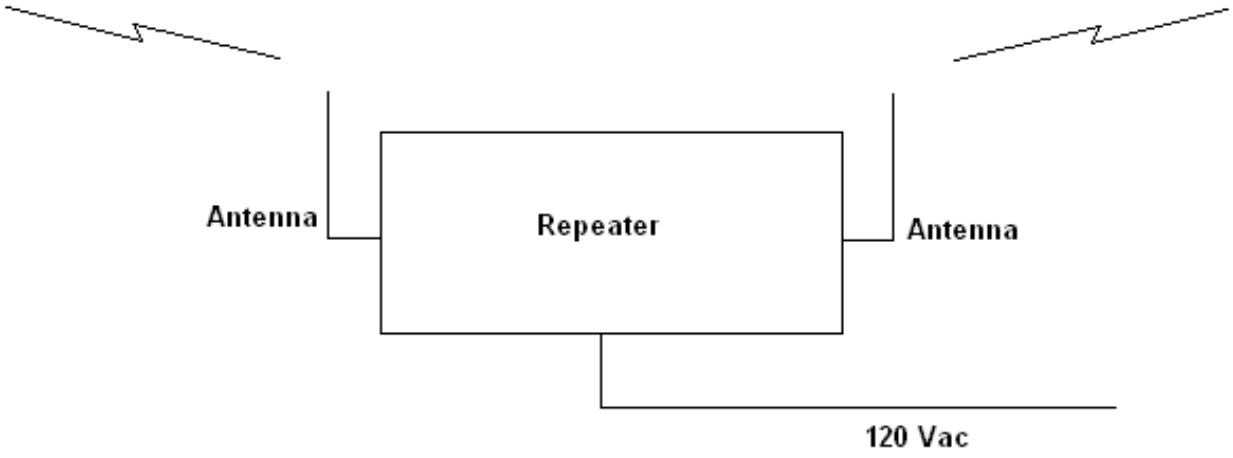
Supply Voltage Input:		120 Vac			
Frequency Range:	**Downlink:**	869 to 894 MHz*			
Frequency Range:	**Uplink:**	824 to 849 MHz*			
Type of Modulation and Designator:		**CDMA (F9W)** ☒	**GSM (GXW)** ☒	**W-CDMA (F9W)** ☒	**EDGE (G7W)** ☒
Output Impedance:		50 ohms			
RF Output (Rated):	**Downlink:**	63.1 mW / 18 dBm			
	Uplink:	63.1 mW / 18 dBm			
Frequency Translation:		**F1-F1** ☒	**F1-F2** ☐	**N/A** ☐	
Band Selection:		**Software** ☒	**Duplexer Change** ☐	**Fullband Coverage** ☐	

* Two variable frequency / fixed bandwidth filters are used in the cellular band. One filter is rated at 2 MHz and the other at 10 MHz.

Description of EUT

The miniRepeaters are bi-directional amplifiers used to enhance signals between a mobile and a base station in a wireless network. They have been designed to increase signal strength in small and medium sized areas such as offices, shops, basements and manufacturing facilities. They are dual band coverage of the 850 cell band and 1900 PCS band.

System Diagram



Section 3. Occupied Bandwidth

NAME OF TEST: Occupied Bandwidth	PARA. NO.: 2.1049
TESTED BY: David Light	DATE: 08 February 2010

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1082-1472

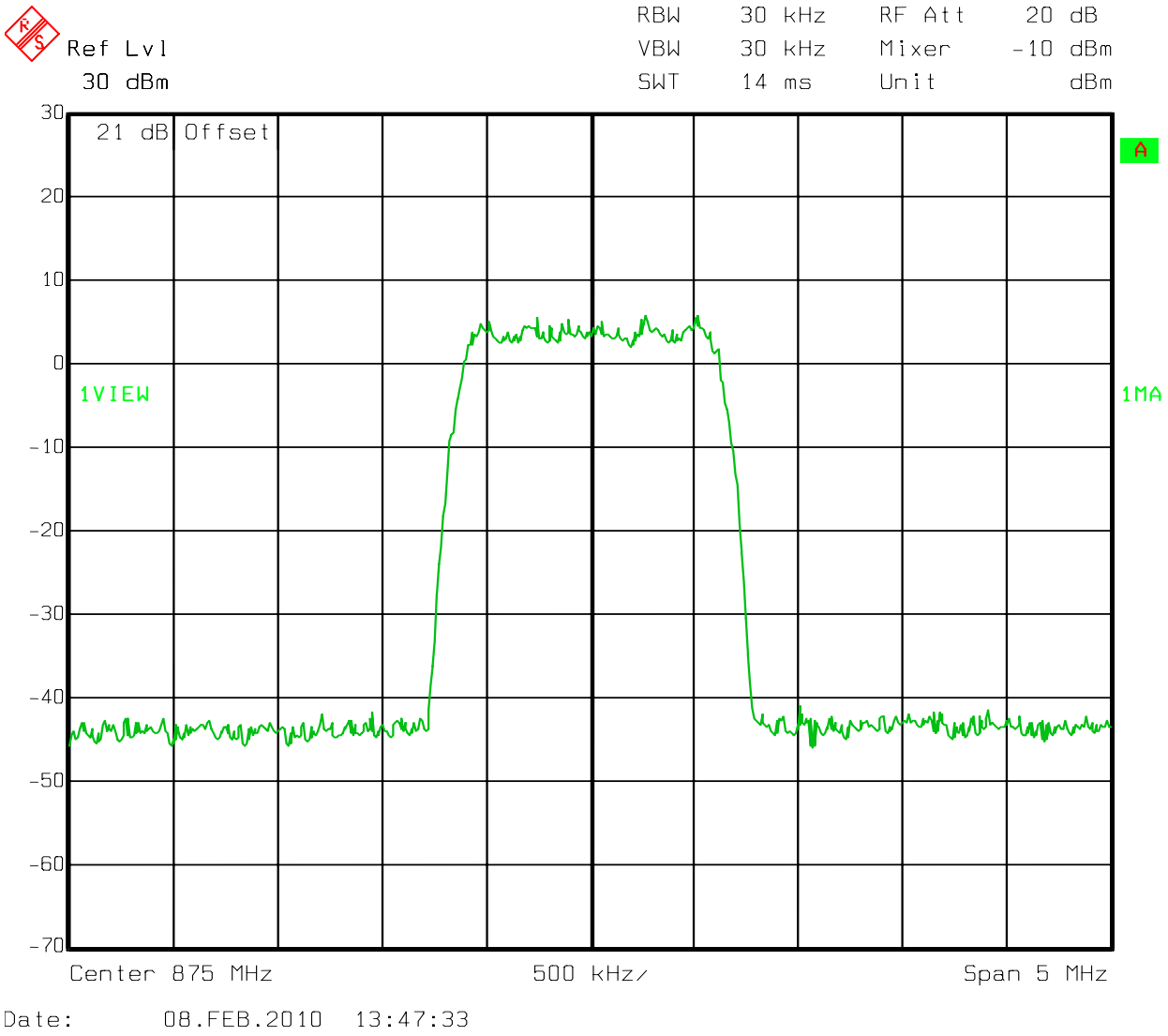
Measurement Uncertainty: $1X10^{-7}$ ppm

Temperature: 22 °C

Relative Humidity: 30 %

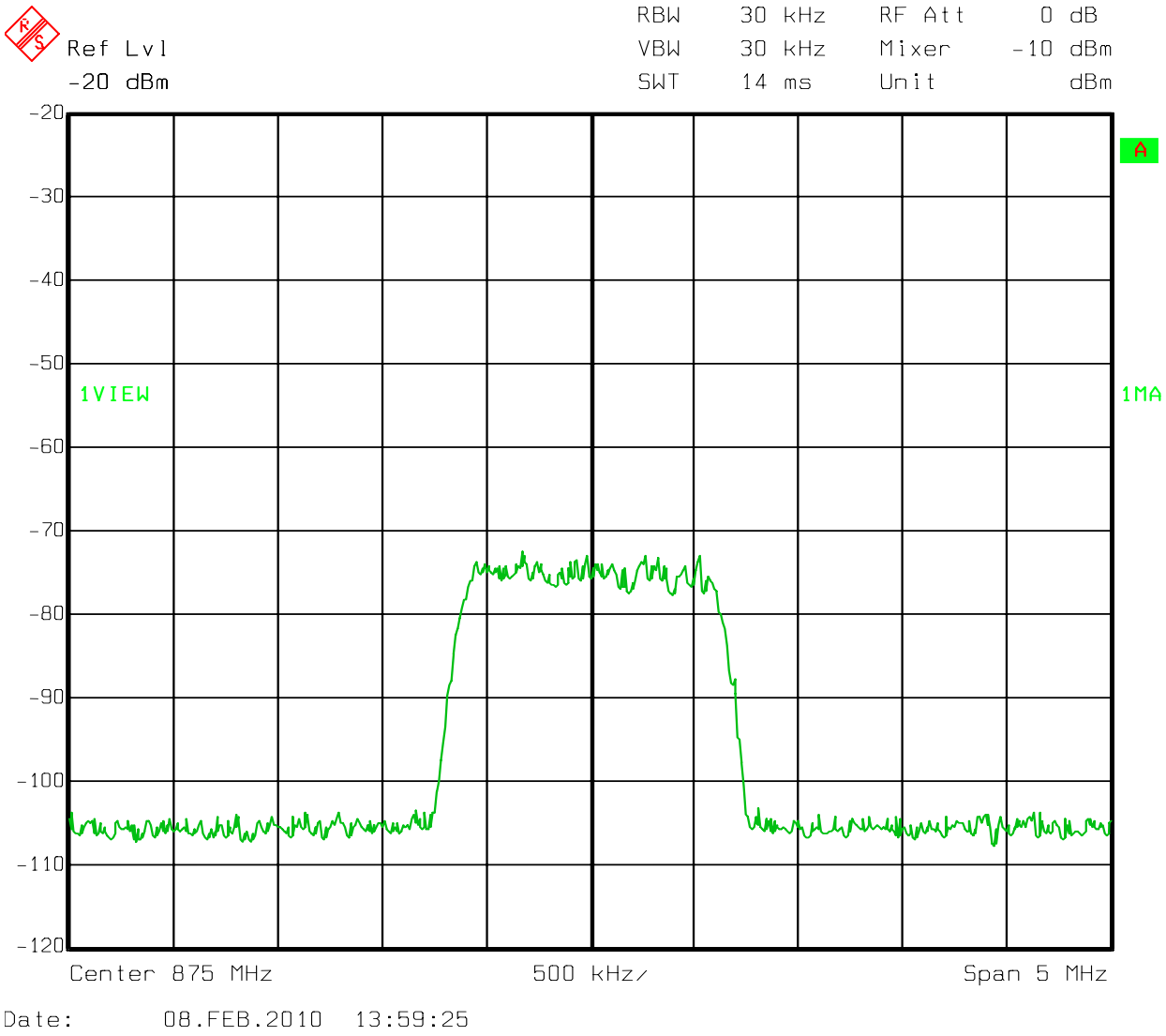
Test Data – Occupied Bandwidth

CDMA - Output
Downlink



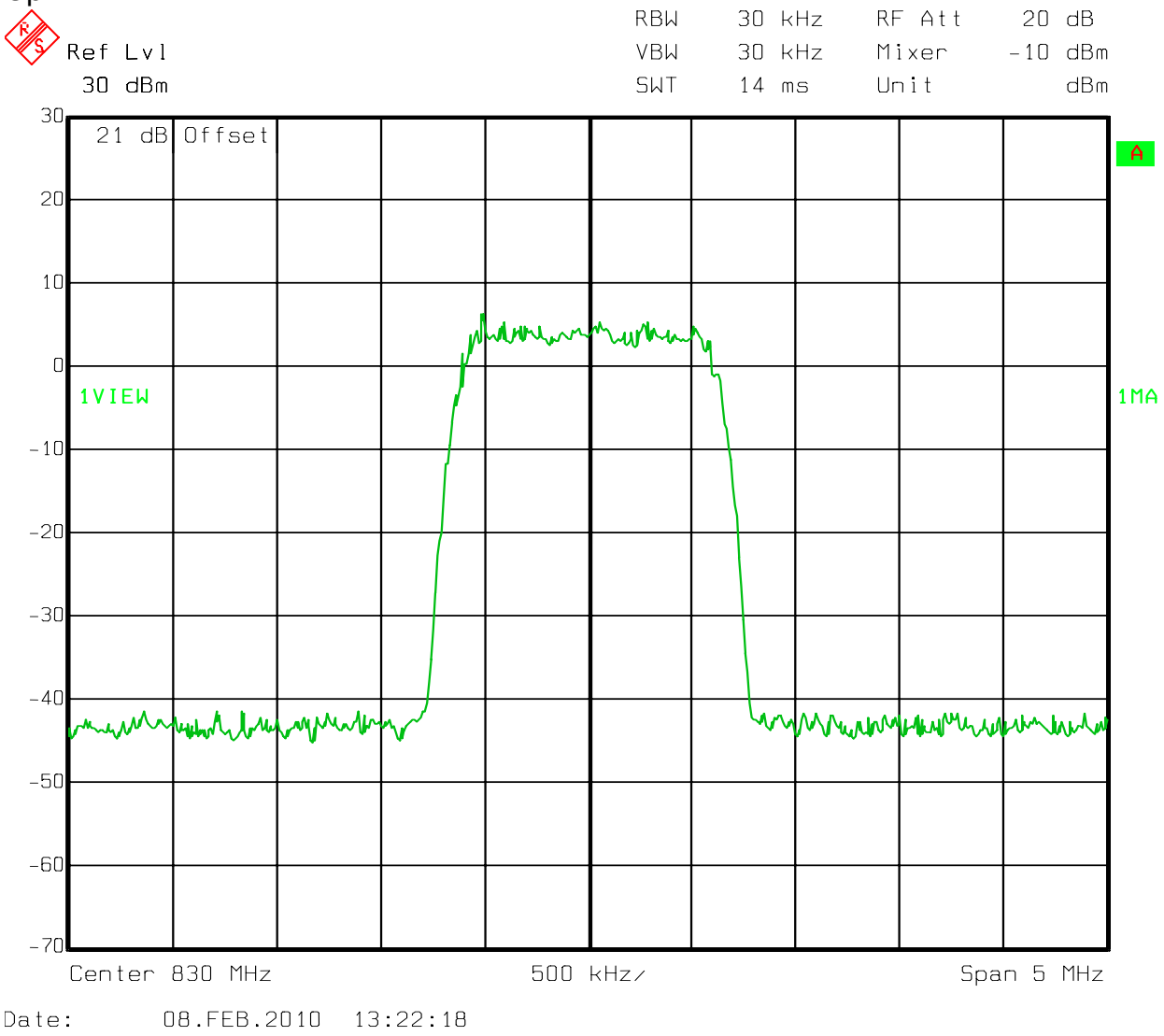
Test Data – Occupied Bandwidth

CDMA - Input
Downlink



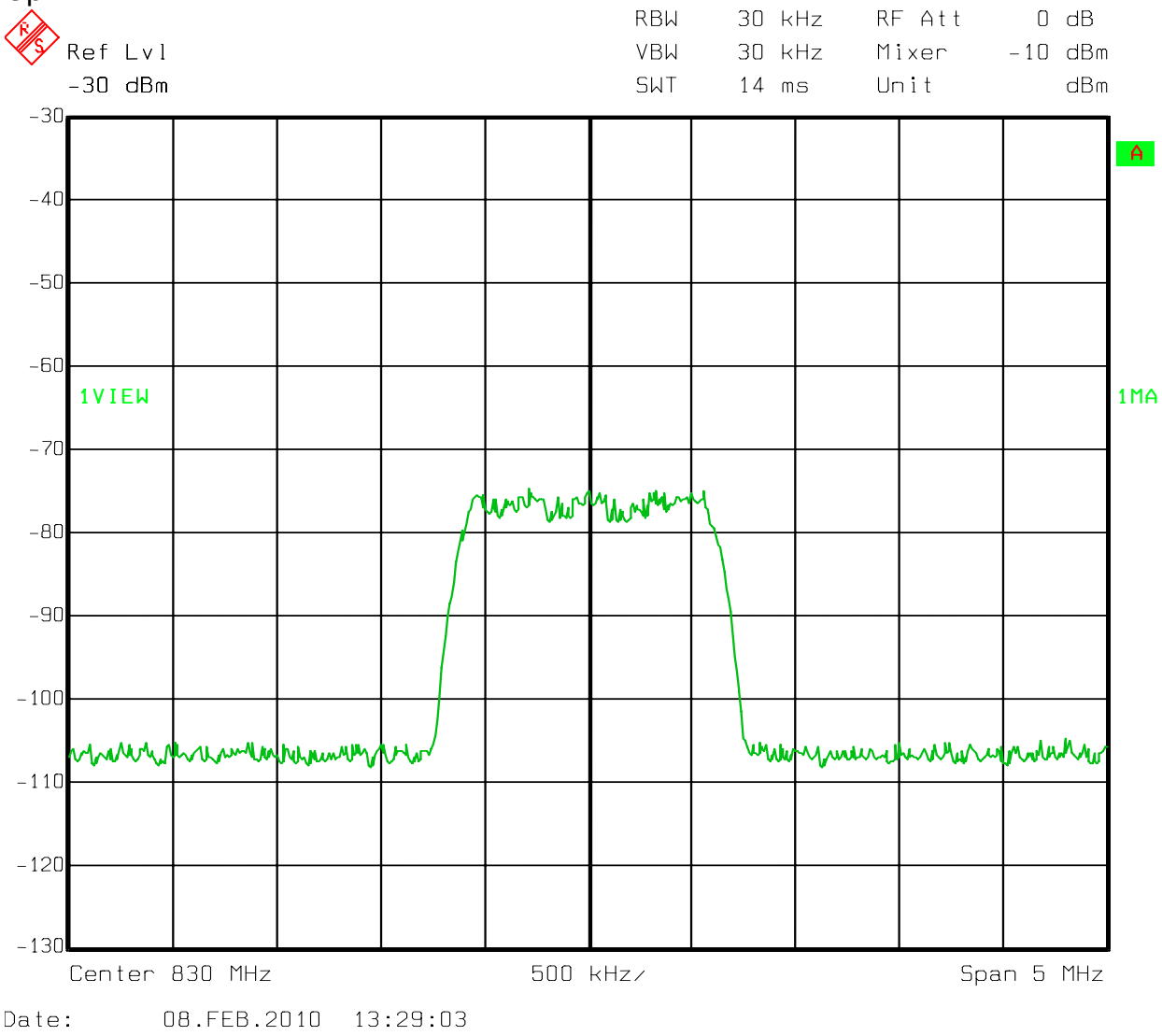
Test Data – Occupied Bandwidth

CDMA - Output
Uplink



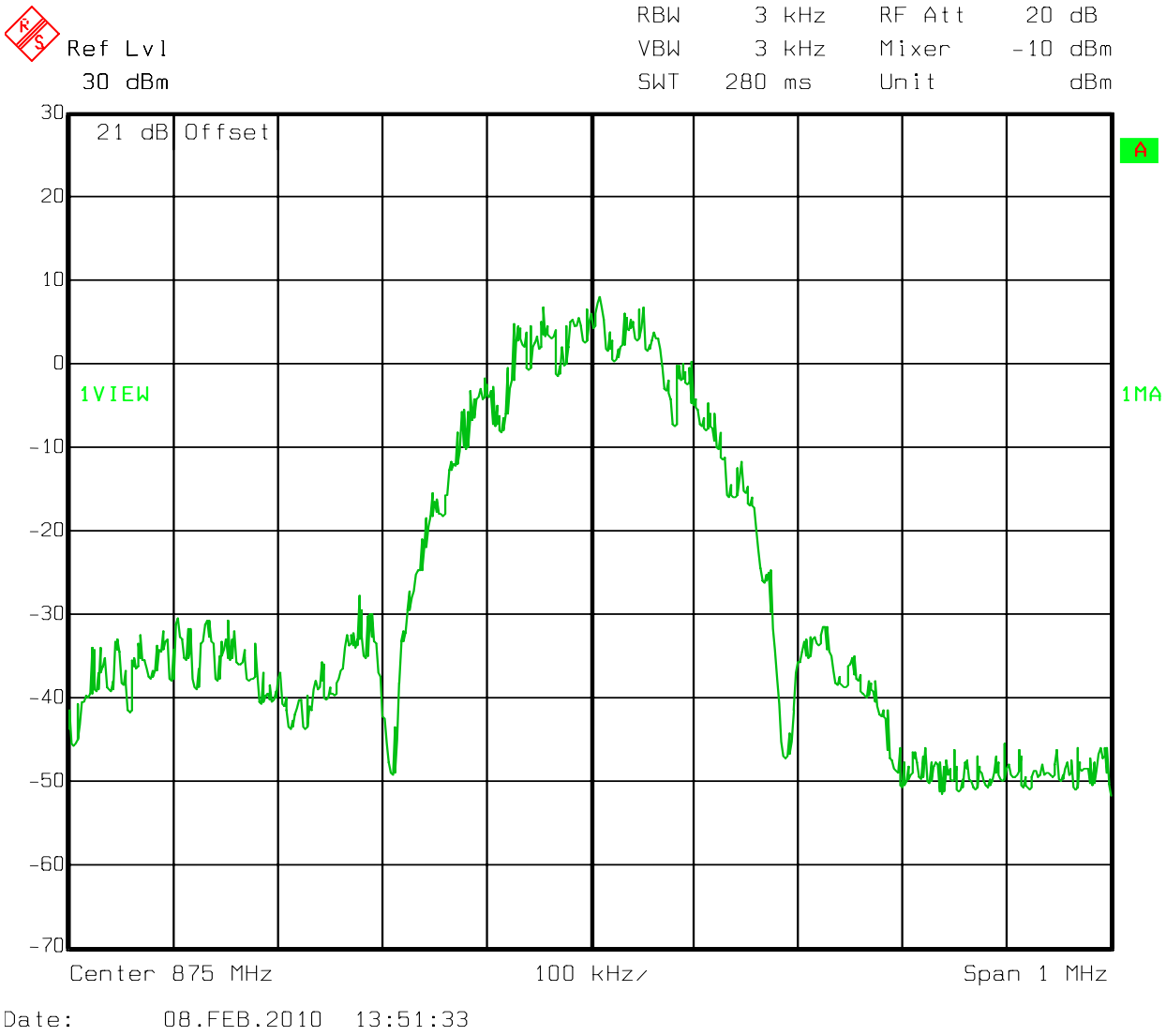
Test Data – Occupied Bandwidth

CDMA - Input
Uplink



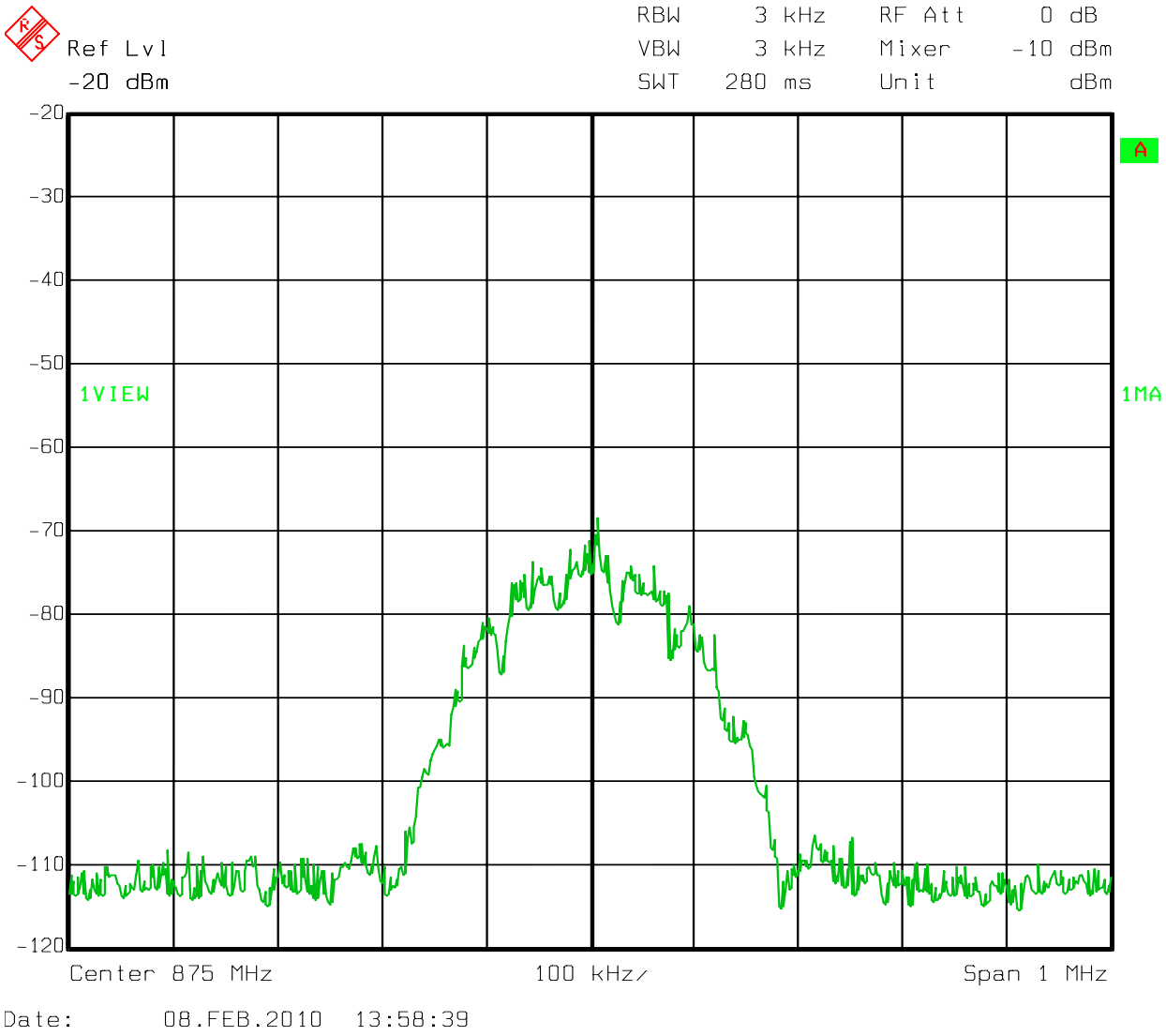
Test Data – Occupied Bandwidth

EDGE - Output
Downlink



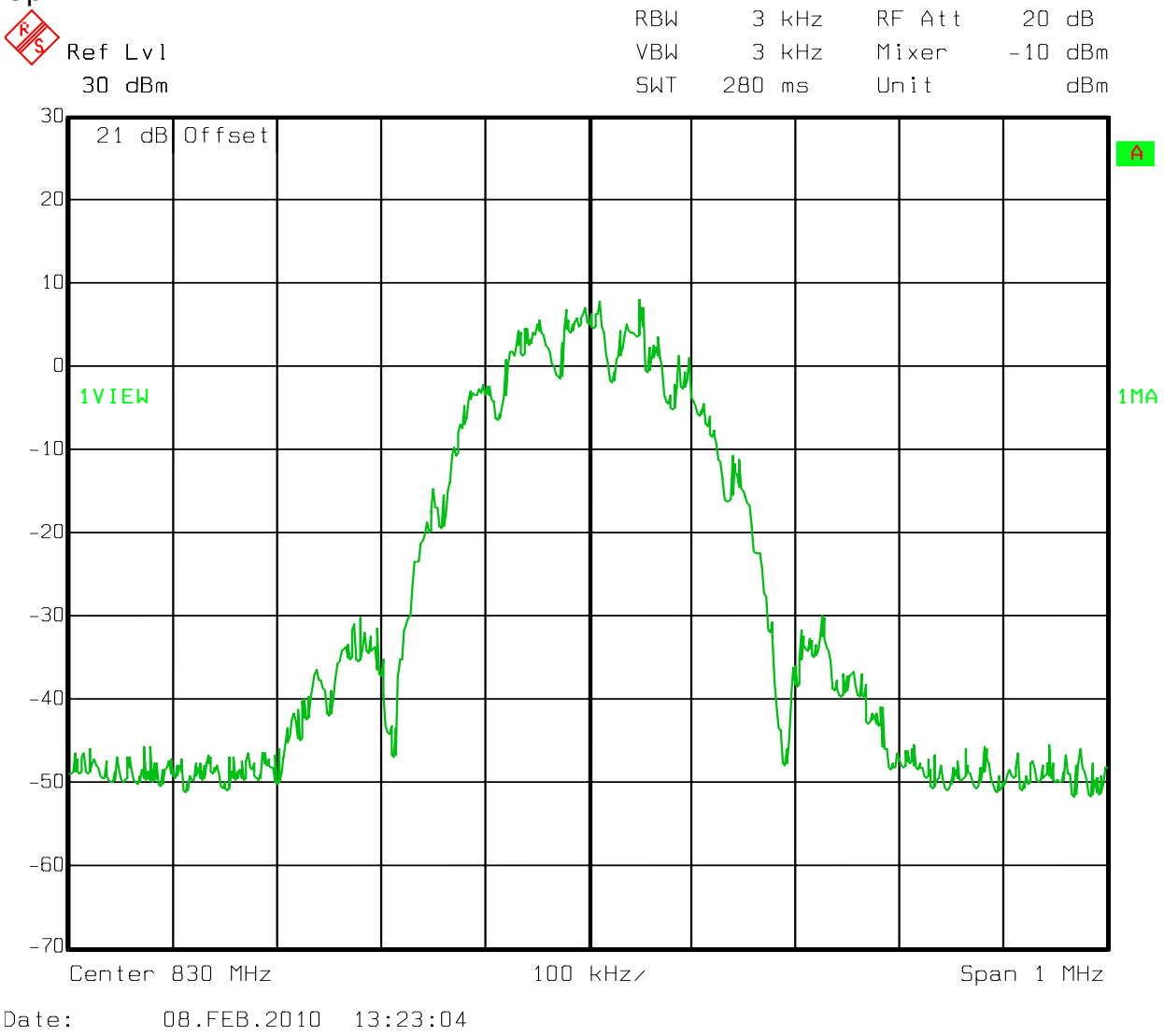
Test Data – Occupied Bandwidth

EDGE - Input
Downlink



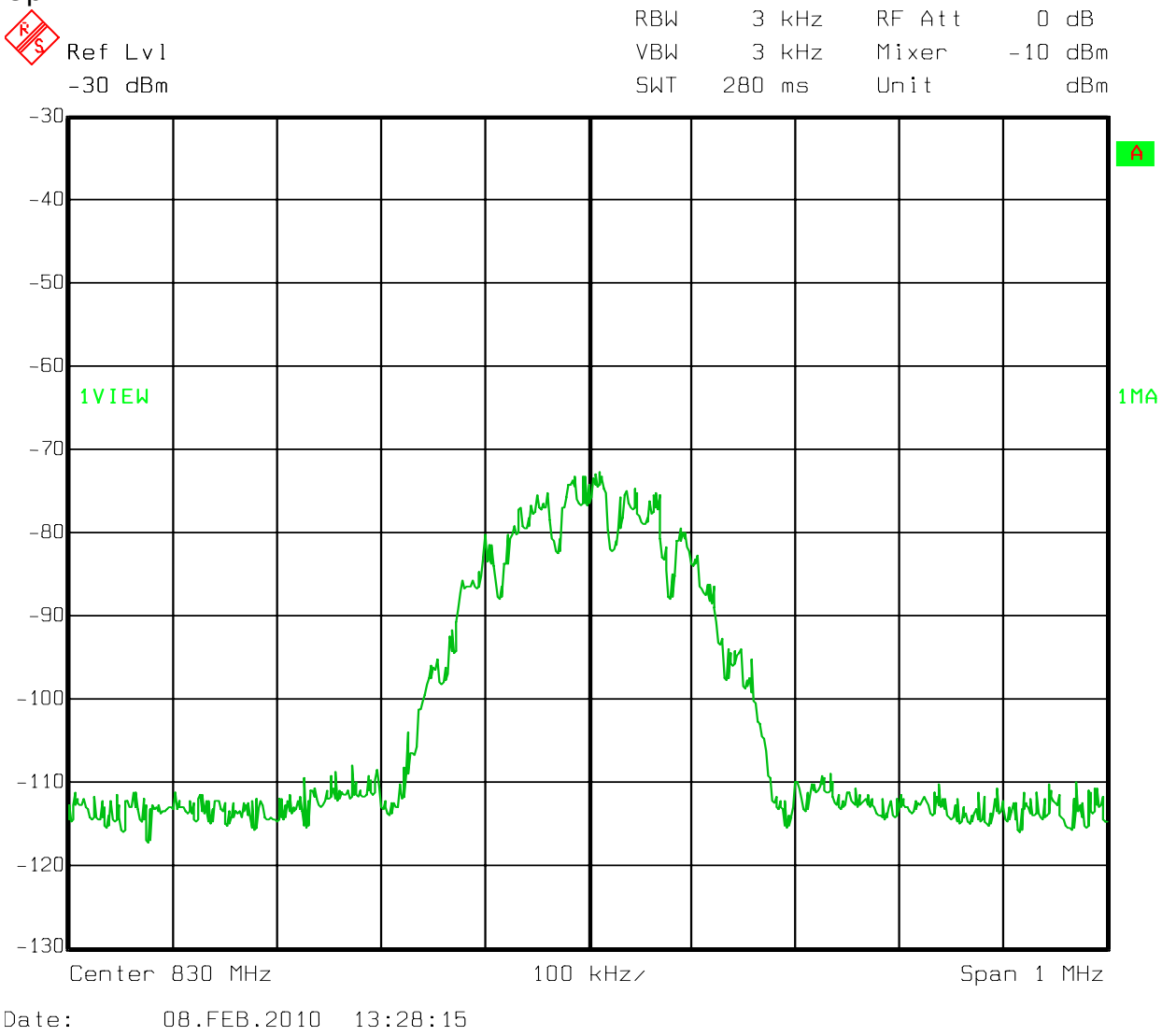
Test Data – Occupied Bandwidth

EDGE - Output
Uplink



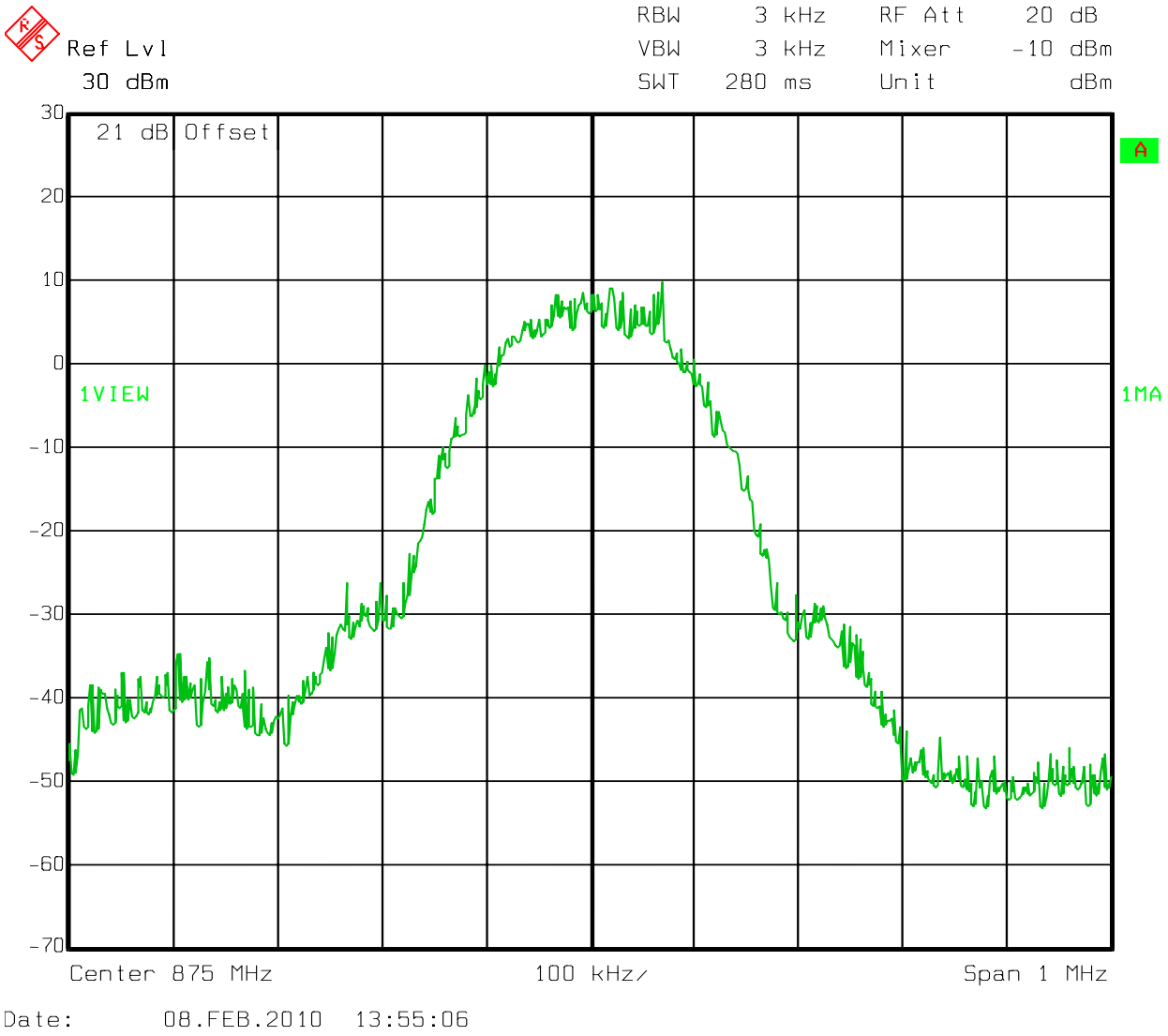
Test Data – Occupied Bandwidth

EDGE - Input
Uplink



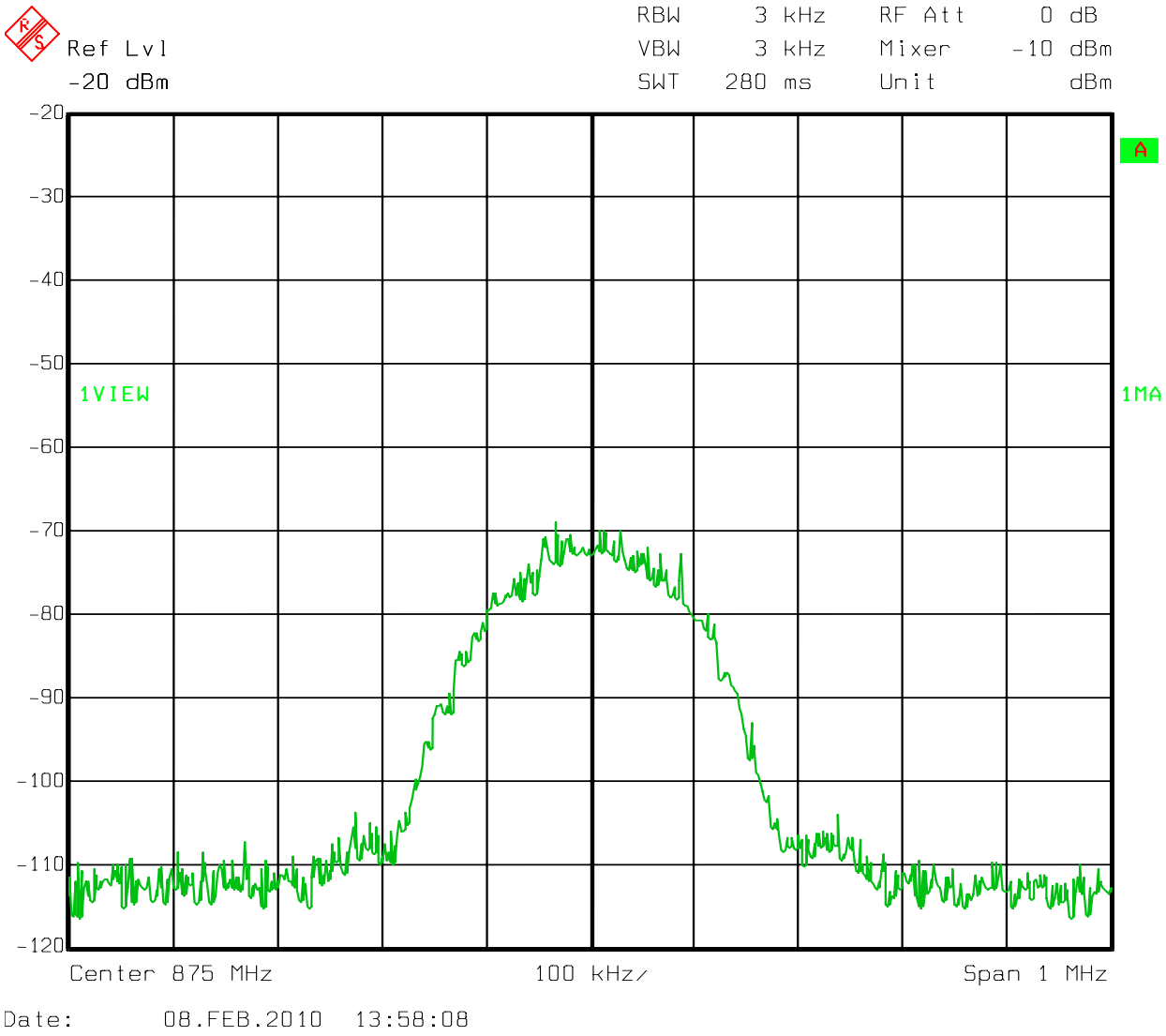
Test Data – Occupied Bandwidth

GSM - Output
Downlink



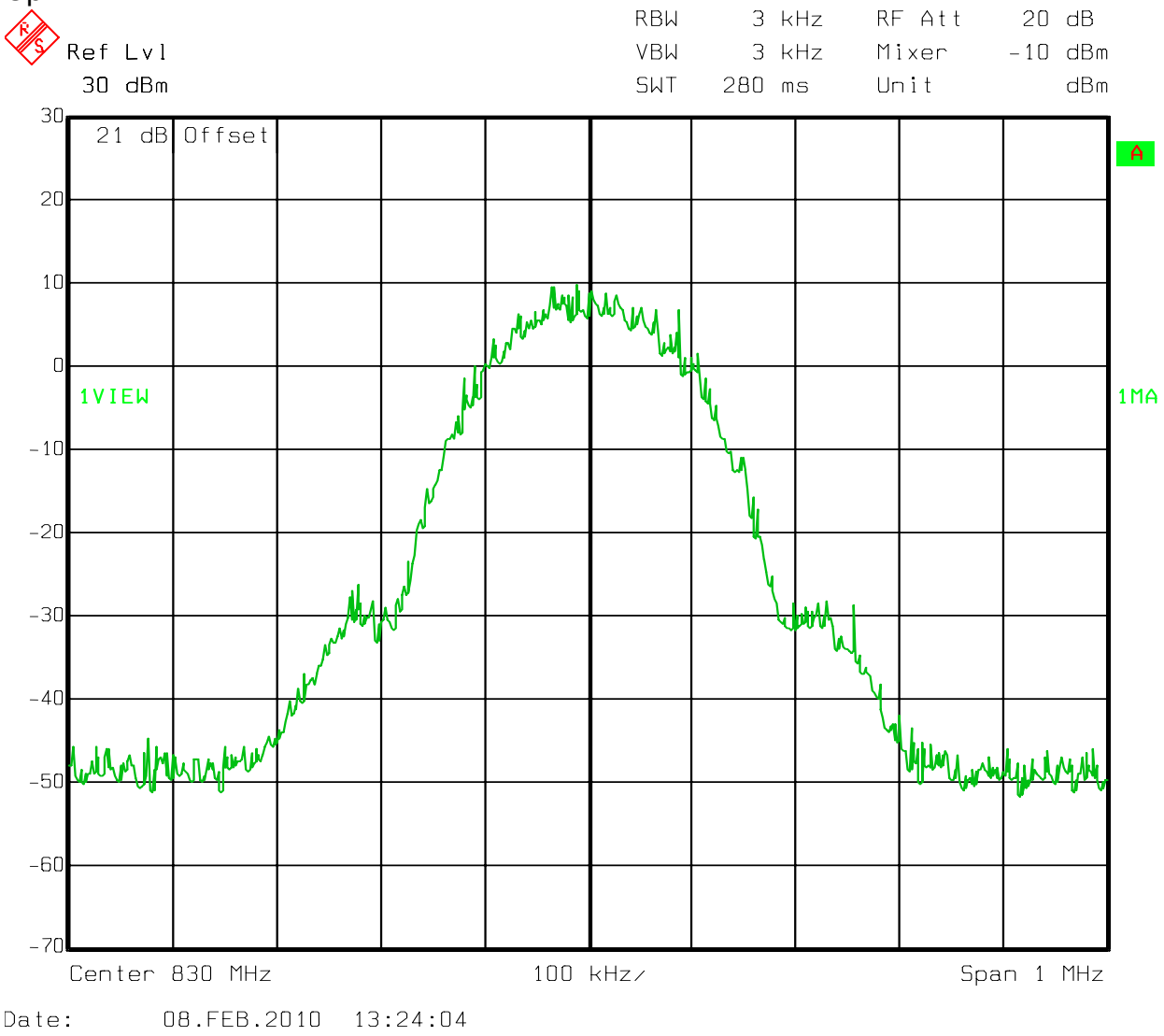
Test Data – Occupied Bandwidth

GSM - Input
Downlink



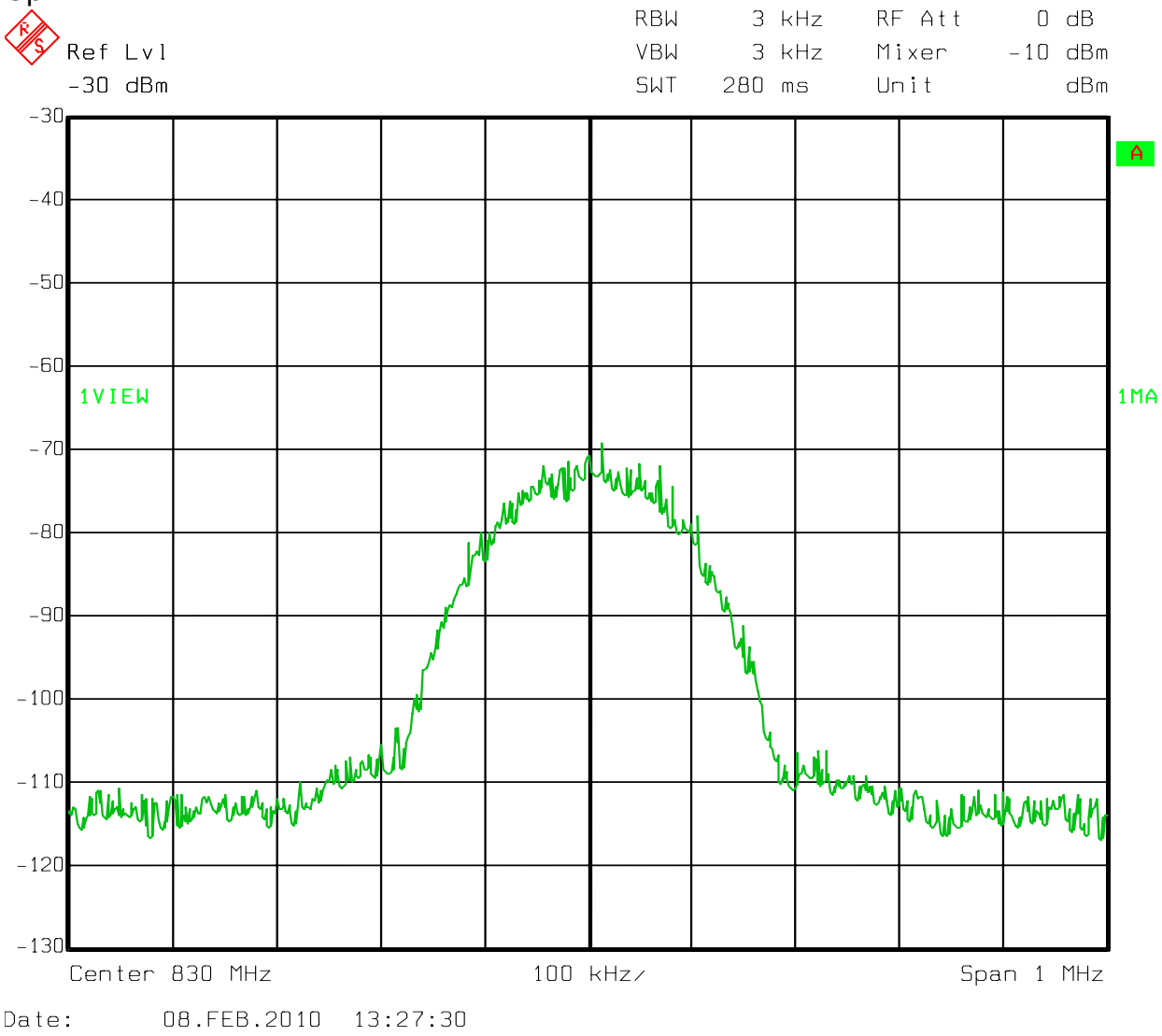
Test Data – Occupied Bandwidth

GSM - Output
Uplink



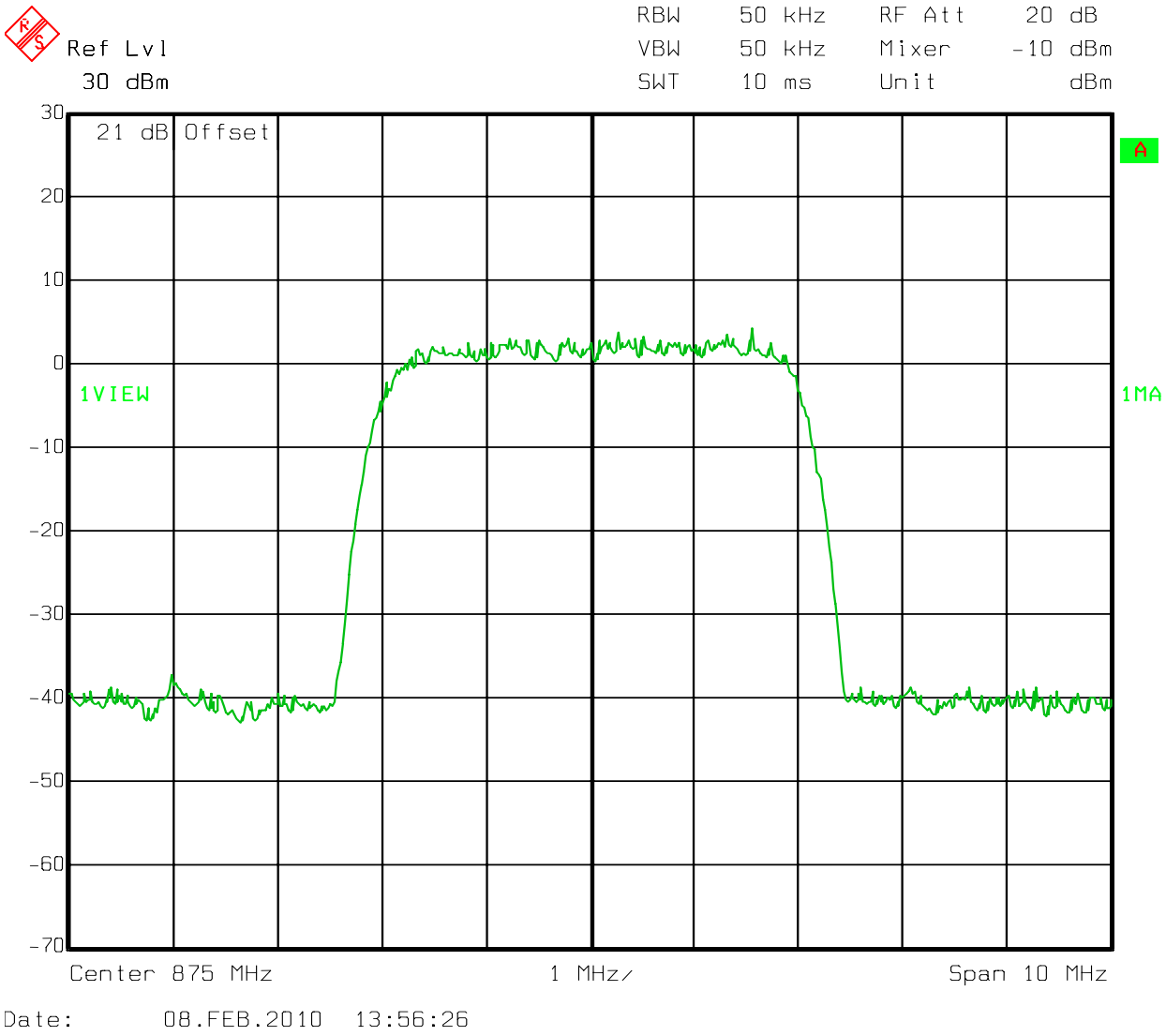
Test Data – Occupied Bandwidth

GSM - Input
Uplink



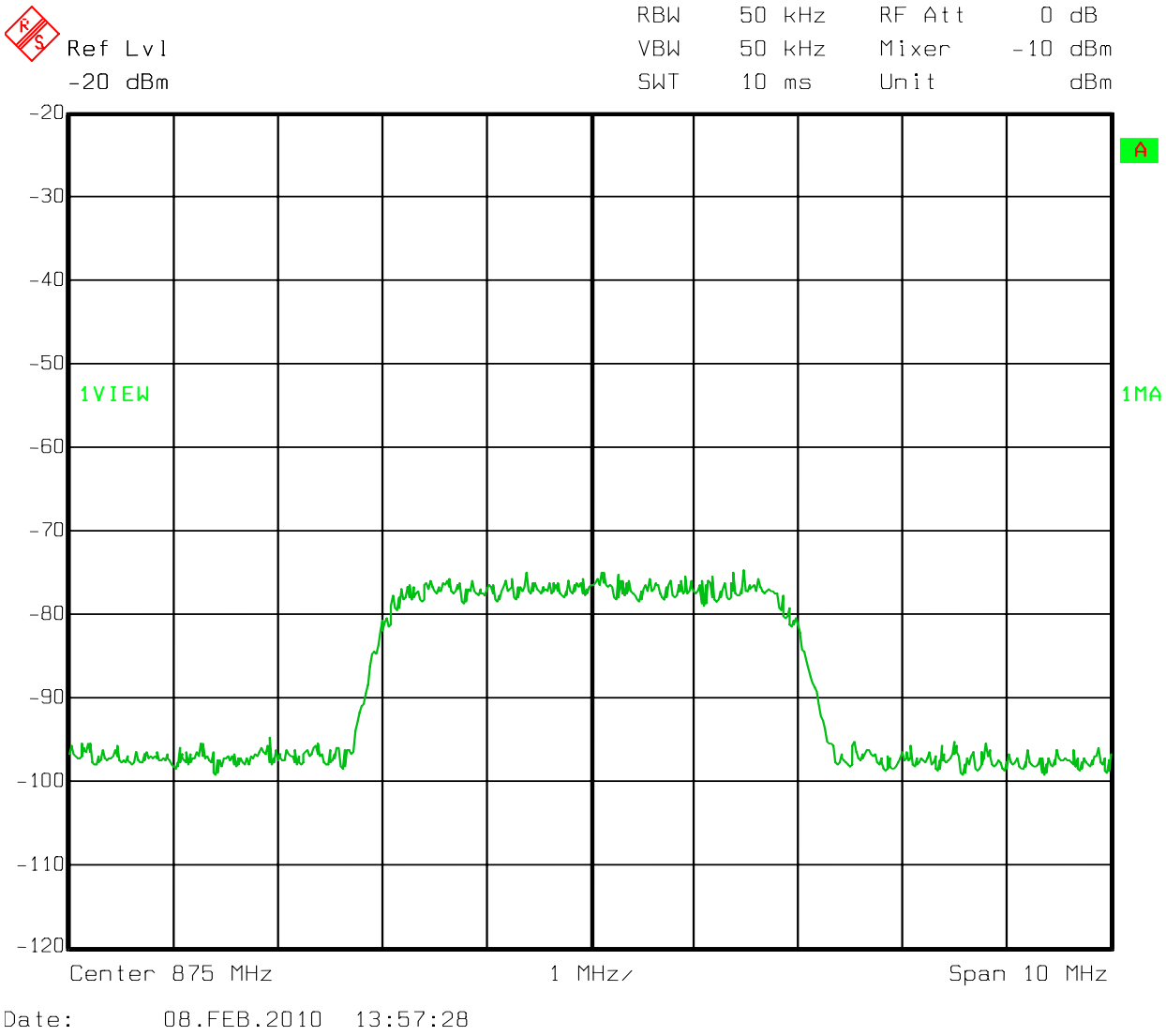
Test Data – Occupied Bandwidth

WCDMA - Output
Downlink



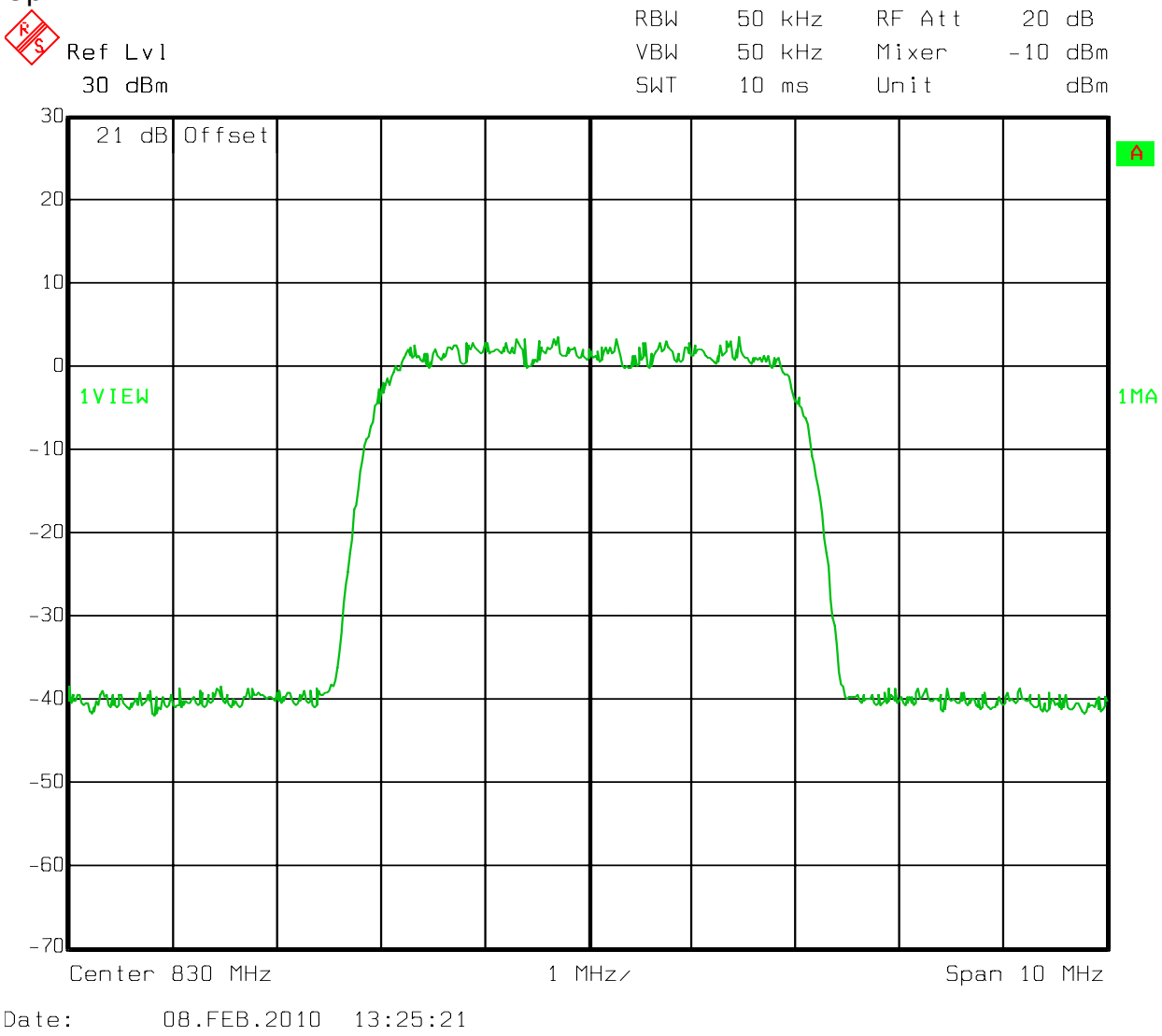
Test Data – Occupied Bandwidth

WCDMA - Input
Downlink



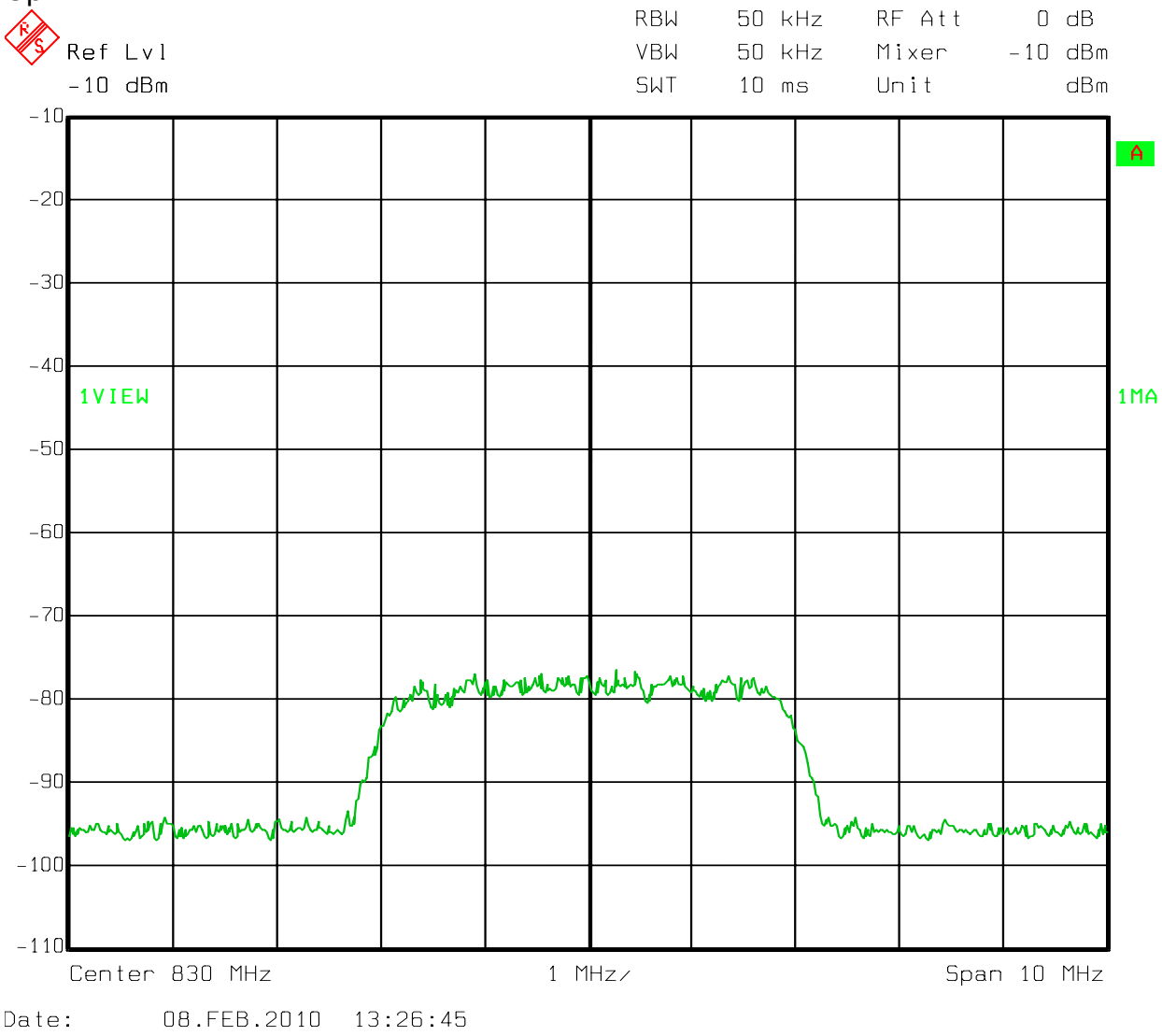
Test Data – Occupied Bandwidth

WCDMA - Output
Uplink



Test Data – Occupied Bandwidth

WCDMA - Input
Uplink



Section 4. Spurious Emissions at Antenna Terminals

NAME OF TEST: Spurious Emissions @ Antenna Terminals	PARA. NO.: 22.917
TESTED BY: David Light	DATE: 08 February 2010

Test Results: Complies.

Test Data: See attached plot(s).

Equipment Used: 1036-1472-1082

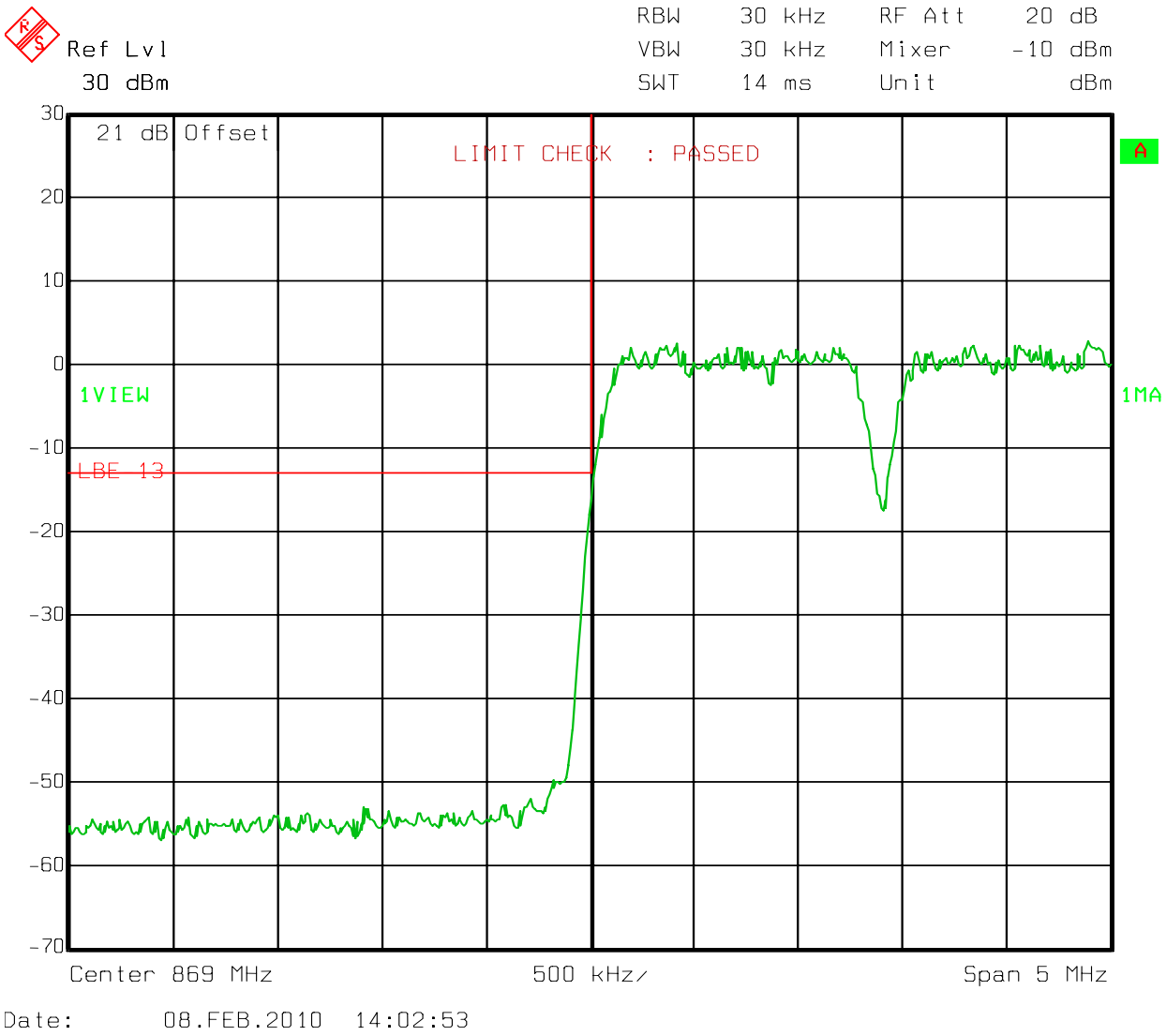
Measurement Uncertainty: +/- 1.7 dB

Temperature: 22 °C

Relative Humidity: 35 %

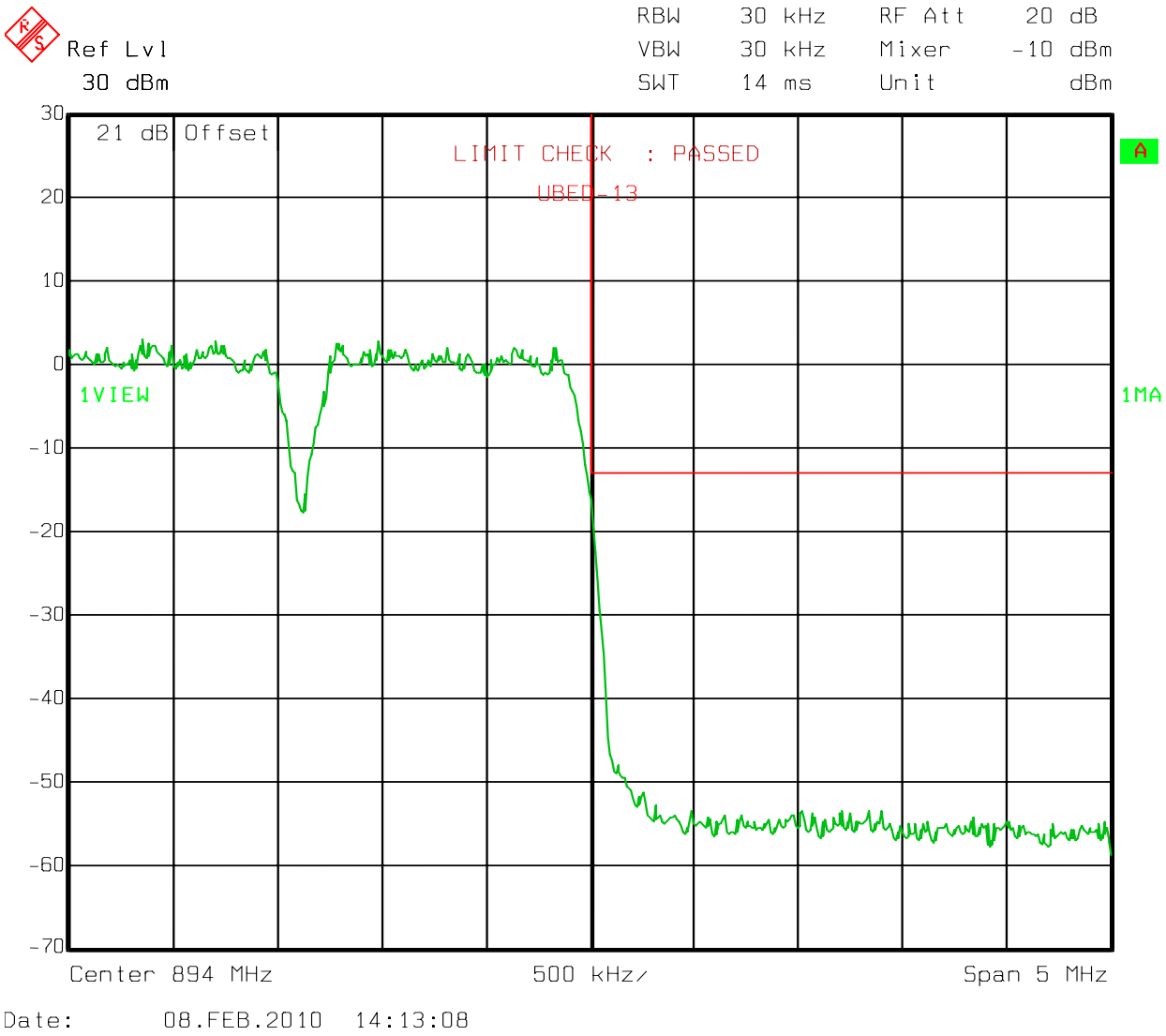
Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation
CDMA
Downlink



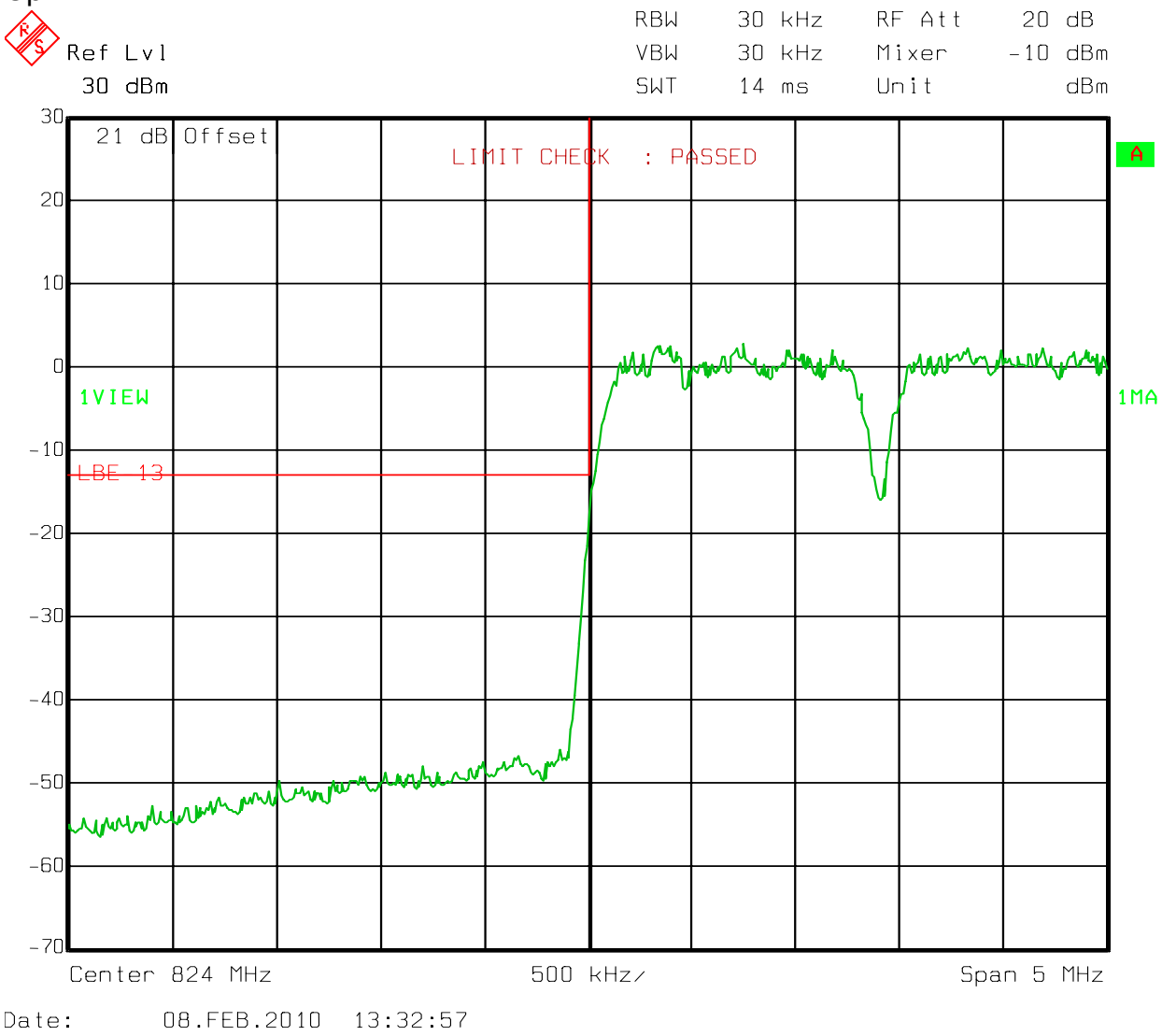
Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation
CDMA
Downlink



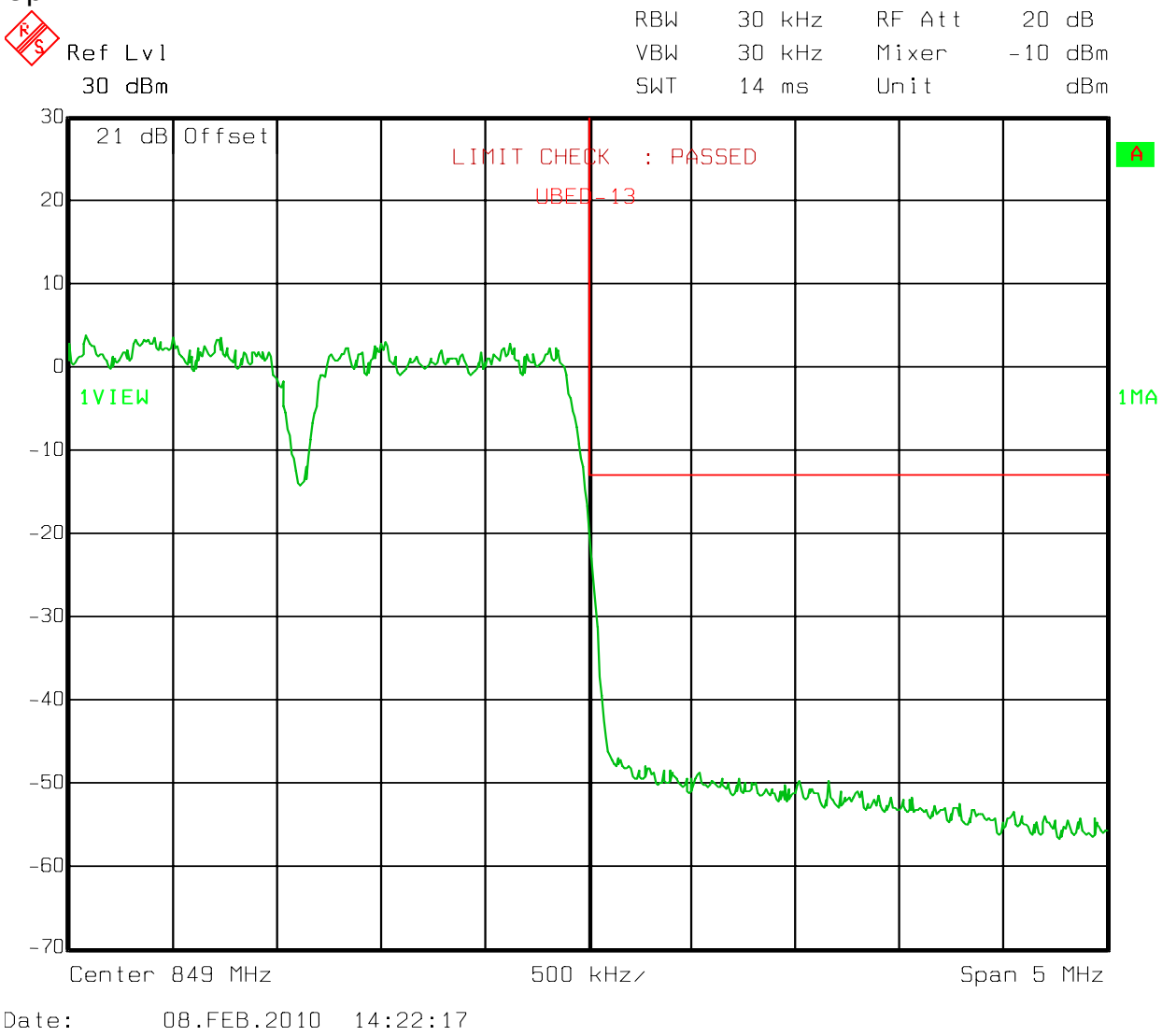
Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation
CDMA
Uplink



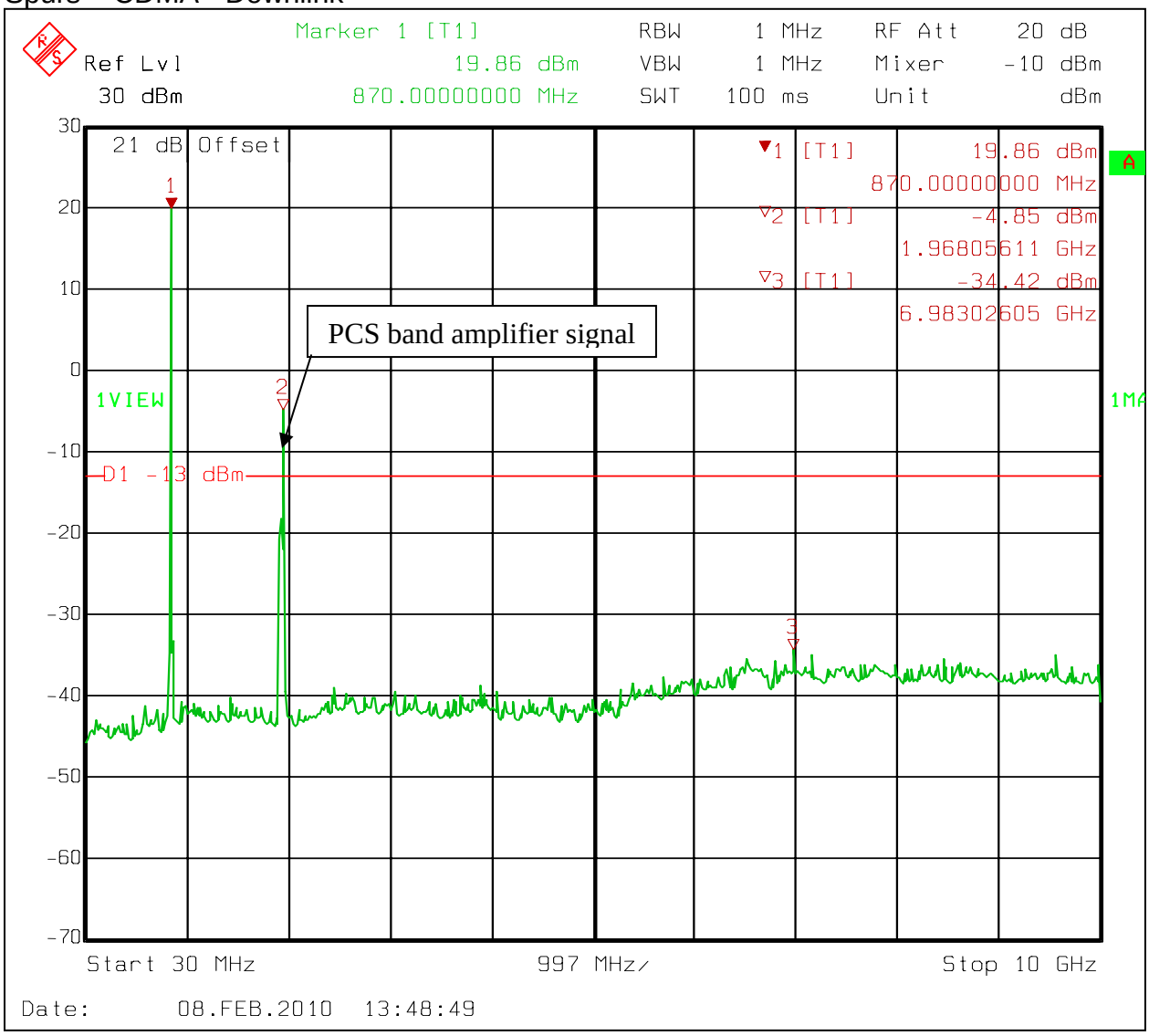
Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation
CDMA
Uplink



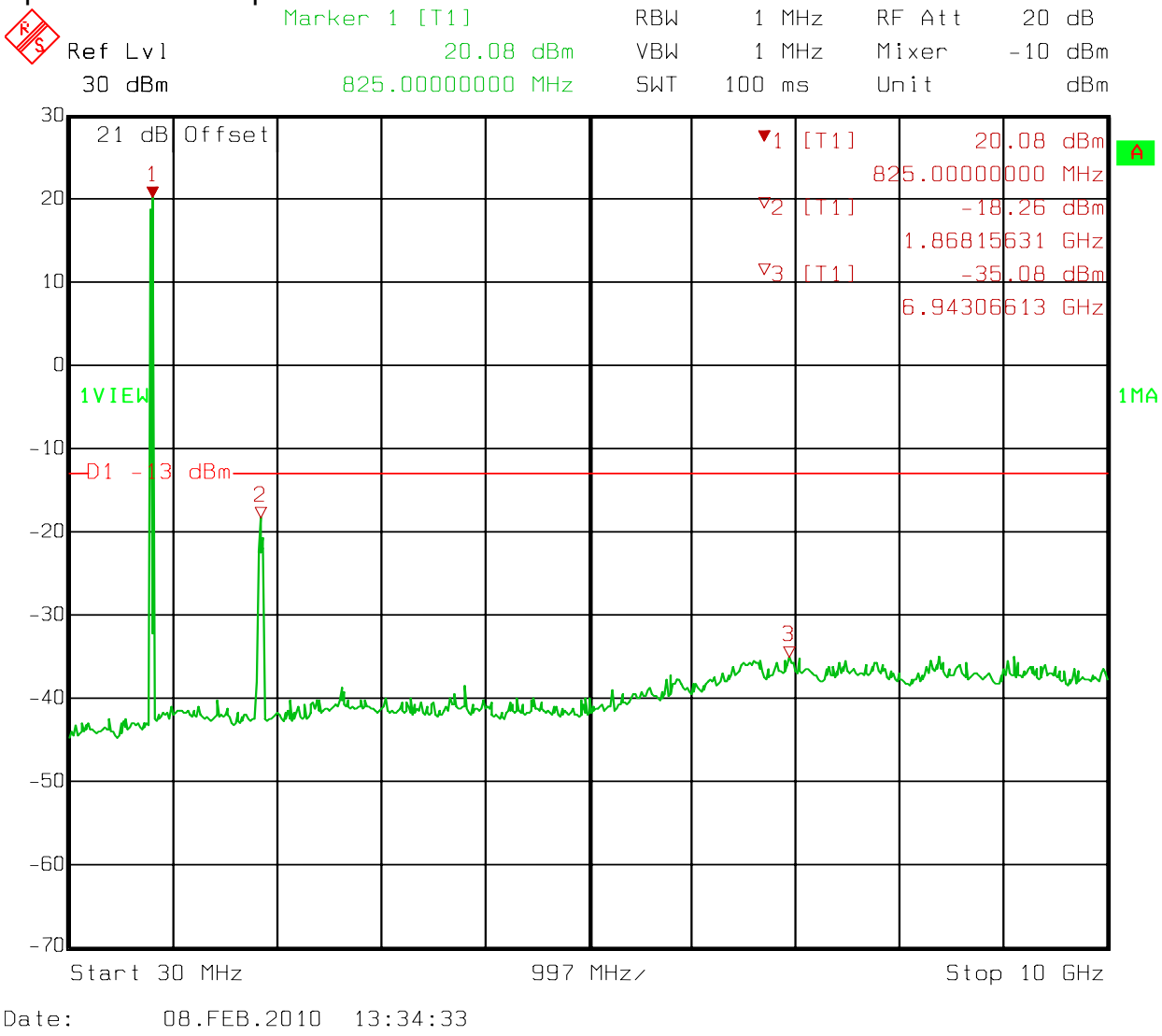
Test Data – Spurious Emissions at Antenna Terminals

Spurs – CDMA - Downlink



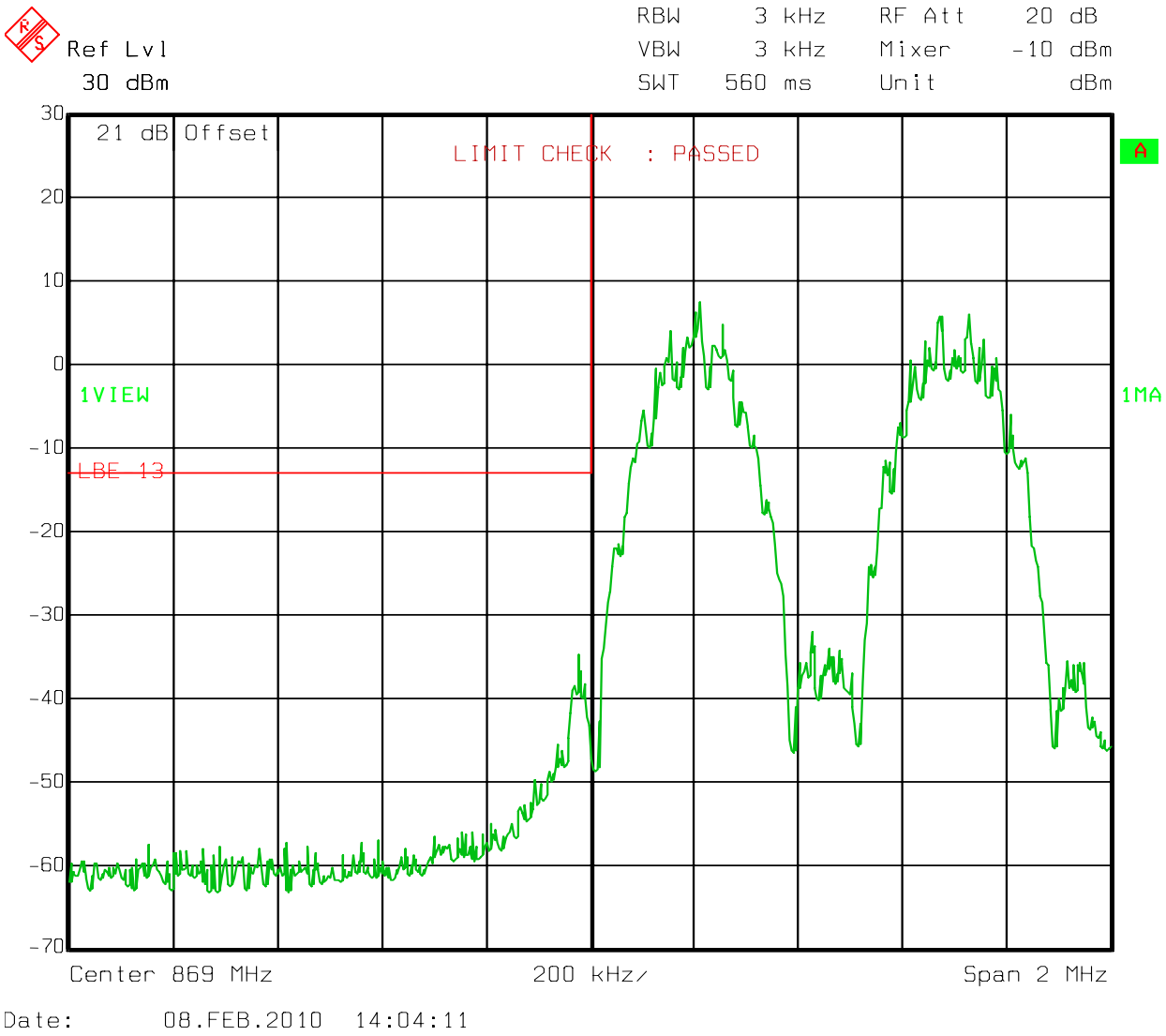
Test Data – Spurious Emissions at Antenna Terminals

Spurs – CDMA - Uplink



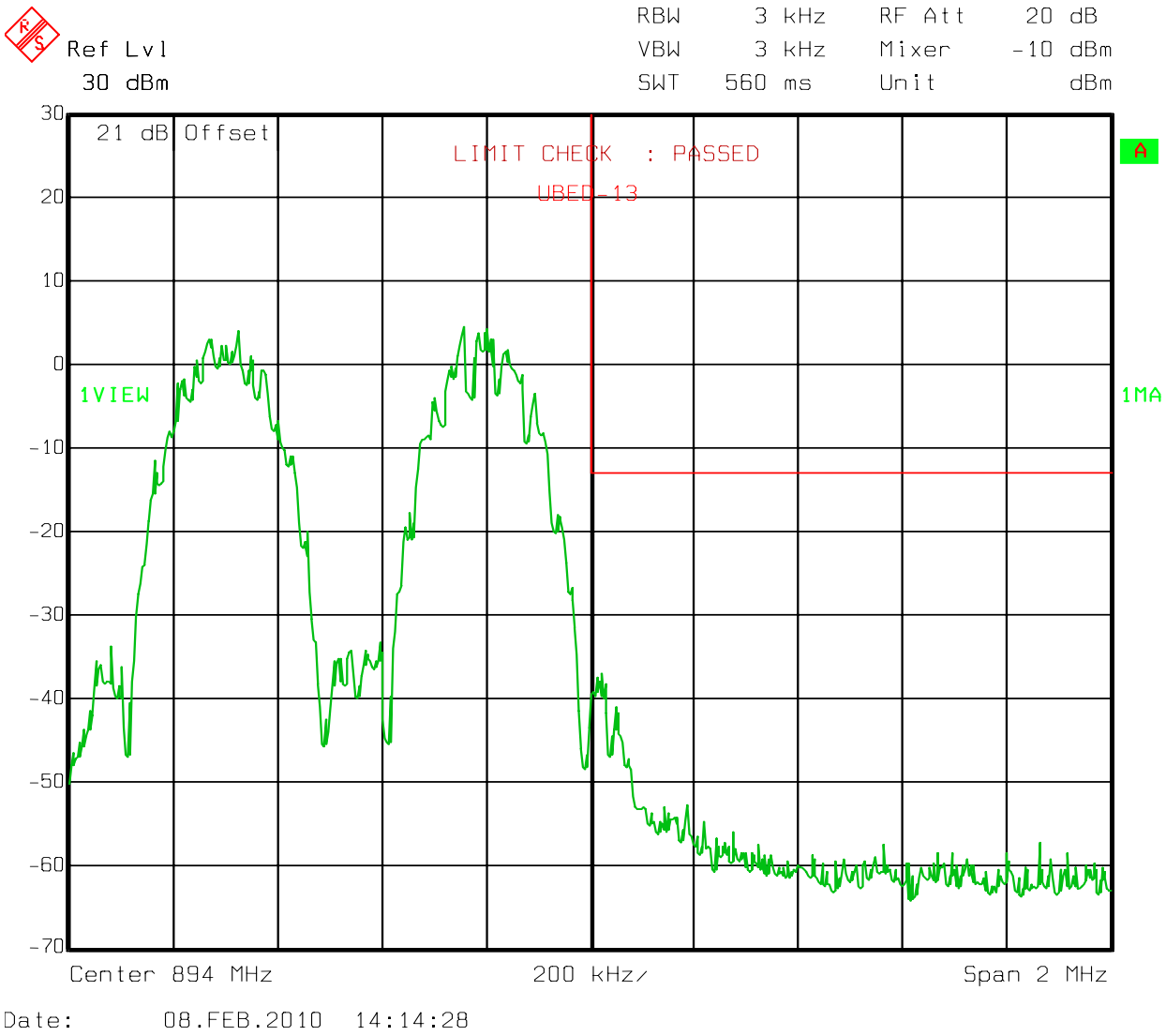
Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation
EDGE
Downlink



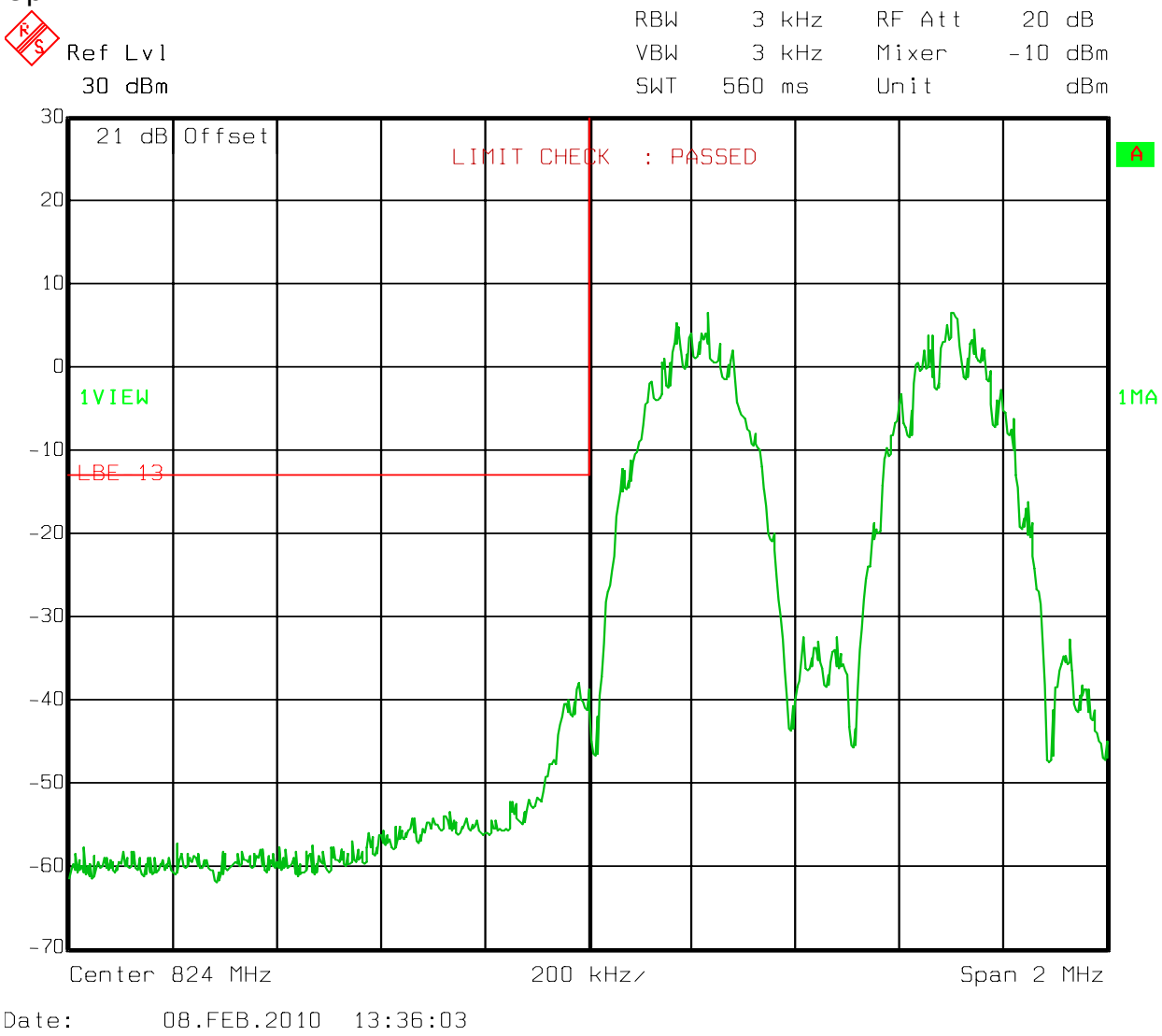
Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation
EDGE
Downlink



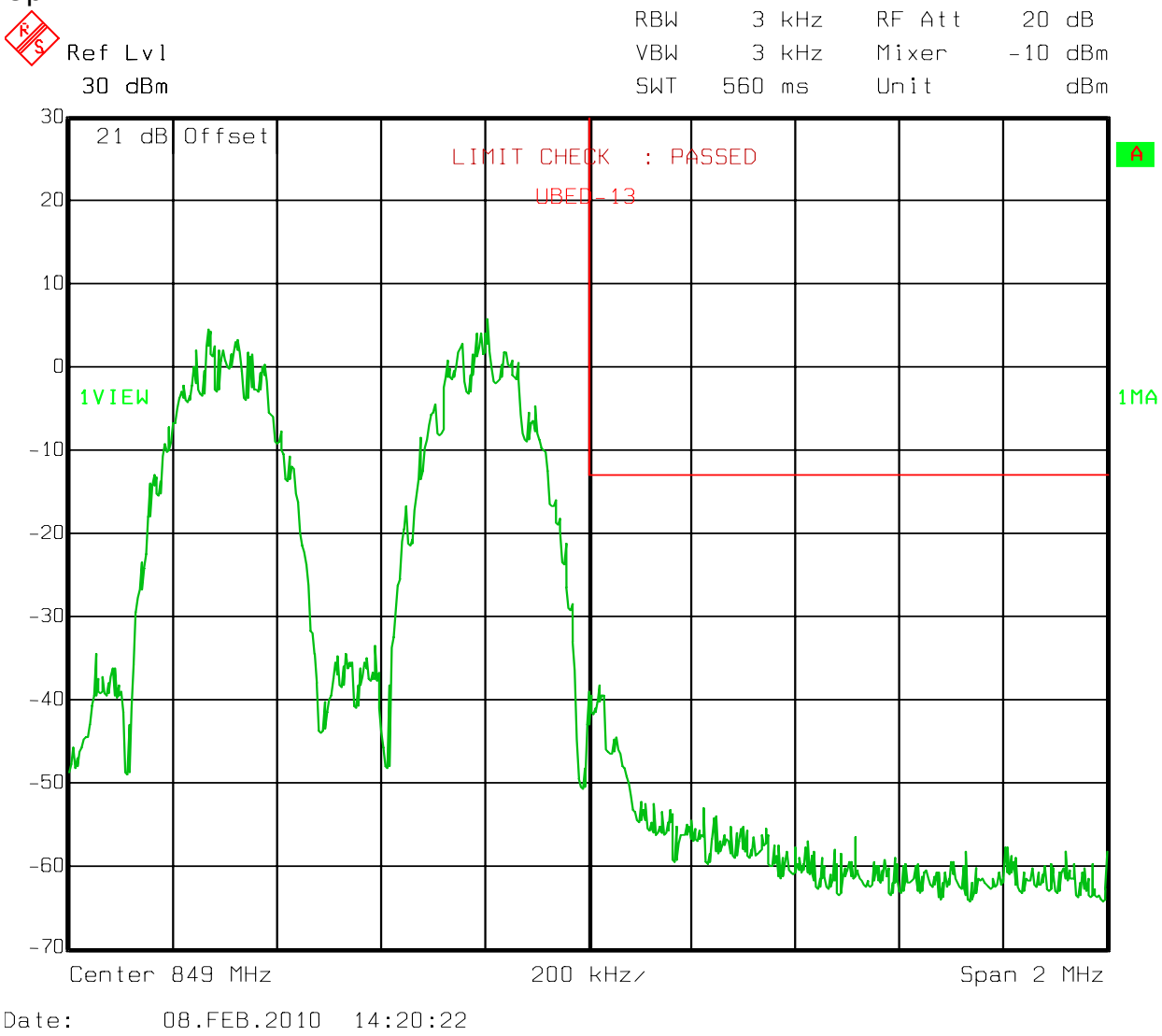
Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation
EDGE
Uplink



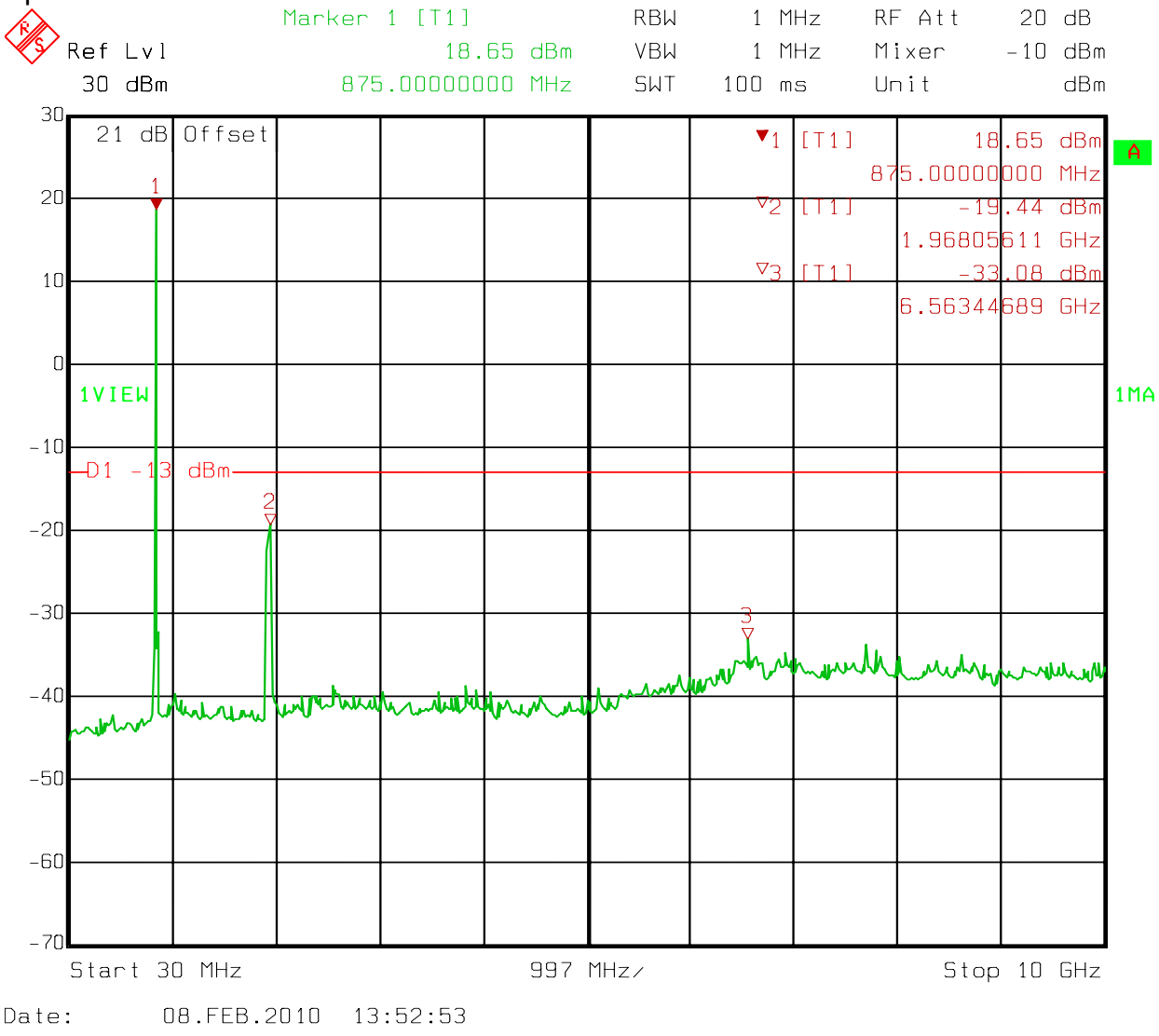
Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation
EDGE
Uplink



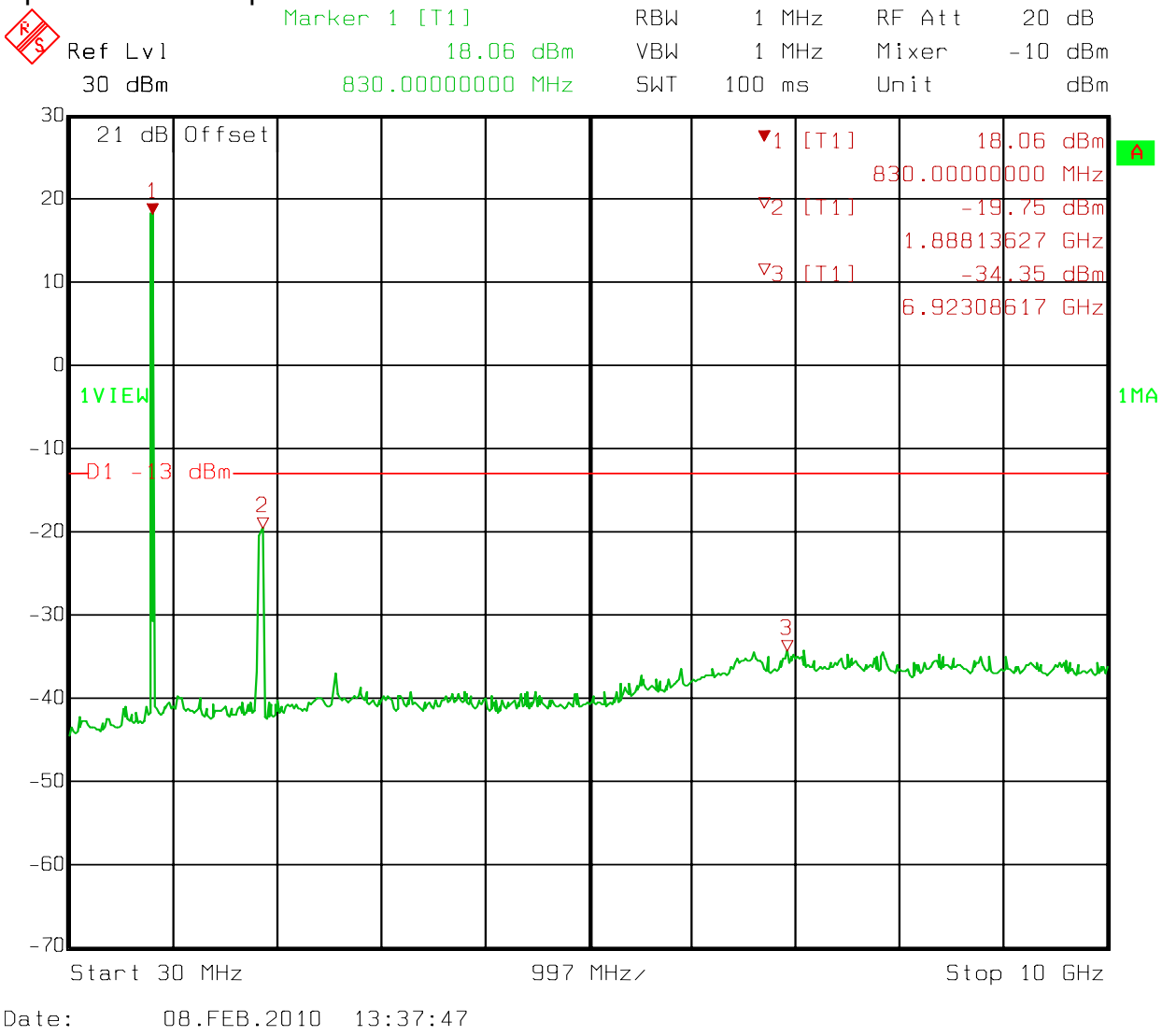
Test Data – Spurious Emissions at Antenna Terminals

Spurs – EDGE - Downlink



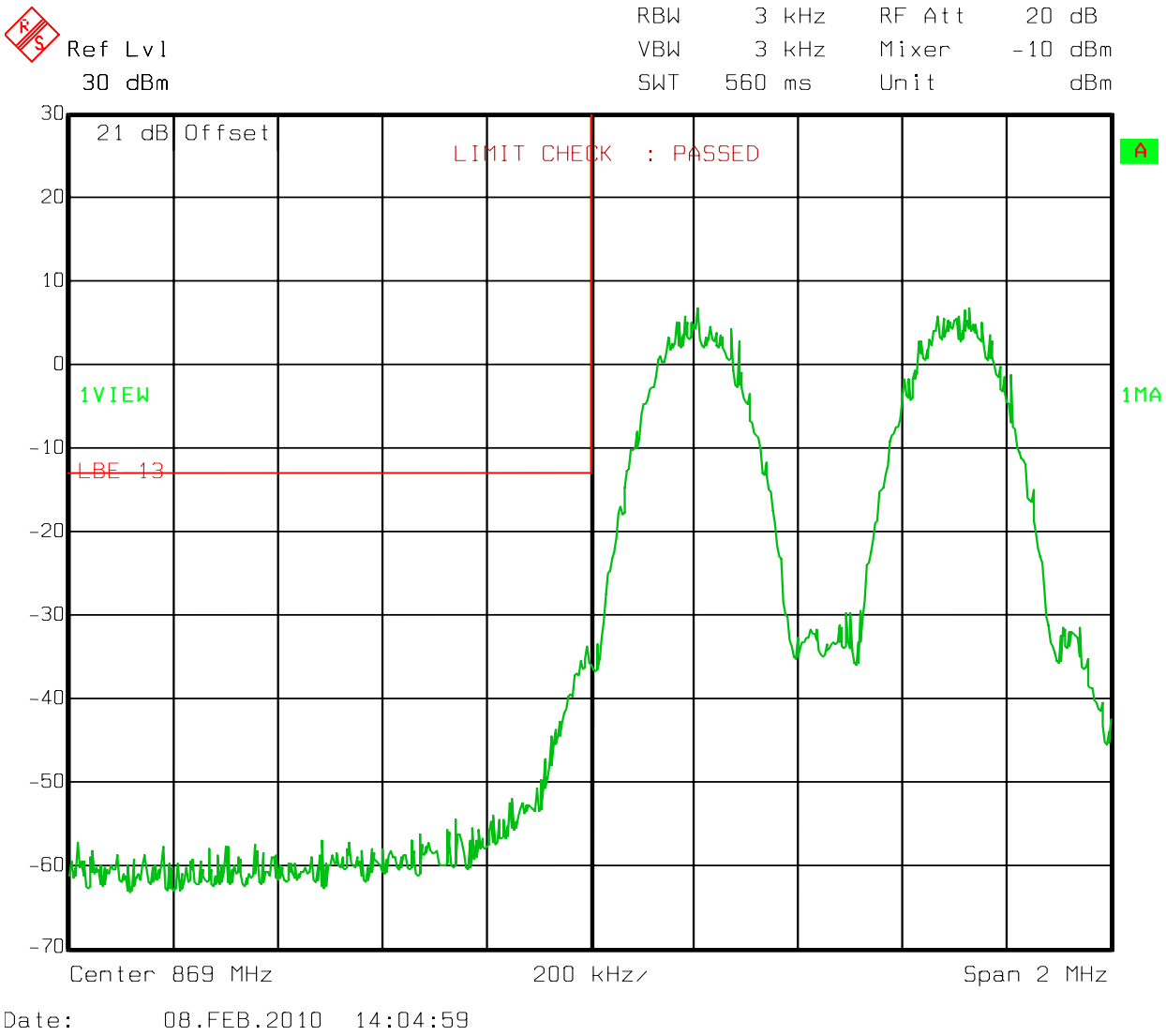
Test Data – Spurious Emissions at Antenna Terminals

Spurs – EDGE - Uplink



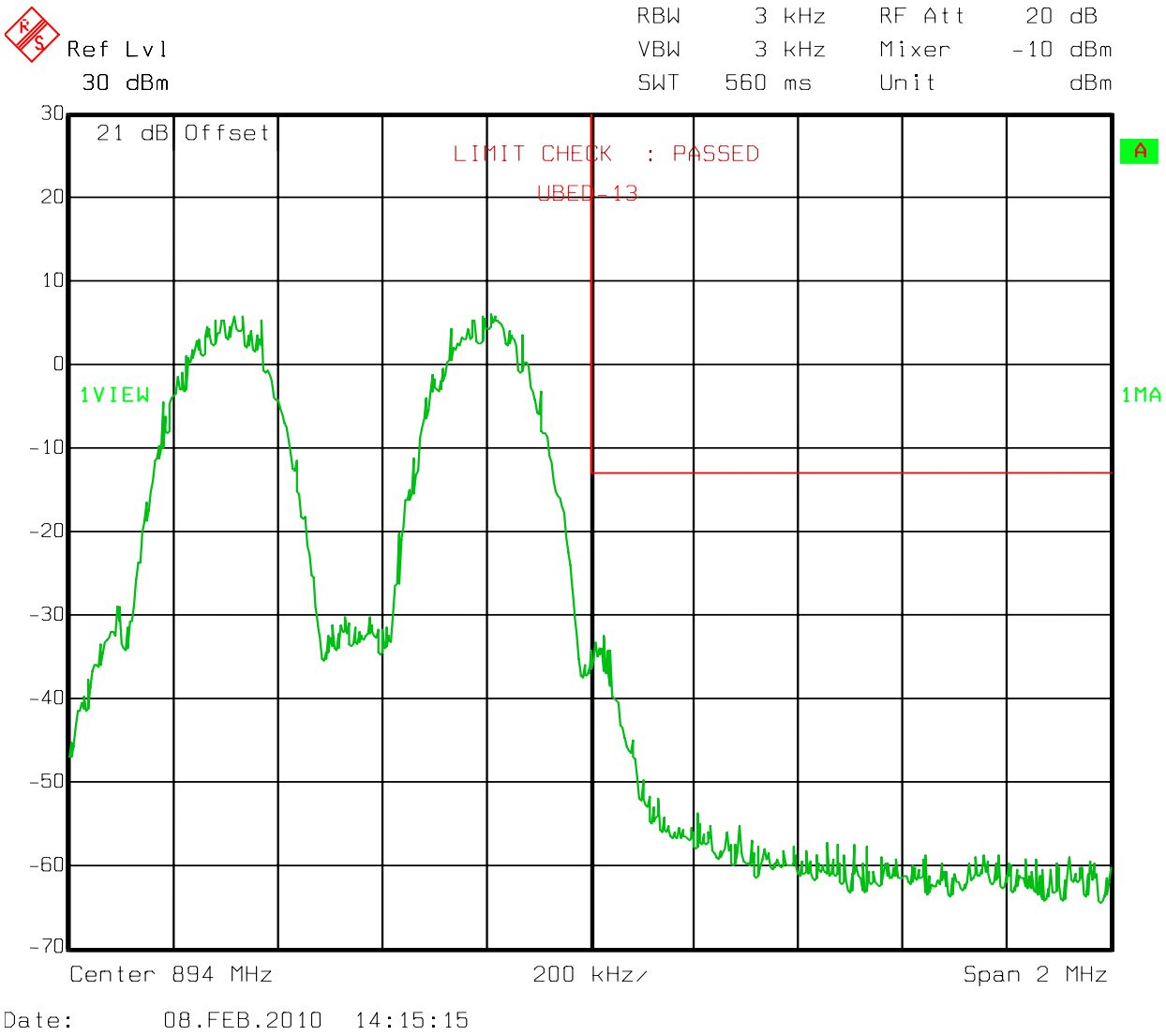
Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation
GSM
Downlink



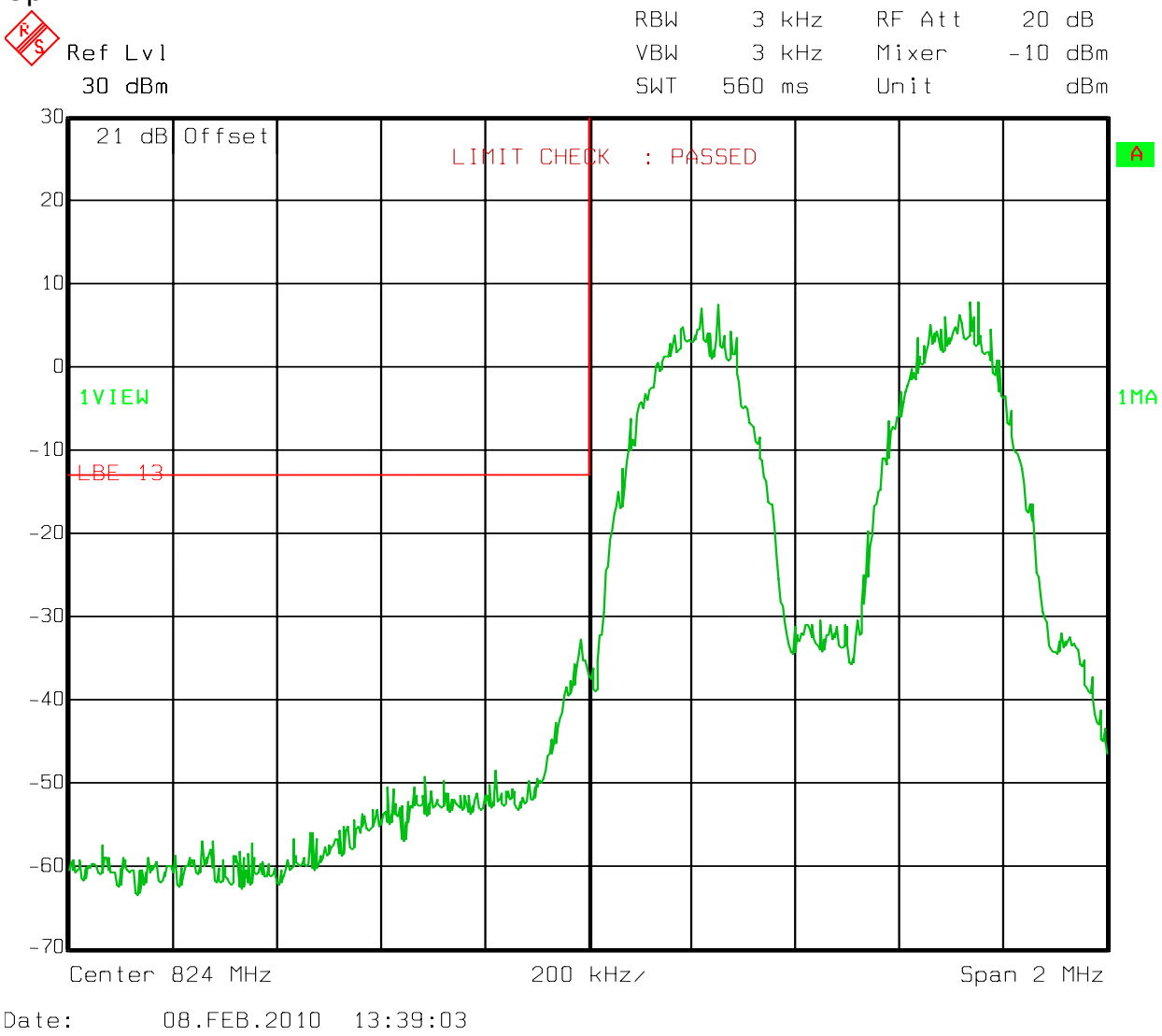
Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation
GSM
Downlink



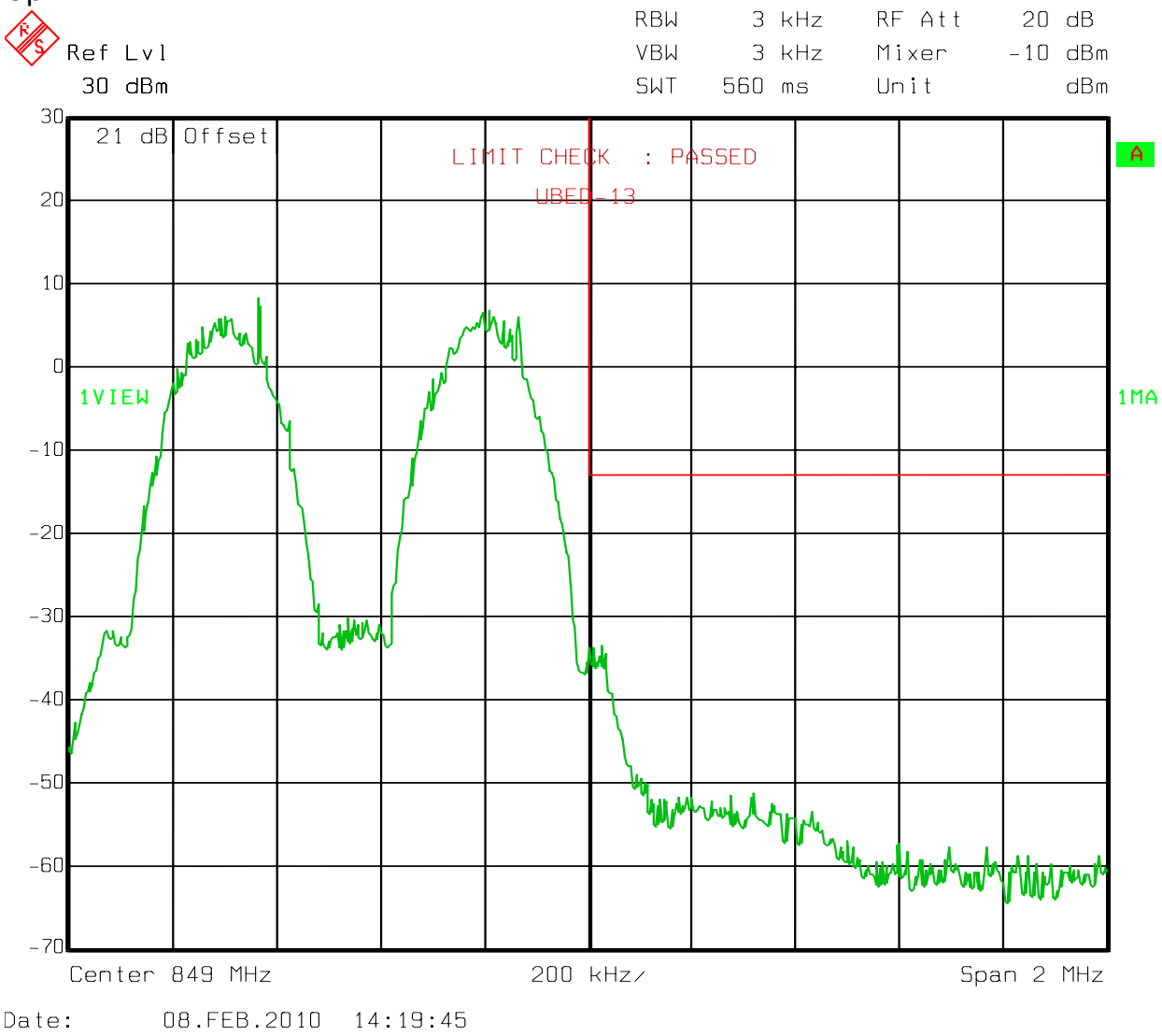
Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation
GSM
Uplink



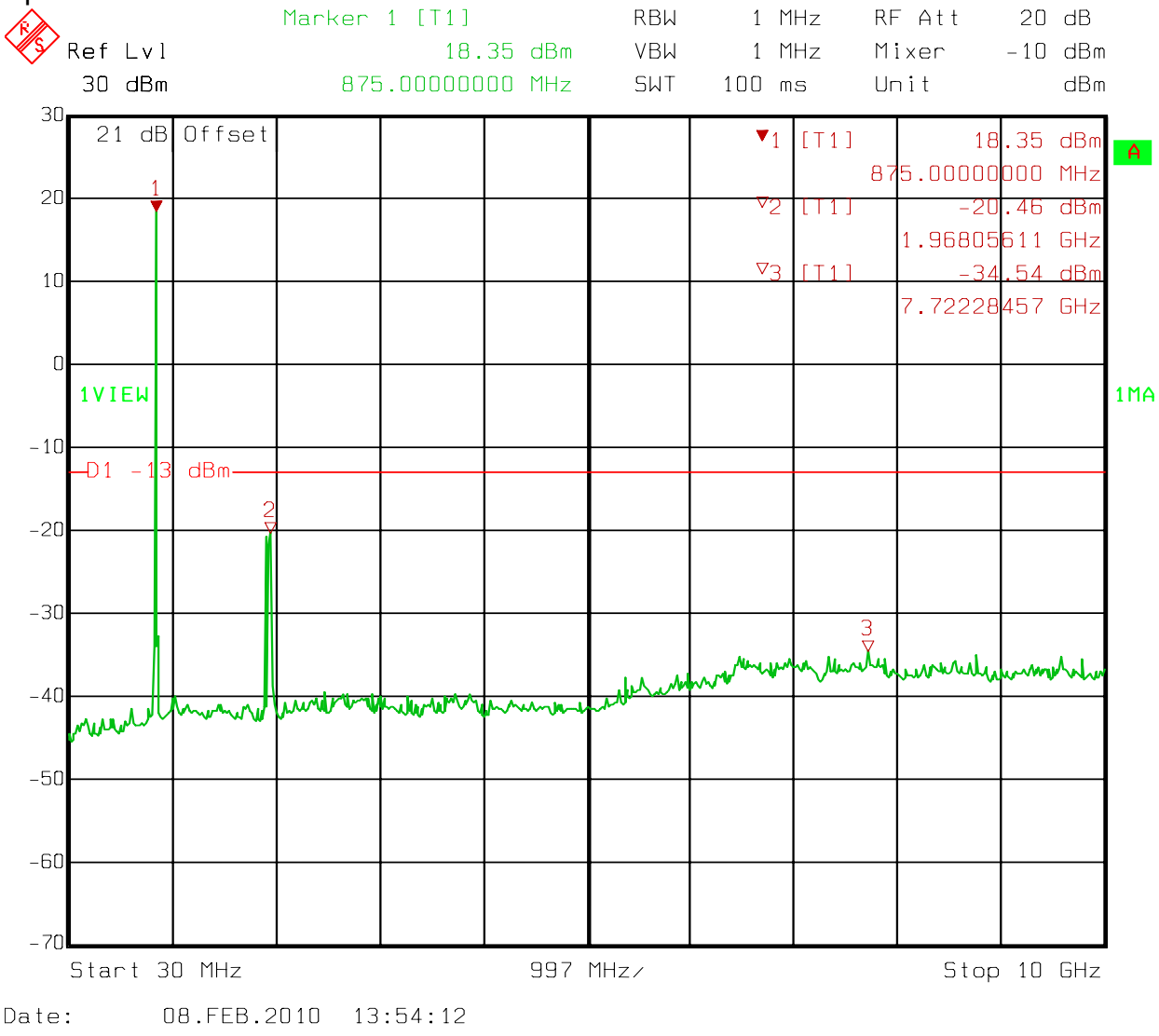
Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation
GSM
Uplink



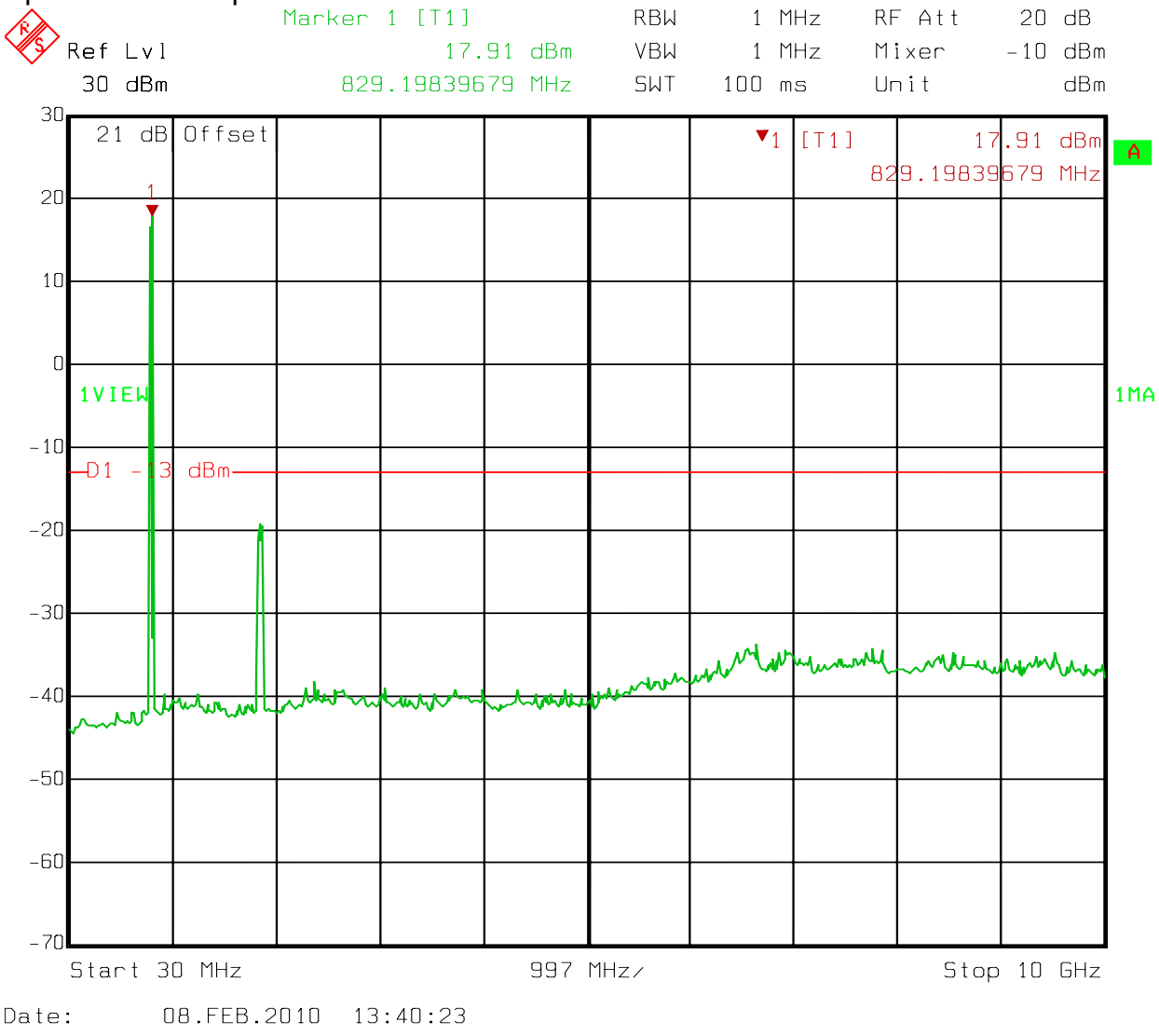
Test Data – Spurious Emissions at Antenna Terminals

Spurs – GSM - Downlink



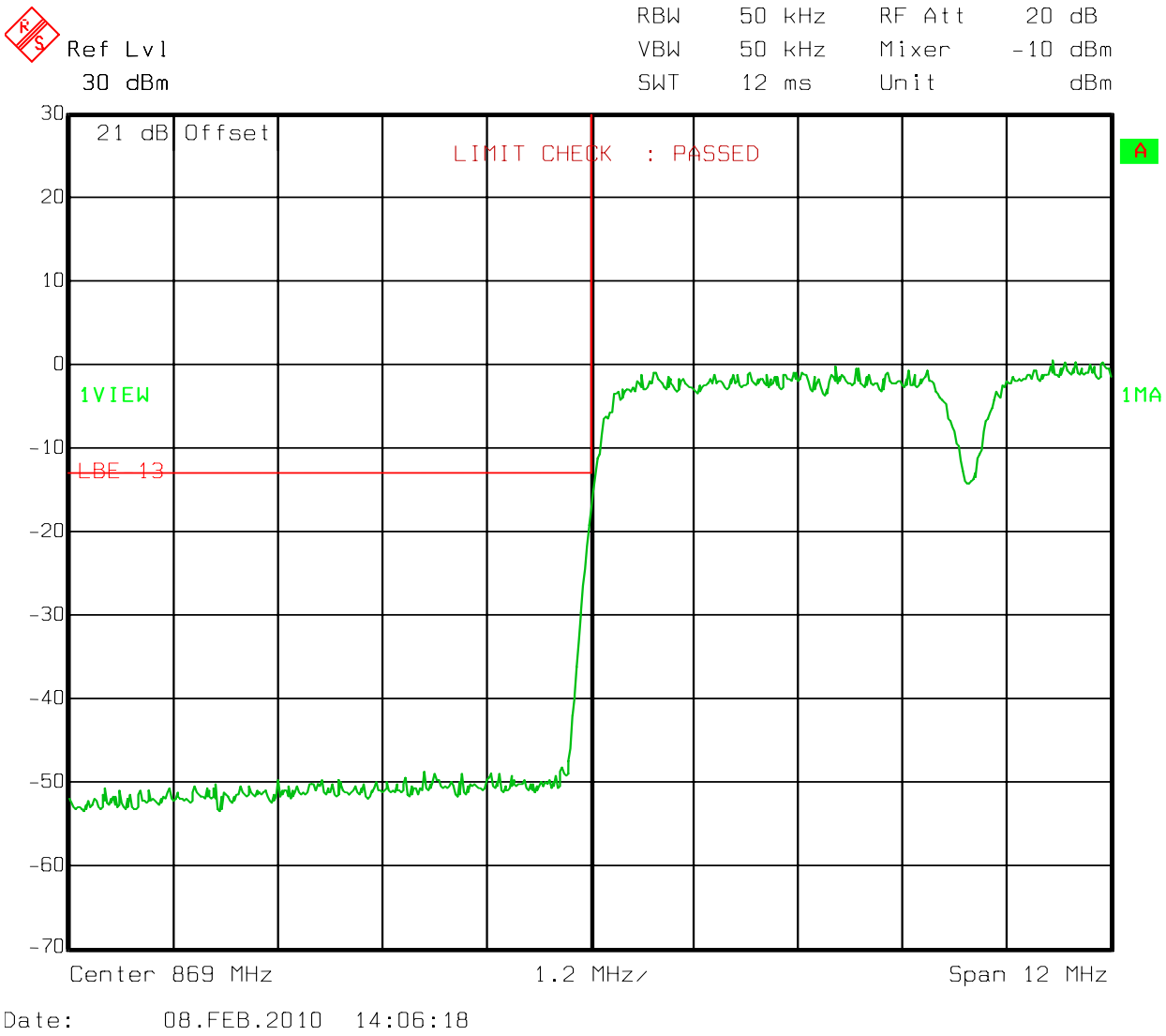
Test Data – Spurious Emissions at Antenna Terminals

Spurs – GSM - Uplink



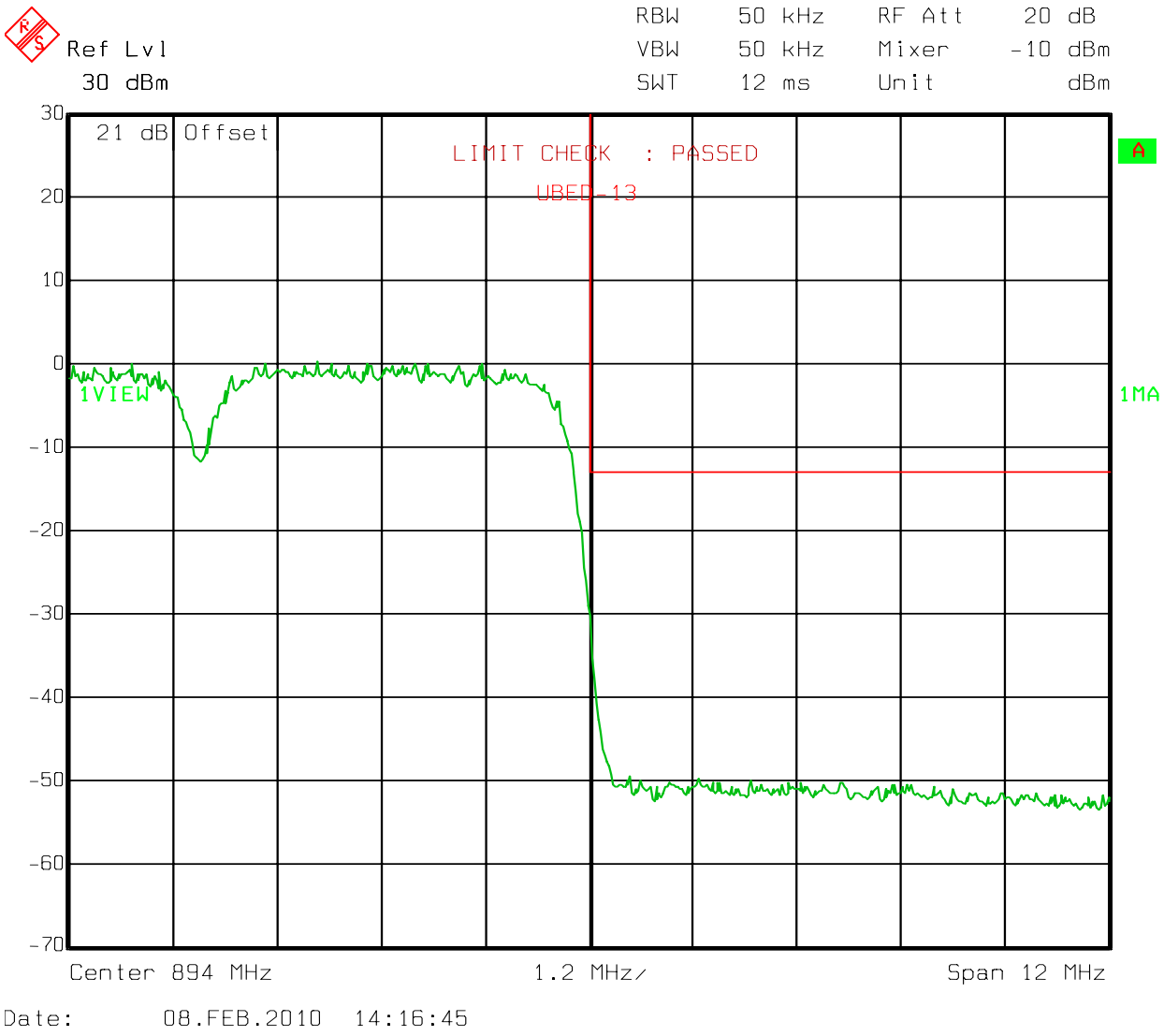
Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation
W-CDMA
Downlink



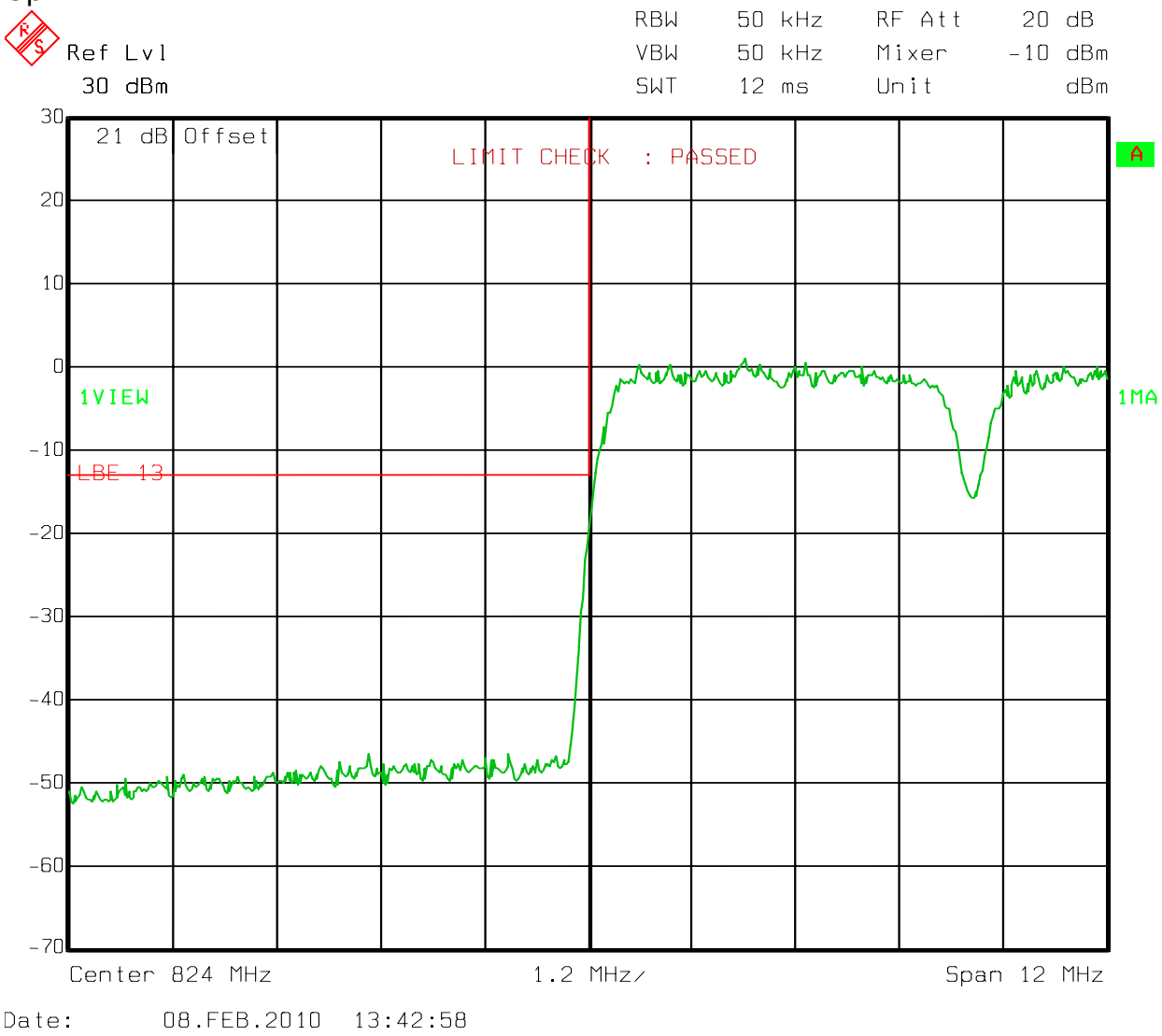
Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation
W-CDMA
Downlink



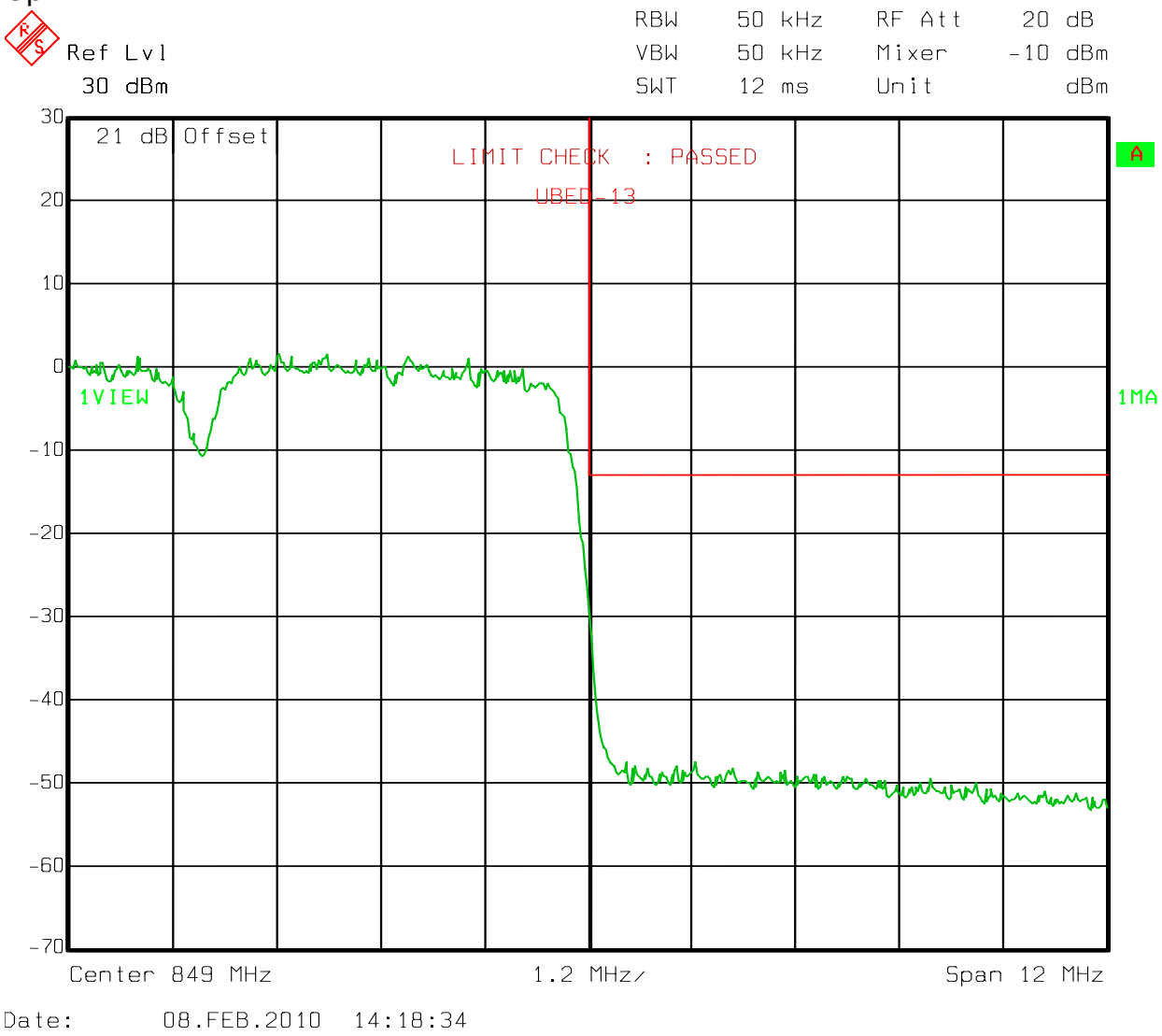
Test Data – Spurious Emissions at Antenna Terminals

Lower Bandedge Intermodulation
W-CDMA
Uplink



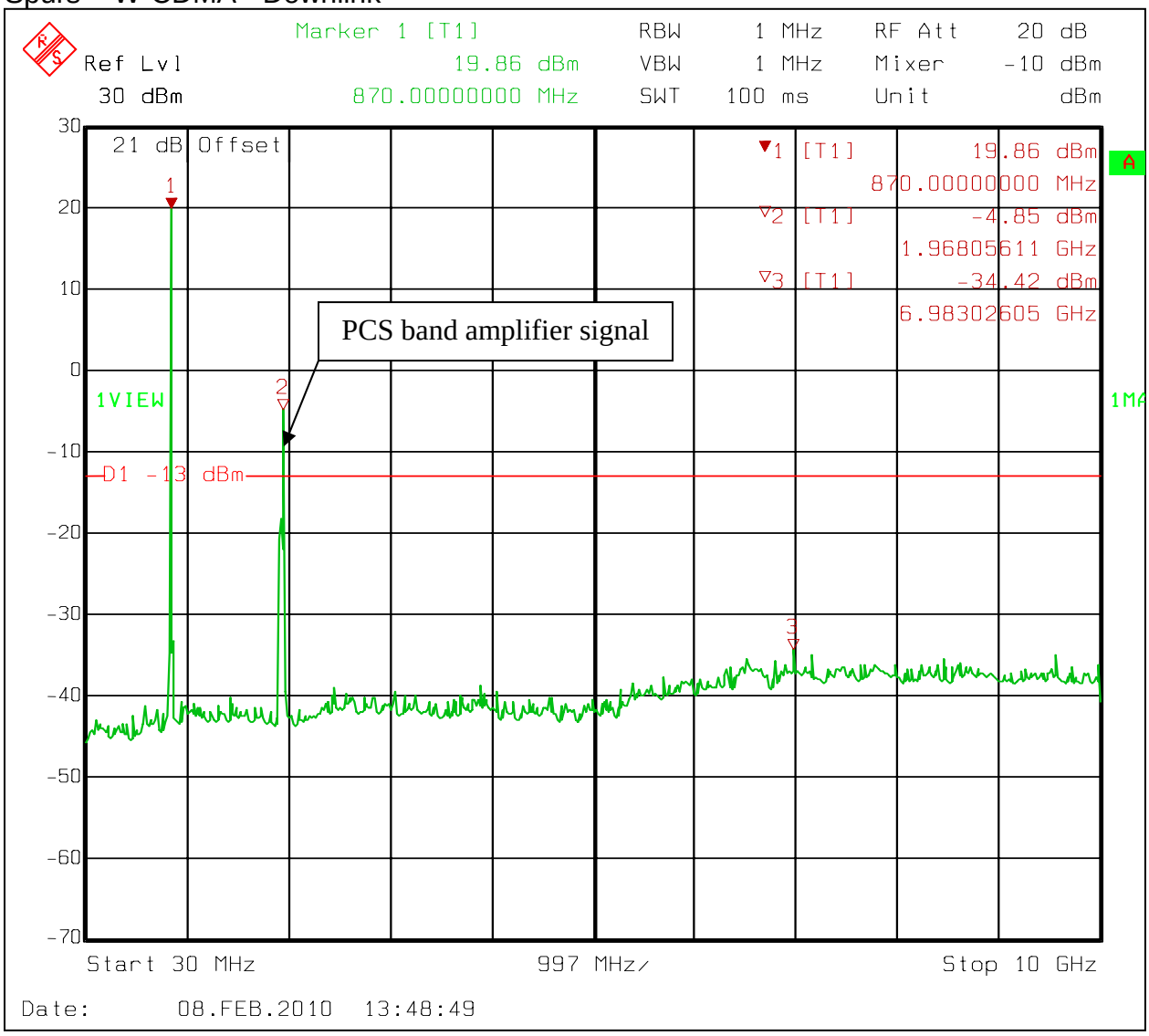
Test Data – Spurious Emissions at Antenna Terminals

Upper Bandedge Intermodulation
W-CDMA
Uplink



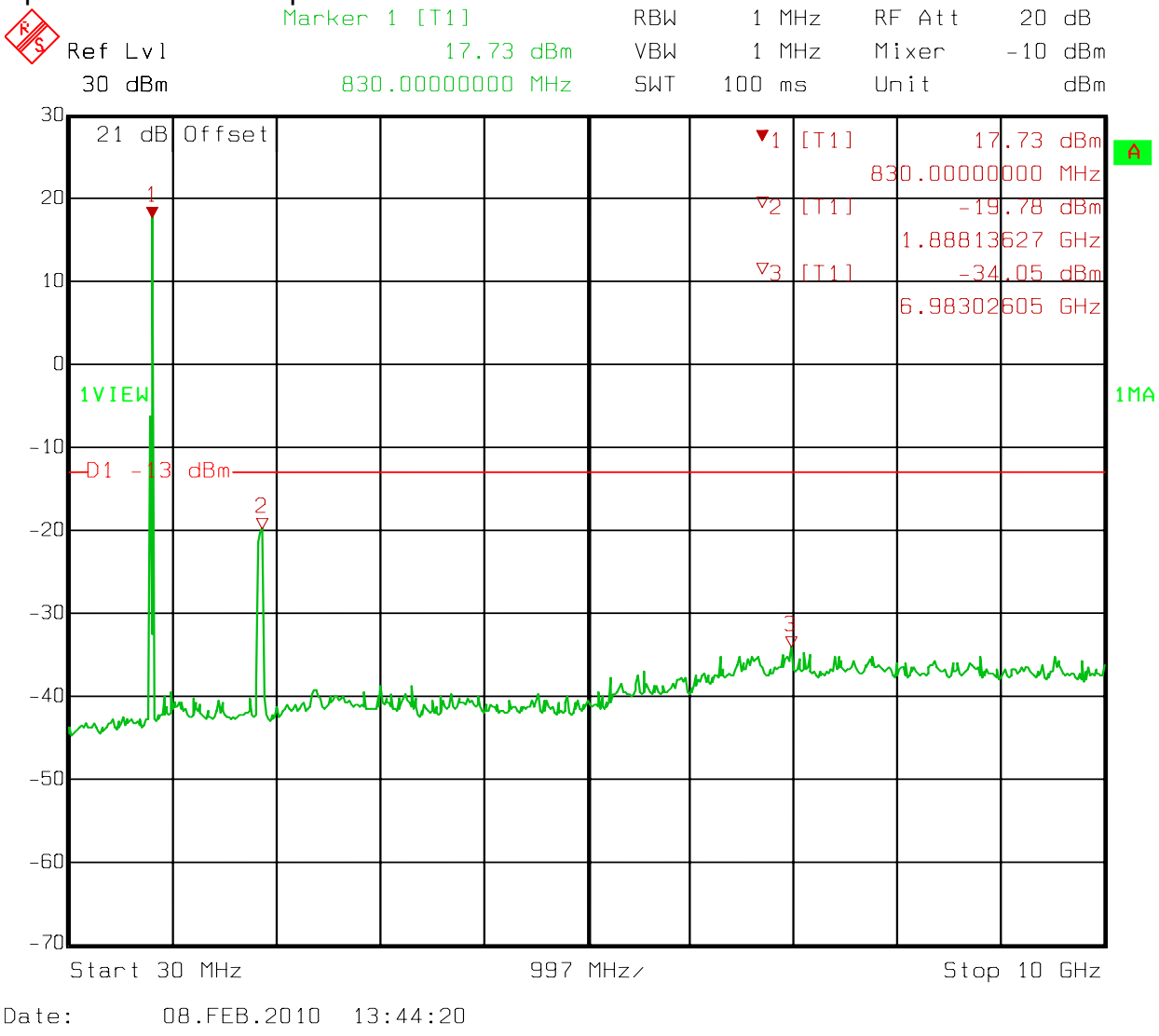
Test Data – Spurious Emissions at Antenna Terminals

Spurs – W-CDMA - Downlink



Test Data – Spurious Emissions at Antenna Terminals

Spurs – W-CDMA - Uplink



Section 5. Test Equipment List

Nemko ID	Description	Manufacturer Model Number	Serial Number	Calibration Date	Calibration Due
1036	SPECTRUM ANALYZER	ROHDE & SCHWARZ FSEK30	830844/006	01/19/09	01/20/11
1082	CABLE 2m	Astrolab 32027-2-29094-72TC	N/A	CBU	N/A
1472	20db Attenuator DC 18 Ghz	Omni Spectra 20600-20db	NONE	CBU	N/A

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:
The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna is fed with a signal at the spurious frequency. The level of the signal is 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 (Input/Output)

Method Of Measurement:

CDMA

Spectrum analyzer settings:
RBW=VBW=30 kHz
Span: 5 MHz
Sweep: Auto

GSM / EDGE

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

TDMA

RBW=VBW= 1 kHz
Span: 1 MHz
Sweep: Auto

W-CDMA

RBW=VBW= 100 kHz
Span: 10 MHz
Sweep: Auto

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:

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 / EDGE

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

TDMA

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

W-CDMA

RBW: 1 MHz (> 1 MHz from Band Edge)
RBW: 100 kHz (< 1MHz from Band Edge)
VBW: ≥ RBW
Sweep: Auto
Video Avg: 6 Sweeps

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.

Method of Measurement TIA/EIA-603-1992

The antenna substitution method is used to determine the equivalent radiated power at spurious frequencies. The spurious emissions are measured at a distance of 3 meters. The EUT is then replaced with a reference substitution antenna with a known gain referenced to a dipole. This antenna is fed with a signal at the spurious frequency. The level of the signal is 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

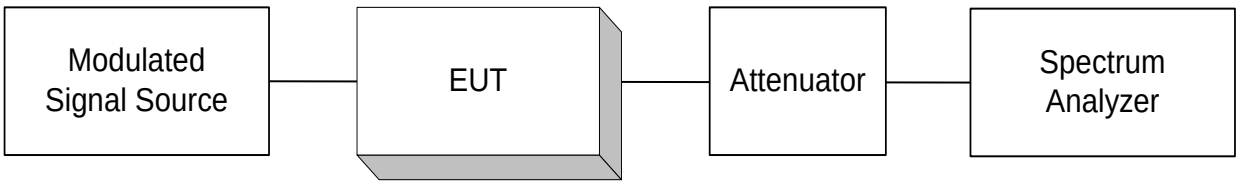
Method Of Measurement:

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.

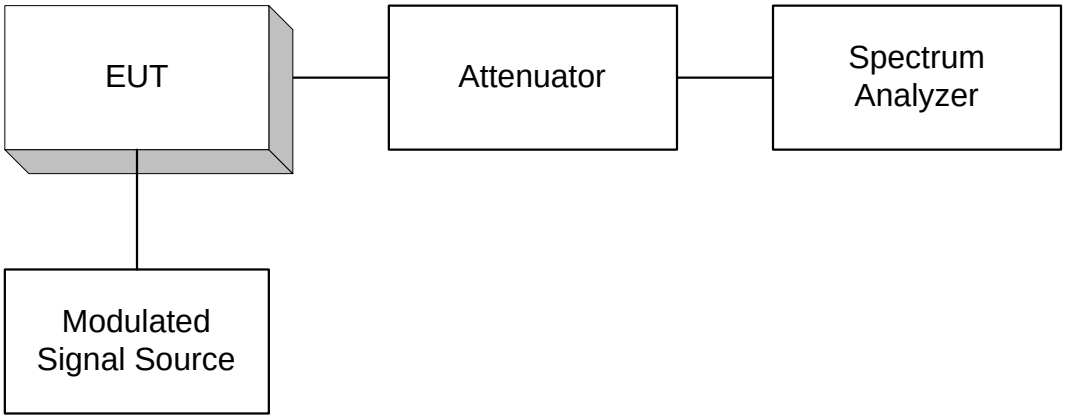
Frequency Stability With Temperature Variation:
The input voltage to the E.U.T. is set to S.T.V. and the temperature of the environmental chamber is varied in 10 degree steps from -30 degrees C to +50 degrees C. The E.U.T. is allowed to stabilize at each temperature and the frequency is measured in 30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

ANNEX B - TEST DIAGRAMS

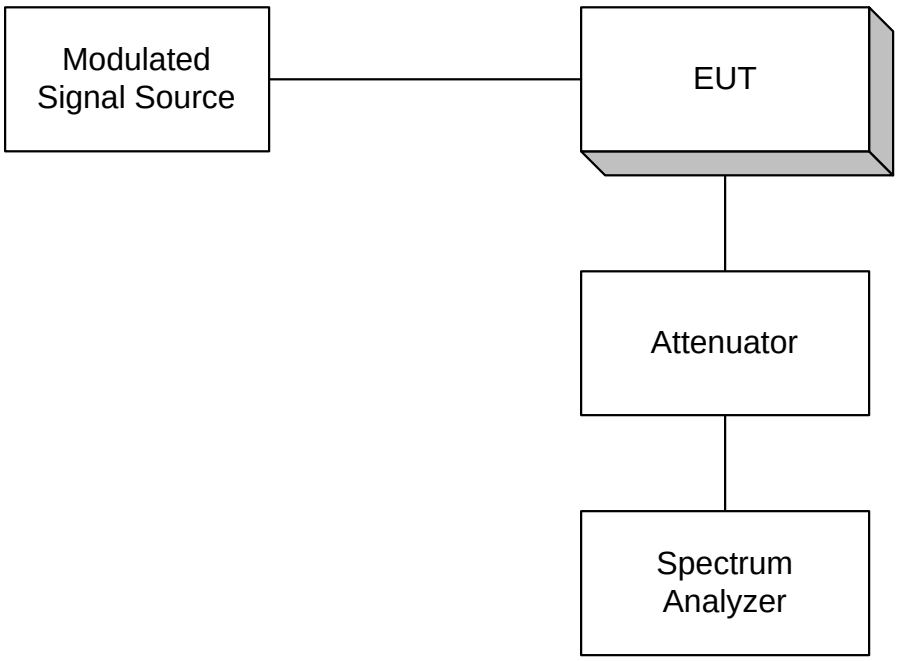
Para. No. 2.1046 - R.F. Power Output



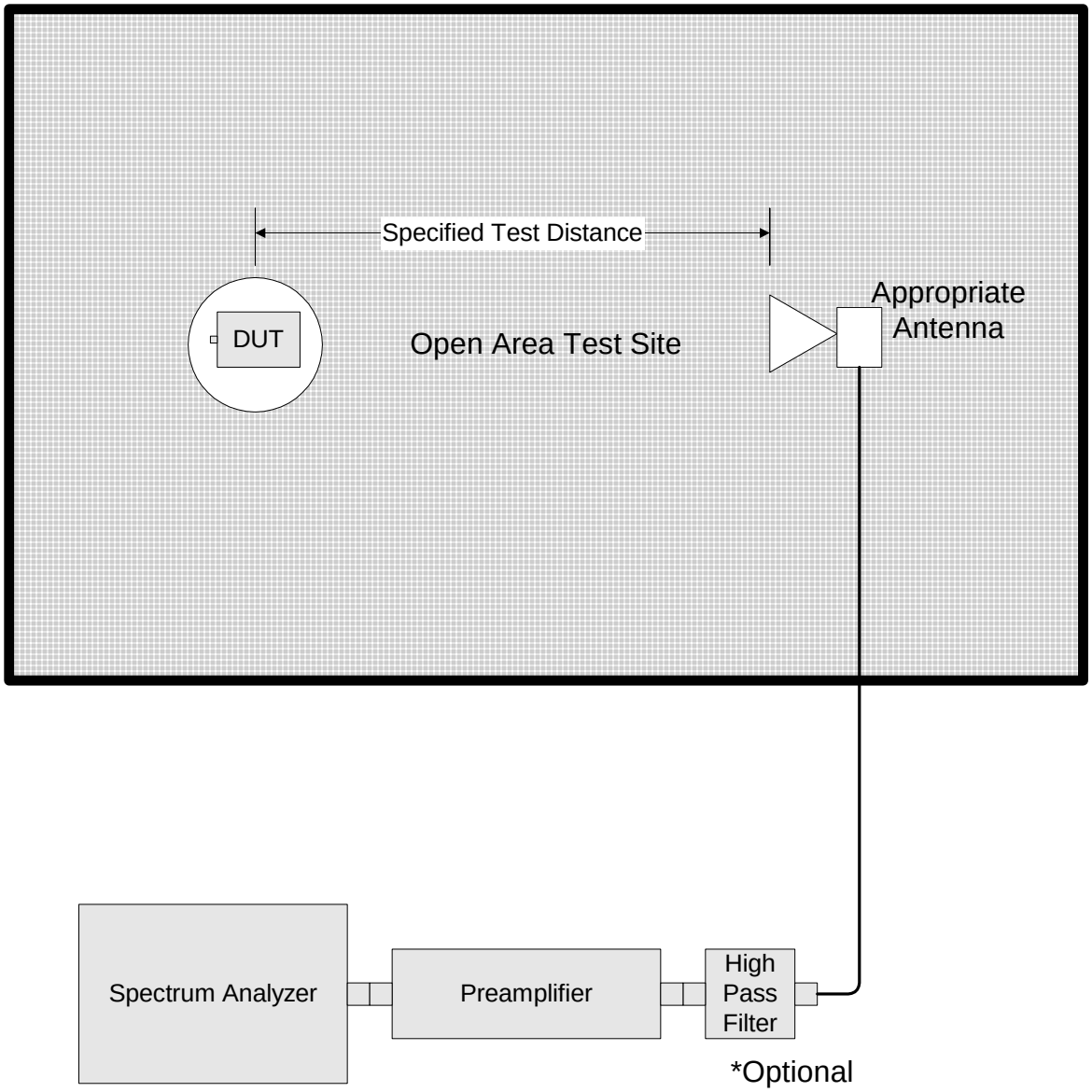
Para. No. 2.1049 - Occupied Bandwidth

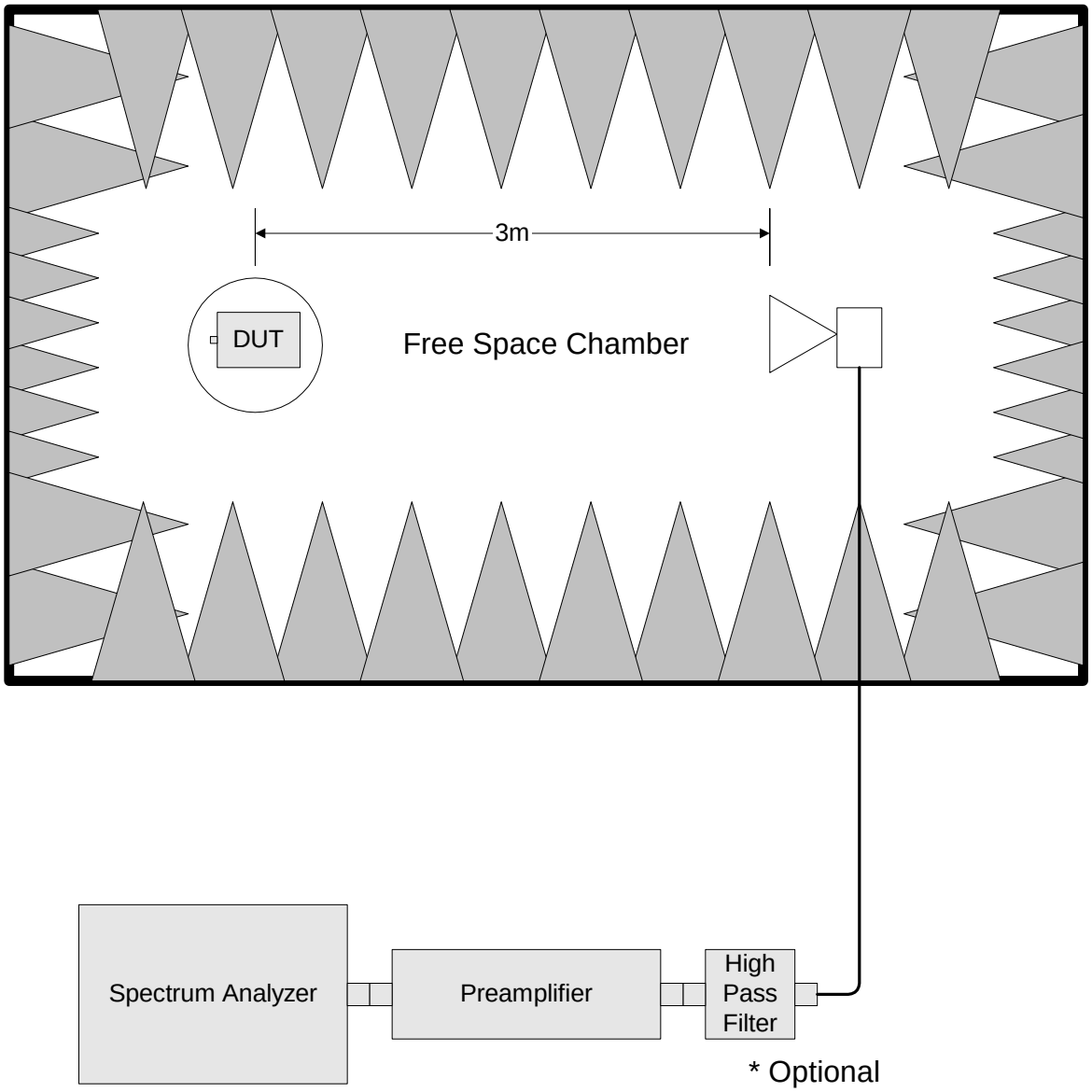


Para. No. 2.1051 Spurious Emissions at Antenna Terminals



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